

LDX Frameless Datasheet

Direct Drive Motors

ENGINEERING PROTOTYPE



Overview

The LiveDrive® LDX direct drive frameless motors offer industry leading torque density. The frameless design allows flexible integration to reduce overall machine size with the added benefit of cable and pneumatic routing using the through hole of the motor. Offering highest accuracy and repeatability, LDX direct drive motors improve throughput by reducing settling times and achieving high acceleration rates.

Features



High Torque Density

High torque density removes the need for gearbox for improved performance and system lifetime.



Low Inertia

Low rotor inertia enables faster acceleration and deceleration times for high productivity and safety.



Compact and Frameless

Compact form factor and frameless design reduce machine footprint and mass and allow for flexible integration.



High Precision

Zero backlash for higher accuracy and repeatability than geared servo motors.



Integrated Technology

Temperature sensor helps protect against overheating.

Specification Summary

LDX Series		095	115	135	160	180
Outer Diameter	mm	95	116	137	158	179
Stator Lengths	mm	29.5 – 117				
Max Cont. Torque	Nm	2.34 – 10.0	4.10 – 17.8	6.23 – 32.4	8.91 – 47.5	13.2 – 67.3
Peak Torque	Nm	4.07 – 24.4	7.76 – 46.5	11.4 – 94.2	17.9 - 136	23.4 - 188
No-Load Speed	RPM	1,057 – 3,137	744 – 2,231	356 – 1,995	371 – 1,597	352 – 1,088
Continuous Current	A_{rms}	2.26 – 4.17	2.85 – 5.23	3.75 – 4.85	4.10 – 6.10	4.28 – 7.65

Specifications are subject to change.

Specifications

LDX 095

Performance		095-013B	095-025B	095-038B	095-050B	095-075B
Max Continuous Torque*	Nm	2.34	4.58	5.96	7.43	10.0
Continuous Current*	A _{rms}	2.26	4.17	3.81	3.54	3.16
Peak Torque at 20°C	Nm	4.07	8.64	12.2	16.3	24.4
Peak Current	A _{rms}	4.20	8.50	8.50	8.50	8.50
Rated Power*	W	479	913	862	829	762
Speed at Rated Power	RPM	2,168	2,294	1,583	1,187	791
Torque at Rated Power	Nm	2.11	3.80	5.20	6.67	9.20
No-Load Speed	RPM	3,137	2,987	2,114	1,585	1,057
Cogging Torque	% of Cont. Torque			2.5		

Electrical		095-013B	095-025B	095-038B	095-050B	095-075B
Design Voltage**	VAC	230	230	230	230	230
K _e at 20°C	V _{rms} /kRPM	73.3	77.0	109	145	218
K _t at 120°C	Nm/A _{rms}	1.04	1.10	1.56	2.10	3.18
K _m at 20°C	Nm/√W	0.313	0.543	0.664	0.792	1.00
K _m at 120°C	Nm/√W	0.227	0.397	0.489	0.587	0.750
Resistance _{L-L} at 20°C	Ω	10.0	3.67	4.90	6.12	8.57
Inductance _{L-L} at 20°C	mH	29.7	14.5	21.7	28.9	43.3

Thermal		095-013B	095-025B	095-038B	095-050B	095-075B
Thermal Resistance	°C/W	0.933	0.752	0.675	0.625	0.558
Heat Sink Dimensions	mm	250 x 250 x 6.3 (aluminum)				
Storage Temp.	°C	-20 to 80				
Operating Temp.***	°C	-20 to 80				
Max Winding Temp.	°C	120				

*Assumes a 100°C temperature rise from 20°C ambient to the maximum winding temperature.

**Motors can be operated at different voltages. Contact an Applications Engineer for inquiries with special voltage requirements.

***Increasing the ambient temperature de-rates motor performance.

All electrical and performance specifications have ±15% tolerance. Specifications are preliminary and subject to change.

Physical

		095-013B	095-025B	095-038B	095-050B	095-075B
Stator Outer Diameter	mm			95.0		
Rotor Inner Diameter	mm			30.0		
Stator Length	mm	29.5	42.0	54.5	67.0	92.0
Stator Sleeve Length	mm	14.5	27.0	39.5	52.0	77.0
Stack Length	mm	12.5	25.0	37.5	50.0	75.0
Rotor Length	mm	14.5	27.0	39.5	52.0	77.0
Rotor Inertia	kgm ²	4.70E-05	9.25E-05	1.38E-04	1.83E-04	2.74E-04
Total Mass	kg	0.68	1.11	1.54	1.97	2.83
Number of Poles				20		

Temperature Sensor**095 (All Models)**

Sensor Type	PT1000 RTD
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LDX 115

Performance

		115-013B	115-025B	115-038B	115-050B	115-075B
Max Continuous Torque*	Nm	4.10	7.60	10.6	13.2	17.8
Continuous Current*	A _{rms}	2.85	5.23	4.81	4.48	4.00
Peak Torque at 20°C	Nm	7.76	15.5	23.3	31.0	46.5
Peak Current	A _{rms}	6.00	12.0	12.0	12.0	12.0
Rated Power*	W	610	1,135	1,092	1,048	948
Speed at Rated Power	RPM	1,585	1,713	1,114	836	557
Torque at Rated Power	Nm	3.68	6.32	9.37	12.0	16.3
No-Load Speed	RPM	2,231	2,231	1,487	1,116	744
Cogging Torque	% of Cont. Torque			2		

Electrical

		115-013B	115-025B	115-038B	115-050B	115-075B
Design Voltage**	VAC	230	230	230	230	230
K _e at 20°C	V _{rms} /kRPM	103	103	155	206	309
K _t at 120°C	Nm/A _{rms}	1.44	1.45	2.20	2.94	4.45
K _m at 20°C	Nm/√W	0.476	0.778	1.01	1.21	1.53
K _m at 120°C	Nm/√W	0.340	0.561	0.735	0.882	1.13
Resistance _{L-L} at 20°C	Ω	8.56	3.21	4.27	5.33	7.46
Inductance _{L-L} at 20°C	mH	23.6	11.7	17.6	23.4	35.1

Thermal

		115-013B	115-025B	115-038B	115-050B	115-075B
Thermal Resistance	°C/W	0.690	0.546	0.485	0.448	0.401
Heat Sink Dimensions	mm	300 x 300 x 12.7 (aluminum)				
Storage Temp.	°C	-20 to 80				
Operating Temp.***	°C	-20 to 80				
Max Winding Temp.	°C	120				

*Assumes a 100°C temperature rise from 20°C ambient to the maximum winding temperature.

