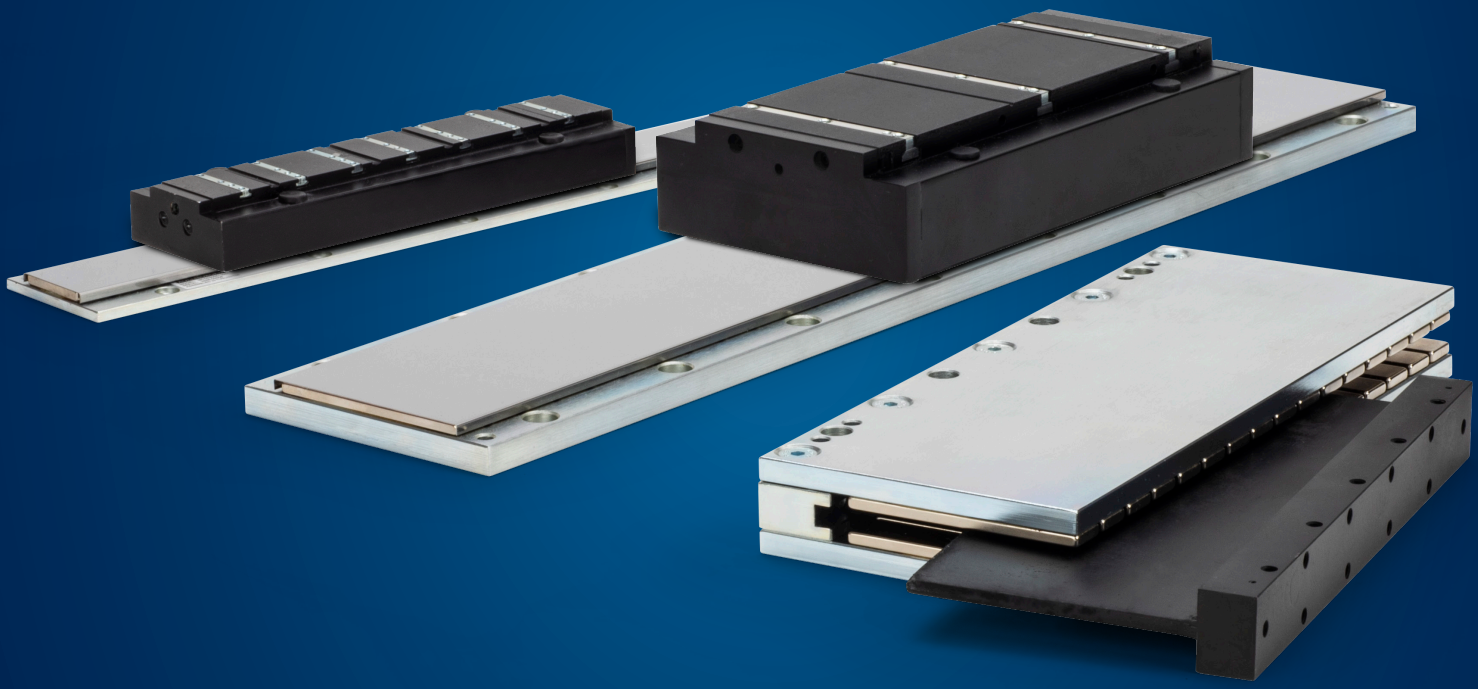
Direct Drive Linear Motor

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.

KOLLMORGEN
A REGAL REXNORD BRAND

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.

Table of Contents

Direct Drive Linear (DDL) Motor

Our direct drive linear motor series provide new dimension in performance with high throughput, accuracy, and zero maintenance.

The product line are frameless, permanent magnet, three phase, brushless servo motors. The DDL product line consists of two fundamental constructions, Ironless (slotless) and Ironcore. Ironless motors have no attractive force between the frameless components and zero cogging for the ultra smooth motion. Ironcore motors provide the highest force per frame size. They feature a anti-cogging design which yields extremely smooth operation. Optional water cooling provides flexibility to increase continuous force in the same profile.

The Benefits of Direct Drive Linear Motor

» **Flexibility and Compatibility for Global Industry Automation Applications**	» Ironcore IC DDL supports 230/400/480 VAC power supply » Ironcore IC and Ironless IL DDL fits CE, UL, RoHS and Reach certifications » Ironcore ICD DDL provides a compact profile. Ironless IL DDL provides zero cogging for high dynamic advantages. Both work at 230 VAC power supply. » Premium performance achieved with Kollmorgen AKD/AKD2G servo drives. The time and frequency domain tuning tools provide premium and stable performance.
» **Zero Maintenance with Greater Accuracy and Higher Bandwidth**	» Smoother velocity and reduced audible noise » Power transmission without backlash » Transmission elements such as couplings, toothed belts, ball/lead screws, rack & pinions, and other fitted components can be eliminated » No gears or screws, no lubrication required » Improved machine reliability
» **Wide Range of Sizes and Force to Cover any Linear Application**	» Increased performance for the entire system » Flat, compact drive solution » Easily mix / match motors and drives » Real-life acceleration up to 10 G
» **Simplified, High Force Permanent Magnet Design**	» Higher bandwidth and faster response than ball/lead screws or rack & pinion solutions » Rapid indexing of heavy loads with peak force up to 12,705 N (2,856 lb_f) » Reduced audible noise, fewer parts and lower cost of ownership » More compact machine design

Direct Drive Linear (DDL) Motor

Kollmorgen Direct Drive Linear DDL Motor Series

Kollmorgen supplied its first linear motors in the late 1970's for use in precision X-Y tables and coating systems. These were brush DC motors using the Kollmorgen push-through commutator bar method. This led to development in the early 1980's of the brushless versions of the linear motor which were used in film processing applications where smooth, high stiffness, linear motion was required. During the past 30 years, advances in permanent magnet material, power semiconductors, and microprocessor technology have been the enablers for increased performance and lower costs for linear motors.

DDL motors series comply with the Low Voltage Directive 73/23/EEC for installation in a machine. Safety depends upon installing and configuring motor per the manufacturer's recommendations. The machine in which this product is to be installed must conform to the provisions of EC directive 89/336/EEC. The installer is responsible for ensuring that the end product complies with all the relevant laws in the country where the equipment is installed.

Standard Product Features

Ironless:

» Peak force 30 to 1600 N (6.7 to 360 lb_f)
» Continuous force 10 to 262 N (2.3 to 59 lb_f)
» Zero cogging
» Zero attractive force
» Smooth motion for speed as low as 1 micron/second (0.00004 in/sec)
» Low mass coil assembly for high acceleration

Ironcore:

» Natural-cooled IC series:
  Peak Force: 369 to 13448 N (83 to 3023 lb_f)
  Continuous Force: 140 to 5834 N (31.5 to 1312 lb_f)
» Water-cooled IC series:
  Peak Force: 384 to 12705 N (86 to 2856 lb_f)
  Continuous Force: 251 to 8211 N (56 to 1846 lb_f)
» ICD series:
  Peak force: 165 to 1099 N (38 to 254 lb_f)
  Continuous: 57.0 to 315 N (12.8 to 70.8 lb_f)
» Anti-cogging technique for minimal cogging without magnet skewing
» High motor constant (Km)
» High force density
» ICD series advantage:
  • Very low profile
  • Low attraction force
  • Suitable to replace many Ironless applications

All Motors:

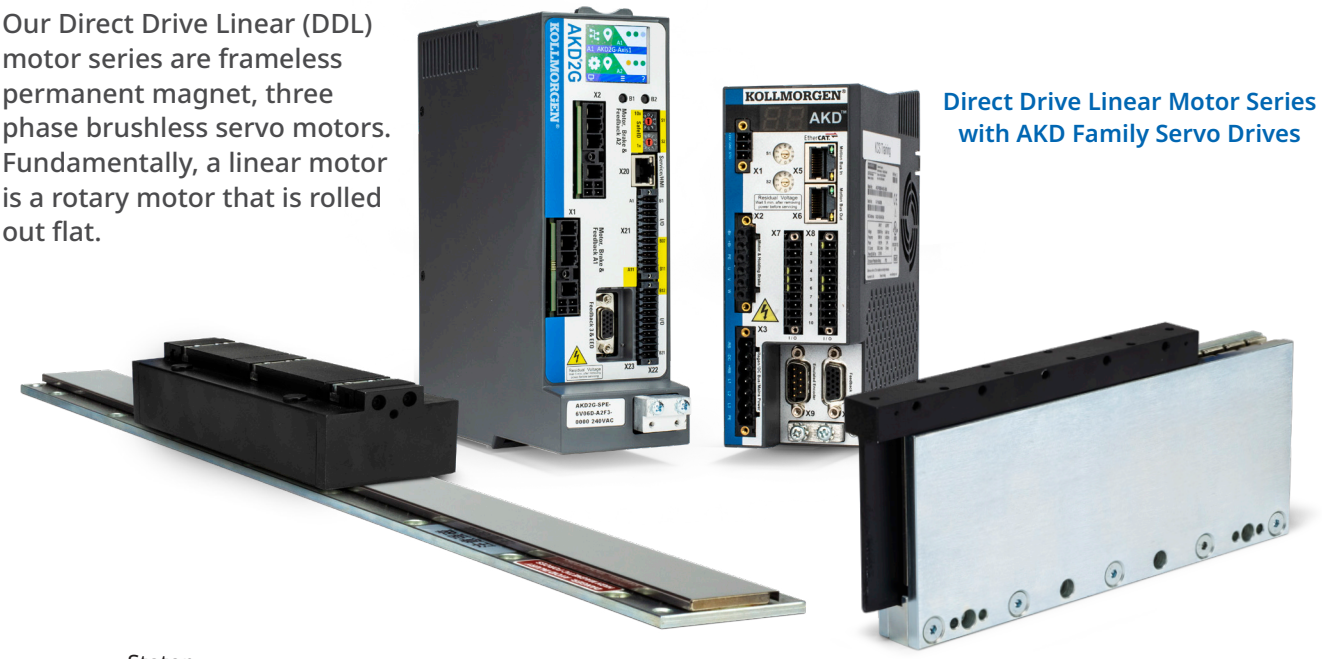
» Zero contact, zero maintenance, brushless design
» 3 phase sinusoidal commutation
» Peak accelerations easily above 10 G
» High position accuracy and resolution
» Very low settling time
» Low thermal losses
» Modular magnet design

Standard Options:

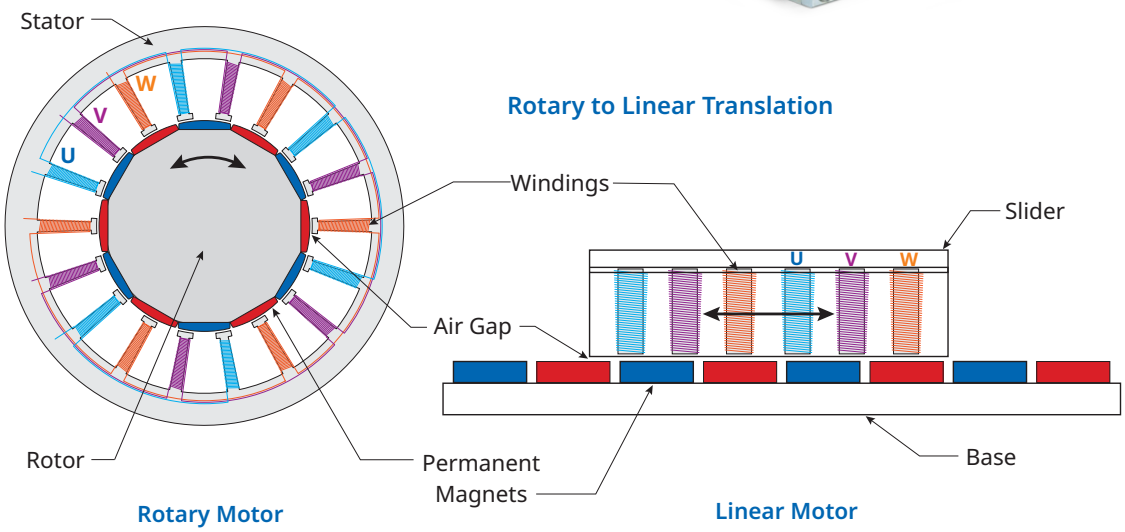
» Hall effect feedback
» Thermal protection
  • Thermistor (PTC)
  • Thermostat (Thermal switch) (Ironcore)
  • PT1000 (Ironcore)
» Supplemental air or water cooling (Ironcore)
» Magnet way covers for easy cleaning (Ironcore)

Kollmorgen Direct Drive Linear DDL Servo Motors

Our Direct Drive Linear (DDL) motor series are frameless permanent magnet, three phase brushless servo motors. Fundamentally, a linear motor is a rotary motor that is rolled out flat.



Direct Drive Linear Motor Series with AKD Family Servo Drives



Rotary to Linear Translation

Rotary Motor Rolled Out Flat

The two primary components of permanent magnet brushless rotary motors are the stator (primary coils) and the rotor (secondary or rotating magnets). In brushless linear motors the rotor is rolled out flat to become the magnet track (also called the magnet way). The primary coils of the rotary motor are rolled out flat to become the coil assembly (also sometimes called the slider).

In most brushless linear motor applications it is typical for the magnet way to be stationary and the coil assembly to be in motion, because of the relative masses of the two components. But it is also perfectly acceptable and sometimes advantageous to reverse this arrangement. The basic electromagnetic operating principles are the same in either case and are identical to those of a rotary motor.

Direct Drive Linear (DDL) Motor

Direct Drive Linear Motor Options

Two types of linear motors are available, **Ironcore** and **Ironless**. Each one provides characteristics and features that are optimal depending upon the application. Ironcore motors have coils wound on silicon steel laminations, to maximize the generated force, with a single sided magnet way.

Using an electromagnetic design, Ironcore DDL linear motors have the highest rated force per size, a high Km motor constant (equals low thermal losses), and low cogging forces without the need for skewing of the magnets. The high thrust forces possible with these motors make them ideal for accelerating and moving high masses, and maintaining stiffness during machining or process forces.

Ironless motors have no iron, or slots for the coils to be wound on. Therefore, these motors have zero cogging, a very light mass, and absolutely no attractive forces between the coil assembly and the magnet way. These characteristics are ideal for applications requiring very low bearing friction, high acceleration of lighter loads, and for maximizing constant velocity, even at ultra low speeds. The modular magnet ways consists of a double row of magnets to maximize the generated thrust force and to provide a flux return path for the magnetic circuit.

Ironcore Motor

Ironless Motor

Feedback Types

All brushless motors require feedback for commutation. The conventional rotary motor typically utilizes a resolver mounted on the rear of the motor or Hall effect devices mounted integrally in the coil windings. For a linear motor, commutation feedback can also be accomplished with a variety of methods. Digital or linear Hall effect devices are available from Kollmorgen for the DDL motor series which allow the drive electronics to commutate the linear motors in a manner identical to rotary motors.

For exceptionally smooth motion requirements, sinusoidal drive electronics such as the Kollmorgen's AKD series, using digital Hall effects, provide sinusoidal drive currents to the motor for the best constant force and velocity performance. As an alternative, it is typical for linear motor applications to have a linear encoder present in the system for position feedback. It is increasingly common today for drive amplifiers, such as the AKD digital amplifier, to derive the necessary commutation information directly from this linear encoder, either with or without supplemental digital Hall effect devices on startup. Other types of feedback used on linear motor applications include linear Inductosyns, laser interferometers, and LVDT.

Advantages

Wide Speed Range

Since the frameless parts of the linear motor are non-contact, and no limitations of a mechanical transmission are present, both very high speeds and very low speeds are easily obtainable. Speeds are truly not limited by the motor. Instead, by eliminating the mechanical transmission, speed becomes limited by other elements in the system such as the linear bearings, and the achievable bandwidth from any feedback devices. Application speeds of greater than 5 meters per second (200 in./sec.) or less than 1 micron per second (.00004 in./sec.) are typically achievable. In comparison, mechanical transmissions such as ball screws are commonly limited to linear speeds of 0.5 to 0.7 meters per second (20-30 in./sec.) because of resonances and wear. In addition to a wide speed range, linear motors, both ironcore and ironless, have excellent constant velocity characteristics, typically better than ± 0.01% speed variation.

High System Dynamics

In addition to high speed capability, direct drive linear motors are capable of very high accelerations. Limited only by the system bearings, accelerations of 3 to 5 G are quite typical for the larger motors and accelerations exceeding 10 G are easily achievable for smaller motors.

Easy Selection Process:

1. Determine peak and continuous force required for your applications (see the Application Sizing section) or use MOTIONEERING, our online sizing and selection tool)
2. Use the DDL Performance Summary tables to choose your motor
3. Refer to the appropriate DDL performance data, performance curves, and dimensional drawings for technical details
4. Build a model number for ordering using the Nomenclature section

Smooth Operation and Positional Accuracy

Both ironless and ironcore motors exhibit very smooth motion profiles due to the inherent motor design of Kollmorgen's DDL series. Cogging, which is a component of force, is greatly reduced in the ironcore designs and is zero in the ironless designs. As a result, these direct drive linear motors provide very low force and velocity ripple for ultra smooth motion. Positioning accuracies are limited only by the feedback resolution, and sub-micron resolutions are commonly achievable.

Unlimited Travel

With the DDL motor series, magnet ways are made in 5 modular sections: 64 mm, 128 mm, 256 mm, and 512 mm long. Each module can be added in unlimited numbers to any other module to allow for unlimited travel. Whether the travel required is 1 mm (0.04 inches) or 100 meters (330 feet), the DDL series can accommodate the need.

No Wear or Maintenance

Linear motors have few components, therefore the need for ball screw components such as nuts, bearing blocks, couplings, motor mounts and the need to maintain these components have been eliminated. Very long life and clean operation, with no lubrication or maintenance of these parts are the result.

Integration of Components is Much Simpler

Frameless linear motors require much fewer components than rotary motors with mechanical transmissions. A 0.8 mm air gap (0.031 inches) for the ironcore design and 0.5 mm air gap (0.020 inches) for the ironless design is the only alignment of the frameless linear motor components that is necessary. No critical alignments are required as with ball screws. Straightness of travel as provided by the system linear bearings is more than sufficient for the Kollmorgen linear motors.

Typical Applications for Linear Motors Include:

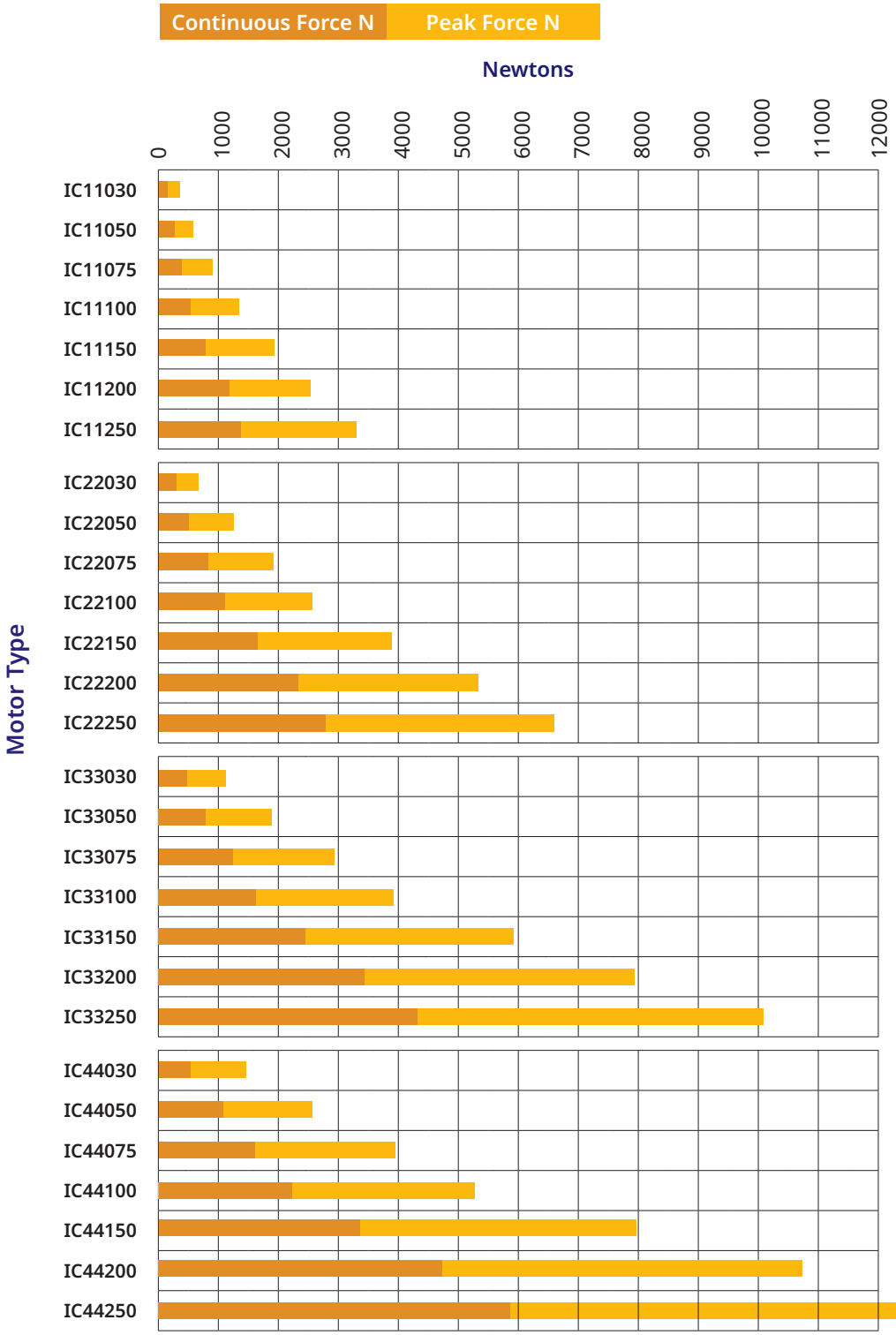
Machine Tool
Drilling
Milling
Grinding
Laser cutting
Cam grinding
Semiconductor
Wafer handling process
Wafer-inspection
Wafer slicing
Tab bonding
Wire bonding
Ion implantation
Lithography
Battery stacking
Battery welding
Battery packaging
Solar panel silk printing
Textile
Carpet tufting
Measurement/inspection
Coordinate measurement machines
Electronic assembly
Pick-and-place machines
Component insertion
Screen printers
Adhesive dispensers
PC board inspection, drilling

Other applications include:
Flight simulators
Acceleration sleds
G-Force measurement

Direct Drive Linear (DDL) Motor

DDL Performance Summary

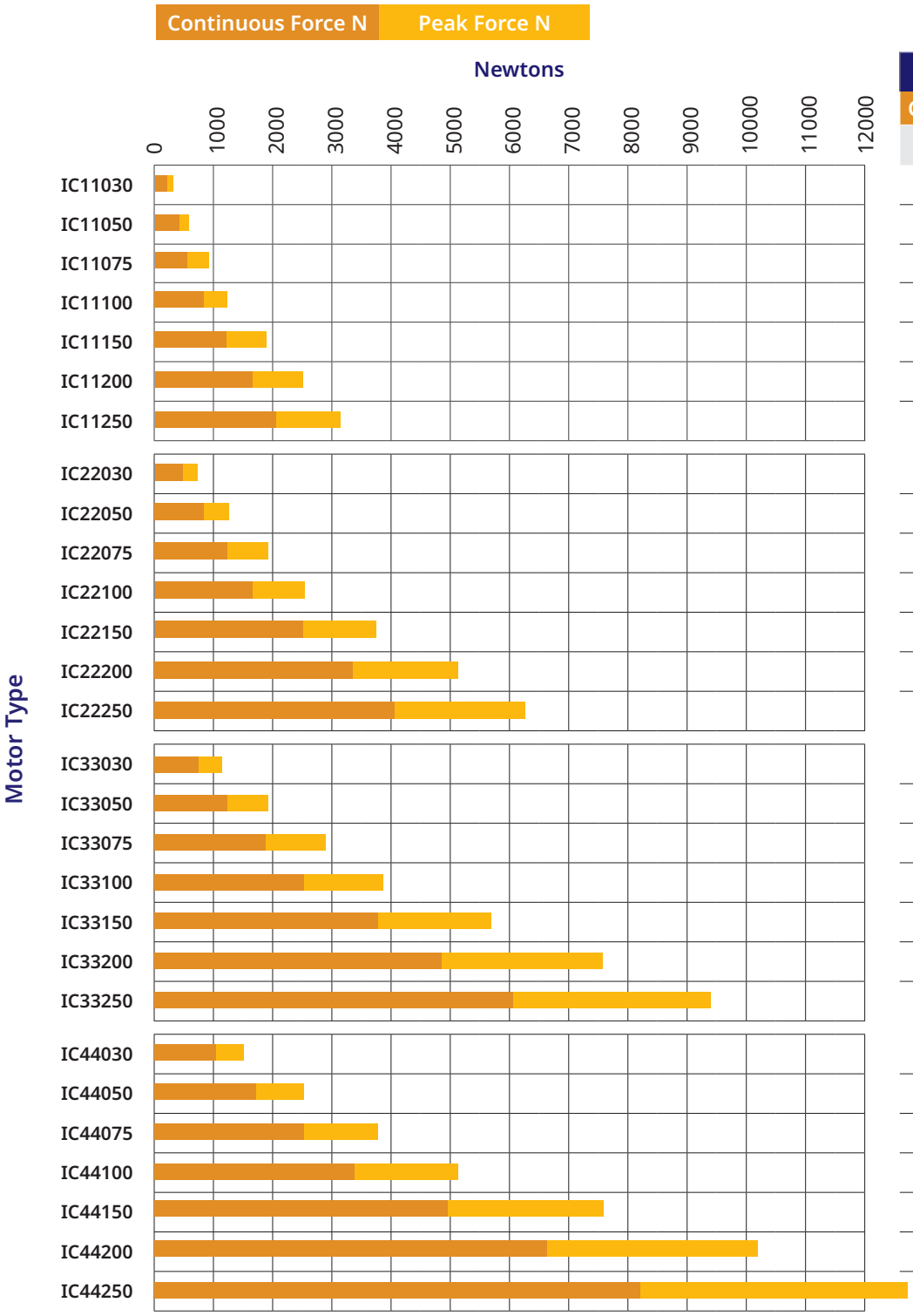
Ironcore Linear Motors – 230/400/480 Vac (Natural-Cooled)



	Max. Force (N)			
	Continuous		Peak	
	N	(lbf)	N	(lbf)
IC11030	140	31.5	369	83
IC11050	256	58	642	144
IC11075	402	90	982	221
IC11100	554	125	1324	298
IC11150	837	188	1991	448
IC11200	1163	188	2688	604
IC11250	1434	322	3344	752
IC22030	283	64	741	167
IC22050	512	115	1285	289
IC22075	802	180	1960	441
IC22100	1112	250	2650	596
IC22150	1656	372	3963	891
IC22200	2286	514	5347	1202
IC22250	2806	631	6646	1494
IC33030	424	95	1113	250
IC33050	774	174	1935	435
IC33075	1224	275	2957	665
IC33100	1654	372	3963	891
IC33150	2486	559	5949	1337
IC33200	3486	784	7991	1796
IC33250	4311	969	10042	2258
IC44030	568	128	1487	334
IC44050	1028	231	2573	578
IC44075	1609	362	3928	883
IC44100	2186	491	5273	1185
IC44150	3353	754	7967	1791
IC44200	4649	1045	10750	2417
IC44250	5834	1312	13448	3023

Note: Performance data summarized here represents motor data only. For system performance data with Kollmorgen drives use the Motioneering Application Engine sizing software found here: https://motioneering.kollmorgen.com

Ironcore Linear Motors – 230/400/480 Vac (Water-Cooled)

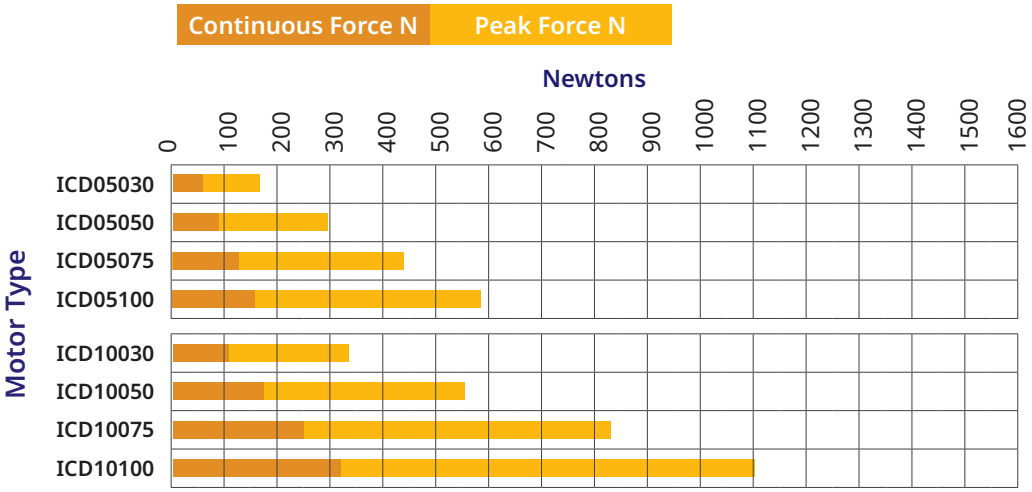


Motor Type	Max. Force (N)			
	Continuous		Peak	
	N	(lbf)	N	(lbf)
IC11030	251	56	385	87
IC11050	418	94	641	144
IC11075	626	141	961	216
IC11100	820	184	1270	286
IC11150	1262	284	1929	434
IC11200	1655	372	2552	572
IC11250	2013	453	3141	706
IC22030	512	115	777	175
IC22050	841	189	1286	289
IC22075	1252	281	1922	432
IC22100	1664	374	2558	575
IC22150	2493	560	3834	862
IC22200	3333	749	5119	1151
IC22250	4012	902	6270	1410
IC33030	761	171	1160	261
IC33050	1259	283	1927	433
IC33075	1877	422	2881	648
IC33100	2513	565	3851	866
IC33150	3729	838	5741	1291
IC33200	4979	1119	7664	1723
IC33250	6021	1354	9411	2116
IC44030	1019	229	1551	349
IC44050	1678	377	2567	577
IC44075	2500	562	3839	863
IC44100	3352	754	5134	1154
IC44150	4992	1122	7671	1725
IC44200	6673	1500	10238	2302
IC44250	8211	1846	12705	2807

Note: Performance data summarized here represents motor data only. For system performance data with Kollmorgen drives use the Motioneering Application Engine sizing software found here: https://motioneering.kollmorgen.com