**Motors can be operated at different voltages. Contact an Applications Engineer for inquiries with special voltage requirements.

***Increasing the ambient temperature de-rates motor performance.

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Physical

		115-013B	115-025B	115-038B	115-050B	115-075B
Stator Outer Diameter	mm			116		
Rotor Inner Diameter	mm			50.0		
Stator Length	mm	29.5	42.0	54.5	67.0	92.0
Stator Sleeve Length	mm	14.5	27.0	39.5	52.0	77.0
Stack Length	mm	12.5	25.0	37.5	50.0	75.0
Rotor Length	mm	14.5	27.0	39.5	52.0	77.0
Rotor Inertia	kgm ²	1.53E-04	3.01E-04	4.48E-04	5.96E-04	8.91E-04
Total Mass	kg	0.89	1.46	2.03	2.61	3.76
Number of Poles				26		

Temperature Sensor**115 (All Models)**

Sensor Type

PT1000 RTD

LDX 135

Performance		135-013B	135-025B	135-050B	135-075B	135-100B
Max Continuous Torque*	Nm	6.23	11.4	19.7	26.4	32.4
Continuous Current*	A _{rms}	3.75	4.85	4.14	3.68	3.38
Peak Torque at 20°C	Nm	11.4	23.6	47.1	70.7	94.2
Peak Current	A _{rms}	7.50	11.5	11.5	11.5	11.5
Rated Power*	W	730	1,009	979	879	801
Speed at Rated Power	RPM	1,571	1,149	547	356	253
Torque at Rated Power	Nm	4.44	8.40	17.1	23.6	30.2
No-Load Speed	RPM	1,995	1,425	713	475	356
Cogging Torque	% of Cont. Torque	2				

Electrical		135-013B	135-025B	135-050B	135-075B	135-100B
Design Voltage**	VAC	230	230	230	230	230
K _e at 20°C	V _{rms} /kRPM	115	161	323	484	646
K _t at 120°C	Nm/A _{rms}	1.66	2.35	4.76	7.18	9.60
K _m at 20°C	Nm/√W	0.67	1.08	1.68	2.13	2.51
K _m at 120°C	Nm/√W	0.491	0.807	1.27	1.62	1.91
Resistance _{L-L} at 20°C	Ω	5.48	4.06	6.74	9.42	12.1
Inductance _{L-L} at 20°C	mH	14.3	14.0	27.8	41.7	55.5

Thermal		135-013B	135-025B	135-050B	135-075B	135-100B
Thermal Resistance	°C/W	0.622	0.502	0.414	0.375	0.346
Heat Sink Dimensions	mm	300 x 300 x 12.7 (aluminum)				
Storage Temp.	°C	-20 to 80				
Operating Temp.***	°C	-20 to 80				
Max Winding Temp.	°C	120				

*Assumes a 100°C temperature rise from 20°C ambient to the maximum winding temperature.

**Motors can be operated at different voltages. Contact an Applications Engineer for inquiries with special voltage requirements.

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Physical

		135-013B	135-025B	135-050B	135-075B	135-100B
Stator Outer Diameter	mm			137		
Rotor Inner Diameter	mm			69.0		
Stator Length	mm	29.5	42.0	67.0	92.0	117
Stator Sleeve Length	mm	14.5	27.0	52.0	77.0	102
Stack Length	mm	12.5	25.0	50.0	75.0	100
Rotor Length	mm	14.5	27.0	52.0	77.0	102
Rotor Inertia	kgm ²	3.63E-04	7.12E-04	1.41E-03	2.11E-03	2.81E-03
Total Mass	kg	1.12	1.81	3.26	4.70	6.14
Number of Poles				32		

Temperature Sensor**135 (All Models)**

Sensor Type	PT1000 RTD
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LDX 160

Performance		160-013B	160-025B	160-050B	160-075B	160-100B
Max Continuous Torque*	Nm	8.91	16.5	28.8	38.7	47.5
Continuous Current*	A _{rms}	4.10	5.60	6.10	5.44	5.00
Peak Torque at 20°C	Nm	17.9	34.1	68.0	102	136
Peak Current	A _{rms}	8.64	12.0	15.0	15.0	15.0
Rated Power*	W	717	997	1,316	1,308	1,242
Speed at Rated Power	RPM	1,165	864	612	399	292
Torque at Rated Power	Nm	5.88	11.0	20.5	31.3	40.6
No-Load Speed	RPM	1,597	1,184	741	494	371
Cogging Torque	% of Cont. Torque	2				

Electrical		160-013B	160-025B	160-050B	160-075B	160-100B
Design Voltage**	VAC	230	230	230	230	230
K _e at 20°C	V _{rms} /kRPM	144	194	310	465	620
K _t at 120°C	Nm/A _{rms}	2.17	2.94	4.73	7.11	9.49
K _m at 20°C	Nm/√W	0.87	1.49	2.31	2.93	3.45
K _m at 120°C	Nm/√W	0.676	1.15	1.80	2.30	2.71
Resistance _{L-L} at 20°C	Ω	4.95	3.12	3.28	4.59	5.89
Inductance _{L-L} at 20°C	mH	11.9	10.7	13.6	20.4	27.1

Thermal		160-013B	160-025B	160-050B	160-075B	160-100B
Thermal Resistance	°C/W	0.575	0.486	0.392	0.353	0.325
Heat Sink Dimensions	mm	300 x 300 x 12.7 (aluminum)				
Storage Temp.	°C	-20 to 80				
Operating Temp.***	°C	-20 to 80				
Max Winding Temp.	°C	120				

*Assumes a 100°C temperature rise from 20°C ambient to the maximum winding temperature.

**Motors can be operated at different voltages. Contact an Applications Engineer for inquiries with special voltage requirements.

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Physical

		160-013B	160-025B	160-050B	160-075B	160-100B
Stator Outer Diameter	mm			158		
Rotor Inner Diameter	mm			84.0		
Stator Length	mm	29.5	42.0	67.0	92.0	117
Stator Sleeve Length	mm	14.5	27.0	52.0	77.0	102
Stack Length	mm	12.5	25.0	50.0	75.0	100
Rotor Length	mm	14.5	27.0	52.0	77.0	102
Rotor Inertia	kgm ²	8.14E-04	1.59E-03	3.15E-03	4.72E-03	6.28E-03
Total Mass	kg	1.33	2.27	4.12	5.96	7.80
Number of Poles				38		

Temperature Sensor**160 (All Models)**

Sensor Type	PT1000 RTD
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LDX 180

Performance

		180-013B	180-025B	180-050B	180-075B	180-100B
Max Continuous Torque*	Nm	13.2	24.4	42.3	56.0	67.3
Continuous Current*	A _{rms}	4.28	6.25	6.70	7.65	7.01
Peak Torque at 20°C	Nm	23.4	46.9	93.8	143	188
Peak Current	A _{rms}	7.72	12.2	15.2	20.0	20.0
Rated Power*	W	937	1,374	1,546	1,782	1,654
Speed at Rated Power	RPM	815	678	421	373	277
Torque at Rated Power	Nm	11.0	19.4	35.1	45.6	57.0
No-Load Speed	RPM	1,088	862	535	463	352
Cogging Torque	% of Cont. Torque			2		

Electrical

		180-013B	180-025B	180-050B	180-075B	180-100B
Design Voltage**	VAC	230	230	230	230	230
K _e at 20°C	V _{rms} /kRPM	211	267	430	497	653
K _t at 120°C	Nm/A _{rms}	3.07	3.90	6.31	7.32	9.60
K _m at 20°C	Nm/√W	1.14	1.88	2.94	3.71	4.30
K _m at 120°C	Nm/√W	0.852	1.41	2.21	2.80	3.24
Resistance _{L-L} at 20°C	Ω	6.22	3.68	3.89	3.27	4.20
Inductance _{L-L} at 20°C	mH	16.0	12.6	16.3	14.1	18.7

Thermal

		180-013B	180-025B	180-050B	180-075B	180-100B
Thermal Resistance	°C/W	0.420	0.333	0.274	0.250	0.232
Heat Sink Dimensions	mm	400 x 400 x 12.7 (aluminum)				
Storage Temp.	°C	-20 to 80				
Operating Temp.***	°C	-20 to 80				
Max Winding Temp.	°C	120				

*Assumes a 100°C temperature rise from 20°C ambient to the maximum winding temperature.