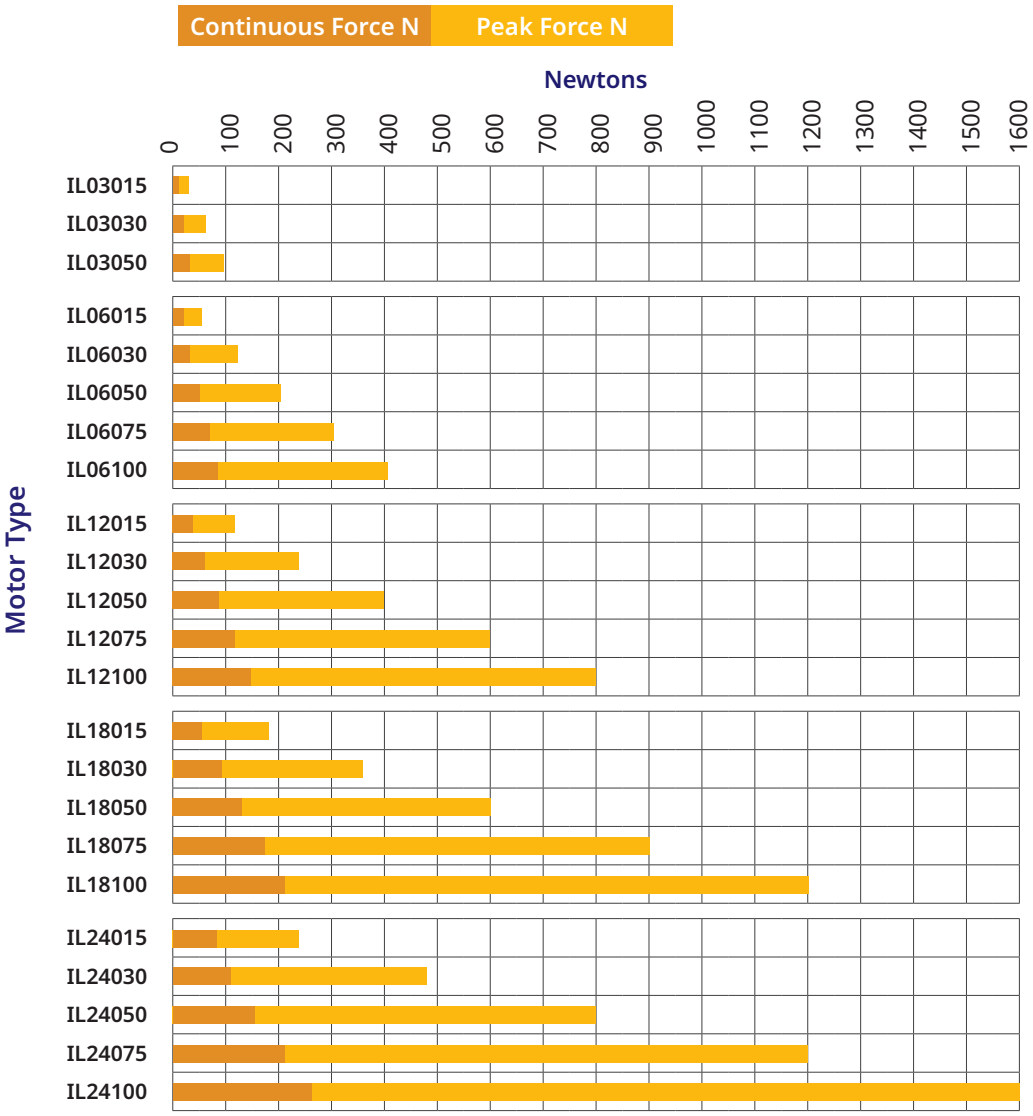
Direct Drive Linear (DDL) Motor

ICD Linear Motors 230 Vac



Motor Type	Max. Force (N) Continuous N	Continuous (lbf)	Peak N	Peak (lbf)
ICD05030	57.0	12.8	165	37.1
ICD05050	87.0	19.6	295	66.3
ICD05075	125	28.1	441	99.1
ICD05100	157	35.3	588	132
ICD10030	104	23.4	330	74.2
ICD10050	171	38.4	550	124
ICD10075	246	55.3	824	185
ICD10100	315	70.8	1099	247

Ironless Linear Motors 230 Vac



Motor Type	Max. Force (N) Continuous N	Continuous (lbf)	Peak N	Peak (lbf)
IL03015	10	2.25	30	6.74
IL03030	19	4.27	60	13.5
IL03050	31	6.97	100	22.5
IL06015	21	4.72	60	13.5
IL06030	30.3	6.81	120	27.0
IL06050	49.7	11.2	200	45.0
IL06075	67.6	15.2	300	67.4
IL06100	82.8	18.6	400	89.9
IL12015	41	9.22	120	27.0
IL12030	62.1	14.0	240	54.0
IL12050	88.4	19.9	400	89.9
IL12075	119	26.8	600	135
IL12100	148	33.3	800	180
IL18015	62	13.9	180	40.5
IL18030	92.1	20.7	360	80.9
IL18050	131	29.4	600	135
IL18075	173	38.9	900	202
IL18100	211	47.4	1200	270
IL24015	83	18.7	240	54.0
IL24030	109	24.5	480	108
IL24050	155	34.8	800	180
IL24075	211	47.4	1200	270
IL24100	262	58.9	1600	360

Note: Performance data summarized here represents motor data only. For system performance data with Kollmorgen drives use the Motioneering Application Engine sizing software found here: https://motioneering.kollmorgen.com

Model Nomenclature

Direct-Drive Linear Motor Coil Model Nomenclature

IL 06 030 A1 AC TR C1 - XXX

Coil Type
IL Ironless
ICD Low Profile Ironcore
IC Ironcore

Coil Series
03 03 Series Ironless
06 06 Series Ironless
12 12 Series Ironless
18 18 Series Ironless
24 24 Series Ironless
05 05 Series ICD
10 10 Series ICD
11 11 Series Ironcore
22 22 Series Ironcore
33 33 Series Ironcore
44 44 Series Ironcore

Magnetic Way
015 15 (IL Only)
030 30
050 50
075 75
100 100
150 150 (IC Only)
200 200 (IC Only)
250 250 (IC Only)

Winding Coil
A1, A2, A3, A4 — Y "Wye" Windings
A5, A6, A7, A8 — △ "Delta" Windings
AS — Alternate Windings
Three-digit suffix shown in Options field

Options
Omit field for standard configurations
001, 002, 003...

Terminal Options
Cx – Motor cable and thermal cable with flying leads:
C1 400 mm (16")
C4 1200 mm (48")
CS Alternate cable length
Three-digit suffix shown in Options field

Thermal Protection / Monitoring Option
TS Thermostat (Thermal switch) (IC only)
TR PTC (IC, ICD, IL)
T1 PT1000 (Linear Type) (IC Only)

Cooling Options (IC Only)
AC Water Cooling
If Natural Cooling, leave blank

Example: IL06030A1TRC1
Ironless 6 Series motor coil, 30 width,
A1 winding designation terminated with 16" cable with flying leads

Model Nomenclature

Direct-Drive Linear Motor Magnetic Way Model Nomenclature

MW 030 L 0128 - XXX

Magnetic Way Type

MW	Ironless
MCD	ICD
MC	Ironcore

Magnetic Way Width

015	15 (IL only)	100	100
030	30	150	150 (IC only)
050	50	200	200 (IC only)
075	75	250	250 (IC only)

Magnetic Way Option

L	Low Profile (030 & 050 Ironless only)
T	Thinner (015 Ironless only)
blank	Standard assemblies or Ironcore

Customization

001	With stainless cover (IC, ICD)
XXX	Customization

Magnetic Assembly Way Length

0064	64 mm
0128	128 mm
0256	256 mm
0512	512 mm

Magnetic Way Height (IC/ICD)

	No Cover	With Cover
030 - 100	14.1 mm	14.35 mm
150 - 250	16.1 mm	16.35 mm

Cover is 0.25 mm (0.01 in) thick

Example: MW0300128
Ironless magnet way, 30 magnet width, 128 assembly length (IC/ICD).

Direct-Drive Linear Motor Hall Effect Assembly Model Nomenclature

HSIL 100 - XX

Hall Effect

HSIC	Digital for Ironcore (Microswitch SS461A)
HSIL	Digital for Ironless (Microswitch SS461A)

Terminal Option

C1	400 mm (16") Shielded cable with flying leads
P1	400 mm (16") Shielded cable with connector

Winding Code

100	A1, A2, A3, A4
200	A5, A6, A7, A8

Example: HSIL100-C1
Hall effect assembly with digital outputs for Ironless motor terminated with 400 mm cable.

IC Ironcore DDL Motors

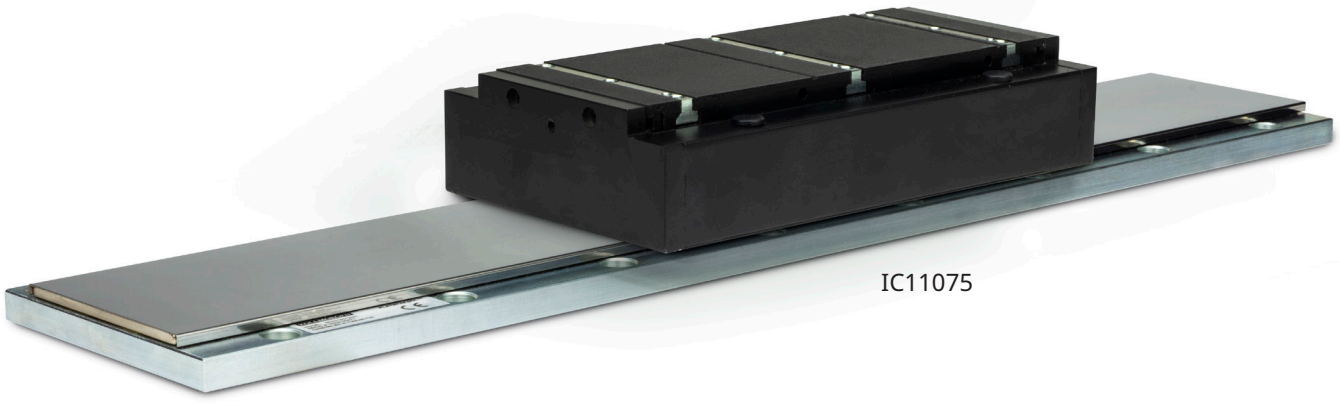
IC Ironcore Natural- and Water-cooled DDL Motors

Ironcore DDL linear motors have the highest rated force per size, a high Km motor constant (equals low thermal losses), and low cogging forces without the need for skewing of the magnets. The high thrust forces possible with these motors make them ideal for accelerating and moving high masses, and maintaining stiffness during machining or process forces.

General Specifications

» Coil frame size 11, 22, 33, 44
» Coil width 030, 050, 075, 100, 150, 200, 250
» Low and high-speed coil winding designs fit various application needs
» Water cooling increased continuous force output in the same profile
» Low cogging electrical magnetic design for smooth force output

	IC11/22/33/44
Peak force range	369 – 13448 N (83 - 3023 lb_f)
Continuous force range	140 – 8211 N (31.5 - 1846 lb_f)
Insulation voltage rating	230/400/480 VAC
Cooling options	Natural-cooling and water-cooling
Feedback	Optional hall sensor
Thermal Devices	Thermostat Thermistor – PTC Thermistor – PT-1000
Certification	UL, CE, RoHS, REACH



IC11075

IC Ironcore DDL Motors

IC11 Ironcore Natural-Cooled Motors Series Performance Data

		Symbol	Tol	Units	IC11-030		IC11-050		IC11-075		IC11-100	
Winding Code ②					A1	A5	A1	A5	A1	A5	A1	A5
Rated Performance												
Max Rated Voltage		Un		VAC	480	230	480	400	480	480	480	480
Max Continuous Force @ Tmax ① ⑤		Fc		N	140		256		402		554	
				lbf	31.5		58		90		125	
Motor constant		Km		N/√W	20.9		29.9		38.7		45.8	
Continous Current @ Tmax		Ic		Arms	3.97	6.9	4.35	7.5	4.56	7.9	4.71	8.2
230 VAC	Peak Force @ Tmax ⑤	Fp		N	369	369	641	642	982	980	1324	1323
				lbf	83	83	144	144	221	220	298	297
	Peak Current @ Tmax ⑤	Ip		Arms	13.9	24.0	15.2	26.4	16.0	27.6	16.5	28.5
	Rated force @ Speed ⑤	Frtd		N	129	112	246	230	394	380	547	534
				lbf	29	25.2	55	52	89	85	123	120
	Rated Speed	Nrtd		m/s	8.4	13.5	4.86	8.7	3.15	5.7	2.25	4.14
400 VAC	Peak Force @ Tmax ⑤	Fp		N	369	-	641	642	982	980	1324	1323
				lbf	83	-	144	144	221	220	298	297
	Peak Current @ Tmax ⑤	Ip		Arms	13.9	-	15.2	26.4	16.0	27.6	16.5	28.5
	Rated force @ Speed ⑤	Frtd		N	112	-	229	189	380	336	534	496
				lbf	25.2	-	51	42.5	85	76	120	112
	Rated Speed	Nrtd		m/s	13.5	-	8.8	13.5	5.8	10.3	4.23	7.6
480 VAC	Peak Force @ Tmax ⑤	Fp		N	369	-	641	-	982	980	1324	1323
				lbf	83	-	144	-	221	220	298	297
	Peak Current @ Tmax ⑤	Ip		Arms	13.9	-	15.2	-	16.0	27.6	16.5	28.5
	Rated force @ Speed ⑤	Frtd		N	109	-	217	-	370	302	526	470
				lbf	24.5	-	48.8	-	83	68	118	106
	Rated Speed	Nrtd		m/s	13.5	-	10.7	-	6.9	12.5	5.1	9.2
Electrical Specifications ②												
Electrical Resistance @ 25°C L-L		Rm	±10%	Ohms	1.95	0.66	2.68	0.9	3.6	1.21	4.51	1.51
Electrical Inductance L-L		L	±20%	mh	17.8	5.9	28.0	9.3	40.8	13.6	54	17.8
Force Constant @ 25°C		Kf	±10%	N/Arms	35.8	20.7	60	34.5	90	52	119	69
				lbf/Arms	8	4.65	13.5	7.8	20.2	11.7	26.8	15.5
Back EMF Constant @ 25°C L-L		Ke	±10%	Vpeak/m/s	29.3	16.9	48.8	28.2	73	42.2	98	56
				Vpeak/in/sec	0.74	0.43	1.24	0.72	1.86	1.07	2.48	1.43
Figures of Merit and Additional Data												
Electrical Time Constant		Te		ms	9.1		10.4		11.3		11.9	
Max. Theoretical Acceleration ③		Amax		g's	15.1		18.2		20.1		20.8	
Magnetic Attraction		Fa		kN	1.4		2.4		3.7		4.9	
				lbf	315		540		832		1102	
Thermal Resistance ④		Rthw-a		°C/Watt	1.64		0.99		0.67		0.5	
Max. Allowable Coil Temp. ④		Tmax		°C	130							
Mechanical Specifications												
Coil Assembly Weight		Mc	±15%	kg	2.5		3.6		5		6.5	
				lbs	5.5		7.9		11		14.3	
Magnet Way Type (MCxxx)					**030**		**050**		**075**		**100**	
Magnet Way Weight		Mw	±15%	kg/m	5.4		7.5		10.1		12.7	
				lbs/in	0.302		0.42		0.57		0.71	

Notes:

① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.

② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.

③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.

④ Please see the application sizing section for more details on sizing and thermal considerations.

⑤ All data referenced to sinusoidal commutation

IC11 Ironcore Natural-Cooled Motors Series Performance Data (Continued)

		Symbol	Tol	Units	IC11-150		IC11-200		IC11-250	
	Winding Code ②				A1	A5	A1	A5	A1	A5
	Rated Performance									
	Max Rated Voltage	Un		VAC	480	480	480	480	480	480
	Max Continuous Force @ Tmax ① ⑤	Fc		N	837		1163		1434	
				lbf	188		261		322	
	Motor constant	Km		N/√W	58		68		77	
	Continous Current @ Tmax	Ic		Arms	4.74	8.2	4.9	8.6	4.87	8.5
230 VAC	Peak Force @ Tmax ⑤	Fp		N	1990	1991	2687	2688	3336	3344
				lbf	447	448	604	604	750	752
	Peak Current @ Tmax ⑤	Ip		Arms	16.6	28.8	17.3	30.0	16.9	29.5
	Rated force @ Speed ⑤	Frtd		N	832	820	1158	1150	1429	1421
				lbf	187	184	260	259	321	319
	Rated Speed	Nrtd		m/s	1.35	2.70	0.99	1.89	0.72	1.44
400 VAC	Peak Force @ Tmax ⑤	Fp		N	1990	1991	2687	2688	3348	3344
				lbf	447	448	604	604	753	752
	Peak Current @ Tmax ⑤	Ip		Arms	16.6	28.8	17.3	30.0	17.1	29.5
	Rated force @ Speed ⑤	Frtd		N	820	789	1150	1121	1421	1398
				lbf	184	177	259	252	319	314
	Rated Speed	Nrtd		m/s	2.70	4.95	1.89	3.60	1.44	2.79
480 VAC	Peak Force @ Tmax ⑤	Fp		N	1990	1991	2687	2688	3348	3344
				lbf	447	448	604	604	753	752
	Peak Current @ Tmax ⑤	Ip		Arms	16.6	28.8	17.3	30.0	17.1	29.5
	Rated force @ Speed ⑤	Frtd		N	813	768	1143	1103	1416	1381
				lbf	183	173	257	248	318	310
	Rated Speed	Nrtd		m/s	3.33	6.0	2.34	4.41	1.80	3.42
	Electrical Specifications ②									
	Electrical Resistance @ 25°C L-L	Rm	±10%	Ohms	6.3	2.12	8.2	2.74	10.0	3.35
	Electrical Inductance L-L	L	±20%	mh	79	26.4	105	34.9	130	43.4
	Force Constant @ 25°C	Kf	±10%	N/Arms	179	103	239	138	299	172
				lbf/Arms	40.2	23.2	54	31	67	38.7
	Back EMF Constant @ 25°C L-L	Ke	±10%	Vpeak/m/s	146	84	195	113	244	141
				Vpeak/in/sec	3.71	2.14	4.95	2.86	6	3.57
	Figures of Merit and Additional Data									
	Electrical Time Constant	Te		ms	12.5		12.8		13	
	Max. Theoretical Acceleration ③	Amax		g's	21.6		22.3		22.5	
	Magnetic Attraction	Fa		kN	7.3		9.9		12.3	
				lbf	1641		2226		2765	
	Thermal Resistance ④	Rthw-a		°C/Watt	0.35		0.25		0.21	
	Max. Allowable Coil Temp. ④	Tmax		°C	130					
	Mechanical Specifications									
	Coil Assembly Weight	Mc	±15%	kg	9.4		12.3		15.2	
				lbs	20.7		27.1		33.5	
	Magnet Way Type (MCxxx)				**150**		**200**		**250**	
	Magnet Way Weight	Mw	±15%	kg/m	20.7		26.8		33.2	
				lbs/in	1.16		1.5		1.86	

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC Ironcore DDL Motors

IC11 Ironcore Water-Cooled Motors Series Performance Data

		Symbol	Tol	Units	IC11-030		IC11-050		IC11-075		IC11-100	
Winding Code ②					A1	A5	A1	A5	A1	A5	A1	A5
Rated Performance												
Max Rated Voltage		Un		VAC	480	230	480	230	480	400	480	480
Max Continuous Force @ Tmax ① ⑤		Fc		N	251		418		626		820	
				lbf	56		94		141		184	
Motor constant		Km		N/√W	18.6		26.5		34.5		41.1	
Continous Current @ Tmax		Ic		Arms	9.8	17.0	9.8	17.1	9.8	17.0	9.6	16.6
230 VAC	Peak Force @ Tmax ⑤	Fp		N	384	385	641	641	961	960	1270	1270
				lbf	86	87	144	144	216	216	286	286
	Peak Current @ Tmax ⑤	Ip		Arms	19.6	34.0	19.6	34.0	19.6	33.9	19.2	33.2
	Rated force @ Speed ⑤	Frtd		N	241	230	410	395	619	606	814	802
				lbf	54	52	92	89	139	136	183	180
	Rated Speed	Nrtd		m/s	9.2	13.5	5.3	9.9	3.4	6.5	2.43	4.77
400 VAC	Peak Force @ Tmax ⑤	Fp		N	384	-	641	-	961	960	1270	1270
				lbf	86	-	144	-	216	216	286	286
	Peak Current @ Tmax ⑤	Ip		Arms	19.6	-	19.6	-	19.6	33.9	19.2	33.2
	Rated force @ Speed ⑤	Frtd		N	230	-	395	-	606	565	802	766
				lbf	52	-	89	-	136	127	180	172
	Rated Speed	Nrtd		m/s	13.5	-	10.0	-	6.5	11.9	4.77	8.8
480 VAC	Peak Force @ Tmax ⑤	Fp		N	384	-	641	-	961	-	1270	1270
				lbf	86	-	144	-	216	-	286	286
	Peak Current @ Tmax ⑤	Ip		Arms	19.6	-	19.6	-	19.6	-	19.2	33.2
	Rated force @ Speed ⑤	Frtd		N	228	-	384	-	597	-	795	742
				lbf	51	-	86	-	134	-	179	167
	Rated Speed	Nrtd		m/s	13.5	-	12.2	-	7.9	-	5.6	10.7
Electrical Specifications ②												
Electrical Resistance @ 25°C L-L		Rm	±10%	Ohms	1.58	0.53	2.17	0.73	2.90	0.97	3.64	1.22
Electrical Inductance L-L		L	±20%	mh	11.4	3.80	18.0	6.0	26.2	8.7	34.4	11.5
Force Constant @ 25°C		Kf	±10%	N/Arms	28.7	16.6	47.8	27.6	72	41.4	96	55
				lbf/Arms	6.5	3.73	10.7	6.2	16.2	9.3	21.6	12.4
Back EMF Constant @ 25°C L-L		Ke	±10%	Vpeak/m/s	23.4	13.5	39.1	22.6	59	33.8	78	45.1
				Vpeak/in/sec	0.6	0.344	0.99	0.57	1.49	0.86	1.98	1.15
Figures of Merit and Additional Data												
Electrical Time Constant		Te		ms	7.2		8.3		9.0		9.5	
Max. Theoretical Acceleration ③		Amax		g's	15.8		18.2		19.6		20.0	
Magnetic Attraction		Fa		kN	1.4		2.4		3.7		4.9	
				lbf	315		540		832		1102	
Thermal Resistance ④		Rthw-a		°C/Watt	0.33		0.24		0.18		0.15	
Max. Allowable Coil Temp. ④		Tmax		°C	130							
Min. Flow Rate of Coolant @ 25°C Max.				liters/min	2.8							
Mechanical Specifications												
Coil Assembly Weight		Mc	±15%	kg	2.5		3.6		5		6.5	
				lbs	5.5		7.9		11		14.3	
Magnet Way Type (MCxxx)					**030**		**050**		**075**		**100**	
Magnet Way Weight		Mw	±15%	kg/m	5.4		7.5		10.1		12.7	
				lbs/in	0.302		0.42		0.57		0.71	

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC11 Ironcore Water-Cooled Motors Series Performance Data (Continued)

		Symbol	Tol	Units	IC11-150		IC11-200		IC11-250	
	Winding Code ②				A1	A5	A1	A5	A1	A5
	Rated Performance									
	Max Rated Voltage	Un		VAC	480	480	480	480	480	480
	Max Continuous Force @ Tmax ① ⑤	Fc		N	1262		1655		2013	
				lbf	284		372		453	
	Motor constant	Km		N/√W	52		61		69	
	Continous Current @ Tmax	Ic		Arms	9.9	17.1	9.7	16.8	9.4	16.2
230 VAC	Peak Force @ Tmax ⑤	Fp		N	1929	1929	2552	2552	3141	3141
				lbf	434	434	574	574	706	706
	Peak Current @ Tmax ⑤	Ip		Arms	19.8	34.3	19.4	33.6	18.7	32.4
	Rated force @ Speed ⑤	Frtd		N	1257	1247	1651	1643	2010	2002
				lbf	283	280	371	369	452	450
	Rated Speed	Nrtd		m/s	1.44	2.97	0.99	2.07	0.63	1.62
400 VAC	Peak Force @ Tmax ⑤	Fp		N	1929	1929	2552	2552	3140	3141
				lbf	434	434	574	574	706	706
	Peak Current @ Tmax ⑤	Ip		Arms	19.8	34.3	19.4	33.6	18.7	32.4
	Rated force @ Speed ⑤	Frtd		N	1247	1220	1643	1617	2002	1979
				lbf	280	274	369	364	450	445
	Rated Speed	Nrtd		m/s	2.97	5.6	2.07	4.14	1.62	3.24
480 VAC	Peak Force @ Tmax ⑤	Fp		N	1929	1929	2552	2552	3141	3141
				lbf	434	434	574	574	706	706
	Peak Current @ Tmax ⑤	Ip		Arms	19.8	34.3	19.4	33.6	18.7	32.4
	Rated force @ Speed ⑤	Frtd		N	1241	1201	1637	1601	1997	1964
				lbf	279	270	368	360	449	442
	Rated Speed	Nrtd		m/s	3.69	6.8	2.61	5.0	2.07	3.96
	Electrical Specifications ②									
	Electrical Resistance @ 25°C L-L	Rm	±10%	Ohms	5.1	1.70	6.6	2.19	8.0	2.68
	Electrical Inductance L-L	L	±20%	mh	51	16.9	67	22.4	84	27.9
	Force Constant @ 25°C	Kf	±10%	N/Arms	144	83	191	110	239	138
				lbf/Arms	32.4	18.7	42.9	24.7	54	31
	Back EMF Constant @ 25°C L-L	Ke	±10%	Vpeak/m/s	117	68	156	90	195	113
				Vpeak/in/sec	2.98	1.72	3.97	2.29	4.96	2.86
	Figures of Merit and Additional Data									
	Electrical Time Constant	Te		ms	10.0		10.2		10.5	
	Max. Theoretical Acceleration ③	Amax		g's	21.0		21.2		21.1	
	Magnetic Attraction	Fa		kN	7.3		9.9		12.3	
				lbf	1641		2226		2765	
	Thermal Resistance ④	Rthw-a		°C/Watt	0.10		0.08		0.07	
	Max. Allowable Coil Temp. ④	Tmax		°C	130					
	Min. Flow Rate of Coolant @ 25°C Max.			liters/min	2.8					
	Mechanical Specifications									
	Coil Assembly Weight	Mc	±15%	kg	9.4		12.3		15.2	
				lbs	20.7		27.1		33.5	
	Magnet Way Type (MCxxx)				**150**		**200**		**250**	
	Magnet Way Weight	Mw	±15%	kg/m	20.7		26.8		33.2	
				lbs/in	1.16		1.5		1.86	

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC Ironcore DDL Motors

IC22 Ironcore Natural-Cooled Motors Series Performance Data

		Symbol	Tol	Units	IC22-030			IC22-050			IC22-075			IC22-100		
Winding Code ②					A1	A2	A6	A1	A2	A6	A1	A2	A6	A1	A2	A6
Rated Performance																
Max Rated Voltage		Un		VAC	480	480	230	480	480	230	480	480	230	480	480	400
Max Continuous Force @ Tmax ① ⑤		Fc		N	283			512			802			1112		
				lbf	64			115			180			250		
Motor constant		Km		N/√W	30.1			42.2			55			65		
Continous Current @ Tmax		Ic		Arms	4.00	8.0	13.9	4.35	8.7	15.1	4.55	9.1	15.8	4.73	9.5	16.4
Peak Force @ Tmax ⑤	230 VAC	Fp		N	741	741	741	1283	1285	1284	1959	1959	1960	2648	2650	2516
				lbf	167	167	167	288	289	289	440	440	441	595	596	566
Peak Current @ Tmax ⑤		Ip		Arms	14.0	28.0	48.5	15.2	30.5	53	15.9	31.8	55	16.5	33.1	50
Rated force @ Speed ⑤		Frtd		N	276	261	227	507	494	460	798	786	758	1108	1098	1073
				lbf	62	59	51	114	111	103	179	177	170	249	247	241
Rated Speed		Nrtd		m/s	3.96	8.4	13.5	2.25	4.90	8.7	1.35	3.15	5.7	0.90	2.25	4.14
Peak Force @ Tmax ⑤	400 VAC	Fp		N	741	741	-	1283	1285	-	1959	1959	-	2648	2650	2516
				lbf	167	167	-	288	289	-	440	440	-	595	596	566
Peak Current @ Tmax ⑤		Ip		Arms	14.0	28.0	-	15.2	30.5	-	15.9	31.8	-	16.5	33.1	50
Rated force @ Speed ⑤		Frtd		N	265	227	-	498	459	-	789	757	-	1102	1073	997
				lbf	60	51	-	112	103	-	177	170	-	248	241	224
Rated Speed		Nrtd		m/s	7.2	13.5	-	4.14	8.8	-	2.70	5.8	-	1.89	4.14	7.6
Peak Force @ Tmax ⑤	480 VAC	Fp		N	741	741	-	1283	1285	-	1959	1959	-	2648	2650	-
				lbf	167	167	-	288	289	-	440	440	-	595	596	-
Peak Current @ Tmax ⑤		Ip		Arms	14	28	-	15.2	30.5	-	15.9	31.8	-	16.5	33.1	-
Rated force @ Speed ⑤		Frtd		N	259	221	-	492	435	-	785	739	-	1097	1055	-
				lbf	58	49.7	-	111	98	-	176	166	-	247	237	-
Rated Speed		Nrtd		m/s	8.7	13.5	-	5.1	10.7	-	3.24	6.9	-	2.34	5.1	-
Electrical Specifications ②																
Electrical Resistance @ 25°C L-L		Rm	±10%	Ohms	3.81	0.96	0.324	5.3	1.33	0.45	7.1	1.79	0.60	8.9	2.25	0.75
Electrical Inductance L-L		L	±20%	mh	35.5	8.9	2.96	56	14.0	4.66	82	20.4	6.8	107	26.8	8.9
Force Constant @ 25°C		Kf	±10%	N/Arms	72	35.8	20.7	119	60	34.5	179	90	52	239	119	69
				lbf/Arms	16.2	8	4.65	26.8	13.5	7.8	40.2	20.2	11.7	54	26.8	15.5
Back EMF Constant @ 25°C L-L		Ke	±10%	Vpeak/m/s	59	29.3	16.9	98	48.8	28.2	146	73	42.2	195	98	56
				Vpeak/in/sec	1.49	0.74	0.43	2.48	1.24	0.72	3.71	1.86	1.07	4.95	2.48	1.43
Figures of Merit and Additional Data																
Electrical Time Constant		Te		ms	9.3			10.6			11.5			12		
Max. Theoretical Acceleration ③		Amax		g's	15.8			19.0			20.8			21.6		
Magnetic Attraction		Fa		kN	2.9			4.9			7.3			9.8		
				lbf	652			1102			1641			2203		
Thermal Resistance ④		Rthw-a		°C/Watt	0.82			0.50			0.34			0.25		
Max. Allowable Coil Temp. ④		Tmax		°C	130											
Mechanical Specifications																
Coil Assembly Weight		Mc	±15%	kg	4.8			6.9			9.6			12.5		
				lbs	10.6			15.2			21.2			27.6		
Magnet Way Type (MCxxx)					**030**			**050**			**075**			**100**		
Magnet Way Weight		Mw	±15%	kg/m	5.4			7.5			10.1			12.7		
				lbs/in	0.302			0.42			0.57			0.71		

Notes:

① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.

② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.

③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.

④ Please see the application sizing section for more details on sizing and thermal considerations.