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Physical

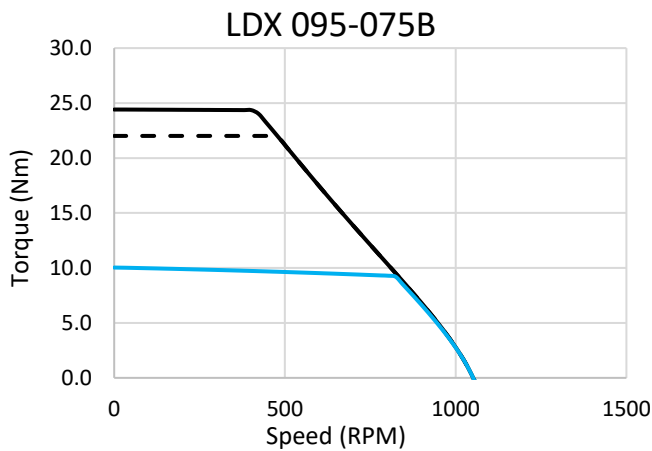
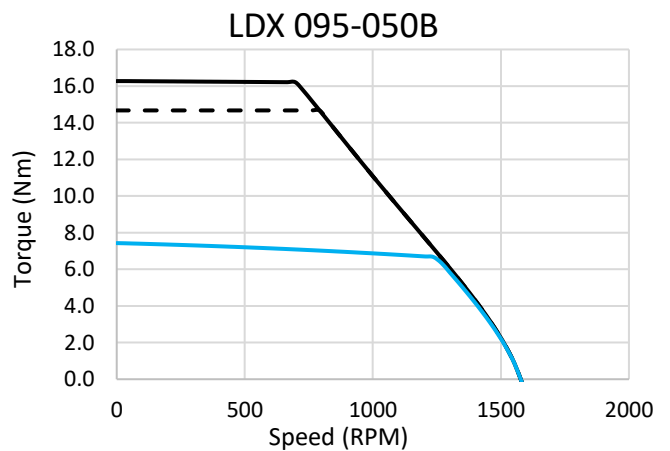
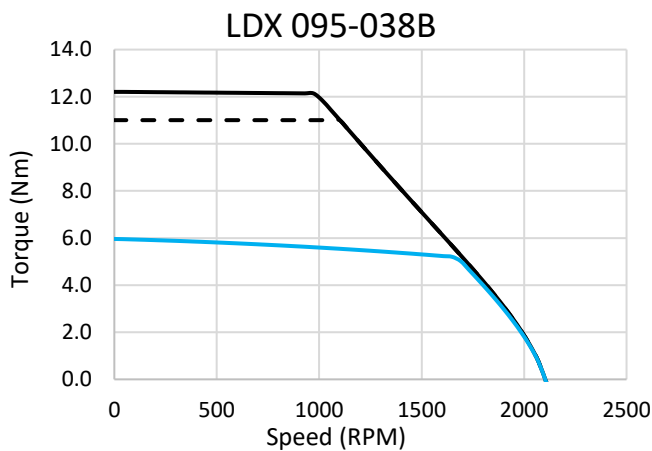
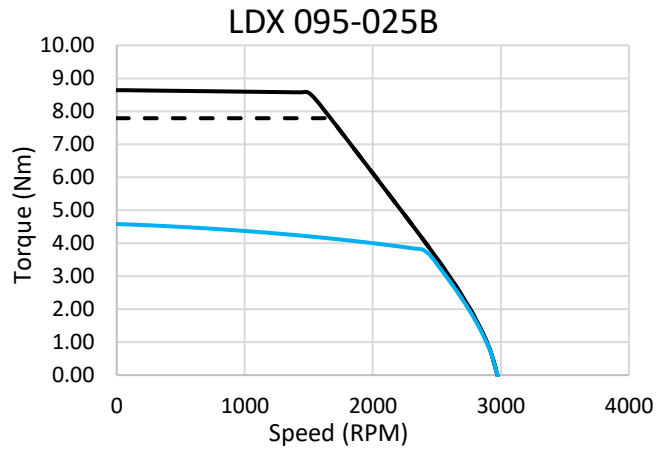
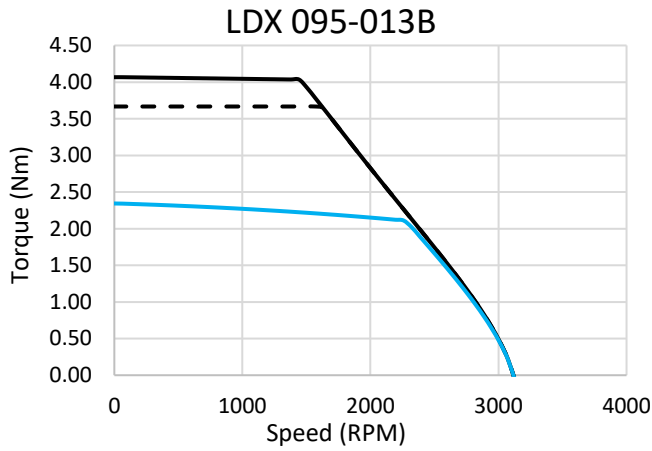
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Stator Outer Diameter	mm			179		
Rotor Inner Diameter	mm			104		
Stator Length	mm	29.5	42.0	67.0	92.0	117
Stator Sleeve Length	mm	14.5	27.0	52.0	77.0	102
Stack Length	mm	12.5	25.0	50.0	75.0	100
Rotor Length	mm	14.5	27.0	52.0	77.0	102
Rotor Inertia	kgm ²	1.42E-03	2.78E-03	5.50E-03	8.22E-03	1.09E-02
Total Mass	kg	1.57	2.65	4.83	6.95	9.10
Number of Poles				44		

Temperature Sensor**180 (All Models)**

Sensor Type	PT1000 RTD
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Performance Curves