⑤ All data referenced to sinusoidal commutation

IC22 Ironcore Natural-Cooled Motors Series Performance Data (Continued)

		Symbol	Tol	Units	IC22-150			IC22-200			IC22-250		
	Winding Code ②				A1	A2	A6	A1	A2	A6	A1	A2	A6
	Rated Performance												
	Max Rated Voltage	Un		VAC	480	480	480	480	480	480	480	480	480
	Max Continuous Force @ Tmax ① ⑤	Fc		N	1656			2286			2806		
				lbf	372			514			631		
	Motor constant	Km		N/√W	82			97			109		
	Continous Current @ Tmax	Ic		Arms	4.69	9.4	16.3	4.86	9.7	16.8	4.77	9.5	16.5
230 VAC	Peak Force @ Tmax ⑤	Fp		N	3628	3963	3428	4151	5347	4570	4494	6646	5713
				lbf	816	891	771	933	1202	1027	1010	1494	1284
	Peak Current @ Tmax ⑤	Ip		Arms	13.4	32.8	42.0	10.4	34.0	42.0	8.5	33.4	42.0
	Rated force @ Speed ⑤	Frtd		N	1653	1643	1622	2285	2277	2259	2805	2797	2782
				lbf	372	369	365	514	512	508	631	629	625
	Rated Speed	Nrtd		m/s	0.54	1.44	2.70	0.27	0.99	1.89	0.18	0.72	1.44
400 VAC	Peak Force @ Tmax ⑤	Fp		N	3963	3963	3428	5347	5347	4570	6333	6646	5713
				lbf	891	891	771	1202	1202	1027	1424	1494	1284
	Peak Current @ Tmax ⑤	Ip		Arms	16.4	32.8	42.0	17.0	34.0	42.0	14.8	33.4	42.0
	Rated force @ Speed ⑤	Frtd		N	1647	1621	1559	2278	2259	2202	2801	2780	2735
				lbf	370	364	350	512	508	495	630	625	615
	Rated Speed	Nrtd		m/s	1.17	2.70	4.95	0.81	1.89	3.60	0.54	1.53	2.79
480 VAC	Peak Force @ Tmax ⑤	Fp		N	3963	3963	3428	5347	5347	4570	6646	6646	5713
				lbf	891	891	771	1202	1202	1027	1494	1494	1284
	Peak Current @ Tmax ⑤	Ip		Arms	16.4	32.8	42.0	17.0	34.0	42.0	16.7	33.4	42.0
	Rated force @ Speed ⑤	Frtd		N	1643	1608	1516	2276	2246	2165	2797	2770	2700
				lbf	369	361	341	512	505	487	629	623	607
	Rated Speed	Nrtd		m/s	1.44	3.33	6.0	0.99	2.34	4.41	0.72	1.89	3.42
	Electrical Specifications ②												
	Electrical Resistance @ 25°C L-L	Rm	±10%	Ohms	12.6	3.16	1.06	16.3	4.08	1.36	19.9	5.0	1.67
	Electrical Inductance L-L	L	±20%	mh	158	39.6	13.2	209	52	17.4	260	65	21.7
	Force Constant @ 25°C	Kf	±10%	N/Arms	358	179	103	478	239	138	597	299	172
				lbf/Arms	80	40.2	23.2	107	54	31	134	67	38.7
	Back EMF Constant @ 25°C L-L	Ke	±10%	Vpeak/m/s	293	146	84	390	195	113	488	244	141
				Vpeak/in/sec	7	3.71	2.14	10	4.95	2.86	12	6	3.57
	Figures of Merit and Additional Data												
	Electrical Time Constant	Te		ms	12.5			12.8			13.1		
	Max. Theoretical Acceleration ③	Amax		g's	22.3			23.1			23.0		
	Magnetic Attraction	Fa		kN	14.6			19.7			24.6		
				lbf	3282			4429			5530		
	Thermal Resistance ④	Rthw-a		°C/Watt	0.18			0.13			0.11		
	Max. Allowable Coil Temp. ④	Tmax		°C	130								
	Mechanical Specifications												
	Coil Assembly Weight	Mc	±15%	kg	18.1			23.7			29.3		
				lbs	39.9			52			65		
	Magnet Way Type (MCxxx)				**150**			**200**			**250**		
	Magnet Way Weight	Mw	±15%	kg/m	20.7			26.8			33.2		
				lbs/in	1.16			1.5			1.86		

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC Ironcore DDL Motors

IC22 Ironcore Water-Cooled Motors Series Performance Data

		Symbol	Tol	Units	IC22-030			IC22-050			IC22-075			IC22-100		
Winding Code ②					A1	A2	A6	A1	A2	A6	A1	A2	A6	A1	A2	A6
Rated Performance																
Max Rated Voltage		Un		VAC	480	230	230	480	480	230	480	480	230	480	480	230
Max Continuous Force @ Tmax ① ⑤		Fc		N	512			841			1252			1664		
				lbf	115			189			281			374		
Motor constant		Km		N/√W	26.5			38			49.2			58		
Continous Current @ Tmax		Ic		Arms	10.1	20.2	34.9	9.9	19.8	34.3	9.8	19.6	33.9	9.8	19.5	33.8
Peak Force @ Tmax ⑤	230 VAC	Fp		N	777	777	777	1286	1286	1286	1922	1922	1922	2557	2557	2558
				lbf	175	175	175	289	289	289	432	432	432	575	575	575
Peak Current @Tmax ⑤		Ip		Arms	20.2	40.3	70	19.8	39.6	67	19.6	39.2	68	19.5	39.0	68
Rated force @ Speed ⑤		Frtd		N	507	494	471	837	825	795	1248	1238	1213	1661	1652	1629
				lbf	114	111	106	188	185	179	281	278	273	373	371	366
Rated Speed		Nrtd		m/s	4.05	9.1	13.5	2.34	5.3	9.9	1.35	3.42	6.4	0.90	2.43	4.68
Peak Force @ Tmax ⑤	400 VAC	Fp		N	777	-	-	1286	1286	-	1922	1922	-	2557	2557	-
				lbf	175	-	-	289	289	-	432	432	-	575	575	-
Peak Current @ Tmax ⑤		Ip		Arms	20.2	-	-	19.8	39.6	-	19.6	39.2	-	19.5	39.0	-
Rated force @ Speed ⑤		Frtd		N	498	-	-	829	795	-	1241	1212	-	1655	1629	-
				lbf	112	-	-	186	179	-	279	272	-	372	366	-
Rated Speed		Nrtd		m/s	7.7	-	-	4.50	9.9	-	2.88	6.5	-	2.07	4.68	-
Peak Force @ Tmax ⑤	480 VAC	Fp		N	777	-	-	1286	1286	-	1922	1922	-	2557	2557	-
				lbf	175	-	-	289	289	-	432	432	-	575	575	-
Peak Current @ Tmax ⑤		Ip		Arms	20.2	-	-	19.8	39.6	-	19.6	39.2	-	19.5	39.0	-
Rated force @ Speed ⑤		Frtd		N	492	-	-	824	774	-	1237	1194	-	1650	1614	-
				lbf	111	-	-	185	174	-	278	268	-	371	363	-
Rated Speed		Nrtd		m/s	9.5	-	-	5.6	12.2	-	3.60	7.9	-	2.61	5.8	-
Electrical Specifications ②																
Electrical Resistance @ 25°C L-L		Rm	±10%	Ohms	3.08	0.77	0.260	4.26	1.07	0.358	5.7	1.43	0.48	7.2	1.80	0.60
Electrical Inductance L-L		L	±20%	mh	22.8	5.7	1.90	35.9	9.0	2.99	52	13.1	4.36	69	17.2	5.7
Force Constant @ 25°C		Kf	±10%	N/Arms	57	28.7	16.6	96	47.8	27.6	144	72	41.4	191	96	55
				lbf/Arms	12.8	6.5	3.73	21.6	10.7	6.2	32.4	16.2	9.3	42.9	21.6	12.4
Back EMF Constant @ 25°C L-L		Ke	±10%	Vpeak/m/s	46.9	23.4	13.5	78.1	39.1	22.6	117	59	33.8	156	78	45.1
				Vpeak/in/sec	1.19	0.6	0.344	1.98	0.99	0.57	2.98	1.49	0.86	3.97	1.98	1.15
Figures of Merit and Additional Data																
Electrical Time Constant		Te		ms	7.4			8.4			9.1			9.6		
Max. Theoretical Acceleration ③		Amax		g's	16.5			19.0			20.4			20.8		
Magnetic Attraction		Fa		kN	2.9			4.9			7.3			9.8		
				lbf	652			1102			1641			2203		
Thermal Resistance ④		Rthw-a		°C/Watt	0.16			0.12			0.091			0.073		
Max. Allowable Coil Temp. ④		Tmax		°C	130											
Min. Flow Rate of Coolant @ 25°C Max.				liters/min	2.8											
Mechanical Specifications																
Coil Assembly Weight		Mc	±15%	kg	4.8			6.9			9.6			12.5		
				lbs	10.6			15.2			21.2			27.6		
Magnet Way Type (MCxxx)					**030**			**050**			**075**			**100**		
Magnet Way Weight		Mw	±15%	kg/m	5.4			7.5			10.1			12.7		
				lbs/in	0.302			0.42			0.57			0.71		

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC22 Ironcore Water-Cooled Motors Series Performance Data (Continued)

		Symbol	Tol	Units	IC22-150			IC22-200			IC22-250		
Winding Code ②					A1	A2	A6	A1	A2	A6	A1	A2	A6
Rated Performance													
Max Rated Voltage		Un		VAC	480	480	230	480	480	230	480	480	230
Max Continuous Force @ Tmax ① ⑤		Fc		N		2493			3333			4012	
				lbf		560			749			902	
Motor constant		Km		N/√W		74			86			98	
Continous Current @ Tmax		Ic		Arms	9.7	19.5	33.7	9.8	19.6	33.9	9.3	18.6	32.2
230 VAC	Peak Force @ Tmax ⑤	Fp		N	3570	3832	3834	4084	5119	5118	-	6267	6270
				lbf	803	861	862	918	1151	1151	-	1409	1410
	Peak Current @ Tmax ⑤	Ip		Arms	16.7	38.9	68	13.0	39.1	68	-	37.2	65
	Rated force @ Speed ⑤	Frtd		N	2491	2483	2464	3332	3325	3309	-	4006	3989
				lbf	560	558	554	749	747	744	-	901	897
	Rated Speed	Nrtd		m/s	0.36	1.44	2.97	0.13	0.99	2.07	-	0.63	1.62
400 VAC	Peak Force @ Tmax ⑤	Fp		N	3535	3832	-	5114	5119	-	6236	6267	-
				lbf	795	861	-	1150	1151	-	1402	1409	-
	Peak Current @ Tmax ⑤	Ip		Arms	19.5	38.9	-	19.5	39.1	-	18.4	37.2	-
	Rated force @ Speed ⑤	Frtd		N	2486	2464	-	3327	3309	-	4008	3988	-
				lbf	559	554	-	748	744	-	901	897	-
	Rated Speed	Nrtd		m/s	1.17	2.97	-	0.72	2.07	-	0.45	1.62	-
480 VAC	Peak Force @ Tmax ⑤	Fp		N	3835	3832	-	5114	5119	-	6267	6267	-
				lbf	862	861	-	1150	1151	-	1409	1409	-
	Peak Current @ Tmax ⑤	Ip		Arms	19.5	38.9	-	19.5	39.1	-	18.6	37.2	-
	Rated force @ Speed ⑤	Frtd		N	2482	2451	-	3325	3297	-	4004	3979	-
				lbf	558	551	-	747	741	-	900	895	-
	Rated Speed	Nrtd		m/s	1.53	3.69	-	0.99	2.61	-	0.72	2.07	-
Electrical Specifications ②													
Electrical Resistance @ 25°C L-L		Rm	±10%	Ohms	10.1	2.54	0.85	13.1	3.27	1.09	16.0	4.00	1.34
Electrical Inductance L-L		L	±20%	mh	102	25.4	8.5	134	33.6	11.2	167	41.8	13.9
Force Constant @ 25°C		Kf	±10%	N/Arms	287	144	83	383	191	110	478	239	138
				lbf/Arms	65	32.4	18.7	86	42.9	24.7	107	54	31
Back EMF Constant @ 25°C L-L		Ke	±10%	Vpeak/m/s	234	117	68	313	156	90	391	195	113
				Vpeak/in/sec	6	2.98	1.72	8	3.97	2.29	10	4.96	2.86
Figures of Merit and Additional Data													
Electrical Time Constant		Te		ms		10.1			10.2			10.4	
Max. Theoretical Acceleration ③		Amax		g's		21.6			22.1			21.7	
Magnetic Attraction		Fa		kN		14.6			19.7			24.6	
				lbf		3282			4429			5530	
Thermal Resistance ④		Rthw-a		°C/Watt		0.052			0.040			0.036	
Max. Allowable Coil Temp. ④		Tmax		°C					130				
Min. Flow Rate of Coolant @ 25°C Max.				liters/min					2.8				
Mechanical Specifications													
Coil Assembly Weight		Mc	±15%	kg		18.1			23.7			29.3	
				lbs		39.9			52			65	
Magnet Way Type (MCxxx)						**150**			**200**			**250**	
Magnet Way Weight		Mw	±15%	kg/m		20.7			26.8			33.2	
				lbs/in		1.16			1.5			1.86	

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC Ironcore DDL Motors

IC33 Ironcore Natural-Cooled Motors Series Performance Data

		Symbol	Tol	Units	IC33-030				IC33-050				IC33-075				IC33-100			
	Winding Code ②				A1	A3	A5	A7	A1	A3	A5	A7	A1	A3	A5	A7	A1	A3	A5	A7
	Rated Performance																			
	Max Rated Voltage	Un		VAC	480	400	480	230	480	400	480	230	480	400	480	230	480	400	480	230
	Max Continuous Force @ Tmax ① ⑤	Fc		N	424				774				1224				1654			
				lbf	95				174				275				372			
	Motor constant	Km		N/√W	36.6				52				67				80			
	Continous Current @ Tmax	Ic		Arms	4.00	12.0	6.9	20.8	4.39	13.2	7.6	22.8	4.62	13.9	8.0	24.0	4.69	14.1	8.1	24.4
230 VAC	Peak Force @ Tmax ⑤	Fp		N	1112	1112	1113	1112	1935	1933	1932	1896	2957	2957	2957	2844	3536	3963	3963	3793
				lbf	250	250	250	250	435	435	434	426	665	665	665	639	795	891	891	853
	Peak Current @ Tmax ⑤	Ip		Arms	14.0	42.0	24.3	73	15.4	46.1	26.6	76	16.2	48.5	28.0	76	12.8	49.2	28.4	76
	Rated force @ Speed ⑤	Frtd		N	419	391	411	339	770	746	763	695	1220	1199	1215	1157	1652	1633	1646	1595
				lbf	94	88	92	76	173	168	172	156	274	270	273	260	371	367	370	359
	Rated Speed	Nrtd		m/s	2.52	8.4	4.68	13.5	1.35	4.86	2.61	8.7	0.81	3.15	1.62	5.7	0.45	2.25	1.17	4.14
400 VAC	Peak Force @ Tmax ⑤	Fp		N	1112	1112	1113	-	1935	1933	1932	-	2959	2957	2957	-	3963	3963	3963	-
				lbf	250	250	250	-	435	435	434	-	665	665	665	-	891	891	891	-
	Peak Current @ Tmax ⑤	Ip		Arms	14.0	42.0	24.3	-	15.4	46.1	26.6	-	16.2	48.5	28.0	-	16.4	49.2	28.4	-
	Rated force @ Speed ⑤	Frtd		N	411	339	390	-	763	693	746	-	1215	1155	1199	-	1646	1593	1633	-
				lbf	92	76	88	-	172	156	168	-	273	260	270	-	370	358	367	-
	Rated Speed	Nrtd		m/s	4.68	13.5	8.5	-	2.61	8.8	4.86	-	1.62	5.8	3.15	-	1.17	4.23	2.25	-
480 VAC	Peak Force @ Tmax ⑤	Fp		N	1112	-	1113	-	1935	-	1932	-	2959	-	2957	-	3963	-	3963	-
				lbf	250	-	250	-	435	-	434	-	665	-	665	-	891	-	891	-
	Peak Current @ Tmax ⑤	Ip		Arms	14.0	-	24.3	-	15.4	-	26.6	-	16.2	-	28.0	-	16.4	-	28.4	-
	Rated force @ Speed ⑤	Frtd		N	407	-	377	-	759	-	734	-	1211	-	1189	-	1643	-	1624	-
				lbf	91	-	85	-	171	-	165	-	272	-	267	-	369	-	365	-
	Rated Speed	Nrtd		m/s	5.7	-	10.2	-	3.24	-	5.9	-	2.07	-	3.87	-	1.44	-	2.79	-
	Electrical Specifications ②																			
	Electrical Resistance @ 25°C L-L	Rm	±10%	Ohms	5.7	0.64	1.90	0.213	7.9	0.88	2.63	0.294	10.6	1.19	3.55	0.396	13.4	1.49	4.47	0.50
	Electrical Inductance L-L	L	±20%	mh	52	5.8	17.4	1.93	82.1	9.1	27.4	3.04	120	13.3	39.9	4.43	157	17.4	52	5.8
	Force Constant @ 25°C	Kf	±10%	N/Arms	107	35.8	62	20.7	179	60	103	34.5	269	90	155	52	358	119	207	69
				lbf/Arms	24.1	8	13.9	4.65	40.2	13.5	23.2	7.8	60	20.2	34.8	11.7	80	26.8	46.5	15.5
	Back EMF Constant @ 25°C L-L	Ke	±10%	Vpeak/m/s	88	29.3	51	16.9	146	48.8	84	28.2	219	73	127	42.2	293	98	169	56
				Vpeak/in/sec	2.23	0.74	1.29	0.43	3.71	1.24	2.14	0.72	6	1.86	3.22	1.07	7	2.48	4.29	1.43
	Figures of Merit and Additional Data																			
	Electrical Time Constant	Te		ms	9.1				10.4				11.3				11.7			
	Max. Theoretical Acceleration ③	Amax		g's	15.5				19.0				21.0				21.4			
	Magnetic Attraction	Fa		kN	4.4				7.4				11.0				14.7			
				lbf	989				1664				2473				3305			
	Thermal Resistance ④	Rthw-a		°C/Watt	0.55				0.33				0.22				0.17			
	Max. Allowable Coil Temp. ④	Tmax		°C	130															
	Mechanical Specifications																			
	Coil Assembly Weight	Mc	±15%	kg	7.3				10.4				14.4				18.9			
				lbs	16.1				22.9				31.7				41.7			
	Magnet Way Type (MCxxx)				**030**				**050**				**075**				**100**			
	Magnet Way Weight	Mw	±15%	kg/m	5.4				7.5				10.1				12.7			
				lbs/in	0.302				0.42				0.57				0.71			

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC33 Ironcore Natural-Cooled Motors Series Performance Data (Continued)

		Symbol	Tol	Units	IC33-150				IC33-200				IC33-250			
	Winding Code ②				A1	A3	A5	A7	A1	A3	A5	A7	A1	A3	A5	A7
	Rated Performance															
	Max Rated Voltage	Un		VAC	480	400	480	230	480	400	480	230	480	400	480	230
	Max Continuous Force @ Tmax ① ⑤	Fc		N	2486				3486				4311			
				lbf	559				784				969			
	Motor constant	Km		N/√W	101				118				134			
	Continous Current @ Tmax	Ic		Arms	4.70	14.1	8.1	24.4	4.90	14.8	8.6	25.7	4.89	14.7	8.5	25.4
230 VAC	Peak Force @ Tmax ⑤	Fp		N	4235	5949	5837	5689	4640	7991	6840	7585	4904	9988	7498	9482
				lbf	952	1337	1312	1279	1043	1796	1538	1705	1102	2245	1686	2132
	Peak Current @ Tmax ⑤	Ip		Arms	9.0	49.3	27.0	76	7.0	50	20.9	76.0	5.7	50	17.1	76
	Rated force @ Speed ⑤	Frtd		N	2484	2467	2480	2434	3485	3471	3482	3445	4311	4298	4308	4274
				lbf	558	555	558	547	783	780	783	774	969	966	968	961
	Rated Speed	Nrtd		m/s	0.18	1.44	0.63	2.70	0.09	0.99	0.36	1.89	0.01	0.72	0.27	1.44
400 VAC	Peak Force @ Tmax ⑤	Fp		N	5853	5949	5952	-	6865	7991	8057	-	7528	9988	10042	-
				lbf	1316	1337	1338	-	1543	1796	1811	-	1692	2245	2258	-
	Peak Current @ Tmax ⑤	Ip		Arms	15.7	49.3	28.5	-	12.2	50	29.9	-	9.9	50	29.6	-
	Rated force @ Speed ⑤	Frtd		N	2480	2434	2467	-	3482	3445	3471	-	4308	4274	4298	-
				lbf	558	547	555	-	783	774	780	-	968	961	966	-
	Rated Speed	Nrtd		m/s	0.63	2.70	1.44	-	0.36	1.89	0.99	-	0.27	1.44	0.72	-
480 VAC	Peak Force @ Tmax ⑤	Fp		N	5945	-	5952	-	7557	-	8057	-	8469	-	10042	-
				lbf	1336	-	1338	-	1699	-	1811	-	1904	-	2258	-
	Peak Current @ Tmax ⑤	Ip		Arms	16.4	-	28.5	-	14.6	-	29.9	-	11.9	-	29.6	-
	Rated force @ Speed ⑤	Frtd		N	2476	-	2459	-	3479	-	3464	-	4306	-	4292	-
				lbf	557	-	553	-	782	-	779	-	968	-	965	-
	Rated Speed	Nrtd		m/s	0.90	-	1.80	-	0.54	-	1.26	-	0.36	-	0.90	-
	Electrical Specifications ②															
	Electrical Resistance @ 25°C L-L	Rm	±10%	Ohms	18.9	2.10	6.3	0.70	24.4	2.71	8.1	0.90	29.9	3.32	10.0	1.11
	Electrical Inductance L-L	L	±20%	mh	232	25.8	77	8.6	307	34.1	102	11.4	382	42.4	127	14.1
	Force Constant @ 25°C	Kf	±10%	N/Arms	537	179	310	103	716	239	414	138	896	299	517	172
				lbf/Arms	121	40.2	70	23.2	161	54	93	31	201	67	116	38.7
	Back EMF Constant @ 25°C L-L	Ke	±10%	Vpeak/m/s	439	146	253	84	585	195	338	113	731	244	422	141
				Vpeak/in/sec	11	3.71	6	2.14	15	4.95	9	2.86	19	6	11	3.57
	Figures of Merit and Additional Data															
	Electrical Time Constant	Te		ms	12.3				12.6				12.8			
	Max. Theoretical Acceleration ③	Amax		g's	22.3				22.9				23.3			
	Magnetic Attraction	Fa		kN	22.1				29.4				36.8			
				lbf	4968				6609				8273			
	Thermal Resistance ④	Rthw-a		°C/Watt	0.12				0.084				0.070			
	Max. Allowable Coil Temp. ④	Tmax		°C	130											
	Mechanical Specifications															
	Coil Assembly Weight	Mc	±15%	kg	27.3				35.7				44.1			
				lbs	60				79				97			
	Magnet Way Type (MCxxx)				**150**				**200**				**250**			
	Magnet Way Weight	Mw	±15%	kg/m	20.7				26.8				33.2			
				lbs/in	1.16				1.5				1.86			

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC Ironcore DDL Motors

IC33 Ironcore Water-Cooled Motors Series Performance Data

		Symbol	Tol	Units	IC33-030			IC33-050			IC33-075			IC33-100		
Winding Code ②					**A1**	**A3**	**A5**	**A1**	**A3**	**A5**	**A1**	**A3**	**A5**	**A1**	**A3**	**A5**
Rated Performance																
Max Rated Voltage		Un		VAC	480	230	480	480	230	480	480	230	480	480	230	480
Max Continuous Force @ Tmax ① ⑤		Fc		N		761			1259			1877			2513	
				lbf		171			283			422			565	
Motor constant		Km		N/√W		32.8			46.8			60			71	
Continous Current @ Tmax		Ic		Arms	10.0	29.9	17.3	9.9	29.6	17.1	9.8	29.4	17.0	9.8	29.5	17.0
Peak Force @ Tmax ⑤	230 VAC	Fp		N	1160	1160	1160	1925	1927	1927	2882	2880	2881	3483	3848	3850
				lbf	261	261	261	433	433	433	648	647	648	783	865	866
Peak Current @ Tmax ⑤	230 VAC	Ip		Arms	19.9	60	34.3	19.7	59	34.2	19.6	59	33.9	16.0	59	34.1
Rated force @ Speed ⑤	230 VAC	Frtd		N	757	733	750	1255	1233	1250	1875	1856	1869	2510	2494	2506
				lbf	170	165	169	282	277	281	422	417	420	564	561	563
Rated Speed	230 VAC	Nrtd		m/s	2.52	9.2	4.95	1.35	5.4	2.79	0.63	3.42	1.71	0.270	2.43	1.17
Peak Force @ Tmax ⑤	400 VAC	Fp		N	1160	-	1160	1925	-	1927	2882	-	2881	3851	-	3850
				lbf	261	-	261	433	-	433	648	-	648	866	-	866
Peak Current @ Tmax ⑤	400 VAC	Ip		Arms	19.9	-	34.5	19.7	-	34.2	19.6	-	33.9	19.7	-	34.1
Rated force @ Speed ⑤	400 VAC	Frtd		N	750	-	732	1250	-	1233	1869	-	1856	2506	-	2494
				lbf	169	-	165	281	-	277	420	-	417	563	-	561
Rated Speed	400 VAC	Nrtd		m/s	3.72	-	9.3	2.79	-	5.4	1.71	-	3.42	1.17	-	2.43
Peak Force @ Tmax ⑤	480 VAC	Fp		N	1160	-	1160	1925	-	1927	2882	-	2881	3851	-	3850
				lbf	261	-	261	433	-	433	648	-	648	866	-	866
Peak Current @ Tmax ⑤	480 VAC	Ip		Arms	19.9	-	34.5	19.7	-	34.2	19.6	-	33.9	19.7	-	34.1
Rated force @ Speed ⑤	480 VAC	Frtd		N	746	-	720	1246	-	1223	1867	-	1846	2503	-	2486
				lbf	168	-	162	280	-	275	420	-	415	563	-	559
Rated Speed	480 VAC	Nrtd		m/s	6.1	-	11.3	3.51	-	6.7	2.16	-	4.32	1.53	-	3.06
Electrical Specifications ②																
Electrical Resistance @ 25°C L-L		Rm	±10%	Ohms	4.58	0.51	1.53	6.3	0.71	2.12	8.5	0.95	2.85	10.8	1.20	3.58
Electrical Inductance L-L		L	±20%	mh	33.5	3.72	11.2	53.0	5.9	17.6	77	8.5	25.6	101	11.2	33.6
Force Constant @ 25°C		Kf	±10%	N/Arms	86	28.7	49.7	144	47.8	83	215	72	124	287	96	166
				lbf/Arms	19.3	6.5	11.2	32.4	10.7	18.7	48.3	16.2	27.9	65	21.6	37.3
Back EMF Constant @ 25°C L-L		Ke	±10%	Vpeak/m/s	70	23.4	40.6	117	39.1	68	176	59	101	234	78	135
				Vpeak/in/sec	1.79	0.6	1.03	2.98	0.99	1.72	4.46	1.49	2.58	6	1.98	3.44
Figures of Merit and Additional Data																
Electrical Time Constant		Te		ms		7.3			8.4			9.1			9.4	
Max. Theoretical Acceleration ③		Amax		g's		16.2			18.9			20.4			20.8	
Magnetic Attraction		Fa		kN		4.40			7.4			11.0			14.7	
				lbf		989			1664			2473			3305	
Thermal Resistance ④		Rthw-a		°C/Watt		0.110			0.081			0.061			0.048	
Max. Allowable Coil Temp. ④		Tmax		°C					130							
Min. Flow Rate of Coolant @ 25°C Max.				liters/min					2.8							
Mechanical Specifications																
Coil Assembly Weight		Mc	±15%	kg		7.3			10.4			14.4			18.9	
				lbs		16.1			22.9			31.7			41.7	
Magnet Way Type (MCxxx)						**030**			**050**			**075**			**100**	
Magnet Way Weight		Mw	±15%	kg/m		5.4			7.5			10.1			12.7	
				lbs/in		0.302			0.42			0.57			0.71	

Notes:

① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.

② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.

③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.

④ Please see the application sizing section for more details on sizing and thermal considerations.

⑤ All data referenced to sinusoidal commutation

IC33 Ironcore Water-Cooled Motors Series Performance Data (Continued)

		Symbol	Tol	Units	IC33-150			IC33-200			IC33-250		
	Winding Code ②				A1	A3	A5	A1	A3	A5	A1	A3	A5
	Rated Performance												
	Max Rated Voltage	Un		VAC	480	230	480	480	230	480	480	230	480
	Max Continuous Force @ Tmax ① ⑤	Fc		N	3729			4979			6021		
				lbf	838			1119			1354		
	Motor constant	Km		N/√W	90			106			120		
	Continous Current @ Tmax	Ic		Arms	9.7	29.1	16.8	9.7	29.2	16.8	9.3	27.9	16.1
230 VAC	Peak Force @ Tmax ⑤	Fp		N	4173	5741	5741	-	7660	6745	-	9408	7394
				lbf	938	1291	1291	-	1722	1516	-	2115	1662
	Peak Current @ Tmax ⑤	Ip		Arms	11.3	58	33.6	-	58	26.1	-	56	21.3
	Rated force @ Speed ⑤	Frtd		N	3728	3725	3725	-	4967	4977	-	6012	6020
				lbf	838	837	837	-	1117	1119	-	1352	1353
	Rated Speed	Nrtd		m/s	0.020	1.44	0.54	-	0.99	0.27	-	0.63	0.120
400 VAC	Peak Force @ Tmax ⑤	Fp		N	5741	-	5741	6764	-	7664	7417	-	9411
				lbf	1291	-	1291	1521	-	1723	1667	-	2116
	Peak Current @ Tmax ⑤	Ip		Arms	19.4	-	33.6	15.2	-	33.7	12.4	-	32.3
	Rated force @ Speed ⑤	Frtd		N	3725	-	3714	4977	-	4967	6020	-	6012
				lbf	837	-	835	1119	-	1117	1353	-	1352
	Rated Speed	Nrtd		m/s	0.54	-	1.44	0.27	-	0.99	0.12	-	0.63
480 VAC	Peak Force @ Tmax ⑤	Fp		N	5741	-	5741	7446	-	7664	8344	-	9411
				lbf	1291	-	1291	1674	-	1723	1876	-	2116
	Peak Current @ Tmax ⑤	Ip		Arms	19.4	-	33.6	18.2	-	33.7	14.8	-	32.3
	Rated force @ Speed ⑤	Frtd		N	3722	-	3707	4975	-	4962	6019	-	6005
				lbf	837	-	833	1118	-	1116	1353	-	1350
	Rated Speed	Nrtd		m/s	0.81	-	1.89	0.45	-	1.26	0.27	-	0.99
	Electrical Specifications ②												
	Electrical Resistance @ 25°C L-L	Rm	±10%	Ohms	15.2	1.68	5.1	19.6	2.17	6.5	24.0	2.66	8.0
	Electrical Inductance L-L	L	±20%	mh	149	16.5	49.6	197	21.9	66	245	27.2	82
	Force Constant @ 25°C	Kf	±10%	N/Arms	431	144	249	574	191	331	718	239	414
				lbf/Arms	97	32.4	56	129	42.9	74	161	54	93
	Back EMF Constant @ 25°C L-L	Ke	±10%	Vpeak/m/s	352	117	203	469	156	271	586	195	338
				Vpeak/in/sec	9	2.98	5	12	3.97	7	15	4.96	9
	Figures of Merit and Additional Data												
	Electrical Time Constant	Te		ms	9.8			10.1			10.2		
	Max. Theoretical Acceleration ③	Amax		g's	21.5			21.8			21.8		
	Magnetic Attraction	Fa		kN	22.1			29.4			36.8		
				lbf	4968			6609			8273		
	Thermal Resistance ④	Rthw-a		°C/Watt	0.035			0.027			0.022		
	Max. Allowable Coil Temp. ④	Tmax		°C	130								
	Min. Flow Rate of Coolant @ 25°C Max.			liters/min	2.8								
	Mechanical Specifications												
	Coil Assembly Weight	Mc	±15%	kg	27.3			35.7			44.1		
				lbs	60			79			97		
	Magnet Way Type (MCxxx)				**150**			**200**			**250**		
	Magnet Way Weight	Mw	±15%	kg/m	20.7			26.8			33.2		
				lbs/in	1.16			1.5			1.86		

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC Ironcore DDL Motors

IC44 Ironcore Natural-Cooled Motors Series Performance Data

		Symbol	Tol	Units	IC44-030				IC44-050				IC44-075				IC44-100			
	Winding Code ②				A1	A2	A3	A7	A1	A2	A3	A7	A1	A2	A3	A7	A1	A2	A3	A7
	Rated Performance																			
	Max Rated Voltage	Un		VAC	480	480	230	230	480	480	230	230	480	480	400	230	480	480	480	230
	Max Continuous Force @ Tmax ① ⑤	Fc		N	568				1028				1609				2186			
				lbf	128				231				362				491			
	Motor constant	Km		N/√W	42.6				60				78				93			
	Continous Current @ Tmax	Ic		Arms	4.02	8.0	16.1	27.9	4.37	8.7	17.5	30.3	4.56	9.1	18.2	31.6	4.64	9.3	18.6	32.2
230 VAC	Peak Force @ Tmax ⑤	Fp		N	1487	1487	1486	1293	2573	2573	2573	2156	3403	3923	3505	3234	3903	5267	4176	4311
				lbf	334	334	334	291	578	578	578	485	765	882	788	727	877	1184	939	969
	Peak Current @ Tmax ⑤	Ip		Arms	14.1	28.2	56	76	15.3	30.6	61	76	12.0	31.9	50	76	9.5	32.5	42.0	76
	Rated force @ Speed ⑤	Frtd		N	563	555	524	455	1025	1017	990	922	1607	1600	1576	1520	2184	2178	2157	2104
				lbf	127	125	118	102	230	229	223	207	361	360	354	342	491	490	485	473
	Rated Speed	Nrtd		m/s	1.80	3.96	8.4	13.5	0.90	2.25	4.86	8.7	0.45	1.35	3.15	5.7	0.270	0.99	2.25	4.23
400 VAC	Peak Force @ Tmax ⑤	Fp		N	1487	1487	-	-	2573	2573	-	-	3928	3923	3505	-	5273	5267	4176	-
				lbf	334	334	-	-	578	578	-	-	883	882	788	-	1185	1184	939	-
	Peak Current @ Tmax ⑤	Ip		Arms	14.1	28.2	-	-	15.3	30.6	-	-	16.0	31.9	50.4	-	16.3	32.5	42.0	-
	Rated force @ Speed ⑤	Frtd		N	557	533	-	-	1020	999	-	-	1602	1583	1518	-	2179	2165	2104	-
				lbf	125	120	-	-	229	225	-	-	360	356	341	-	490	487	473	-
	Rated Speed	Nrtd		m/s	3.42	7.2	-	-	1.89	4.14	-	-	1.17	2.70	5.8	-	0.81	1.89	4.23	-
480 VAC	Peak Force @ Tmax ⑤	Fp		N	1487	1487	-	-	2573	2573	-	-	3928	3923	-	-	5273	5267	4176	-
				lbf	334	334	-	-	578	578	-	-	883	882	-	-	1185	1184	939	-
	Peak Current @ Tmax ⑤	Ip		Arms	14.1	28.2	-	-	15.3	30.6	-	-	16.0	31.9	-	-	16.3	32.5	42.0	-
	Rated force @ Speed ⑤	Frtd		N	554	519	-	-	1016	987	-	-	1599	1574	-	-	2178	2155	2071	-
				lbf	125	117	-	-	228	222	-	-	359	354	-	-	490	484	466	-
	Rated Speed	Nrtd		m/s	4.14	8.8	-	-	2.34	5.1	-	-	1.44	3.24	-	-	0.99	2.34	5.1	-
	Electrical Specifications ②																			
	Electrical Resistance @ 25°C L-L	Rm	±10%	Ohms	7.5	1.89	0.48	0.160	10.5	2.63	0.66	0.221	14.1	3.54	0.89	0.297	17.8	4.46	1.12	0.374
	Electrical Inductance L-L	L	±20%	mh	70	17.4	4.35	1.45	110	27.4	6.8	2.28	159	39.9	10.0	3.32	209	52	13.1	4.36
	Force Constant @ 25°C	Kf	±10%	N/Arms	143	72	35.8	20.7	239	119	60	34.5	358	179	90	52	478	239	119	69
				lbf/Arms	32.1	16.2	8	4.65	54	26.8	13.5	7.8	80	40.2	20.2	11.7	107	54	26.8	15.5
	Back EMF Constant @ 25°C L-L	Ke	±10%	Vpeak/m/s	117	59	29.3	16.9	195	98	48.8	28.2	293	146	73	42.2	390	195	98	56
				Vpeak/in/sec	2.97	1.49	0.74	0.43	4.95	2.48	1.24	0.72	7	3.71	1.86	1.07	10	4.95	2.48	1.43
	Figures of Merit and Additional Data																			
	Electrical Time Constant	Te		ms	9.3				10.5				11.3				11.7			
	Max. Theoretical Acceleration ③	Amax		g's	15.8				18.9				20.9				21.5			
	Magnetic Attraction	Fa		kN	5.9				9.8				14.7				19.6			
				lbf	1326				2203				3305				4406			
	Thermal Resistance ④	Rthw-a		°C/Watt	0.41				0.250				0.170				0.130			
	Max. Allowable Coil Temp. ④	Tmax		°C	130															
	Mechanical Specifications																			
	Coil Assembly Weight	Mc	±15%	kg	9.6				13.9				19.2				25.0			
				lbs	21.2				30.6				42.3				55			
	Magnet Way Type (MCxxx)				**030**				**050**				**075**				**100**			
	Magnet Way Weight	Mw	±15%	kg/m	5.4				7.5				10.1				12.7			
				lbs/in	0.302				0.42				0.57				0.71			

Notes:

① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.

② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.

③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.

④ Please see the application sizing section for more details on sizing and thermal considerations.

⑤ All data referenced to sinusoidal commutation

IC44 Ironcore Natural-Cooled Motors Series Performance Data (Continued)

		Symbol	Tol	Units	IC44-150				IC44-200				IC44-250			
Winding Code ②					A1	A2	A3	A7	A1	A2	A3	A7	A1	A2	A3	A7
Rated Performance																
Max Rated Voltage		Un		VAC	480	480	480	230	480	480	480	230	480	480	480	230
Max Continuous Force @ Tmax ① ⑤		Fc		N	3353				4649				5834			
				lbf	754				1045				1312			
Motor constant		Km		N/√W	117				137				155			
Continous Current @ Tmax		Ic		Arms	4.75	9.5	19.0	32.9	4.94	9.9	19.8	34.2	4.96	9.9	19.8	34.4
230 VAC	Peak Force @ Tmax ⑤	Fp		N	4505	7264	6264	6467	-	8309	8352	8623	-	8996	10440	10779
				lbf	1013	1633	1408	1454	-	1868	1878	1939	-	2022	2347	2423
	Peak Current @ Tmax ⑤	Ip		Arms	6.7	26.9	42.0	76	-	20.8	42.0	76	-	17.0	42.0	76
	Rated force @ Speed ⑤	Frtd		N	3352	3347	3329	3285	-	4646	4630	4595	-	5830	5816	5784
				lbf	754	752	748	738	-	1044	1041	1033	-	1311	1307	1300
	Rated Speed	Nrtd		m/s	0.090	0.54	1.44	2.70	-	0.27	0.99	1.89	-	0.180	0.72	1.44
400 VAC	Peak Force @ Tmax ⑤	Fp		N	6716	7967	6264	-	7546	10750	8352	-	8090	12637	10440	-
				lbf	1510	1791	1408	-	1696	2417	1878	-	1819	2841	2347	-
	Peak Current @ Tmax ⑤	Ip		Arms	11.7	33.3	42.0	-	9.1	34.6	42.0	-	7.4	29.6	42.0	-
	Rated force @ Speed ⑤	Frtd		N	3350	3336	3285	-	4647	4633	4595	-	5832	5822	5784	-
				lbf	753	750	738	-	1045	1042	1033	-	1311	1309	1300	-
	Rated Speed	Nrtd		m/s	0.360	1.17	2.70	-	0.18	0.81	1.89	-	0.11	0.54	1.44	-
480 VAC	Peak Force @ Tmax ⑤	Fp		N	7426	7967	6264	-	8550	10750	8352	-	9288	13448	10440	-
				lbf	1669	1791	1408	-	1922	2417	1878	-	2088	3023	2347	-
	Peak Current @ Tmax ⑤	Ip		Arms	14.1	33.3	42.0	-	10.9	34.6	42.0	-	8.9	34.7	42.0	-
	Rated force @ Speed ⑤	Frtd		N	3347	3328	3257	-	4646	4630	4569	-	5830	5816	5761	-
				lbf	752	748	732	-	1044	1041	1027	-	1311	1307	1295	-
	Rated Speed	Nrtd		m/s	0.54	1.44	3.33	-	0.27	0.90	2.34	-	0.18	0.72	1.80	-
Electrical Specifications ②																
Electrical Resistance @ 25°C L-L		Rm	±10%	Ohms	25.1	6.3	1.58	0.53	32.5	8.1	2.03	0.68	39.8	10.0	2.49	0.83
Electrical Inductance L-L		L	±20%	mh	309	77	19.3	6.4	409	102	25.6	8.5	510	127	31.8	10.6
Force Constant @ 25°C		Kf	±10%	N/Arms	716	358	179	103	955	478	239	138	1194	597	299	172
				lbf/Arms	161	80	40.2	23.2	215	107	54	31	268	134	67	38.7
Back EMF Constant @ 25°C L-L		Ke	±10%	Vpeak/m/s	585	293	146	84	780	390	195	113	975	488	244	141
				Vpeak/in/sec	15	7	3.71	2.14	20	10	4.95	2.86	25	12	6	3.57
Figures of Merit and Additional Data																
Electrical Time Constant		Te		ms	12.3				12.6				12.8			
Max. Theoretical Acceleration ③		Amax		g's	22.4				23.2				23.4			
Magnetic Attraction		Fa		kN	29.4				39.4				49.2			
				lbf	6609				8857				11061			
Thermal Resistance ④		Rthw-a		°C/Watt	0.088				0.063				0.052			
Max. Allowable Coil Temp. ④		Tmax		°C	130											
Mechanical Specifications																
Coil Assembly Weight		Mc	±15%	kg	36.2				47.4				58.5			
				lbs	80				104				129			
Magnet Way Type (MCxxx)					**150**				**200**				**250**			
Magnet Way Weight		Mw	±15%	kg/m	20.7				26.8				33.2			
				lbs/in	1.16				1.5				1.86			

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC Ironcore DDL Motors

IC44 Ironcore Water-Cooled Motors Series Performance Data

		Symbol	Tol	Units	IC44-030			IC44-050			IC44-075			IC44-100		
	Winding Code ②				A1	A2	A3	A1	A2	A3	A1	A2	A3	A1	A2	A3
	Rated Performance															
	Max Rated Voltage	Un		VAC	480	480	230	480	480	230	480	480	230	480	480	230
	Max Continuous Force @ Tmax ① ⑤	Fc		N	1019			1678			2500			3352		
				lbf	229			377			562			754		
	Motor constant	Km		N/√W	38.1			54			69			83		
	Continous Current @ Tmax	Ic		Arms	10.0	20.0	40.1	9.9	19.7	39.4	9.8	19.5	39.1	9.8	19.7	39.4
230 VAC	Peak Force @ Tmax ⑤	Fp		N	1549	1551	1521	2567	2567	2535	3347	3839	3803	3839	5134	5071
				lbf	348	349	342	577	577	570	752	863	855	863	1154	1140
	Peak Current @ Tmax ⑤	Ip		Arms	20.0	40.1	76	19.7	39.4	76	14.9	39.1	76	11.8	39.4	76
	Rated force @ Speed ⑤	Frtd		N	1016	1008	981	1675	1668	1644	2499	2492	2471	3352	3346	3327
				lbf	228	227	221	377	375	370	562	560	556	754	752	748
	Rated Speed	Nrtd		m/s	1.62	4.14	9.2	0.72	2.34	5.4	0.27	1.35	3.42	0.05	0.90	2.43
400 VAC	Peak Force @ Tmax ⑤	Fp		N	1549	1551	-	2567	2567	-	3835	3839	-	5134	5134	-
				lbf	348	349	-	577	577	-	862	863	-	1154	1154	-
	Peak Current @ Tmax ⑤	Ip		Arms	20.0	40.1	-	19.7	39.4	-	19.5	39.1	-	19.7	39.4	-
	Rated force @ Speed ⑤	Frtd		N	1010	989	-	1671	1652	-	2494	2478	-	3348	3333	-
				lbf	227	222	-	376	371	-	561	557	-	753	749	-
	Rated Speed	Nrtd		m/s	3.51	7.8	-	1.89	4.59	-	1.08	2.88	-	0.63	2.07	-
480 VAC	Peak Force @ Tmax ⑤	Fp		N	1549	1551	-	2567	2567	-	3835	3839	-	5134	5134	-
				lbf	348	349	-	577	577	-	862	863	-	1154	1154	-
	Peak Current @ Tmax ⑤	Ip		Arms	20.0	40.1	-	19.7	39.4	-	19.5	39.1	-	19.7	39.4	-
	Rated force @ Speed ⑤	Frtd		N	1007	978	-	1667	1642	-	2492	2468	-	3346	3324	-
				lbf	226	220	-	375	369	-	560	555	-	752	747	-
	Rated Speed	Nrtd		m/s	4.32	9.6	-	2.43	5.7	-	1.44	3.60	-	0.99	2.61	-
	Electrical Specifications ②															
	Electrical Resistance @ 25°C L-L	Rm	±10%	Ohms	6.08	1.52	0.382	8.4	2.11	0.53	11.4	2.84	0.71	14.3	3.58	0.90
	Electrical Inductance L-L	L	±20%	mh	44.7	11.2	2.79	70	17.6	4.39	102	25.6	6.4	134	33.6	8.4
	Force Constant @ 25°C	Kf	±10%	N/Arms	115	57	28.7	191	96	47.8	287	144	72	383	191	96
				lbf/Arms	25.9	12.8	6.5	42.9	21.6	10.7	65	32.4	16.2	86	42.9	21.6
	Back EMF Constant @ 25°C L-L	Ke	±10%	Vpeak/m/s	94	46.9	23.4	156	78	39.1	234	117	59	313	156	78
				Vpeak/in/sec	2.38	1.19	0.6	3.97	1.98	0.99	6	2.98	1.49	8	3.97	1.98
	Figures of Merit and Additional Data															
	Electrical Time Constant	Te		ms	7.4			8.3			8.9			9.4		
	Max. Theoretical Acceleration ③	Amax		g's	16.5			18.9			20.4			21.0		
	Magnetic Attraction	Fa		kN	5.9			9.8			14.7			19.6		
				lbf	1326			2203			3305			4406		
	Thermal Resistance ④	Rthw-a		°C/Watt	0.082			0.061			0.046			0.036		
	Max. Allowable Coil Temp. ④	Tmax		°C	130											
	Min. Flow Rate of Coolant @ 25°C Max.			liters/min	2.8											
	Mechanical Specifications															
	Coil Assembly Weight	Mc	±15%	kg	9.6			13.9			19.2			25.0		
				lbs	21.2			30.6			42.3			55		
	Magnet Way Type (MCxxx)				**030**			**050**			**075**			**100**		
	Magnet Way Weight	Mw	±15%	kg/m	5.4			7.5			10.1			12.7		
				lbs/in	0.302			0.42			0.57			0.71		

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC44 Ironcore Water-Cooled Motors Series Performance Data (Continued)

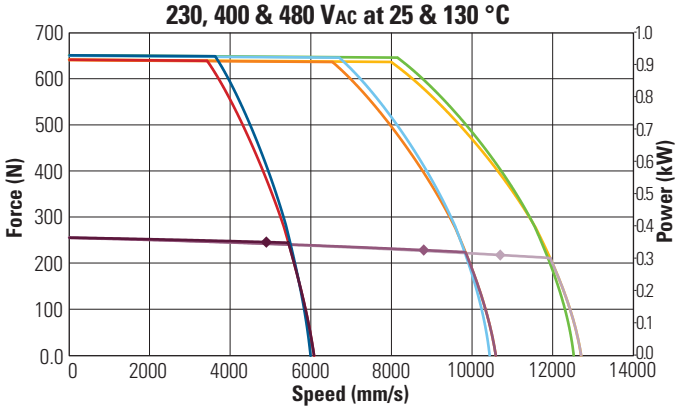
		Symbol	Tol	Units	IC44-150			IC44-200			IC44-250		
	Winding Code ②				A1	A2	A3	A1	A2	A3	A1	A2	A3
	Rated Performance												
	Max Rated Voltage	Un		VAC	480	480	230	480	480	230	480	480	230
	Max Continuous Force @ Tmax ① ⑤	Fc		N		4992			6673			8211	
				lbf		1122			1500			1846	
	Motor constant	Km		N/√W		104			122			138	
	Continous Current @ Tmax	Ic		Arms	9.8	19.5	39.0	9.8	19.6	39.1	9.6	19.2	38.4
230 VAC	Peak Force @ Tmax ⑤	Fp		N	-	7153	7606	-	8183	10142	-	-	12677
				lbf	-	1608	1710	-	1840	2280	-	-	2850
	Peak Current @ Tmax ⑤	Ip		Arms	-	33.5	76	-	26.0	76	-	-	76
	Rated force @ Speed ⑤	Frtd		N	-	4989	4972	-	6671	6657	-	-	8198
				lbf	-	1122	1118	-	1500	1497	-	-	1843
	Rated Speed	Nrtd		m/s	-	0.36	1.44	-	0.130	0.99	-	-	0.63
400 VAC	Peak Force @ Tmax ⑤	Fp		N	6610	7671	-	7428	10238	-	-	12484	-
				lbf	1486	1725	-	1670	2302	-	-	2807	-
	Peak Current @ Tmax ⑤	Ip		Arms	14.6	39.0	-	11.3	39.1	-	-	36.9	-
	Rated force @ Speed ⑤	Frtd		N	4990	4978	-	6673	6662	-	-	8203	-
				lbf	1122	1119	-	1500	1498	-	-	1844	-
	Rated Speed	Nrtd		m/s	0.18	1.17	-	0.010	0.72	-	-	0.45	-
480 VAC	Peak Force @ Tmax ⑤	Fp		N	7311	7671	-	8417	10238	-	9144	12705	-
				lbf	1644	1725	-	1892	2302	-	2056	2856	-
	Peak Current @ Tmax ⑤	Ip		Arms	17.5	39.0	-	13.6	39.1	-	11.1	38.4	-
	Rated force @ Speed ⑤	Frtd		N	4989	4970	-	6671	6657	-	8211	8196	-
				lbf	1122	1117	-	1500	1497	-	1846	1843	-
	Rated Speed	Nrtd		m/s	0.36	1.53	-	0.160	0.99	-	0.01	0.72	-
	Electrical Specifications ②												
	Electrical Resistance @ 25°C L-L	Rm	±10%	Ohms	20.2	5.0	1.26	26.0	6.5	1.63	31.9	8.0	2.00
	Electrical Inductance L-L	L	±20%	mh	198	49.6	12.4	263	66	16.4	327	82	20.4
	Force Constant @ 25°C	Kf	±10%	N/Arms	574	287	144	765	383	191	957	478	239
				lbf/Arms	129	65	32.4	172	86	42.9	215	107	54
	Back EMF Constant @ 25°C L-L	Ke	±10%	Vpeak/m/s	469	234	117	625	313	156	781	391	195
				Vpeak/in/sec	12	6	2.98	16	8	3.97	20	10	4.96
	Figures of Merit and Additional Data												
	Electrical Time Constant	Te		ms		9.8			10.1			10.2	
	Max. Theoretical Acceleration ③	Amax		g's		21.6			22.1			22.1	
	Magnetic Attraction	Fa		kN		29.4			39.4			49.2	
				lbf		6609			8857			11061	
	Thermal Resistance ④	Rthw-a		°C/Watt		0.026			0.020			0.017	
	Max. Allowable Coil Temp. ④	Tmax		°C				130					
	Min. Flow Rate of Coolant @ 25°C Max.			liters/min				2.8					
	Mechanical Specifications												
	Coil Assembly Weight	Mc	±15%	kg		36.2			47.4			58.5	
				lbs		80			104			129	
	Magnet Way Type (MCxxx)					**150**			**200**			**250**	
	Magnet Way Weight	Mw	±15%	kg/m		20.7			26.8			33.2	
				lbs/in		1.16			1.5			1.86	

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.
⑤ All data referenced to sinusoidal commutation

IC Ironcore DDL Motors

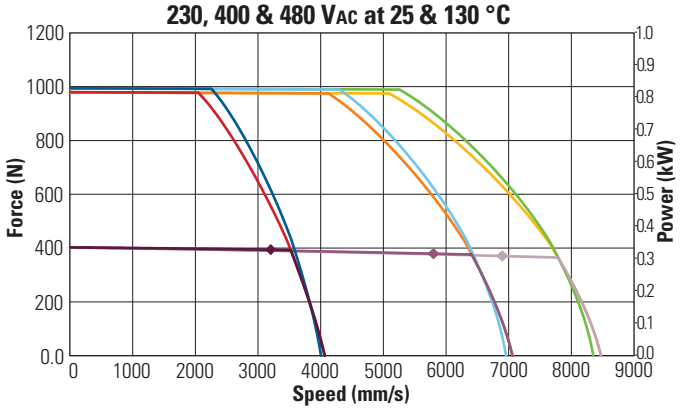
ICxx Performance Curves

IC11050A1
230, 400 & 480 VAC at 25 & 130 °C



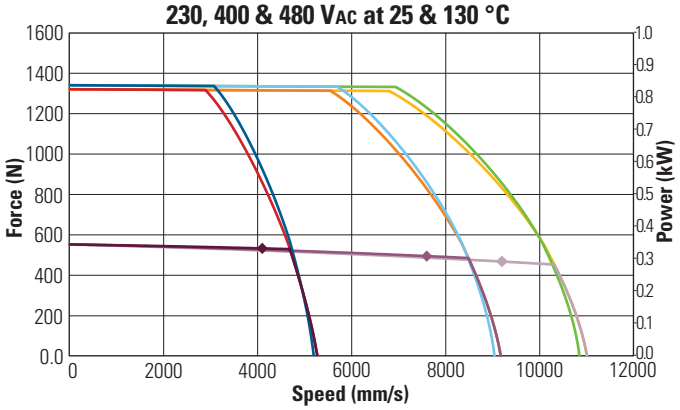
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC11075A1
230, 400 & 480 VAC at 25 & 130 °C



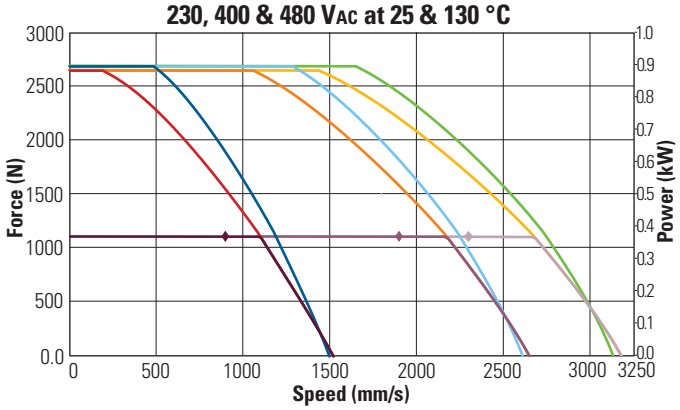
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC11100A5
230, 400 & 480 VAC at 25 & 130 °C



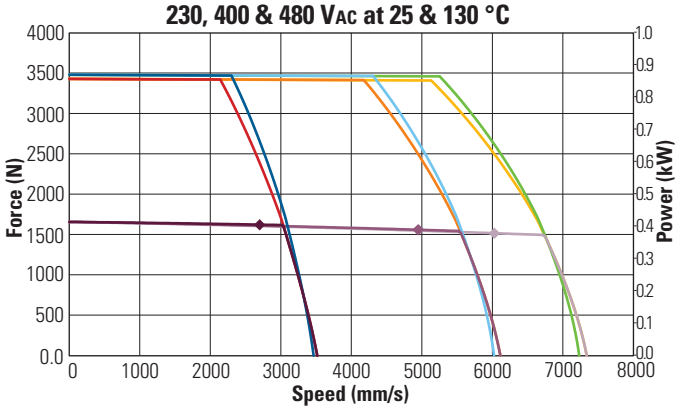
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC22100A1
230, 400 & 480 VAC at 25 & 130 °C



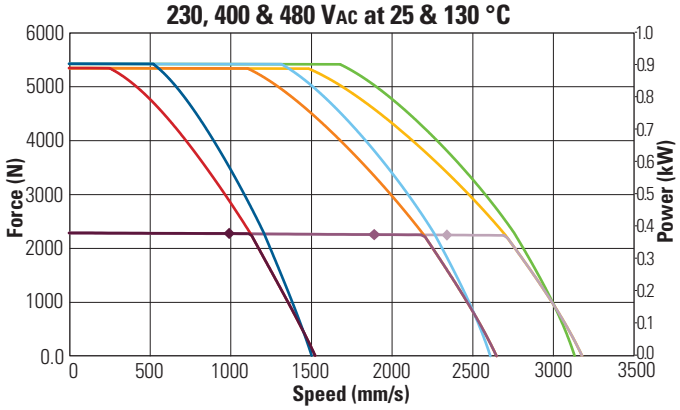
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC22150A6
230, 400 & 480 VAC at 25 & 130 °C



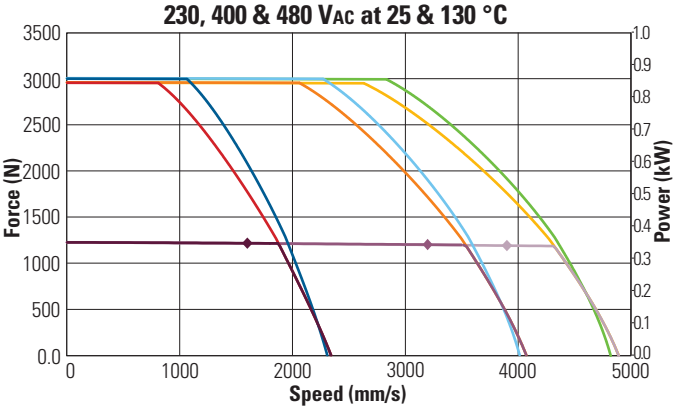
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC22200A2
230, 400 & 480 VAC at 25 & 130 °C



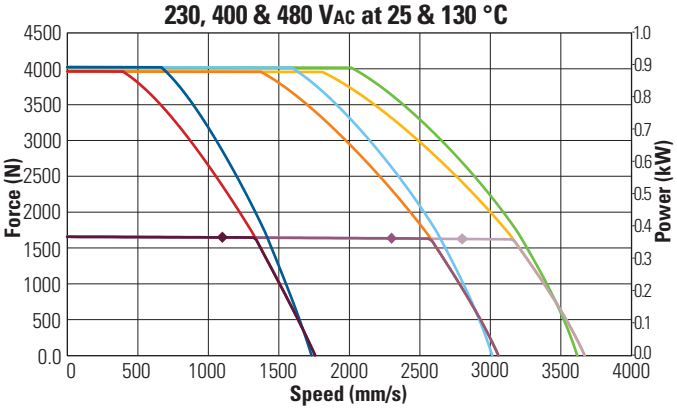
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC33075A5
230, 400 & 480 VAC at 25 & 130 °C



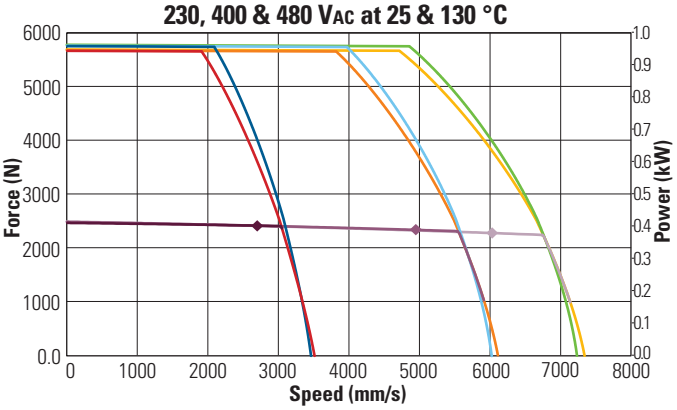
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC33100A5
230, 400 & 480 VAC at 25 & 130 °C



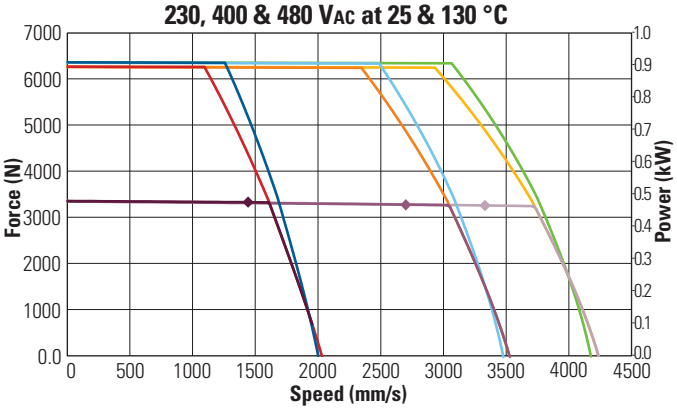
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC33150A7
230, 400 & 480 VAC at 25 & 130 °C



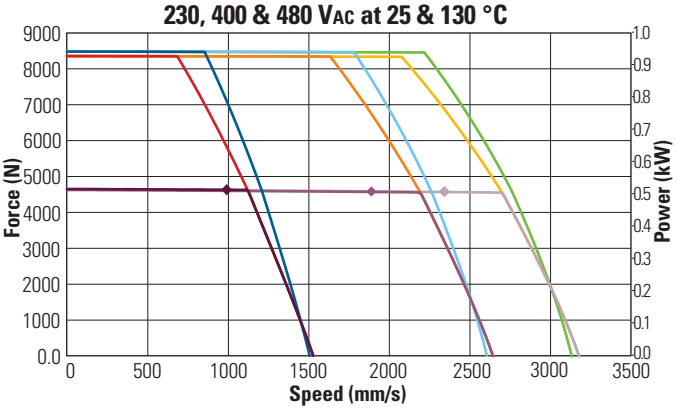
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC44150A3
230, 400 & 480 VAC at 25 & 130 °C



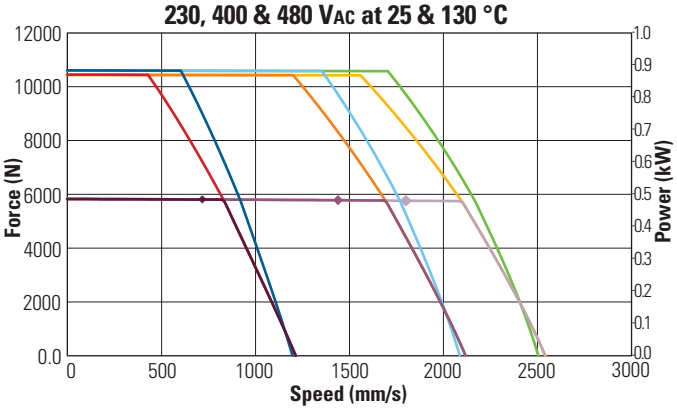
I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC44200A3
230, 400 & 480 VAC at 25 & 130 °C