LDX 095



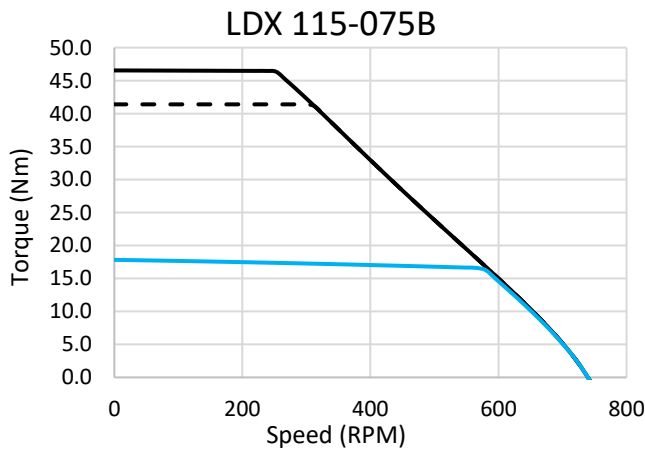
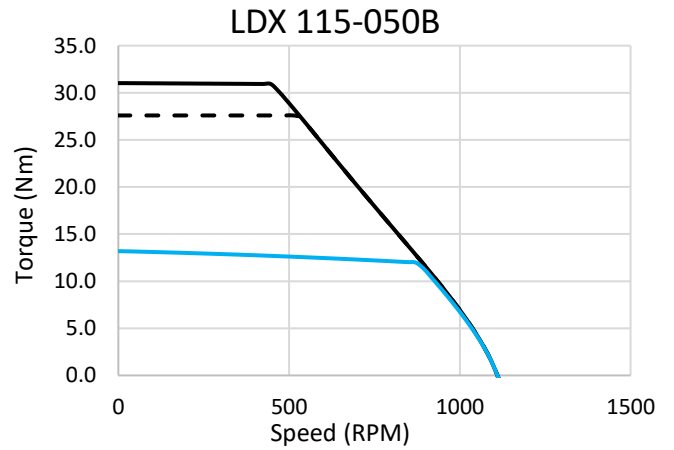
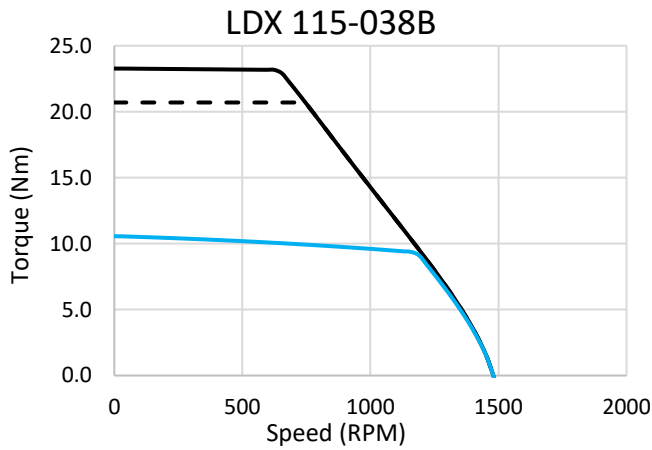
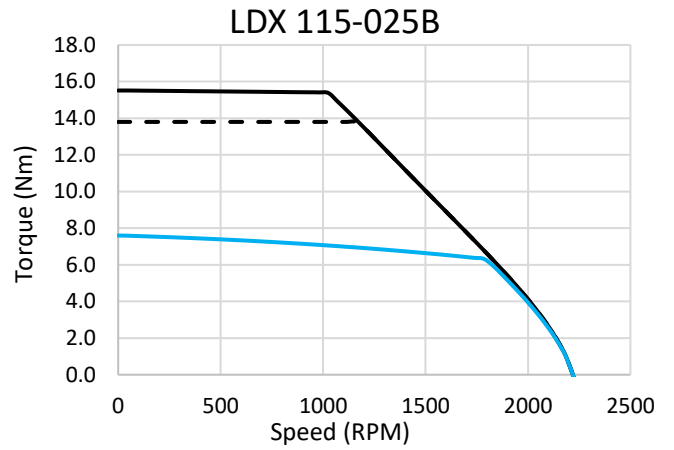
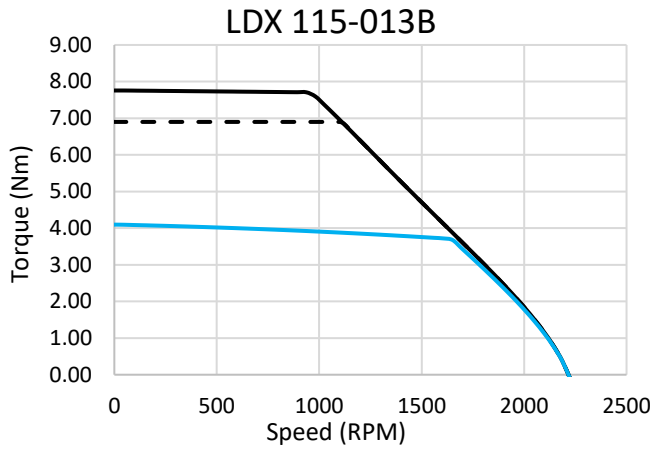
— Continuous Torque at 120°C
- - - Peak Torque at 120°C
— Peak Torque at 20°C

Design Voltage: 230 VAC

Performance curves assume an ambient temperature of 20°C with an allowable temperature rise of 100°C to a maximum winding temperature of 120°C. Assume heat sink dimensions as stated in Specifications.

Contact an Applications Engineer for special thermal or voltage requirements.