I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

IC44250A3
230, 400 & 480 VAC at 25 & 130 °C

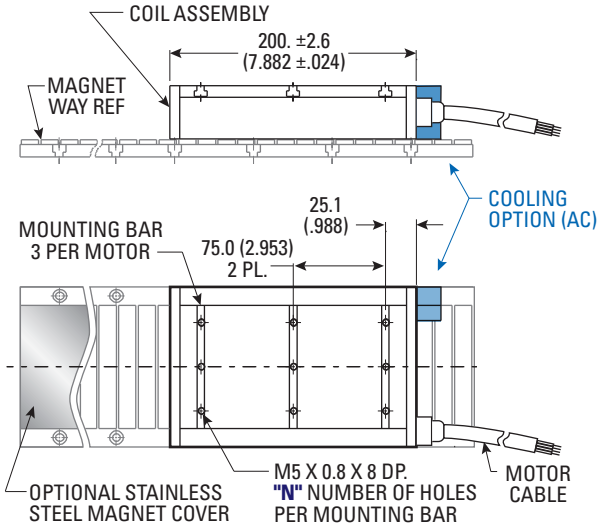


I_{pk} Motor winding @ 130 °C: 230 VAC 400 VAC 480 VAC
I_{pk} Motor winding @ 25 °C ambient: 230 VAC 400 VAC 480 VAC
Rated Power: 230 400 480 SOAC (cont. operation): 230 400 480

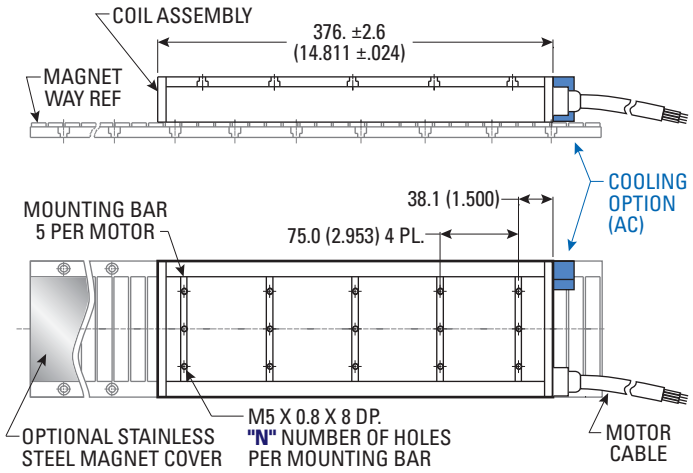
IC Ironcore DDL Motors

ICxx Coil Series Dimensional Drawings

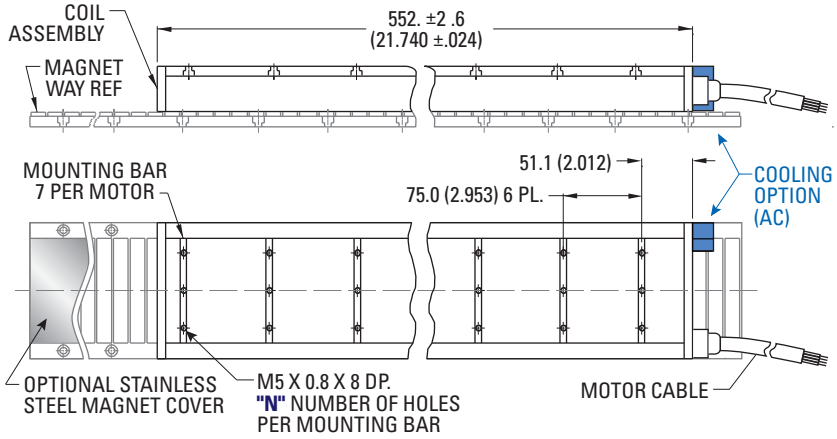
IC11 Dimensional Drawings



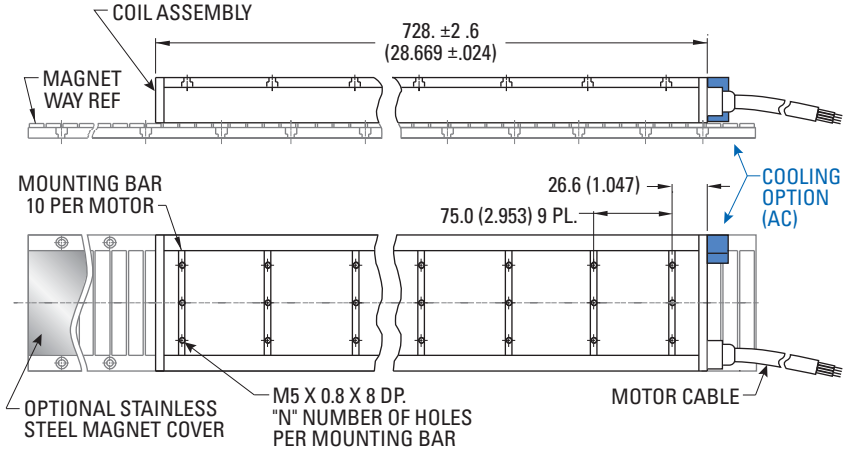
IC22 Dimensional Drawings



IC33 Dimensional Drawings

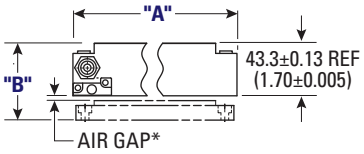


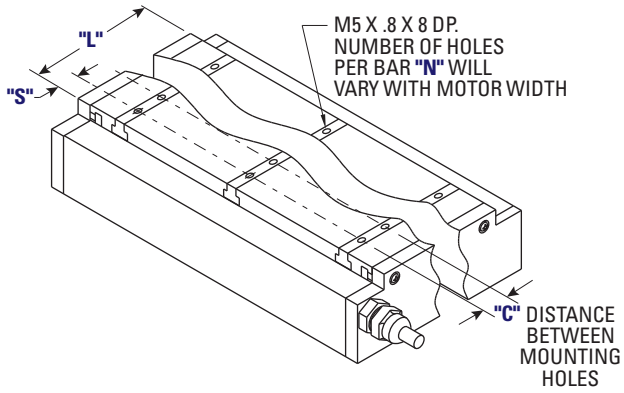
IC44 Dimensional Drawings



Dimensions in mm (in)

ICxx Typical Coil Type Dimensional Drawings and Data





*AIR GAP:
A suitable air gap should be set to ensure that the feeler gauge of the corresponding size can pass smoothly between the coil and the magnetic circuit.

For the magnetic circuit without cover, the air gap is 0.8 ± 0.1 mm

For the covered magnetic circuit, the air gap is 0.55 ± 0.1 mm

(Stainless steel cover plate thickness 0.25 mm)

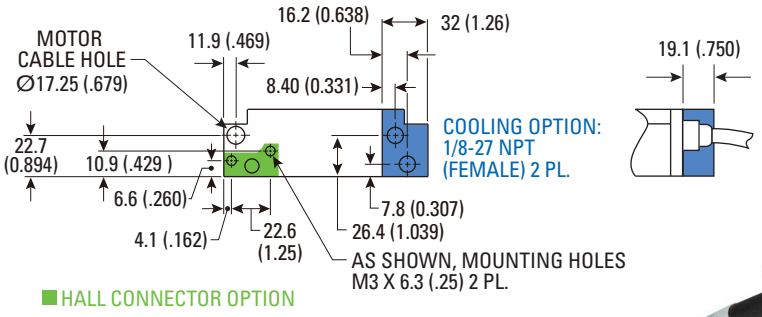
ICxx Dimensional Data, Typical Mounting Bar Lengths & Mounting Holes Tabulation

Motor Coil Type	Coil Width	Height w/ Air Gap		Spacing Between Holes	Mounting Bar Length	# Holes	
	"A"	"B" w/ mag. cvr	"B" w/o mag. cvr	"C"	"L"	"N"	"S"
ICxx030	65.0 (2.559) ± 1.0 (.04)	58.6±0.1 (2.307±.004)	58.3±0.1 (2.295±.004)	16.0 (0.630)	30 (1.18)	2	7.0 (0.28)
ICxx050	85.0 (3.346) ± 1.0 (.04)			36.0 (1.417)	50 (1.97)	2	7.0 (0.28)
ICxx075	110.0 (4.331) ± 1.0 (.04)			32.0 (1.260)	75 (2.95)	3	5.5 (0.21)
ICxx100	135.0 (5.315) ± 1.0 (.04)			36.0 (1.417)	100 (3.94)	3	14.0 (0.55)
ICxx150	185.0 (7.283) ± 1.5 (.06)	60.6±0.1 (2.386±.004)	60.3±0.1 (2.374±.004)	32.0 (1.260)	150 (5.91)	5	11.0 (0.43)
ICxx200	235.0 (9.252) ± 1.5 (.06)			36.0 (1.417)	200 (7.87)	6	10.0 (0.39)
ICxx250	285.0 (11.22) ± 1.5 (.06)			38.0 (1.496)	250 (9.84)	7	11.0 (0.43)

Note:
1. Dimensions in mm (inches)
2. Tolerances (unless otherwise specified):
   No decimal places: ±0.8
   One decimal place: ±0.1
   Two decimal places: ±0.05

Dimensions in mm (in)

ICxx Typical Cable Port and Cooling Unit Dimensions



Optional IC Hall Effect Connector Cable

Optional Cooling Unit

ICD Low-Profile Ironcore DDL Motors

Ironcore DDL linear motors have a compact profile to provide force moving load.

General Specifications

» Coil frame size 05, 10
» Coil width 030, 050, 075, 100
» Low and high-speed coil winding designs fit various application needs

	ICD05/10
Peak force range	165 – 1099 N
Continuous force range	57 – 315 N
Insulation voltage rating	230 VAC
Cooling options	Natural-cooled only
Feedback	Optional hall sensor
Thermal Devices	Thermistor – PTC
Certification	RoHS, REACH

ICD10

RoHS compliant REACh

ICD05 Low Profile Ironcore Motor Performance Data

	Symbol	Units	ICD05030		ICD05050		ICD05075		ICD05100	
Rated Performance										
Peak Force	Fp	N	165		295		441		588	
		lbf	37.1		66.3		99.1		132	
Continuous Force @ Tmax ①	Fc	N	57.0		87.0		125		157	
		lbf	12.8		19.6		28.1		35.3	
Motor Constant @ 25°C	Km	N/√W	12.3		17.2		22.0		26.0	
		lbf/√W	2.8		3.9		4.9		5.9	
Electrical Specifications										
Winding Code ②			A1	A5	A1	A5	A1	A5	A1	A5
Peak Current	Ip	Arms	7.9	13.7	8.5	14.7	8.5	14.7	8.5	14.7
Continuous Current @ Tmax	Ic	Arms	2.1	3.7	2.0	3.4	1.9	3.3	1.8	3.1
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	3.2	1.1	4.5	1.5	6.1	2.0	7.7	2.6
Electrical Inductance ±20%	L	mh L-L	9.1	3.0	14.4	4.8	21.0	7.0	27.6	9.2
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	21.8	12.6	36.3	21.0	54.3	31.4	72.4	41.8
		Vpeak/in/sec L-L	0.55	0.32	0.92	0.53	1.38	0.80	1.84	1.06
Force Constant @ 25°C±10%	Kf	N/Arms	26.7	15.4	44.5	25.7	66.5	38.4	88.7	51.2
		lbf/Arms	6.0	3.5	10.0	5.8	15.0	8.6	19.9	11.5
Mechanical Specifications										
Coil Assembly Weight ±15%	Mc	kg	0.62		0.95		1.36		1.71	
		lbs	1.4		2.1		3.0		3.8	
Magnetic Way Type (MCDxxx)			030		050		075		100	
Magnetic Way Weight ±15%	Mw	kg/m	2.70		3.93		5.48		7.04	
		lbs/in	0.15		0.22		0.31		0.39	
Figures of Merit and Additional Data										
Electrical Time Constant	Te	ms	2.9		3.2		3.4		3.6	
Max. Theoretical Acceleration ③	Amax	g's	28.0		30.2		31.9		32.8	
Magnetic Attraction	Fa	kN	0.53		0.89		1.33		1.78	
		lbf	119		200		299		400	
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	3.50		2.90		2.30		2.06	
Max. Allowable Coil Temp. ④	Tmax	°C	130		130		130		130	

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

ICD Low-Profile Ironcore DDL Motors

ICD10 Low Profile Ironcore Motor Performance Data

	Symbol	Units	ICD10030				ICD10050			
Rated Perfomance										
Peak Force	Fp	N	330				550			
		lbf	74.2				124			
Continuous Force @ Tmax ①	Fc	N	104				171			
		lbf	23.4				38.4			
Motor Constant @ 25°C	Km	N/√W	17.3				24.3			
		lbf/√W	3.9				5.5			
Electrical Specifications										
Winding Code ②			**A1**	**A4**	**A5**	**A8**	**A1**	**A4**	**A5**	**A8**
Peak Current	Ip	Arms	7.9	15.8	13.7	27.4	7.9	15.8	13.7	27.4
Continuous Current @ Tmax	Ic	Arms	1.9	3.9	3.4	6.8	1.9	3.8	3.3	6.6
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	6.4	1.6	2.1	0.5	9.0	2.2	3.0	0.7
Electrical Inductance ±20%	L	mh L-L	18.3	4.6	6.1	1.5	29.0	7.3	9.7	2.4
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	43.7	21.8	25.2	12.6	72.8	36.4	42.0	21.0
		Vpeak/in/sec L-L	1.11	0.55	0.64	0.32	1.85	0.92	1.07	0.53
Force Constant @ 25°C±10%	Kf	N/Arms	53.5	26.8	30.9	15.4	89.2	44.6	51.5	25.7
		lbf/Arms	12.0	6.0	6.9	3.5	20.1	10.0	11.6	5.8
Mechanical Specifications										
Coil Assembly Weight ±15%	Mc	kg	1.1				1.9			
		lbs	2.5				4.1			
Magnetic Way Type (MCDxxx)			**030**				**050**			
Magnetic Way Weight ±15%	Mw	kg/m	2.70				3.93			
		lbs/in	0.15				0.22			
Figures of Merit and Additional Data										
Electrical Time Constant	Te	ms	2.9				3.2			
Max. Theoretical Acceleration ③	Amax	g's	30.7				30.7			
Magnetic Attraction	Fa	kN	1.06				1.78			
		lbf	2.38				400			
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	2.05				1.52			
Max. Allowable Coil Temp. ④	Tmax	°C	130				130			

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

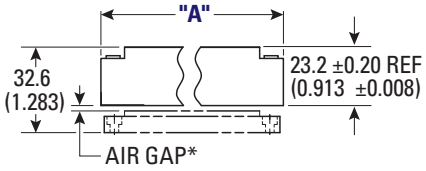
ICD10 Low Profile Ironcore Motor Performance Data (Continued)

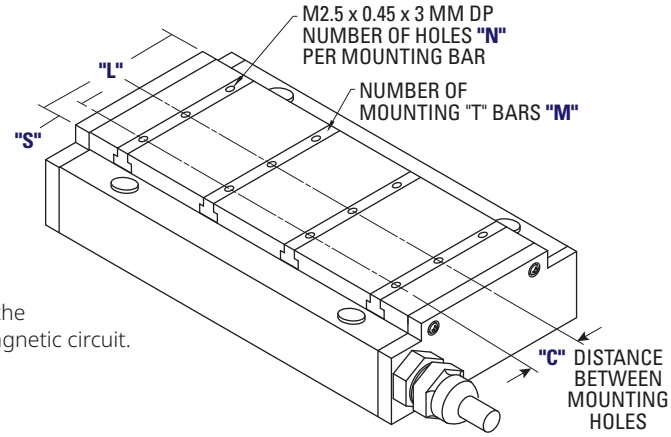
	Symbol	Units	ICD10075				ICD10100			
Rated Perfomance										
Peak Force	Fp	N	824				1099			
		lbf	185				247			
Continuous Force @ Tmax ①	Fc	N	246				315			
		lbf	55.3				70.8			
Motor Constant @ 25°C	Km	N/√W	31.3				37.1			
		lbf/√W	7.0				8.3			
Electrical Specifications										
Winding Code ②			**A1**	**A4**	**A5**	**A8**	**A1**	**A4**	**A5**	**A8**
Peak Current	Ip	Arms	7.9	15.8	13.7	27.4	7.9	15.8	13.7	27.4
Continuous Current @ Tmax	Ic	Arms	1.8	3.7	3.2	6.4	1.8	3.5	3.1	6.1
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	12.2	3.0	4.1	1.0	15.4	3.9	5.1	1.3
Electrical Inductance ±20%	L	mh L-L	42.4	10.6	14.1	3.5	55.8	13.9	18.6	4.6
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	109.2	54.6	63.1	31.5	145.7	72.8	84.1	42.0
		Vpeak/in/sec L-L	2.77	1.39	1.60	0.80	3.70	1.85	2.14	1.07
Force Constant @ 25°C±10%	Kf	N/Arms	134	66.9	77.2	38.6	178	89.2	103	51.5
		lbf/Arms	30.1	15.0	17.4	8.7	40.1	20.1	23.2	11.6
Mechanical Specifications										
Coil Assembly Weight ±15%	Mc	kg	2.7				3.4			
		lbs	5.9				7.5			
Magnetic Way Type (MCDxxx)			**075**				**100**			
Magnetic Way Weight ±15%	Mw	kg/m	5.48				7.04			
		lbs/in	0.31				0.39			
Figures of Merit and Additional Data										
Electrical Time Constant	Te	ms	3.5				3.6			
Max. Theoretical Acceleration ③	Amax	g's	32.5				33.7			
Magnetic Attraction	Fa	kN	2.66				3.56			
		lbf	598				800			
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	1.21				1.04			
Max. Allowable Coil Temp. ④	Tmax	°C	130				130			

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

ICD Low-Profile Ironcore DDL Motors

ICDxx Dimensional Drawings and Data





*AIR GAP:
A suitable air gap should be set to ensure that the feeler gauge of the corresponding size can pass smoothly between the coil and the magnetic circuit.

For the covered magnetic circuit, the air gap is 0.6 ± 0.1 mm

ICDxx Dimensional Data, Typical Mounting Bar Lengths & Mounting Holes Tabulation

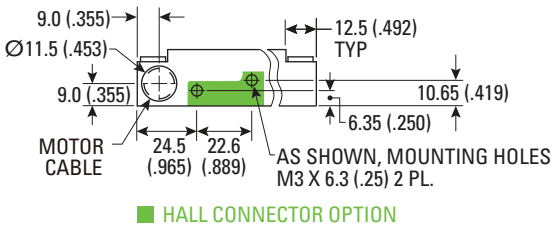
Motor Coil Type	Coil Width	# Holes	Spacing Between Holes	Mounting Bar Length	
	"A"	"N"	"C"	"L"	"S"
ICDxx030	55.0 (2.165) ± 1.0 (.04)	3	12.0 (.472)	30 (1.18)	3.0 (.118)
ICDxx050	75.0 (2.953) ± 1.0 (.04)	4	12.0 (.472)	50 (1.97)	7.0 (2.76)
ICDxx075	100.0 (3.937) ± 1.0 (.04)	5	16.0 (.630)	75 (2.95)	5.5 (.217)
ICDxx100	125.0 (4.921) ± 1.0 (.04)	5	20.0 (.787)	100 (3.94)	10.0 (.394)

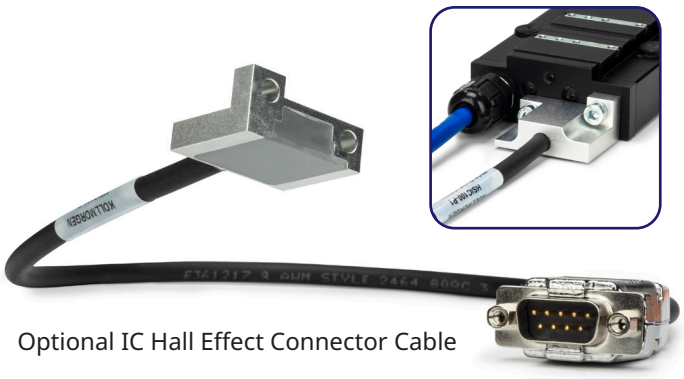
Dimensions in mm (in.)

Motor Model	Number of Bars
	"M"
ICD05XXX	4
ICD10XXX	7

Note:
1. Dimensions in mm (inches)
2. Tolerances (unless otherwise specified):
   No decimal places: ±0.8
   One decimal place: ±0.1
   Two decimal places: ±0.05

ICDxx Typical Cable Port and Optional Halls Effect Connector Dimensions

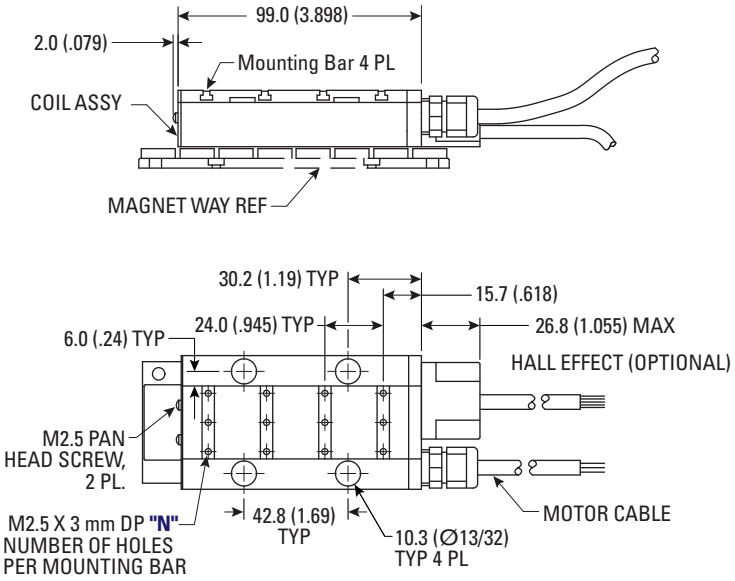




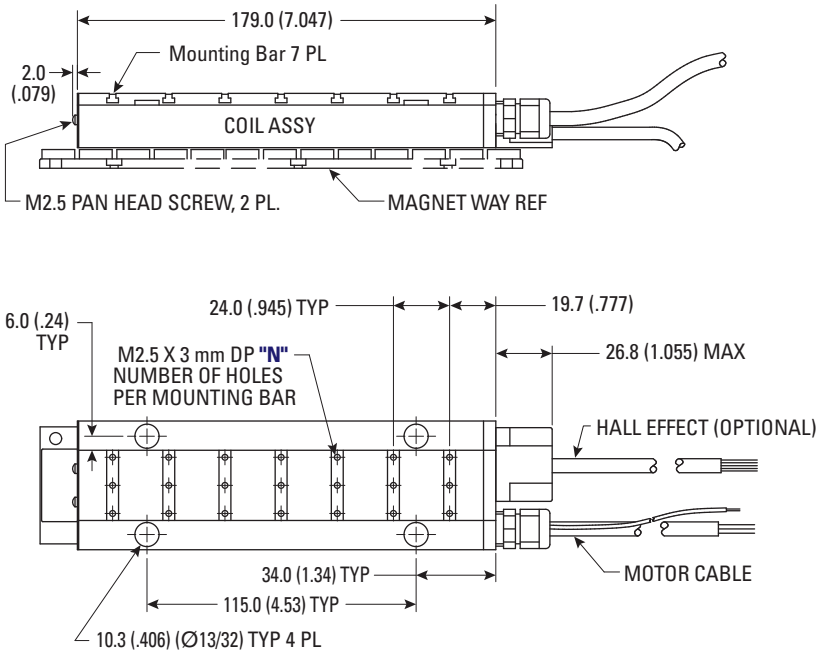
Optional IC Hall Effect Connector Cable

ICDxx Coil Series Dimensional Drawings

ICD05 Ironcore Dimensional Drawings



ICD10 Ironcore Dimensional Drawings

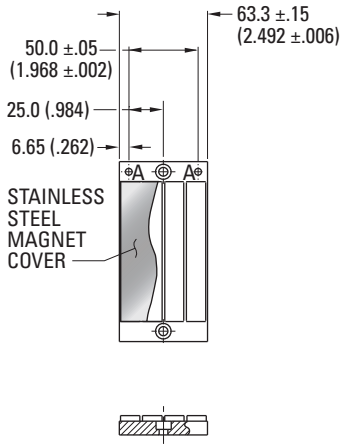


Ironcore Magnet Ways

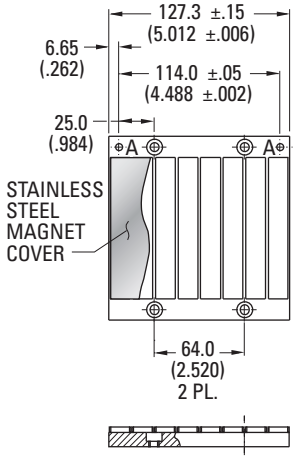
Magnet assembiles are modular and can be installed in multiples of same or alternate lengths (see following page). Standard assembly lengths are shown below.

MC Magnet Ways Dimensional Drawings

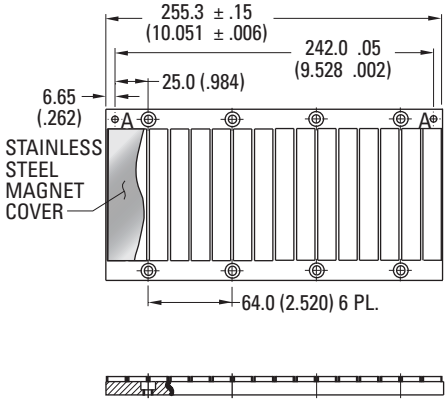
MCxxx-0064



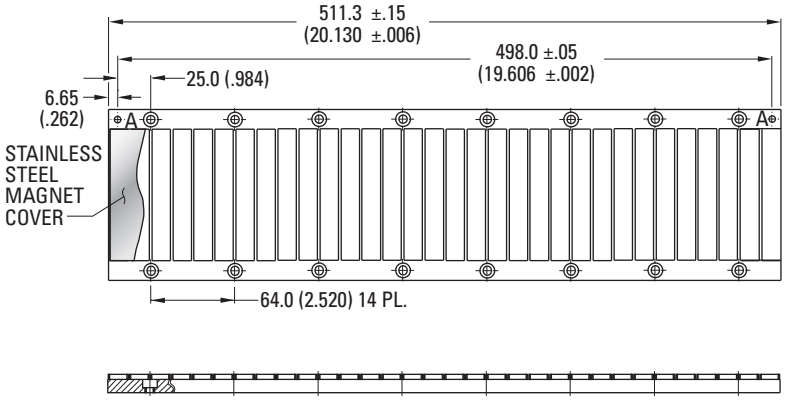
MCxxx-0128



MCxxx-0256

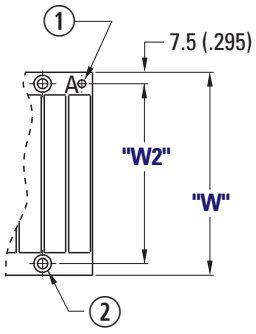


MCxxx-0512

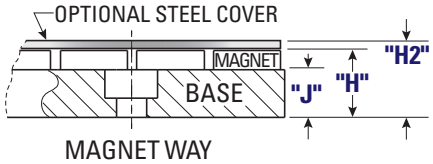


MCxxx Magnetic Way Typical Dimensions

Magnet Way Type	Assembly Width	Mounting Hole Width	Base Height	Base + Magnet Height	Total Height with Cover
	"W" ±.3 (.012)	"W2" ±.10 (.004)	"J"	"H" ±.2 (.008)	"H2" ±.2 (.008)
MC030xxxx	60.0 (2.362)	45.0 (1.772)	10.0 (0.394)	14.1 (0.555)	14.4 (0.556)
MC050xxxx	80.0 (3.150)	65.0 (2.560)			
MC075xxxx	105.0 (4.134)	90.0 (3.544)			
MC100xxxx	130.0 (5.118)	115.0 (4.528)			
MC150xxxx	180.0 (7.087)	165.0 (6.496)	12.0 (0.472)	16.1 (0.634)	16.4 (0.645)
MC200xxxx	230.0 (9.055)	215.0 (8.464)			
MC250xxxx	285.0 (11.22)	270.0 (10.63)			

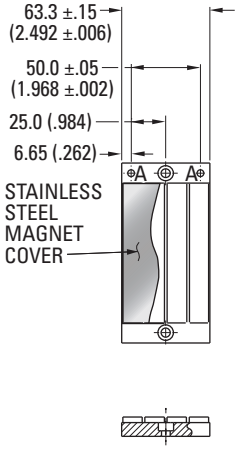


1. Ø5.110-5.135 (.201-.202) THRU 2 PL. MARKED "A" FOR RECOMMENDED 5mm M6 LOCATING PINS
2. Ø6.6 (.260) THRU C'BORE Ø11.0 (.433) X 6.2 (.246) DP. 2 PL. LOCATED AS SHOWN. RECOMMENDED MOUNTING HARDWARE: M6 SOC. HD. CAP DIN 912 (1/4" SOC. HD. CAP SCREW)

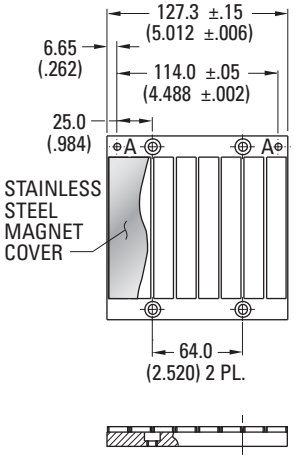


MCD Magnet Ways Dimensional Drawings

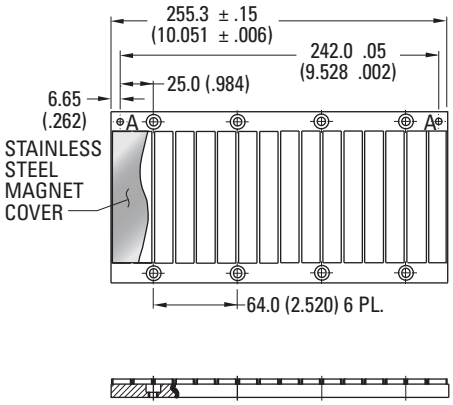
MCDxx-0064



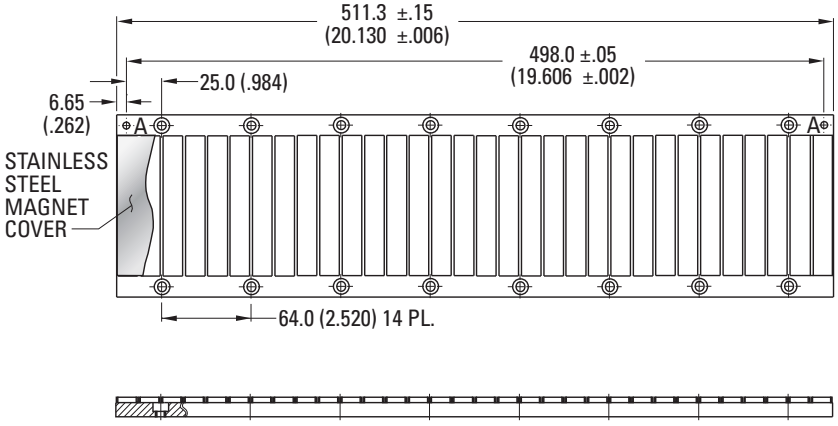
MCDxxx-0128



MCDxxx-0256



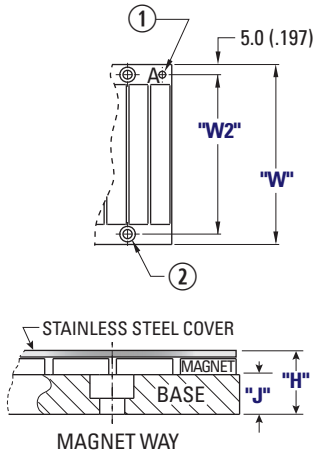
MCDxxx-0512



Type	"W" ±.25 (.010)	"W2" ±.08 (.003)	"J"	"H" ±.25 (.010)
MCD0300xxx001	55.0 (2.165)	45.0 (1.772)	4.0 (.157)	8.25 (.325)
MCD0500xxx001	75.0 (2.953)	65.0 (2.559)		
MCD0750xxx001	100.0 (3.937)	90.0 (3.543)		
MCD1000xxx001	125.0 (4.921)	115.0 (4.528)		

1. Ø5.110-5.135 (.201-.202) THRU 2 PL. MARKED "A" FOR RECOMMENDED 5mm M6 LOCATING PINS
2. Ø4.7 (.185) THRU C'BORE Ø8.3 (.327) X 1.6 $^{+0.25}_{-0.00}$ (.063) DP. 2 PL. LOCATED AS SHOWN. RECOMMENDED MOUNTING HARDWARE: M4 SOCKET CAP DIN 912 8-32 SOCKET CAP SCREW

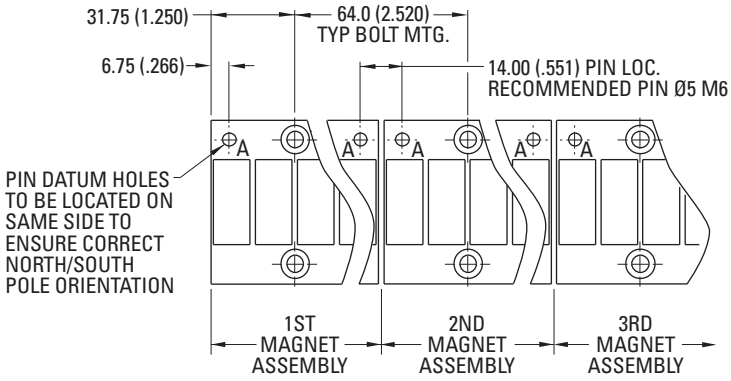
MCDxxx-xxxx



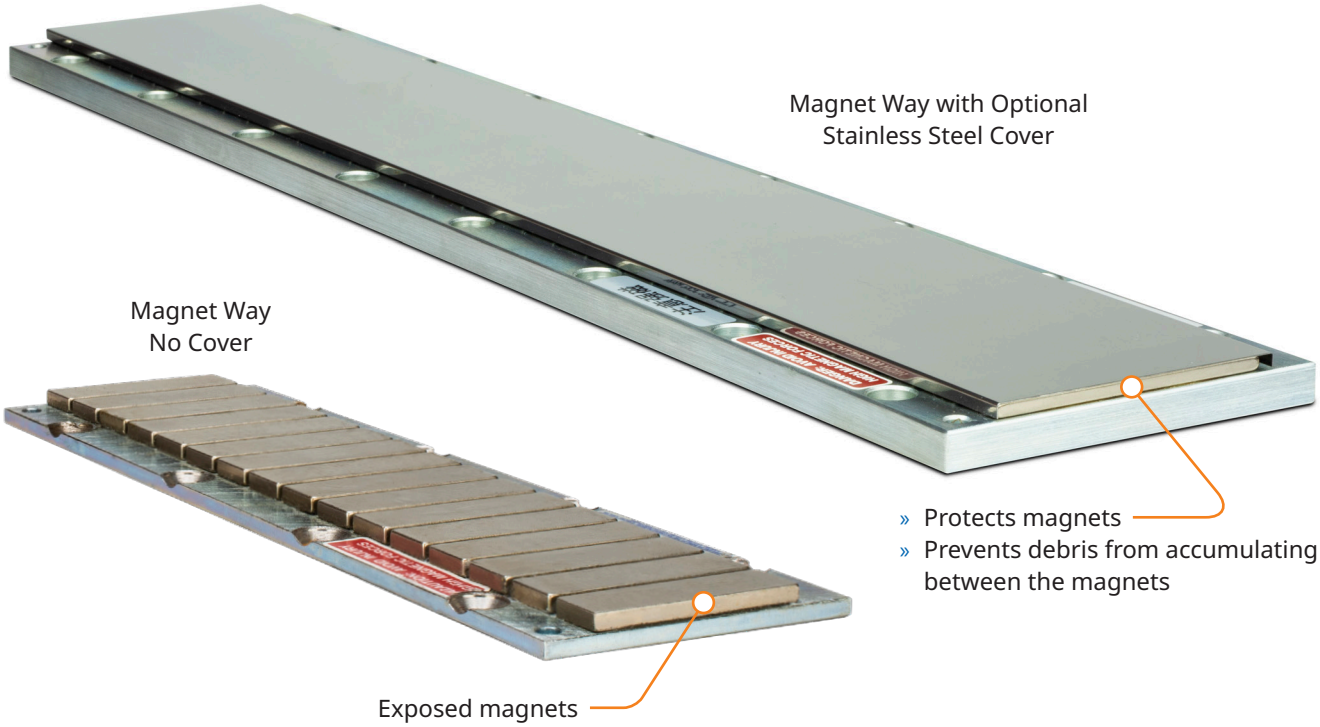
Ironcore Magnet Ways

Typical Installation of Multiple Ironcore Magnet Assemblies

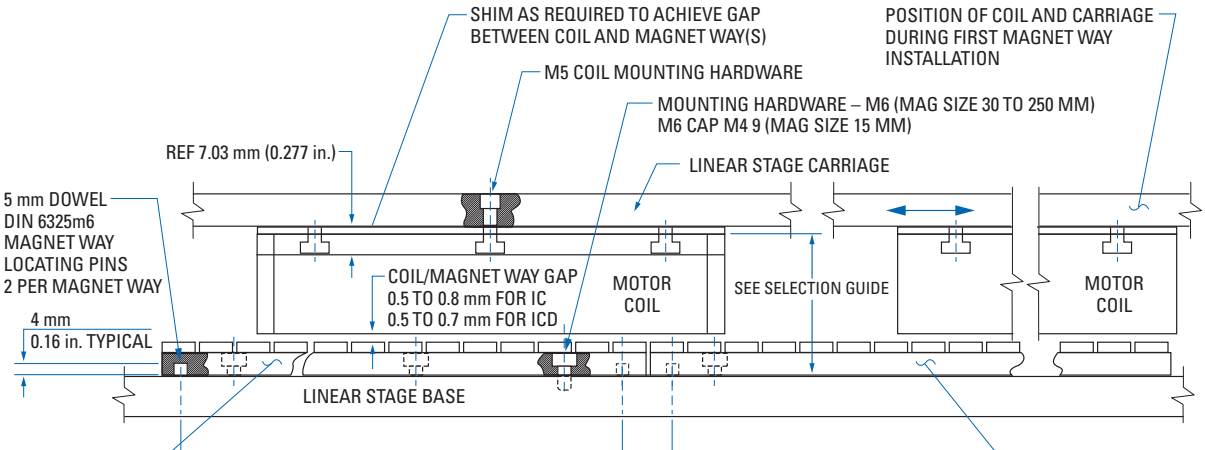
Magnet Way widths correspond to the mating coil assembly width. Magnet Way assemblies are modular and come in standard lengths: 64, 128, 256, 512 mm. Multiple magnet assemblies can be installed to obtain the desired length. Shown below is the method to mount multiple assemblies.



Optional Magnetic Way Stainless Steel Cover



Magnet Way and Ironcore Coil Assembly Overview



MAGNET WAY LENGTH (mm)	LOCATION DOWEL DIM ±0.05 mm (±0.002 in.)
64	50.00 mm (1.968 in.)
128	114.00 mm (4.488 in.)
256	242.00 mm (9.528 in.)
512	498.00 mm (19.606 in.)

IL Ironless DDL Motors

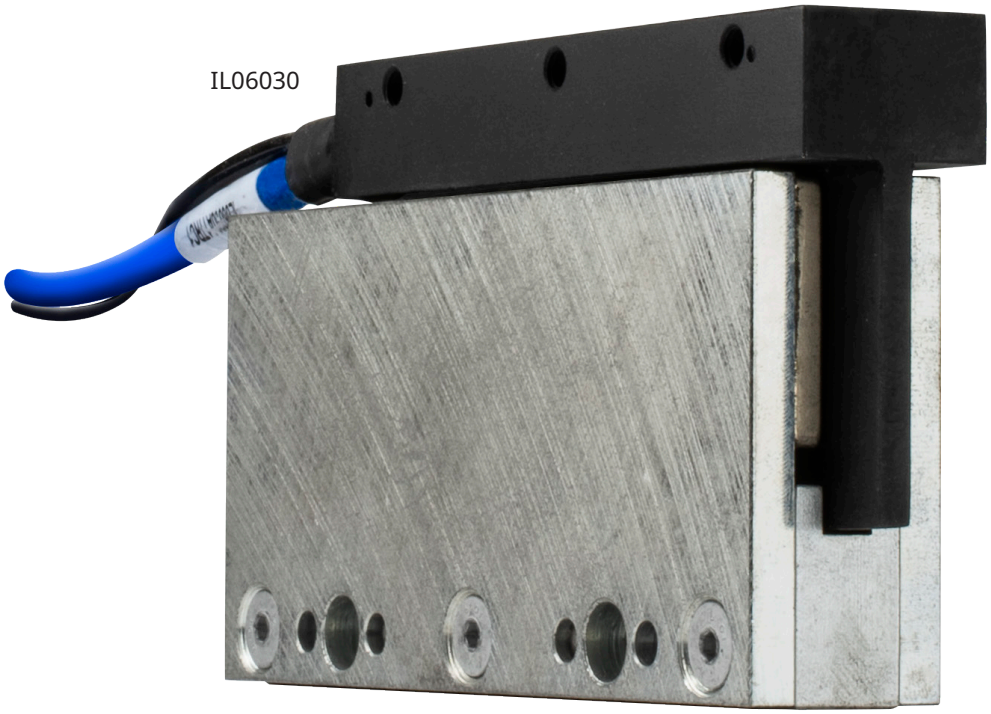
Ironless motors have no iron, or slots for the coils to be wound on. Therefore, these motors have zero cogging, a very light mass, and absolutely no attractive forces between the coil assembly and the magnet way. These characteristics are ideal for applications requiring very low bearing friction, high acceleration of lighter loads, and for maximizing constant velocity, even at ultra low speeds. The modular magnet ways consists of a double row of magnets to maximize the generated thrust force DDL linear motors have a compact profile to provide force moving load.

General Specifications

» Coil frame size 03, 06, 12, 18, 24
» Coil width 015, 030, 050, 075, 100
» Low and high-speed coil winding designs fit various application needs

	IL03/06/12/18/24
Peak force range	30 – 1600 N
Continuous force range	10 – 262 N
Insulation voltage rating	230 VAC
Cooling options	Natural-cooled only
Feedback	Optional hall sensor
Thermal Devices	Thermistor – PTC
Certification	RoHS, REACH, UL, CE

IL06030



RoHS compliant REACh UL CE

IL03 Ironless Motor Performance Data

	Symbol	Units	IL03015	IL03030	IL03050
Rated Perfomance					
Peak Force	Fp	N	30	60	100
		lbf	6.74	13.5	22.5
Continuous Force @ Tmax ①	Fc	N	10	19	31
		lbf	2.3	4.3	7.0
Motor Constant	Km	N√W	2.4	3.9	5.6
Electrical Specifications					
Winding Code ②			**A1**	**A1**	**A1**
Peak Current	Ip	Arms	7.2	7.1	7.0
Continuous Current @ Tmax	Ic	Arms	2.5	2.3	2.1
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	2.1	3.1	4.3
Electrical Inductance ±20%	L	mH L-L	0.25	0.65	1.50
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	3.4	6.9	11.6
		Vpeak/in/sec L-L	0.1	0.2	0.3
Force Constant @ 25°C±10%	kf	N/Arms	4.2	8.4	14.3
		lbf/Arms	0.9	1.9	3.2
Mechanical Specifications					
Coil Assembly Weight ±15%	Mc	kg	0.12	0.14	0.16
		lbs	0.26	0.31	0.35
Magnetic Way Type (MWxxx)			**015**	**030**	**050**
Magnetic Way Weight ±15%	Mw	kg/m	5.1	9.4	12.2
		lb/in	0.29	0.51	0.68
Figures of Merit and Additional Data					
Electrical Time Constant	Te	ms	0.12	0.21	0.35
Max. Theoretical Acceleration ③	Amax	g's	25.5	43.7	63.7
Magnetic Attraction	Fa	kN	0	0	0
		lbf	0	0	0
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	3.94	3.22	2.52
Max. Allowable Coil Temp. ④	Tmax	°C	130	130	130

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

IL Ironless DDL Motors

IL06 Ironless Motor Performance Data

	Symbol	Units	IL06015		IL06030		IL06050		IL06075		IL06100	
Rated Perfomance												
Peak Force	Fp	N	60		120		200		300		400	
		lbf	13.5		27		45		68		90	
Continuous Force @ Tmax ①	Fc	N	21		30.3		49.7		67.6		82.8	
		lbf	4.72		6.81		11.2		15.2		18.6	
Motor Constant	Km	N√W	3.3		5.6		8.0		10.2		12.1	
Electrical Specifications												
Winding Code ②			A1	A4	A1	A4	A1	A4	A1	A4	A1	A4
Peak Current	Ip	Arms	7.2	14.4	7.1	14.2	7.0	14.0	7.0	14.0	7.0	14.0
Continuous Current @ Tmax	Ic	Arms	2.5	4.9	1.8	3.6	1.7	3.5	1.6	3.2	1.5	2.9
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	4.2	1.1	6.1	1.5	8.6	2.2	11.7	2.9	14.7	3.7
Electrical Inductance ±20%	L	mH L-L	0.50	0.13	1.3	0.33	3.00	0.75	5.00	1.25	7.00	1.75
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	6.9	3.4	13.7	6.9	23.3	11.6	34.9	17.5	46.5	23.3
		Vpeak/in/sec L-L	0.18	0.09	0.35	0.17	0.59	0.30	0.89	0.44	1.18	0.59
Force Constant @ 25°C±10%	kf	N/Arms	8.4	4.2	16.8	8.4	28.5	14.3	42.8	21.4	57.0	28.5
		lbf/Arms	1.9	0.9	3.8	1.9	6.4	3.2	9.6	4.8	12.8	6.4
Mechanical Specifications												
Coil Assembly Weight ±15%	Mc	kg	0.23		0.27		0.32		0.38		0.45	
		lbs	0.5		0.6		0.7		0.8		1.0	
Magnetic Way Type (MWxxx) L = low profile T = Thinner			015	015T	030	030L	050	050L	075		100	
Magnetic Way Weight ±15%	Mw	kg/m	5.1	4.2	9.4	7.3	12.2	10.2	18.9		27.3	
		lb/in	0.29	0.24	0.51	.040	0.68	0.56	1.05		1.51	
Figures of Merit and Additional Data												
Electrical Time Constant	Te	ms	0.12		0.21		0.35		0.43		0.48	
Max. Theoretical Acceleration ③	Amax	g's	26.8		45.2		63.6		80.6		90.7	
Magnetic Attraction	Fa	kN	0		0		0		0		0	
		lbf	0		0		0		0		0	
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	1.97		1.61		1.26		1.04		0.87	
Max. Allowable Coil Temp. ④	Tmax	°C	130		130		130		130		130	

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

IL12 Ironless Motor Performance Data

	Symbol	Units	IL12015			IL12030			IL12050			IL12075			IL12100	
Rated Performance																
Peak Force	Fp	N	120			240			400			600			800	
		lbf	27			54			90			135			180	
Continuous Force @ Tmax ①	Fc	N	41			62.1			88.4			119			148	
		lbf	9.22			14.0			19.9			26.8			33.3	
Motor Constant @ 25°C	Km	N√W	4.8			7.8			11.3			14.5			17.2	
Electrical Specifications																
Winding Code ②			A1	A2	A4	A1	A2	A4	A1	A2	A4	A1	A2	A4	A2	A4
Peak Current	Ip	Arms	7.1	14.3	28.3	7.1	14.2	28.5	7.0	14.0	28.1	7.0	14.0	28.1	14.0	28.1
Continuous Current @ Tmax	Ic	Arms	2.4	4.9	9.8	1.8	3.7	7.4	1.6	3.1	6.2	1.4	2.8	5.6	2.6	5.2
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	8.5	2.1	0.5	12.2	3.1	0.8	17.2	4.3	1.1	23.3	5.8	1.5	7.4	1.8
Electrical Inductance ±20%	L	mH L-L	1.00	0.25	0.06	2.60	0.65	0.16	6.00	1.5	0.38	10.0	2.5	0.63	3.5	0.88
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	13.7	6.9	3.4	27.5	13.8	6.9	46.5	23.3	11.6	69.8	34.9	17.5	46.5	23.3
		Vpeak/in/sec L-L	0.35	0.18	0.09	0.70	0.35	0.17	1.18	0.59	0.30	1.77	0.89	0.44	1.18	0.59
Force Constant @ 25°C±10%	Kf	N/Arms	16.8	8.4	4.2	33.7	16.9	8.4	57.0	28.5	14.3	85.5	42.8	21.4	57.0	28.5
		lbf/Arms	3.78	1.89	0.94	7.6	3.8	1.9	12.8	6.4	3.2	19.2	9.6	4.8	12.8	6.4
Mechanical Specifications																
Coil Assembly Weight ±15%	Mc	kg	0.35			0.42			0.52			0.65			0.77	
		lbs	0.8			0.9			1.1			1.4			1.7	
Magnetic Way Type (MWxxx) L = low profile T = Thinner			015	015T		030	030L		050	050L		075			100	
Magnetic Way Weight ±15%	Mw	kg/m	5.1	4.2		9.4	7.3		12.2	10.2		18.9			27.3	
		lb/in	0.29	0.24		0.51	0.40		0.68	0.56		1.05			1.51	
Figures of Merit and Additional Data																
Electrical Time Constant	Te	ms	0.12			0.21			0.35			0.43			0.48	
Max. Theoretical Acceleration ③	Amax	g's	35.0			58.2			78.4			94.1			106	
Magnetic Attraction	Fa	kN	0			0			0			0			0	
		lbf	0			0			0			0			0	
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	0.984			0.804			0.629			0.519			0.433	
Max. Allowable Coil Temp. ④	Tmax	°C	130			130			130			130			130	

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

IL Ironless DDL Motors

IL18 Ironless Motor Performance Data

	Symbol	Units	IL18015				IL18030				IL18050			
Rated Performance														
Peak Force	Fp	N	180				360				600			
		lbf	40				81				135			
Continuous Force @ Tmax ①	Fc	N	62				92.1				131			
		lbf	13.9				20.7				29.4			
Motor Constant @ 25°C	Km	N√W	5.8				9.7				13.8			
Electrical Specifications														
Winding Code ②			A1	A2	A3	A4	A1	A2	A3	A4	A1	A2	A3	A4
Peak Current	Ip	Arms	7.1	14.2	21.3	42.6	7.1	14.3	21.4	42.8	7.0	14.0	21.0	42.1
Continuous Current @ Tmax	Ic	Arms	2.4	4.9	7.3	14.7	1.8	3.6	5.5	11.0	1.5	3.1	4.6	9.2
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	12.7	3.2	1.4	0.4	18.2	4.6	2.0	0.5	25.7	6.4	2.9	0.7
Electrical Inductance ±20%	L	mH L-L	1.50	0.38	0.17	0.04	3.8	0.95	0.42	0.11	9.00	2.25	1.00	0.25
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	20.7	10.3	6.9	3.4	41.2	20.6	13.7	6.9	69.8	34.9	23.3	11.6
		Vpeak/in/sec L-L	0.53	0.26	0.18	0.09	1.05	0.52	0.35	0.17	1.77	0.89	0.59	0.30
Force Constant @ 25°C±10%	Kf	N/Arms	25.3	12.7	8.4	4.2	50.5	25.3	16.8	8.4	85.5	42.8	28.5	14.3
		lbf/Arms	5.7	2.9	1.9	0.9	11.4	5.7	3.8	1.9	19.2	9.6	6.4	3.2
Mechanical Specifications														
Coil Assembly Weight ±15%	Mc	kg	0.46				0.57				0.72			
		lbs	1.0				1.3				1.6			
Magnetic Way Type (MWxxx) L = low profile T = Thinner			015		015T		030		030L		050		050L	
Magnetic Way Weight ±15%	Mw	kg/m	5.1		4.2		9.4		7.3		12.2		10.2	
		lb/in	0.29		0.24		0.51		0.40		0.68		0.56	
Figures of Merit and Additional Data														
Electrical Time Constant	Te	ms	0.12				0.21				0.35			
Max. Theoretical Acceleration ③	Amax	g's	40.2				64.5				84.9			
Magnetic Attraction	Fa	kN	0				0				0			
		lbf	0				0				0			
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	0.656				0.536				0.419			
Max. Allowable Coil Temp. ④	Tmax	°C	130				130				130			

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

IL18 Ironless Motor Performance Data (Continued)

	Symbol	Units	IL18075				IL18100			
Rated Performance										
Peak Force	Fp	N	900				1200			
		lbf	202				270			
Continuous Force @ Tmax ①	Fc	N	173				211			
		lbf	38.9				47.4			
Motor Constant @ 25°C	Km	N√W	17.7				21.0			
Electrical Specifications										
Winding Code ②			**A1**	**A2**	**A3**	**A4**	**A1**	**A2**	**A3**	**A4**
Peak Current	Ip	Arms	7.0	14.0	21.0	42.1	7.0	14.0	21.0	42.1
Continuous Current @ Tmax	Ic	Arms	1.4	2.7	4.0	8.1	1.2	2.5	3.7	7.4
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	35.0	8.8	3.9	1.0	44.2	11.1	4.9	1.2
Electrical Inductance ±20%	L	mH L-L	15.0	3.75	1.67	0.42	21.0	5.25	2.33	0.58
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	105	52.4	34.9	17.5	140	69.9	46.6	23.3
		Vpeak/in/sec L-L	2.66	1.33	0.89	0.44	3.55	1.77	1.18	0.59
Force Constant @ 25°C±10%	Kf	N/Arms	128	64.2	42.8	21.4	171	85.6	57.0	28.5
		lbf/Arms	28.8	14.4	9.6	4.8	38.5	19.2	12.8	6.4
Mechanical Specifications										
Coil Assembly Weight ±15%	Mc	kg	0.91				1.10			
		lbs	2.0				2.4			
Magnetic Way Type (MWxxx)			**075**				**100**			
Magnetic Way Weight ±15%	Mw	kg/m	18.9				27.3			
		lb/in	1.05				1.51			
Figures of Merit and Additional Data										
Electrical Time Constant	Te	ms	0.43				0.48			
Max. Theoretical Acceleration ③	Amax	g's	101				111			
Magnetic Attraction	Fa	kN	0				0			
		lbf	0				0			
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	0.35				0.29			
Max. Allowable Coil Temp. ④	Tmax	°C	130				130			

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

IL Ironless DDL Motors

IL24 Ironless Motor Performance Data

	Symbol	Units	IL24015			IL24030			IL24050		
Rated Performance											
Peak Force	Fp	N	240			480			800		
		lbf	54			108			180		
Continuous Force @ Tmax ①	Fc	N	83			109			155		
		lbf	18.7			24.5			34.8		
Motor Constant @ 25°C	Km	N√W	6.7			11.2			15.9		
Electrical Specifications											
Winding Code ②			A1	A2	A3	A1	A2	A3	A1	A2	A3
Peak Current	Ip	Arms	7.1	14.2	28.4	7.1	14.2	28.5	7.0	14.0	28.1
Continuous Current @ Tmax	Ic	Arms	2.4	4.9	9.8	1.6	3.2	6.4	1.4	2.7	5.4
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	16.9	4.20	1.10	24.3	6.1	1.5	34.3	8.6	2.1
Electrical Inductance ±20%	L	mH L-L	2.00	0.50	0.13	5.1	1.28	0.32	12.0	3.00	0.75
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	27.5	13.8	6.9	55.0	27.5	13.8	93.1	46.5	23.3
		Vpeak/in/sec L-L	0.70	0.35	0.18	1.40	0.70	0.35	2.36	1.18	0.59
Force Constant @ 25°C ±10%	Kf	N/Arms	33.7	16.9	8.4	67.4	33.7	16.9	114	57.0	28.5
		lbf/Arms	7.6	3.8	1.9	15.2	7.6	3.8	25.6	12.8	6.4
Mechanical Specifications											
Coil Assembly Weight ±15%	Mc	kg	0.57			0.72			0.92		
		lbs	1.3			1.6			2.0		
Magnetic Way Type (MWxxx) L = low profile T = Thinner			015	015T		030	030L		050	050L	
Magnetic Way Weight ±15%	Mw	kg/m	5.1	4.2		9.4	7.3		12.2	10.2	
		lb/in	0.29	0.24		0.51	0.40		0.68	0.56	
Figures of Merit and Additional Data											
Electrical Time Constant	Te	ms	0.12			0.21			0.35		
Max. Theoretical Acceleration ③	Amax	g's	42.9			68.0			88.7		
Magnetic Attraction	Fa	kN	0			0			0		
		lbf	0			0			0		
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	0.49			0.40			0.32		
Max. Allowable Coil Temp. ④	Tmax	°C	130			130			130		

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

IL24 Ironless Motor Performance Data (Continued)

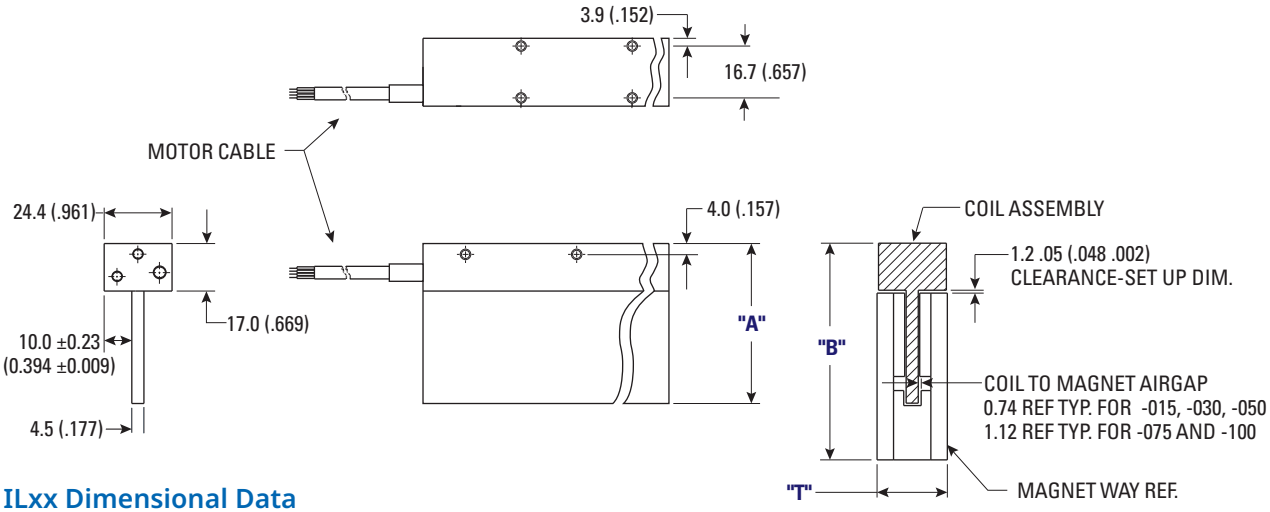
	Symbol	Units	IL24075				IL24100			
Rated Performance										
Peak Force	Fp	N	1200				1600			
		lbf	270				360			
Continuous Force @ Tmax ①	Fc	N	211				262			
		lbf	47.4				58.9			
Motor Constant @ 25°C	Km	N√W	20.6				24.4			
Electrical Specifications										
Winding Code ②			A1	A2	A3	A4	A1	A2	A3	A4
Peak Current	Ip	Arms	7.0	14.0	28.0	56.1	7.0	14.0	28.1	56.1
Continuous Current @ Tmax	Ic	Arms	1.2	2.5	4.9	9.9	1.2	2.3	4.6	9.2
Electrical Resistance @ 25°C±10%	Rm	Ohms L-L	46.6	11.7	2.9	0.73	58.9	14.7	3.7	0.92
Electrical Inductance ±20%	L	mH L-L	20.0	5.0	1.25	0.31	28.0	7.00	1.75	0.44
Back EMF Constant @ 25°C±10%	Ke	Vpeak/m/s L-L	140.	69.9	34.9	17.5	186	93.1	46.6	23.3
		Vpeak/in/sec L-L	3.55	1.77	0.89	0.44	4.73	2.37	1.18	0.59
Force Constant @ 25°C ±10%	Kf	N/Arms	171	85.6	42.8	21.4	228	114	57.0	28.5
		lbf/Arms	38.5	19.2	9.6	4.8	51.3	25.6	12.8	6.4
Mechanical Specifications										
Coil Assembly Weight ±15%	Mc	kg	1.17				1.42			
		lbs	2.6				3.1			
Magnetic Way Type (MWxxx)			075				100			
Magnetic Way Weight ±15%	Mw	kg/m	18.9				27.3			
		lb/in	1.05				1.51			
Figures of Merit and Additional Data										
Electrical Time Constant	Te	ms	0.43				0.48			
Max. Theoretical Acceleration ③	Amax	g's	105				115			
Magnetic Attraction	Fa	kN	0				0			
		lbf	0				0			
Thermal Resistance ④ (Coils to External Structure)	Rth	°C/Watt	0.26				0.22			
Max. Allowable Coil Temp. ④	Tmax	°C	130				130			

Notes:
① The motor continuous rated force is measured with the motor coils achieving the motor maximum allowable temperature Tmax.
② Alternate windings can be made available. Please consult Kollmorgen Customer Support for design options.
③ Maximum theoretical acceleration is based on the motor's peak force and the motor mass alone. Limitations due to such factors as the additional mass of the load, the bearing type and design, the shock rating of the feedback, and the peak current available from the amplifier etc., must be considered to determine the achievable acceleration in each application.
④ Please see the application sizing section for more details on sizing and thermal considerations.

IL Ironless DDL Motors

ILxx Typical Coil Type Dimensional Drawings and Data

ILxx Typical Dimensions



ILxx Dimensional Data

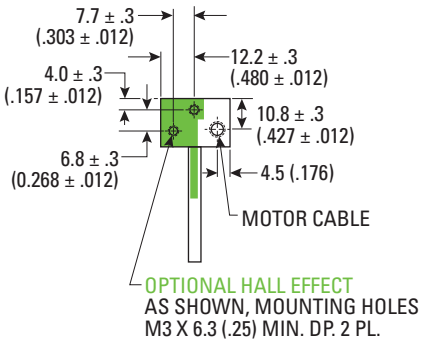
Motor Coil	Coil Width "A" ILxx015: +0.5 (0.020) ILxx030-100: +0.7 (0.027) −0.3 (0.012)	Typ. Assy. Width "B" ±.6 (0.024)	Typ. Assy. Width "T" ±.4 (0.016)
ILxx015	42.30 (1.665)	52.10 (2.051)	25.40 (1.000)
ILxx015 T	42.30 (1.665)	52.10 (2.051)	21.70 (0.854)
ILxx030	57.30 (2.256)	78.50 (3.091)	25.40 (1.000)
ILxx030 L	57.30 (2.256)	67.30 (2.650)	25.40 (1.000)
ILxx050	77.30 (3.043)	98.50 (3.878)	25.40 (1.000)
ILxx050 L	77.30 (3.043)	87.30 (3.437)	25.40 (1.000)
ILxx075	102.30 (4.028)	123.50 (4.862)	30.00 (1.181)
ILxx100	127.30 (5.012)	148.50 (5.846)	34.00 (1.339)

Dimensions in mm (in.)