LDX 115



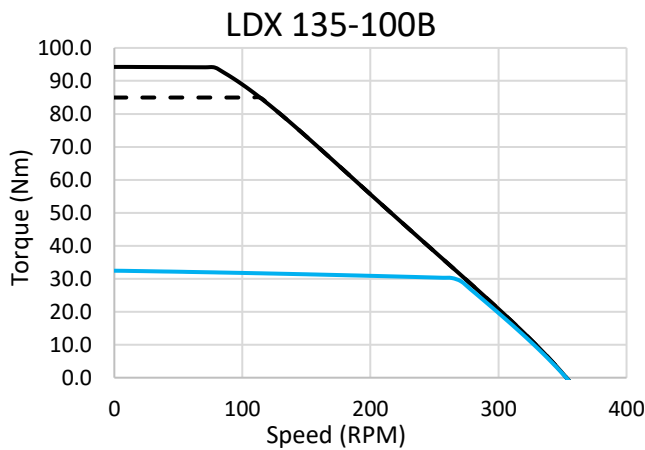
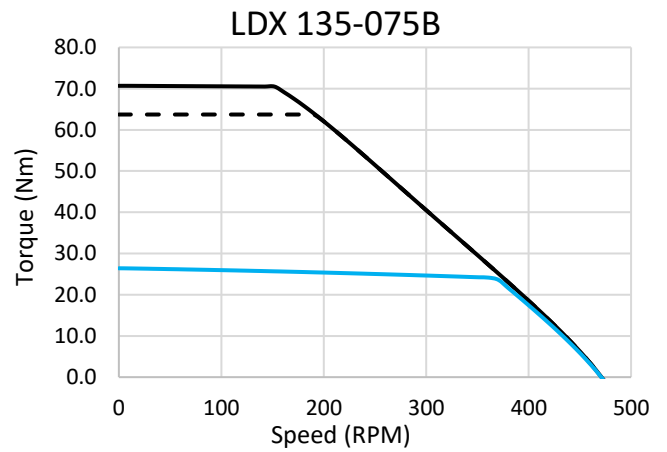
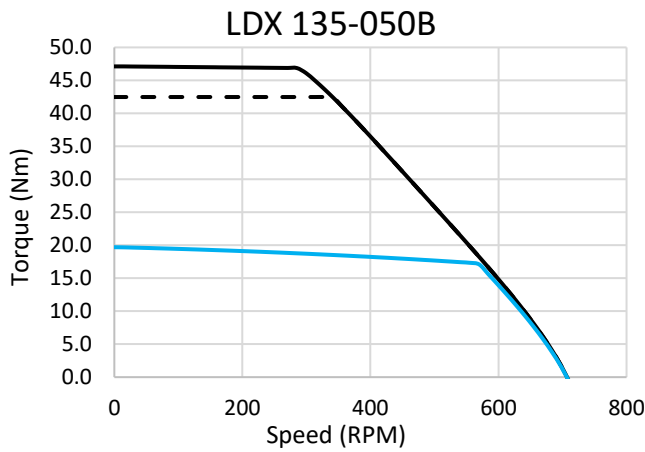
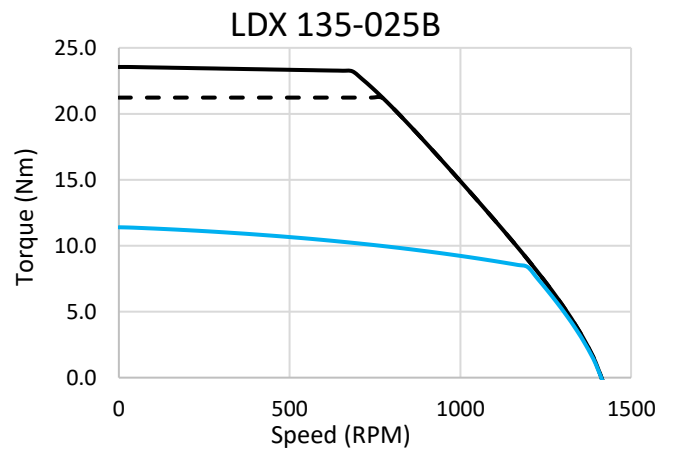
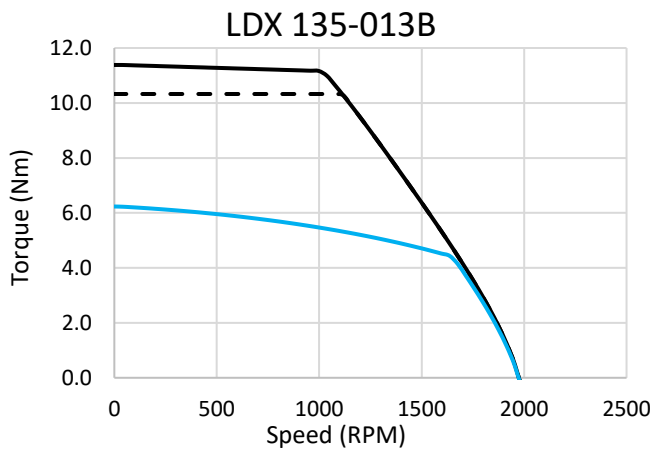
- Continuous Torque at 120°C
- - - Peak Torque at 120°C
- Peak Torque at 20°C

Design Voltage: 230 VAC

Performance curves assume an ambient temperature of 20°C with an allowable temperature rise of 100°C to a maximum winding temperature of 120°C. Assume heat sink dimensions as stated in Specifications.

Contact an Applications Engineer for special thermal or voltage requirements.

LDX 135



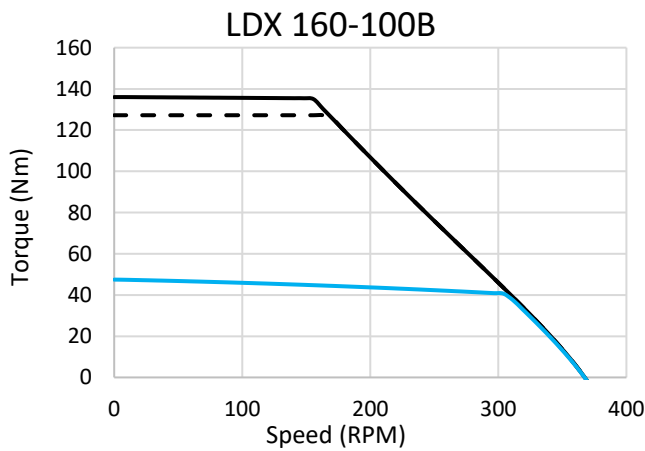
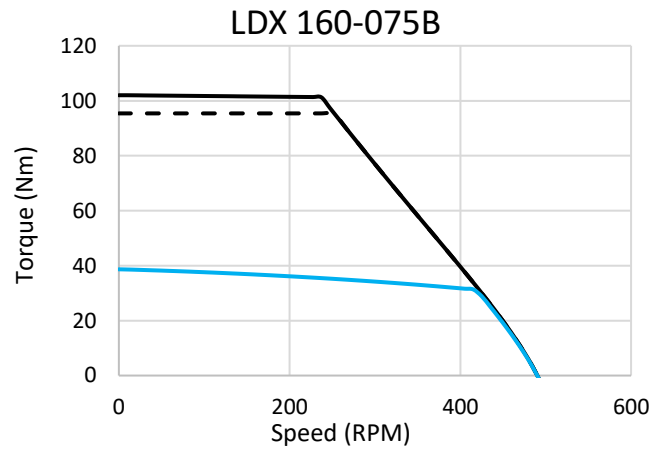
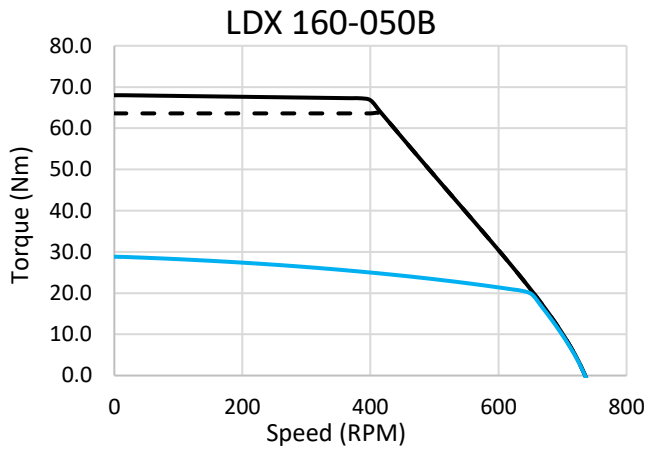
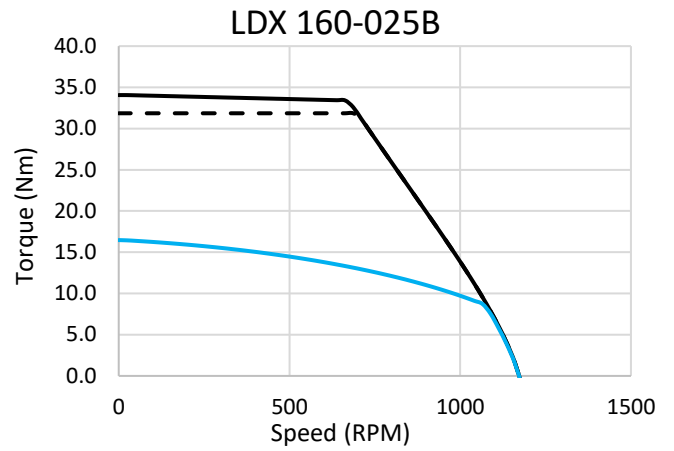
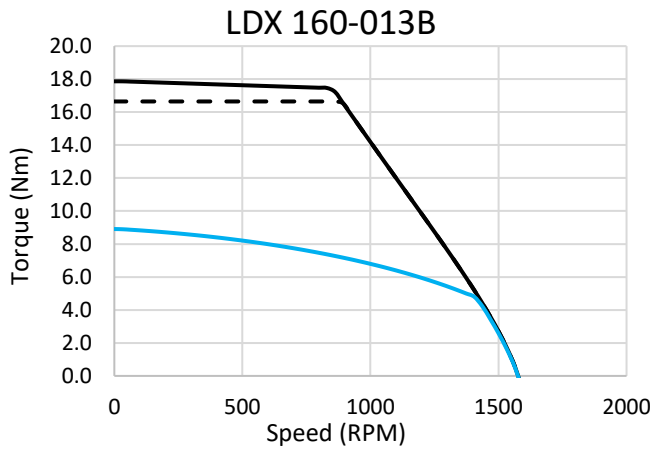
— Continuous Torque at 120°C
- - - Peak Torque at 120°C
— Peak Torque at 20°C

Design Voltage: 230 VAC

Performance curves assume an ambient temperature of 20°C with an allowable temperature rise of 100°C to a maximum winding temperature of 120°C. Assume heat sink dimensions as stated in Specifications.

Contact an Applications Engineer for special thermal or voltage requirements.

LDX 160



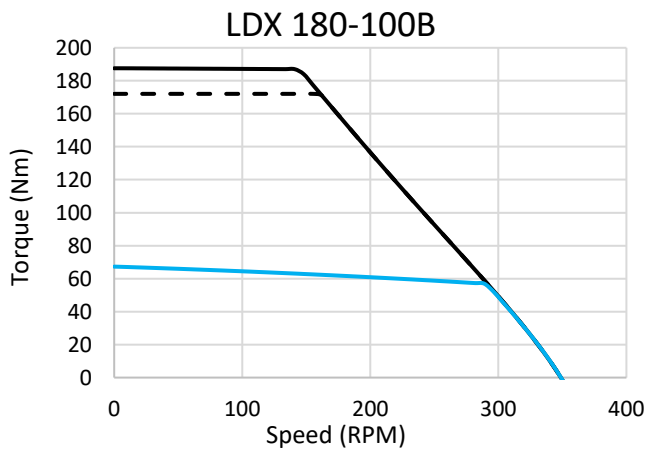
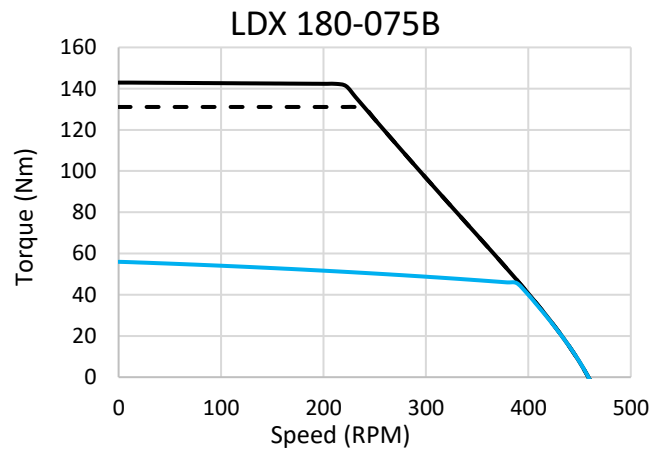
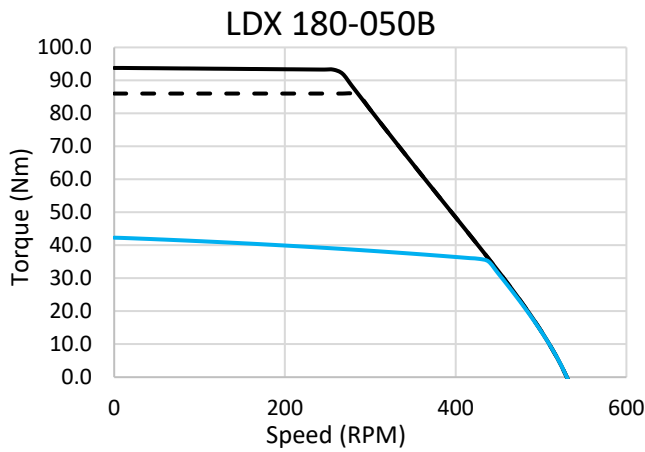
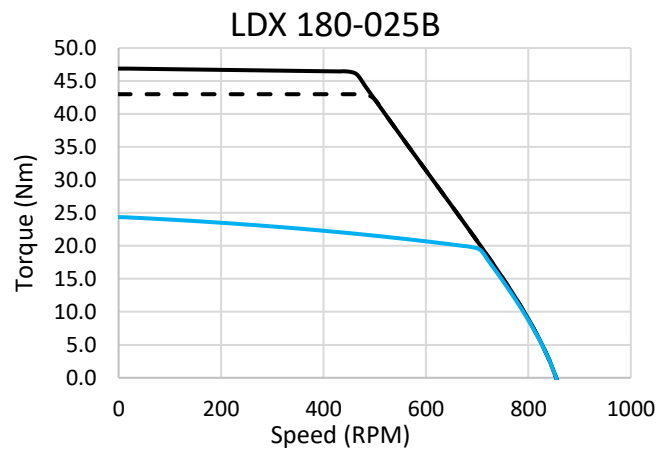
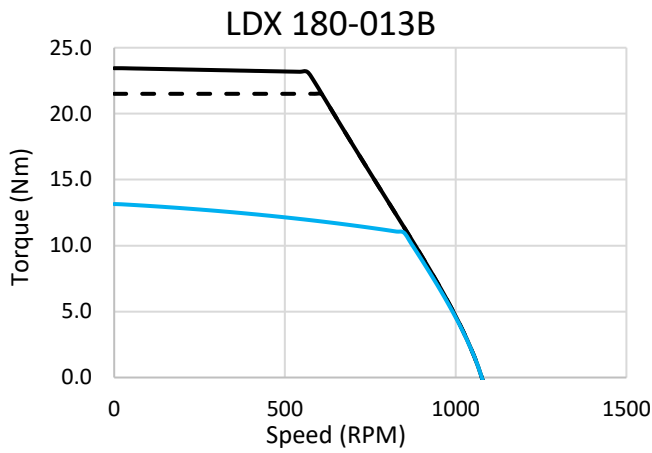
— Continuous Torque at 120°C
- - - Peak Torque at 120°C
— Peak Torque at 20°C