Note:
1. Dimensions in mm (inches)
2. Tolerances (unless otherwise specified):
   No decimal places: ±0.8
   One decimal place: ±0.1
   Two decimal places: ±0.05

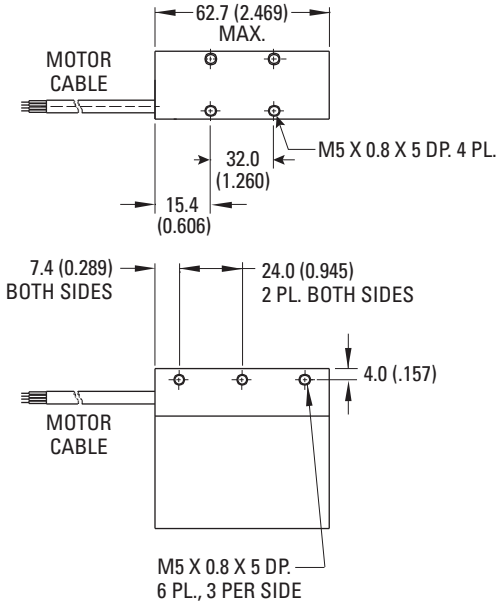
ILxx Typical Cable Port Dimensions

ILxx Cable Ports and Hall Mount



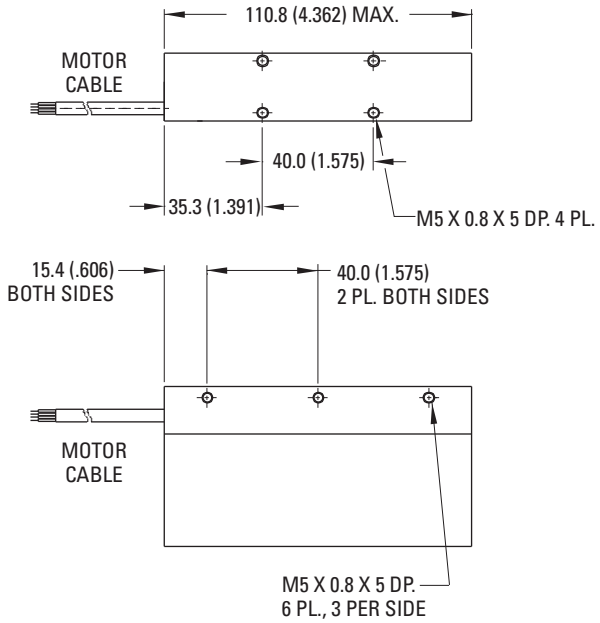
IL Coil Series Dimensional Drawings

IL03 Dimensions

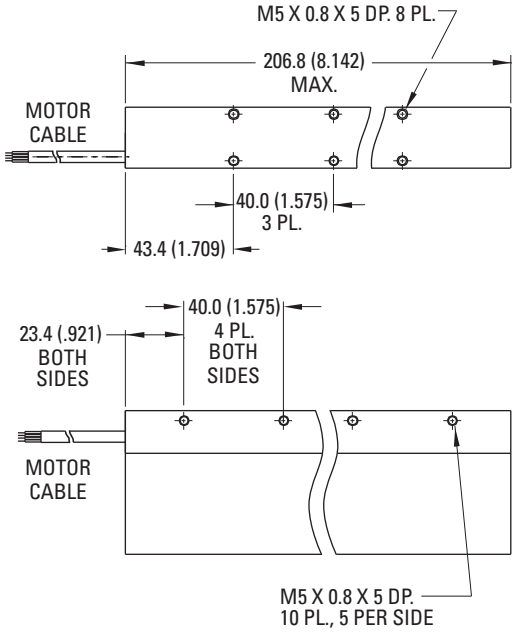


IL Coil Series Dimensional Drawings

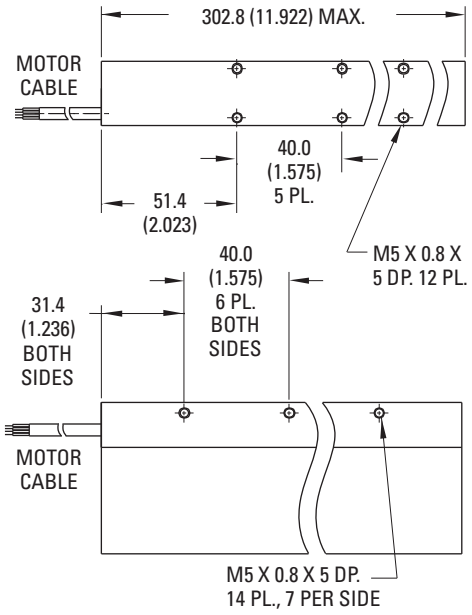
IL06 Dimensions



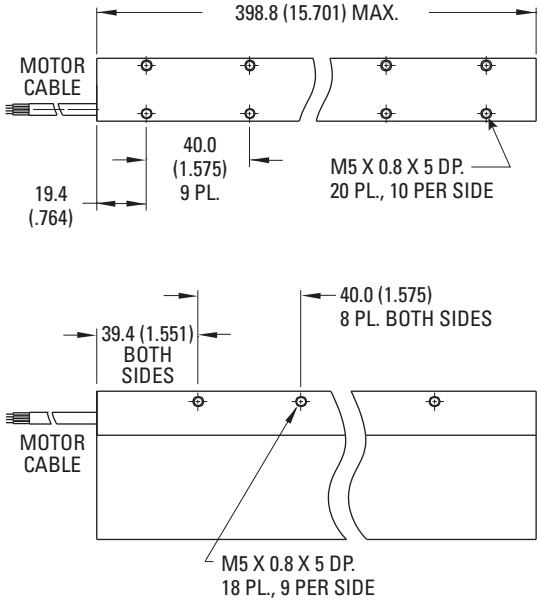
IL12 Dimensions



IL18 Dimensions



IL24 Dimensions

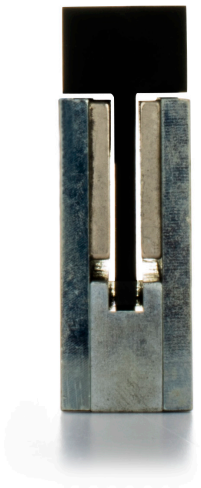


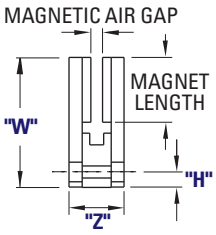
Note:
1. Dimensions in mm (inches)
2. Tolerances (unless otherwise specified):
   No decimal places: ±0.8
   One decimal place: ±0.1
   Two decimal places: ±0.05

Ironless Magnet Ways

Magnetic Way Dimensional Data

Magnet Way MWxxx-0xxx Standard Dimensions



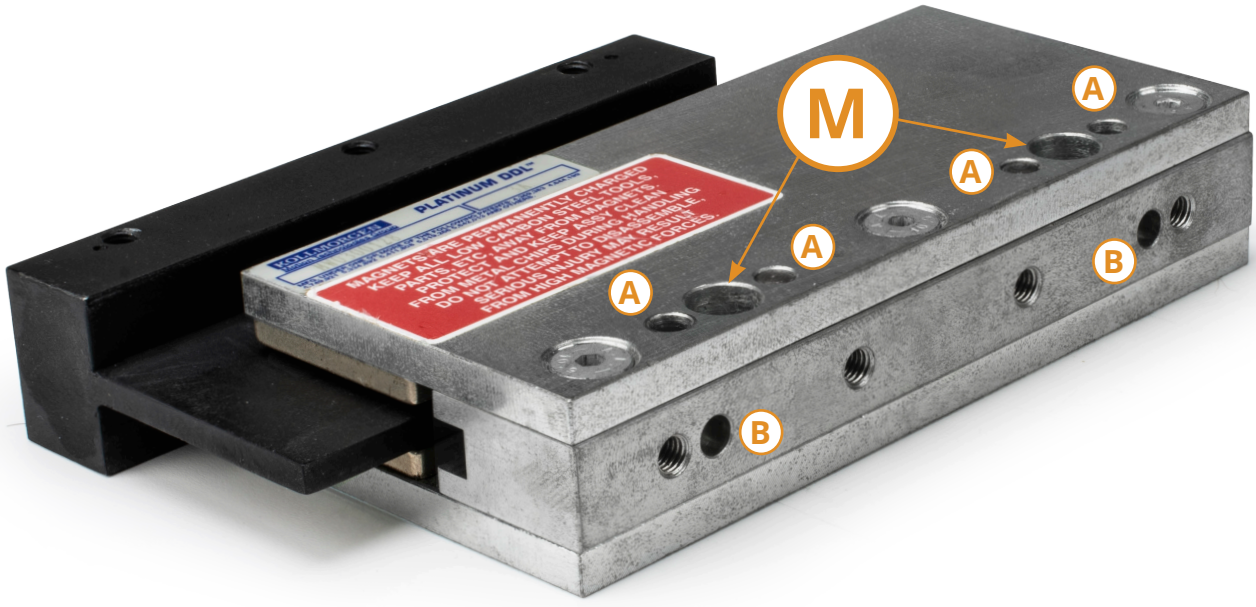


Magnet Way	Magnet Size Reference	"H" ±.8 (.003)	"W" ±.4 (.016)	"Z" ±.4 (.016)
MW0150xxx	15 mm	5.69 (.224)	33.80 (1.331)	25.40 (1.000)
MW015T0xxx	15 mm	5.69 (.224)	33.80 (1.331)	21.8 (0.858)
MW0300xxx	30 mm	7.11 (.280)	60.20 (2.370)	25.40 (1.000)
MW030L0xxx	30 mm	5.69 (.224)	49.00 (1.929)	25.40 (1.000)
MW0500xxx	50 mm	7.11 (.280)	80.20 (3.158)	25.40 (1.000)
MW050L0xxx	50 mm	5.69 (.224)	69.00 (2.716)	25.40 (1.000)
MW0750xxx	75 mm	8.23 (.324)	105.20 (4.142)	30.00 (1.181)
MW1000xxx	100 mm	8.23 (.324)	130.20 (5.126)	34.00 (1.339)

"M" Dimensional Specifications

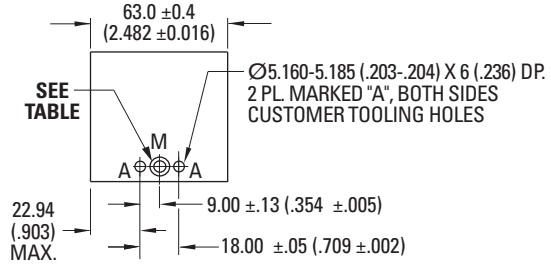
Magnet Way	Hardware (Hex, Socket Head Cap)					
	Hole Dia. ±.13 (.005)	C'bore Dia. ±.13 (.005)	C'bore Depth ±.13 (.005)	Metric	Inch	Bottom Mount Thread Option
MW0150xxx	4.70 (.185)	7.80 (.307)	4.00 (.158)	M4	#8	M4 X 0.7 X 6.0 DP.
MW015T0xxx	4.70 (.185)	7.80 (.307)	5.79 (.228)	M4	#8	M4 X 0.7 X 6.0 DP.
MW0300xxx	5.70 (.224)	9.35 (.368)	5.79 (.228)	M5	#10	M5 X 0.8 X 8.0 DP.
MW030L0xxx	4.70 (.185)	7.80 (.307)	5.79 (.228)	M4	#8	M4 X 0.7 X 6.0 DP.
MW0500xxx	5.70 (.224)	9.35 (.368)	5.79 (.228)	M5	#10	M5 X 0.8 X 8.0 DP.
MW050L0xxx	4.70 (.185)	7.80 (.307)	5.79 (.228)	M4	#8	M4 X 0.7 X 6.0 DP.
MW0750xxx	5.70 (.224)	9.35 (.368)	7.95 (.313)	M5	#10	M5 X 0.8 X 8.0 DP.
MW1000xxx	5.70 (.224)	9.35 (.368)	9.96 (.392)	M5	#10	M5 X 0.8 X 8.0 DP.

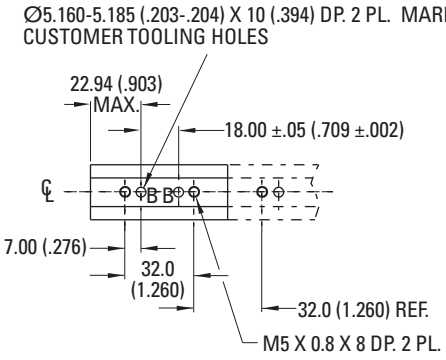
Dimensions in mm (in.)



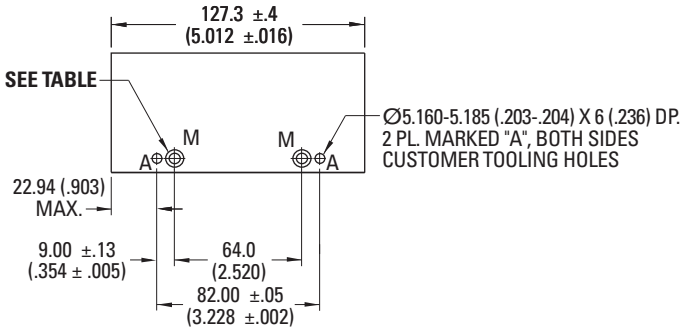
Magnetic Way Dimensional Data (Continued)

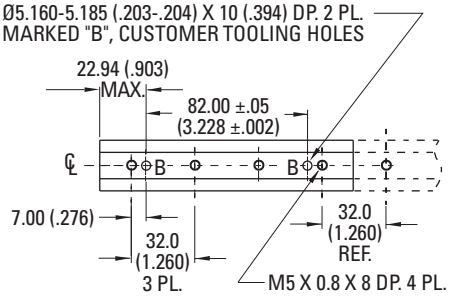
MWxxx-0064 Dimensional Data



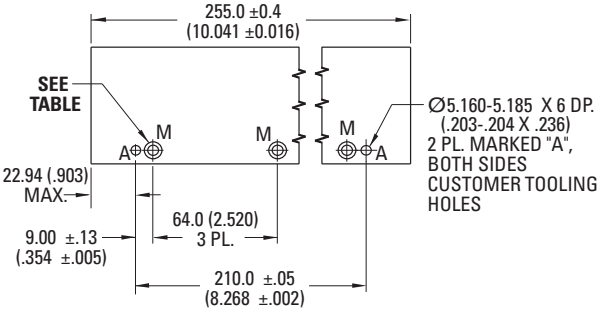


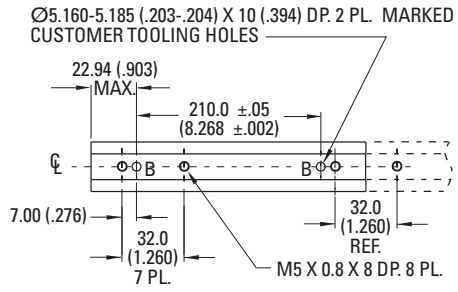
MWxxx-0128 Dimensional Data



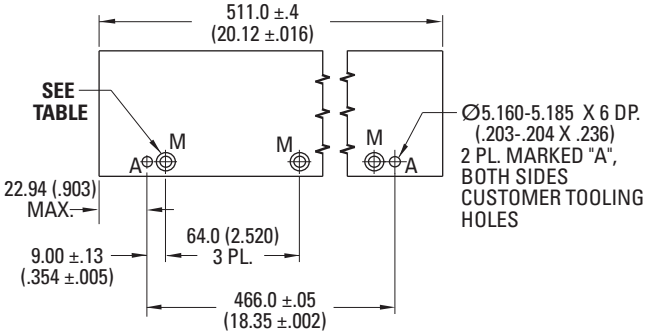


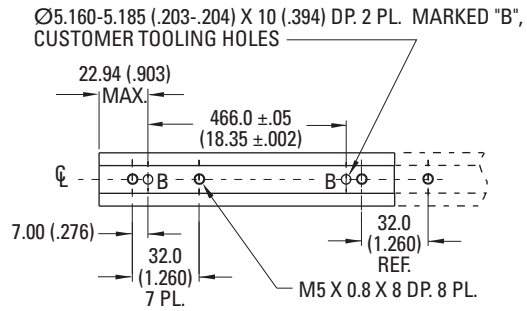
MWxxx-0256 Dimensional Data





MWxxx-0512 Dimensional Data





Ironless Magnet Ways

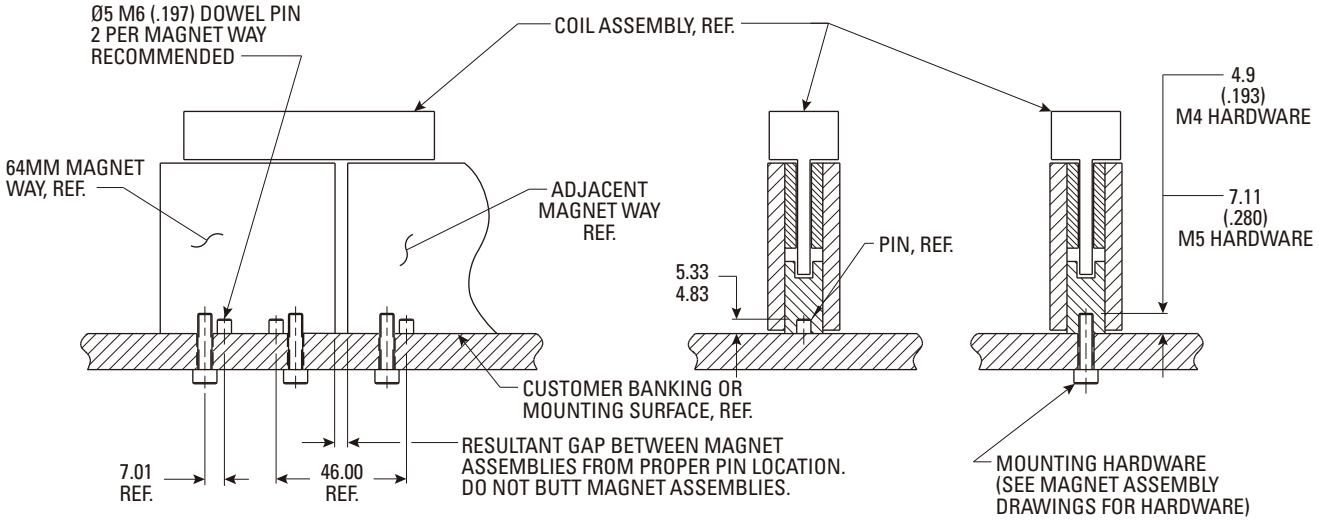
Magnetic Way Assemblies Dimensional Data and Specifications

Magnetic assemblies are modular and can be installed in integer multiples of the same length or alternative lengths.

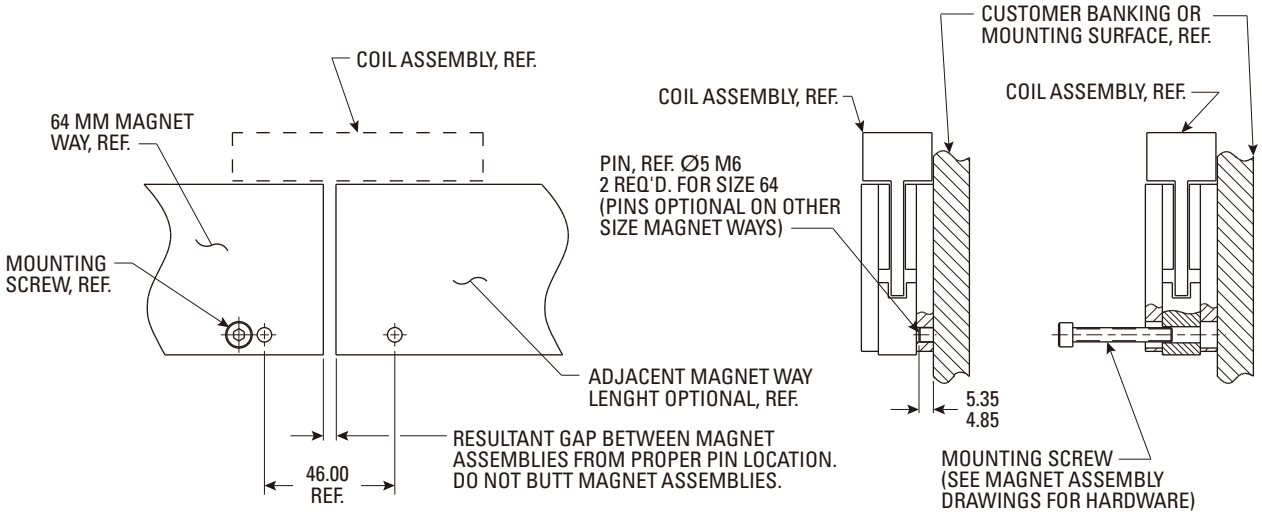
The width of the magnetic circuit corresponds to the width of the matching coil assembly.

The magnetic circuit assemblies are modular and are available in the following standard lengths: 64, 128, 256, 512 mm.

Base Mounting



Side Mounting



Thermal Sensor Protective Devices

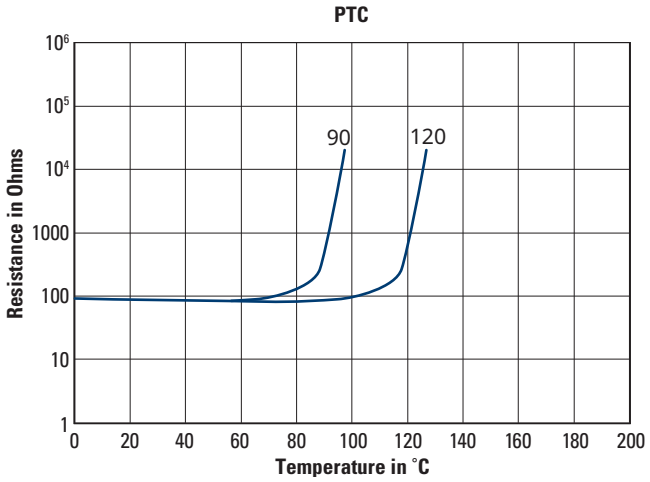
The standard version of each motor is fitted with a choice of an electrically isolated PTC Avalanche-Type thermal sensor, a PT1000 RTD Linear thermal sensor, or a thermostat. The thermal sensors do not provide any protection against short, heavy overloading.

The sensor is integrated into the monitoring system of the digital servo amplifiers with correct connection.

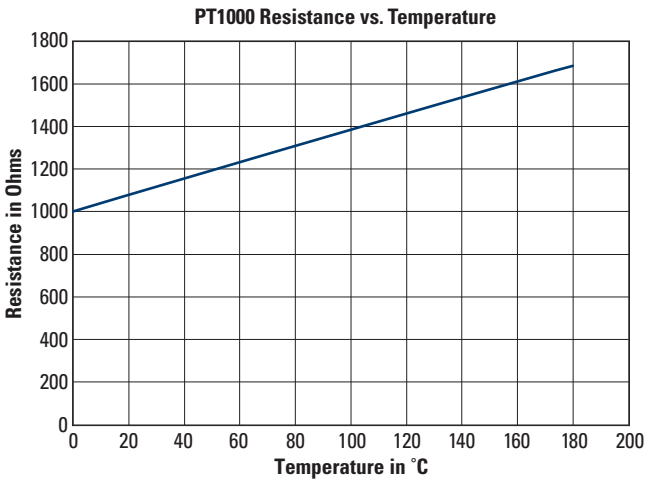
Thermal Device Options: Resistance vs. Temperature Graphs

Kollmorgen AKD drives can directly interpret information from the motor thermal sensors to properly reflect the motor winding temperature. For other drives please refer to the graph Delta Between Motor Winding and Thermal Device on the following page.

Option TR



Option T1



Note: PTC thermistor (155°C ± 5 °C switching temperature) installed.

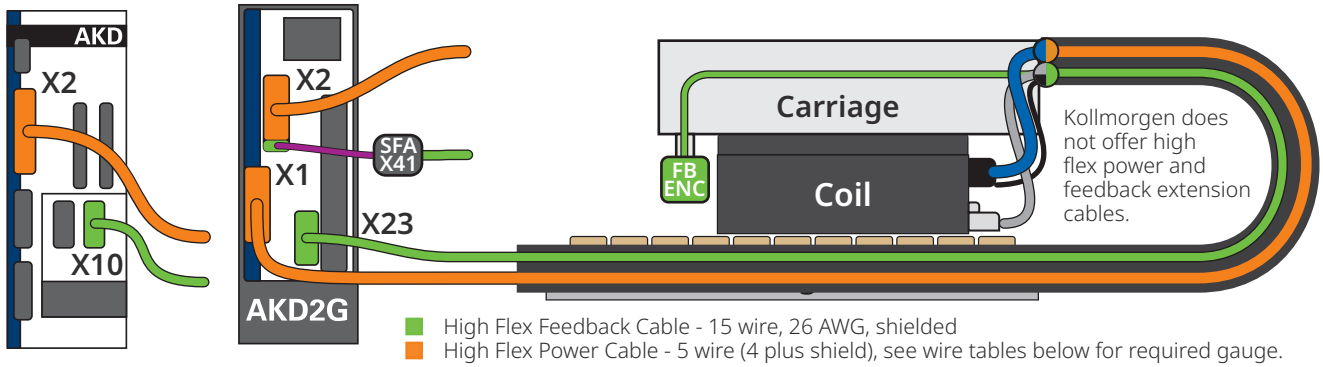
Resistance at 25 °C: ≤ 550 ohms.

Switching Resistance: ≥ 1330 ohms within ±5 °C of switch temperature.

Wiring and Output

DDL to AKD/AKD2G System Wiring

DDL to AKD2G / AKD Connection Via High Flex Extension Cables



High Flex Feedback Cable - 15 wire, 26 AWG, shielded
High Flex Power Cable - 5 wire (4 plus shield), see wire tables below for required gauge.

AKD and AKD2G power connectors are available through Kollmorgen. Please contact Customer Support for more information.

Wiring Specification Tables for High Flex Extension Cables

Motor Wire Table
SEE TABLE BE LOW FOR AWG DIA

Wire Color	Function
–	–
Red	U
White	V
Black	W
Grn/Yel	GND
Violet	Shield

Hall Effect Wire Table
26 AWG 6.0 DIA (.24")

Pin #	Color	Function
1	Red	+5 Vdc
2	Orange	S1
3	Yellow	S2
4	Brown	S3
5	Black	Return
Shell	Shield	Shield

Thermal Protection Wire Table
Cable Diameter 3.8 (.15 in.)

Type	Thermostat	Thermistor	
Wire Gauge	22 AWG	26 AWG	
Code	TS	TR - PTC	T1 - PT1000
Wire/Pin #	Color		
1	Black/White	Black/White	Blue
2	Black/White	Black/White	Blue

Notes:
PTC - Transition point 120˚C (IC/ICD) / 90˚C (IL)
PT1000 - Linear 180˚C max. (IC only)

Note: Ground and shield connection at shell: first make/last break

IC WIRE TABLE NON-COOLED

WINDING CODE	AWG	APPROX. CBL. DIA.
A1	18	6.69 mm (.265 in)
A2	18	6.69 mm (.265 in)
A3	14	7.96 mm (.315 in)
A5	18	6.69 mm (.265 in)
A6	14	7.96 mm (.315 in)
A7	12	8.97 mm (.355 in)

IC WIRE TABLE COOLED (AC)

WINDING CODE	AWG	APPROX. CBL. DIA.
A1	18	6.69 mm (.265 in)
A2	14	7.96 mm (.315 in)
A3	12	8.97 mm (.355 in)
A5	14	7.96 mm (.315 in)
A6	12	8.97 mm (.355 in)

ICD WIRE TABLE

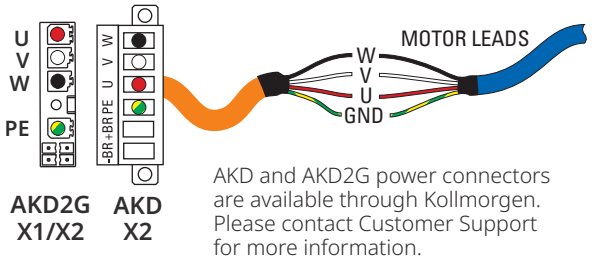
WINDING CODE	AWG	APPROX. CBL. DIA.
ALL (A1 - A4)	22	6.18 mm (.245 in)

IL WIRE TABLE

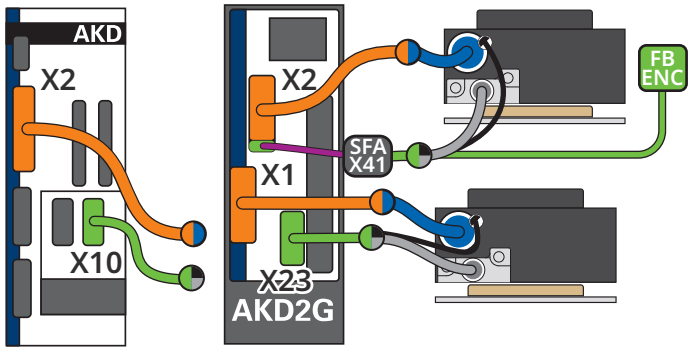
WINDING CODE	AWG	APPROX. CBL. DIA.
ALL (A1,A2,A3,A4)	18	6.69 mm (.265 in)

DDL to AKD/AKD2G System Wiring

DDL to AKD2G / AKD Power Connection



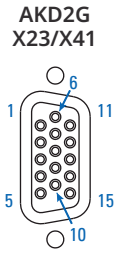
AKD and AKD2G power connectors are available through Kollmorgen. Please contact Customer Support for more information.