Design Voltage: 230 VAC

Performance curves assume an ambient temperature of 20°C with an allowable temperature rise of 100°C to a maximum winding temperature of 120°C. Assume heat sink dimensions as stated in Specifications.

Contact an Applications Engineer for special thermal or voltage requirements.

LDX 180



— Continuous Torque at 120°C
- - - Peak Torque at 120°C
— Peak Torque at 20°C

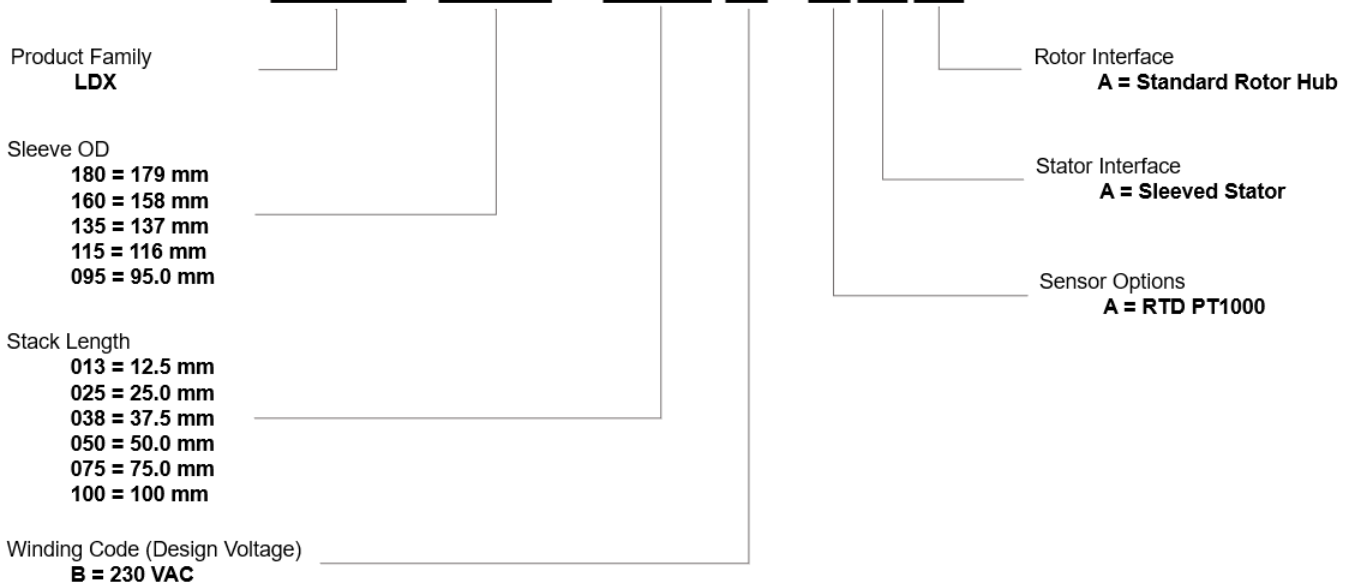
Design Voltage: 230 VAC

Performance curves assume an ambient temperature of 20°C with an allowable temperature rise of 100°C to a maximum winding temperature of 120°C. Assume heat sink dimensions as stated in Specifications.

Contact an Applications Engineer for special thermal or voltage requirements.

Ordering Guide

LDX 180-013B-AAA-02



Contact a Genesis Motion Solutions representative for customization options.