DDL to AKD2G / AKD Hall, Thermal Device, and Feedback Connections

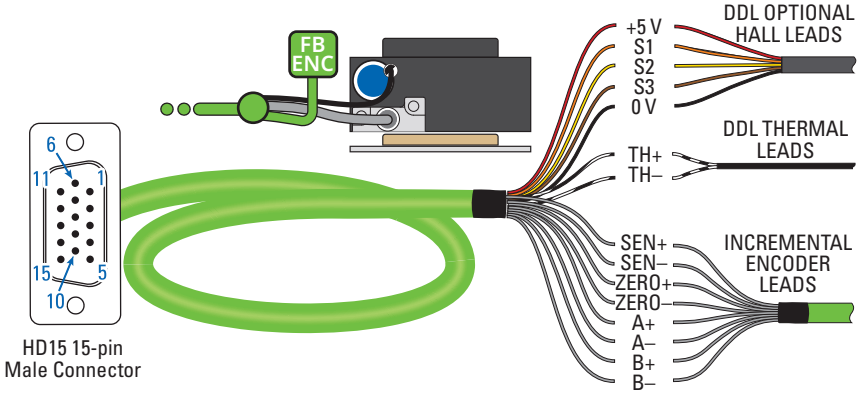
AKD/AKD2G Connector Pinouts to DDL Optional Hall Leads

X23/X41 X10 Pin	X23/X41 X10 Pin Label	DDL HALL + TH Leads
1	Hall U	S1
2	Hall V	S2
3	Hall W	S3
8	TH+	TH+
9	TH-	TH-
10	+5 V	+5 V
11	0 V	Return



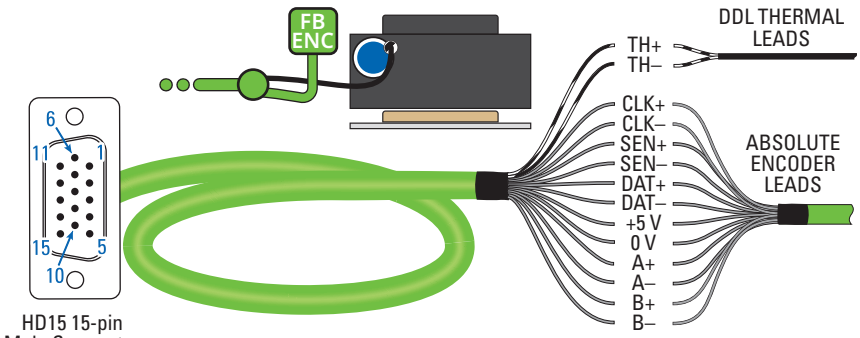
AKD X10 HD15 Female Connector

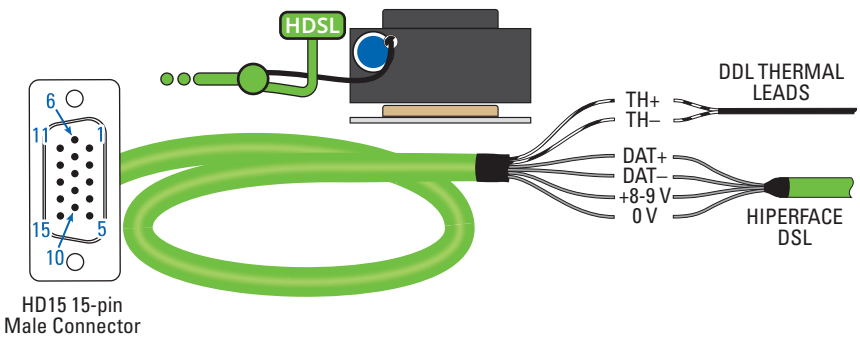
Hall, Thermal Device, and Optional Feedback Leads to HD15 15-pin AKD/AKD2G Mating Connector



AKD/AKD2G Connector Pinouts to Feedback Leads

X23/X41 X10 Pin	FB ENC Optional Incr. Encoder Leads	FB ENC Optional Abs. Encoder Leads	HDSL HIPERFACE DSL
2	–	CLK+	–
3	–	CLK–	–
4	SENSE+	SENSE+	–
5	SENSE–	SENSE–	–
6	Zero+	DAT+	DAT+
7	Zero–	DAT–	DAT–
8	DDL TH+		
9	DDL TH–		
10	–	+5 V	+8-9 V
11	–	0 V	0 V
12	A+	A+	–
13	A–	A–	–
14	B+	B+	–
15	B–	B–	–

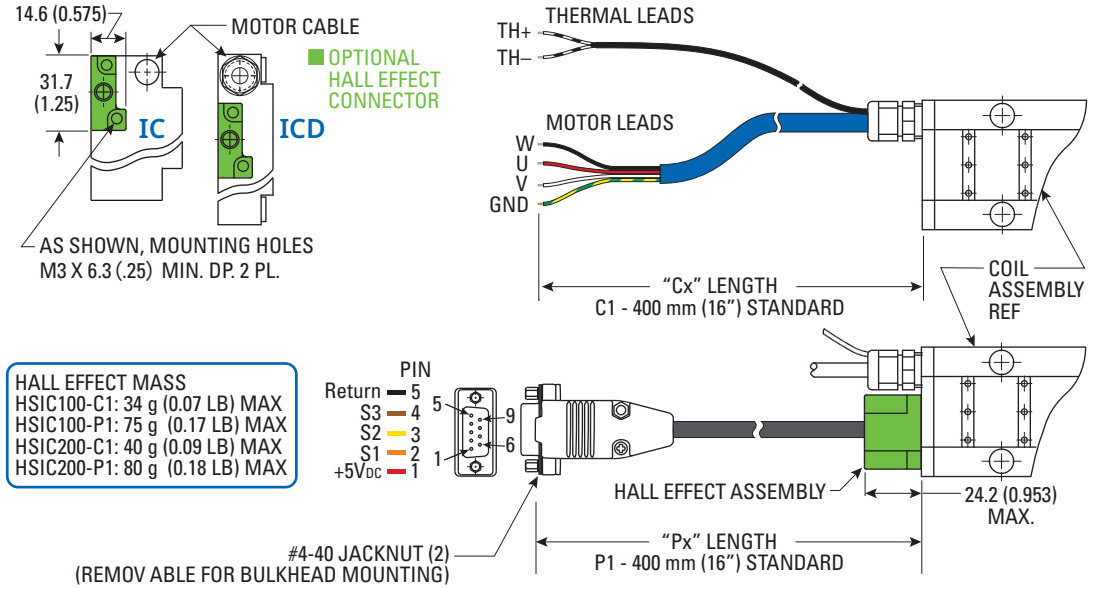




Wiring and Output

Wiring Leads and Connector Specifications

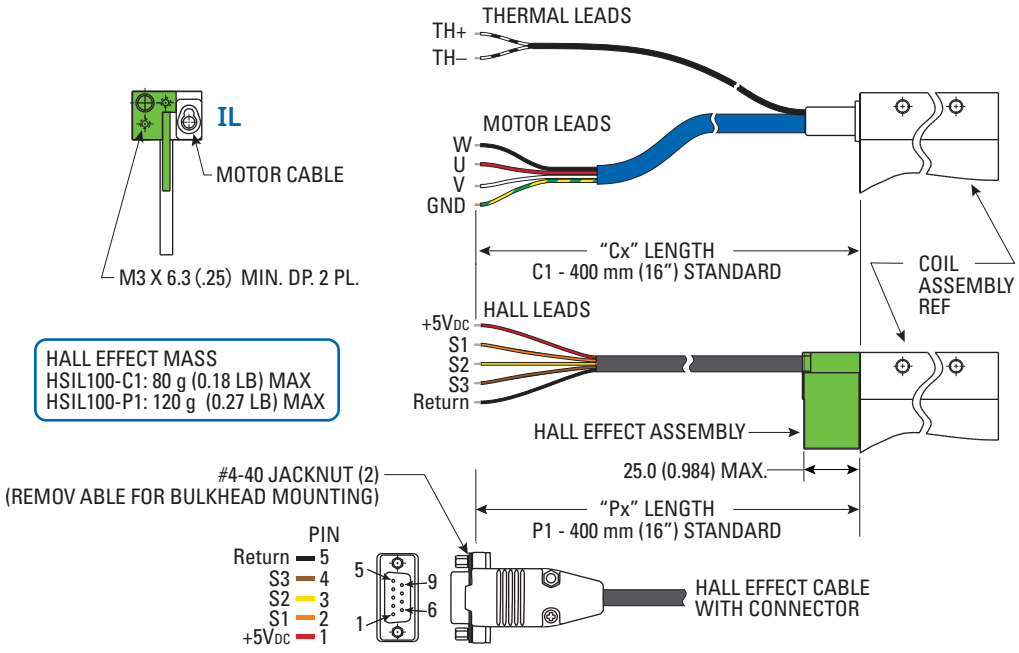
IC/ICD Cable Leads and Hall Effect Connector



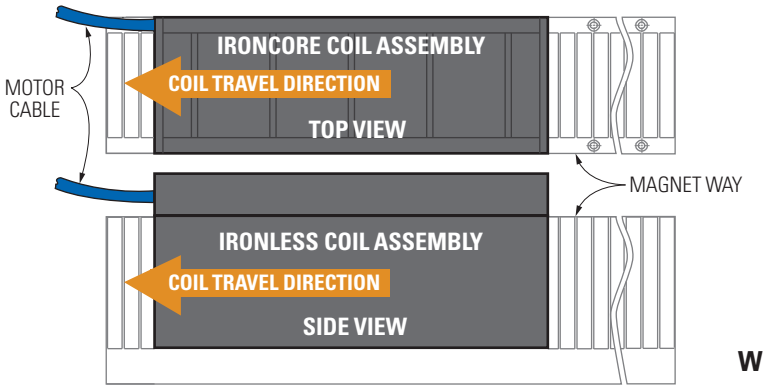
Optional IC Hall Effect Connector Cable

Optional IL Hall Effect Connector Cable

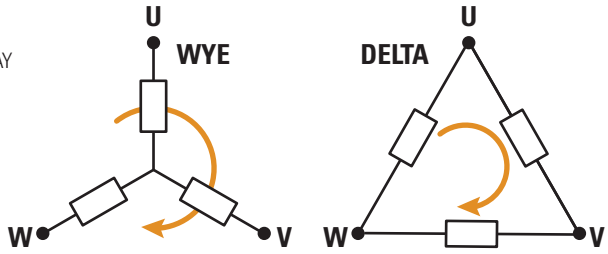
IL Cable Leads and Hall Effect Connector



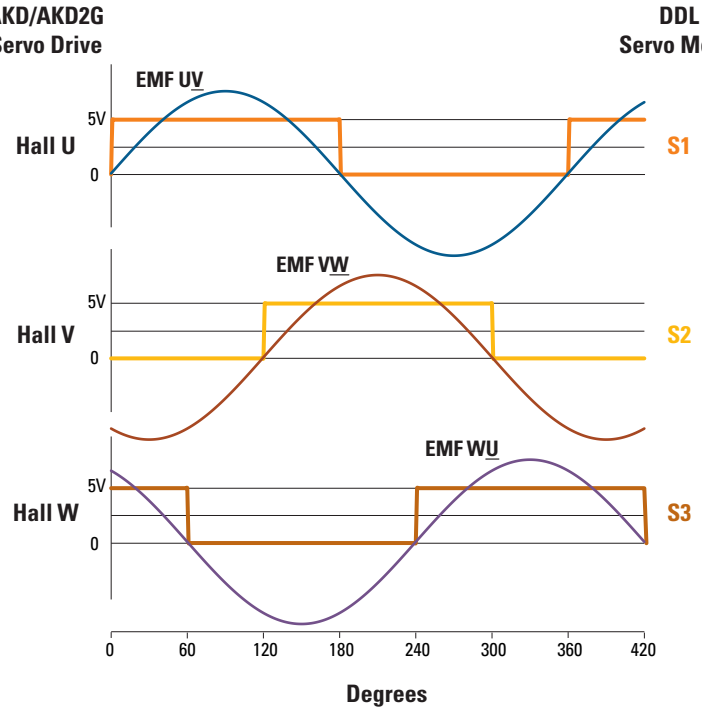
Motor Phasing

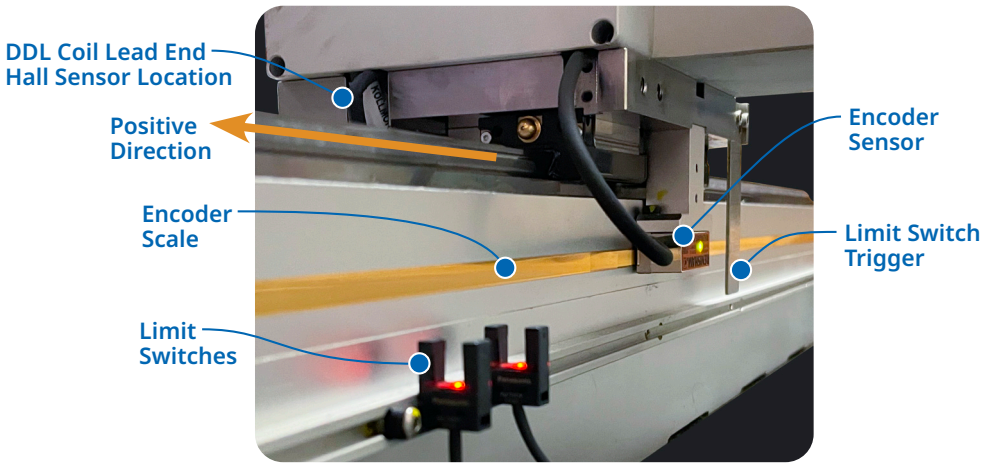


MOTOR WINDING CONFIGURATION WITH TRAVEL DIRECTION AS SHOWN



Positive Direction
Motor Phase Sequence:
EMF UV – U leads V by 120°
EMF VW – V leads W by 120°
EMF WU – W leads U by 120°





Application Sizing

To size a Linear Motor, you will need to:

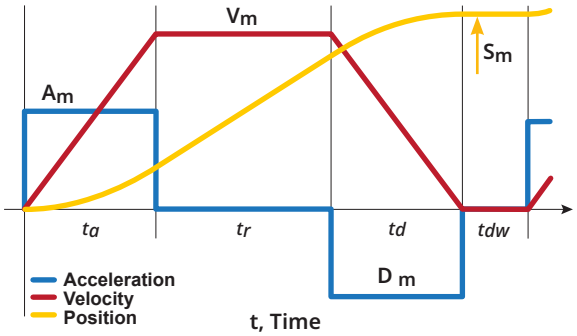
1. Define a Move Profile
2. Define the Load
3. Size the Motor and the Amplifier

From the move profile, we can calculate the maximum speed and the maximum acceleration/deceleration. From the load we can calculate all of the forces at constant speed and using the move profile all the dynamic forces during acceleration and deceleration. Once a motor is selected, the weight of the moving parts of the motor are added to the moving weight to calculate a total Peak Force and a total RMS force. The motor should be able to deliver the peak force and the calculated RMS force should be less than the continuous force to ensure a known safety margin. The coil temperature rise can also be calculated to ensure that it is lower than the intended maximum temperature rise.

The maximum bus voltage and continuous and peak current can also be calculated and compared to the selected amplifier to be sure the calculated performances can be achieved.

1. Defining the Move Profile

Triangular/Trapezoidal



Symbol	Description	Units	
		SI	English
S_m	Move displacement	meters	inches
t_a	Acceleration Time	seconds	
t_r	Time run at constant speed		
t_d	Deceleration Time		
t_{dw}	Dwell Time		
V_m	Max Velocity	meters/sec	inches/sec
A_m	Acceleration	meters/sec^2	inches/sec^2
D_m	Deceleration		

EXAMPLE: Move 0.1 meter in 100 msec assuming $t_a = t_d$ and $t_r = 0$, (assume triangular move)

Max Speed: $V_m = 2 \cdot S_m / (t_a + t_d + 2 \cdot t_r)$

$V_m = 2 \cdot 0.1 / (100E\text{-}3)$

$= 2$ meter/sec

Max Acceleration/Deceleration

Acceleration: $A_m = V_m / t_a$

$A_m = 2 / 50E\text{-}3$

$A_m = 40$ meter/sec^2

A_m "g" $= A_m/9.81$

A_m (g) $= 40 / 9.81$

$A_m = 4.08$ g

Deceleration: $D_m = V_m/t_d$

$D_m = 2/50E\text{-}3$

$= 40$ meter/sec^2

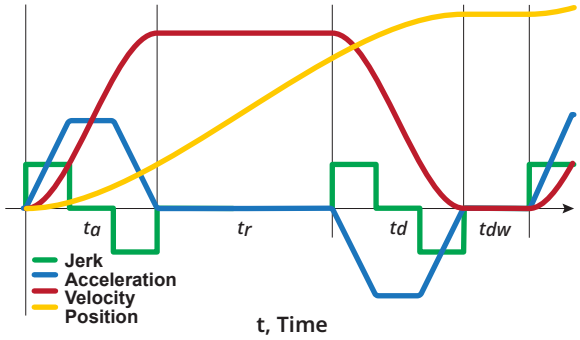
D_m "g" $= D_m/9.81$

D_m(g) $= 40/9.81$

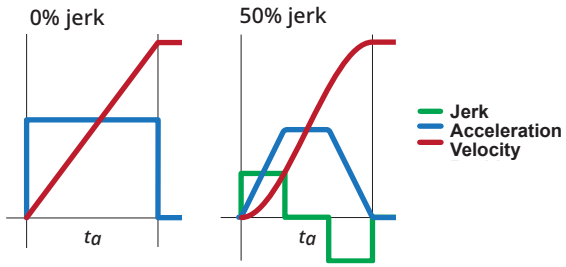
$D_m = 4.08$ g

S-Curve and Jerk

If the actual application requires the use of an S-curve, the required peak thrust needs to be increased appropriately according to the magnitude of the Jerk (acceleration).



Analyze the 1/3 trapezoidal motion that joins the S-curve with the following acceleration profile for the first (accelerated) segment (at 50% jerk):



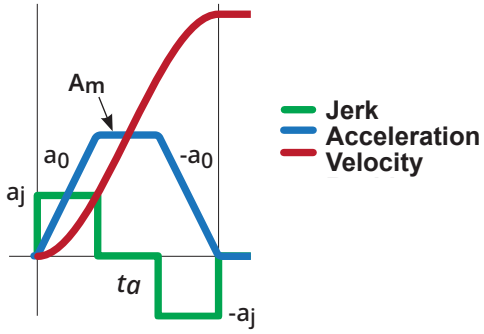
To ensure that the same velocity is achieved in the same amount of time, the required acceleration has the following relationship:

$$a_j = \frac{2}{2\text{-}jerk}\, a_0$$

jerk - the plus acceleration, i.e., the acceleration of the acceleration
a_0 - the acceleration required for the trapezoidal curve
a_j - the maximum acceleration required with the addition of the S-curve to this basis
At this point, the acceleration force needs to be increased in the same proportion

$$Fa_j = \frac{2}{2\text{-}jerk}\, Fa$$

Fa_j - the acceleration force after the addition of the S-curve



2. Determining the Load

Symbol	Description	Units	
		SI	English
F_{ext}	External Force only (Cutting force, etc.)	N	lb_f
F_{acc}	Acceleration Force only		
F_r	Run Force at constant speed		
F_{dec}	Deceleration Force only		
F_{am}	Max. Acceleration Force		
F_{dm}	Max. Deceleration Force		
F_{dw}	Dwell Force		
F_{rms}	RMS Force		
μ	Coefficient of Friction (bearing support)	–	–
M_l	Load Mass	kg	lbs
M_c	Coil Mass		
M_{cb}	Counterbalance Mass		
F_a	Magnetic Attraction Force	N	lb_f
CB	Counterbalance of load in %	–	–
q	Angle of Linear Displacement (0° = horizontal, 90° = vertical)	degrees	degrees
n	Number of motors in parallel	–	–

BASIC FORMULAS*:

We assume a general case where we have **n** motors solidly coupled pushing the load and a possible counterbalance weight M_{cb} (Mostly for vertical displacement).

Example of Coefficient of Friction μ:

Linear bearing w/ balls	0.002 - 0.004
Linear bearing w/ rollers	0.005
Steel on oiled steel	0.06
Steel on dry steel	0.2
Steel on concrete	0.3

Counterbalance Weight:

$$M_{cb} = M_l \cdot CB / 100$$

Acceleration Force only:

$$F_{acc} = [(M_l / n) \cdot (1 + CB/100) + M_c] \cdot A_m$$

Run Force at constant speed:

$$F_r = (M_l / n + M_c) \cdot g \cdot SIN(q) + m \cdot COS(q) - (M_{cb}/n) \cdot g + F_a \cdot \mu + F_{ext}/n$$

where m = mass, g = gravity

Deceleration Force only:

$$F_{dec} = [(M_l / n) \cdot (1 + CB/100) + M_c] \cdot D_m$$

Maximum Acceleration Force:

$$F_{am} = F_{acc} + F_r$$

Maximum Deceleration Force:

$$F_{am} = F_{acc} - F_r$$

Dwell Force:

$$F_{dw} = (M_l / n + M_c) \cdot g \cdot [SIN(q)] - (M_{cb}/n) \cdot g$$

RMS Force:

$$F_{rms} = \sqrt{\frac{F_{am}^2 \cdot t_a + F_r^2 \cdot t_r + F_{dm}^2 \cdot t_d + F_{dw}^2 \cdot t_{dw}}{t_a + t_r + t_d + t_{dw}}}$$

* All calculations are given in SI units.
For English units use weight in lbs instead of mass · g.

Application Sizing

3. Size the Motor and Amplifier

EXAMPLE:

Moving Weight:	M_l = 0.5kg
Number of Motors:	n = 1
Horizontal Move:	q = 0
Counterbalance Force:	M_{cb} = 0
External Force:	F_{ext} = 0
Friction Coefficient:	μ = 0.01

Assume same move as above with a Dwell Time of 50 ms.

Run Force at Constant:	F_r = 0.5•9.81•0.01 = 0 .05 N
Acceleration Force only:	F_a = 0.5•40 = 20 N
Deceleration Force only:	F_d = 0.5•40 = 20 N
Maximum Accel Force:	F_{am} = 20 + 0.05 = 20.05 N
Maximum Decel Force:	F_{dm} = 20 - 0.05 = 19.95 N
Friction Coefficient:	μ = 0.01
Rms Force:	

$$F_{rms} = \sqrt{\frac{(20.05)^2 \cdot (50E\text{-}3) + (19.95)^2 \cdot (50E\text{-}3)}{100E\text{-}3 + 50E\text{-}3}} = 16.3 \text{ N}$$

Motor Sizing:

If we select an ironless motor for smoothest possible move we can use Motor IL060-30A1. This motor has a coil mass of 0.21 kg and no attractive force. By adding that weight in the equations above, we need an additional Force of 0.21• 40 • 0.01= 0.084 N. So Peak Force is 20.05 + 0.08 = 28.45 N and RMS force: 23.19 N. This motor will have a safety factor of (38-23.19)•100/38 = 39%.

Sizing the Amplifier :

Symbol	Description	Units	
		SI	English
I_a	Max Acceleration Current $I_a = F_{am}/K_f$	Amp	
I_r	Run Current - At constant speed: $I_r = F_r/K_f$		
I_d	Max. Deceleration Current only $I_d = F_{dm}/K_f$		
I_{dw}	Dwell Current $I_{dw} = F_{dw}/K_f$		
I_{rms}	RMS Current $I_{rms} = F_{rms}/K_f$		
K_f	Force Constant	N/Amp	lbf/Amp
R_m	Motor Electrical Resistance	Ohms L-L	
K_e	Back EMF Constant	Vpk/m/s	Vpk/in/s
V_{bus}	Bus Voltage	VDC	
L	Electrical Inductance	H L-L	

Bus Voltage:

If we assume a sine wave drive with a phase advance φ (degrees) and full conduction, the minimum bus voltage (see Fig. 1) is:

V_{B1} = 2.4 (Volts)

$V_{B2} = K_e \cdot V_m$

$V_{B3} = 1.225 \cdot R_{m,hot} \times I_{rms}$

$V_{B4} = 7.6953 \cdot L \cdot I_{rms} \cdot V_m$/Pitch

α_v = ARCTANGENT (V_{B4}/V_{B3})

$V_{LR} = \sqrt{V_{B3}^2 + V_{B4}^2}$

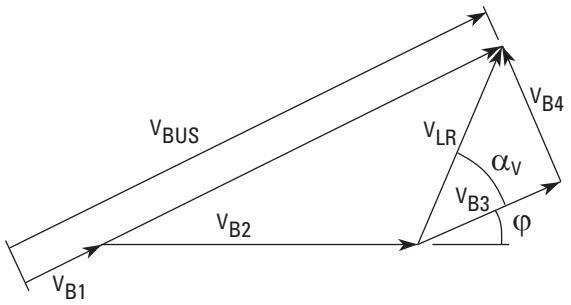
$V_{bre} = V_{B2} + V_{LR} \cdot \text{COS}(\alpha v + \varphi)$

$V_{bim} = V_{LR} \cdot \text{SIN}(\alpha v + \varphi)$

$V_{BUS} = V_{B1} + \sqrt{V_{bre}^2 + V_{bim}^2}$

Note: If there is no Phase advance take φ=0°.

Figure 1:



Thermal Considerations:

Symbol	Description	Units	
		SI	English
$\Delta\varphi$	Coil increase of temperature	°C	°F
R_{th}	Thermal Resistance	°C/W	°F/W
K_m	Motor Constant	N/$\sqrt{W}$	lbf/$\sqrt{W}$
P_{out}	Output Power	W	W

Coil Temperature rise:

$$\Delta\varphi = R_{th} \cdot (F_{rms}/K_M)^2$$

Resistance of Coil hot (copper)

$$R_{m,hot} = \frac{R_{ambient}\,(234.5 + \varphi_{hot})}{(234.5 + \varphi_{hot})}$$

Power Losses:

$$P_{Irms} = \Delta\varphi/R_{th} = \frac{\sqrt{(\varphi_{hot} - \varphi_{ambient})}}{R_{th}}$$

Output Power:

$$P_{out}(max) = F_{am} \cdot V_m$$

Example: In above example with:

R_{th} = 1.61 °C/W
K_m = 4.7 N/$\sqrt{W}$

Coil Temperature rise: $\Delta\varphi = 1.61 \cdot (23.19/4.7)^2 = 39.2$ °C
Power Losses **PL** = 39.2/1.61 = 24.34 Watts
Max output Power $P_{out}(max)$ = 57 Watts.

The Use of the Motor Constant K_m:

Cognizance of the heat load being generated by the linear motor is an important consideration in the application of any linear motor. Linear motors are direct drive devices, typically mounted very close to the moving load. Therefore, any heat generated by the linear motor needs to be managed to avoid affecting the process or workpiece that the moving load is carrying. The motor constant K_m is a powerful parameter that can be used to determine this heat load.

$$K_m = \frac{F}{\sqrt{P_c}}$$ where the RMS force F is in Newtons, the RMS heat load Pc is in watts and Km is in units of N/$\sqrt{W}$

The motor constant, K_m, allows us to determine motor performance capabilities such as shown in the following two examples. In the first example, we use K_m to calculate, for a given force, how many watts of generated heat are dissipated by the motorís coil assembly. In the second, we use K_m to determine the maximum RMS force developed by the motor when the dissipated power is limited to some value.

1. An application requires a continuous thrust force of 200 Newtons. The IC11-050 ironcore motor is a good candidate, having a continuous force rating of 276 Newtons and a K_m of 32.0 N/$\sqrt{W}$. Therefore, since resistance rises 1.405 times at 130°C from the ambient value at 25°C, and since resistance is the square root denominator of K_m, we must write our equation as follows,

$$\text{Force} = \frac{K_M}{\sqrt{\text{Factor}}}\sqrt{\text{Power (dissipated)}}$$

$$200 = \frac{32.0}{\sqrt{1.405}}\sqrt{\text{Watts}}$$

Watts = 54.9

This value of watts is the power or heat generated by the motor. It is interesting to note that for the same application, a larger IC11-100 ironcore motor, with a K_m of 49.1 N/$\sqrt{W}$, would dissipate only 23.3 watts for the same force, F.

2. The same application requires that no more than 45 watts are to be dissipated by the motor into the surrounding structure and environment. What is the maximum RMS force that the IC11-050 motor may produce while not exceeding this power limit?

$$\text{Maximum RMS Force} = \frac{32.0}{\sqrt{1.405}} \cdot \sqrt{45} = 181 \text{ N}$$

Therefore, if the motor delivers no more than 181 N of thrust force on an RMS basis, then this same motor will not dissipate more than 45 watts.

Application Sizing

Continuous Force Fc as a Function of Ambient Temperature

In our data sheets the continuous rated force Fc is the RMS force that the motor can supply continuously 100% of the time, assuming the ambient temperature is 25 degrees C and with the coils achieving a maximum temperature of 130 degrees C. At higher (or lower) ambient temperatures, the Fc of the motor must be adjusted by a factor that is determined by the following equation:

$$\text{Factor} = \sqrt{\frac{(130 - \theta_{Amb})}{105}}$$

where φ_{Amb} = Ambient Temperature

This factor vs. ambient temperature works out as:

5 °C	10	15	20	25	30	35	40	45
1.091	1.069	1.047	1.024	1	0.976	0.951	0.926	0.900

Notes

0.125 inch divisions

Application Sizing Worksheet

Customer:	**Project Name:**
Contact:	**Axis Name:**
Telephone:	**Prepared by:**
fax:	**E-Mail:**

Move

Axis Orientation _____ ❑ horizontal ❑ vertical
Typical Move _____ ❑ mm ❑ in
Typical Travel Time _____ ❑ mm ❑ in
Typical Move Time _____ seconds
Maximum Speed _____ ❑ meters/sec ❑ inches/sec
Minimum Speed _____ ❑ meters/sec ❑ inches/sec
Max. Acceleration _____ ❑ meters/sec^2 ❑ inches/sec^2 ❑g
or Accel/Decel Time_____ seconds
Dwell Time _____ seconds
More Profile _____ ❑ trapezoidal ❑ triangular ❑ S-curve

Loads

Friction Coefficient _____
Max Load Mass _____ ❑ kg ❑ lb
Thrust Force _____ ❑ N ❑ lbf
Is this thrust present during Accel/Decel? _____ ❑ Yes ❑ No

Precision

Repeatability _____ ❑ µm ❑ inch
Absolute Accuracy _____ ❑ µm ❑ inch
Resolution _____ ❑ µm ❑ inch

Encoder Feedback

Signal Period _____ µm
Resolution _____ ❑ lines/mm ❑ lines/in
Electronic Interpolation _____ ❑ Yes ❑ No If Yes, Muliplication Factor: _____

Environment

Ambient Temperature _____ ❑ °C ❑ °F
Max Permissible Temperature Rise _____ ❑ °C ❑ °F
Clean Room Environment _____ ❑ Yes ❑ No If Yes Class: _____
Is Water or Air Cooling Permissible? _____ ❑ Yes ❑ No
Vacuum? _____ ❑ Yes ❑ No Pressure: _____

Amplifier & Power Supply

Max Voltage _____ VDC
Max Current _____ Amps
Power Supply _____ ❑ Single Phase ❑ Three Phase
Voltage _____ V ❑ 50 Hz ❑ 60 Hz

AKD Servo Drive Product Family

Experience enhanced system performance, streamlined configuration, and overall piece of mind by pairing your Kollmorgen DDL motor with an AKD drive.

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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- AKME
- AKMH
- BLM
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- KAS
- Kollmorgen Visualization Builder
- KVB
- MKD
- P8000
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- PCMM2G
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- Instapak: Sealed Air Corporation.
- INTERCONTEC: INTERCONTEC Pfeiffer Industrie-Steckverbindungen GmbH.
- LOCTITE 640: HenkeAG & CO. KGAA.
- LOCTITE: HenkeAG & CO. KGAA.
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- PHOENIX CONTACT: Phoenix Contact GmbH & Co. KG.
- PROFINET: PROFIBUS Nutzerorganisation e.V.
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- sercos: Sercos InternationaE.V.
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- SpeedTec: Liqui-Moly GmbH or TE Connectivity IndustriaGmbH.
  - If SpeedTec is used as a lubricant, it belongs to Liqui-Moly GmbH.
  - If SpeedTec is used as a connector, it belongs to TE Connectivity IndustriaGmbH
- Teflon: The Chemours Company FC, LLC.
- Windows: Microsoft Corporation.

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我们可能会进行技术更改以提高设备性能，恕不另行通知！

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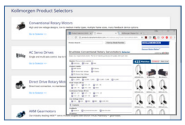

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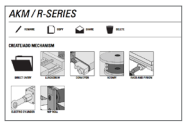

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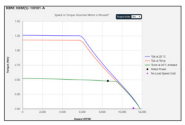

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