

Unimotor hd 230 V | 460 V

Compact, Powerful High Dynamic AC Servo Motors

Designed for maximum torque density, the Unimotor hd brushless AC Servo motor series provides an exceptionally compact, low inertia solution for applications that require very high torque during rapid acceleration and deceleration profiles. Unimotor hd motors fitted with high resolution SinCos or absolute encoders are pre-loaded with the motor “electronic nameplate” data during the manufacturing process. This data can be read by most Control Techniques’ brand servo drives and used to automatically optimize the drive settings. This feature simplifies commissioning and maintenance, ensures consistent performance and saves time.

The Unimotor hd torque profile is closely matched to Digitax ST Servo drives providing up to 300% peak overload for maximum dynamic performance.

Key Features

- Torque range: 6.4 to 752 lb-in (0.72 to 85.0 Nm)
- High torque-to-inertia ratio for high-dynamic performance
- Compact and powerful
- Optional holding brake
- IP65 conformance
- Segmented stator design
- World class performance
- Winding to suit 230 V and 460 V
- Speeds include 2000, 3000, 4000 and 6000 rpm
- Large shafts to increase torsional rigidity
- Multiple feedback options:
 - Incremental encoder: High accuracy, medium resolution
 - Absolute: Medium accuracy, medium resolution, single-turn and multi-turn
 - SinCos/absolute: High accuracy, high resolution, single-turn and multi-turn
 - HIPERFACE (SICK) and EnDat (Heidenhain) protocols supported
 - Resolver: Robust for extreme applications and conditions; lower accuracy, medium resolution

Approvals

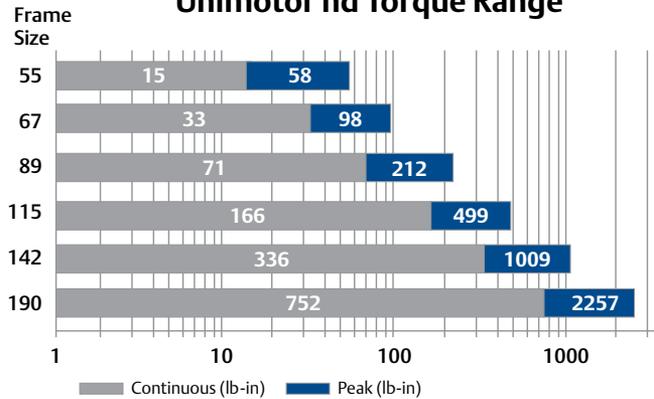


Unimotor



Unimotor hd motors (shown with a Digitax ST Servo drive).

Unimotor hd Torque Range



All Unimotor hd motors feature connections that rotate for easier cable routing and installation.

UNIMOTOR HD

Unimotor hd 230 V | 460 V

Order Code information

Use the information below to create an order code for a Unimotor hd (top row is an example).

089	UD	B	30	5	B	A	CA	A	XXX	XXX	
Frame Size	Motor Voltage	Stator Length	Speed	Brake (24 V)	Connection Type	Output Shaft	Feedback Device		Inertia	BCD	Shaft Diameter
		055 - 089 Frames	055 - 067 Frames	055 - 190 Frames	055 - 115 Frames		055 Frame			055 Frame Only†	
055	ED = 230 V	A	30 = 3000 rpm	0 = Not Fitted	B = Power size 1.0 and Signal 90° and Rotatable	A = Keyway w/ full key installed	CR = Incremental Encoder (Renco) **	4096 ppr (R35i)	A = Std.	063	9.0 A-C
067	UD = 460 V	B	60 = 6000 rpm	5 = Holding Brake**			142 Frame‡	EM = SinCos Multi-Turn			EQI 1130 - EnDat
089		C	089 Frame		115 Frame	190 Frame		FM = SinCos Single-Turn	ECI 1118 - EnDat	14.0 A-C	
115		115 Frame	30 = 3000 rpm	B = Power size 1.0 and Signal 90° and Rotatable			F = Keyway w/ full & half key* provided	67 Frame			
142		B	40 = 4000 rpm		J = Power size 1.5 and Signal 90° Rotatable	190 Frame		CR = Incremental Encoder (Renco) **	4096 ppr (R35i)		
190		C	60 = 6000 rpm	J = Power size 1.5 and signal 90° and Rotatable			190 Frame	EM = SinCos Multi-Turn	EQI 1130 - EnDat		
		D	115 Frame		190 Frame	190 Frame		FM = SinCos Single-Turn	ECI 1118 - EnDat		
		142 Frame	20 = 2000 rpm	190 Frame			190 Frame	089 - 190 Frames			
		C	30 = 3000 rpm		190 Frame	190 Frame		CA = Incremental Encoder (SICK)	4096 ppr (CFS50)		
		D	142 Frame	190 Frame			190 Frame	EC = SinCos Multi-Turn	EQI 1331 - EnDat		
		E	10 = 1000 rpm		190 Frame	190 Frame		EB = SinCos Multi-Turn	EQN 1325 - EnDat		
		190 Frame	15 = 1500 rpm	190 Frame			190 Frame	FB = SinCos Single-Turn	ECN 1313 - EnDat		
		C	20 = 2000 rpm		190 Frame	190 Frame		FC = SinCos Single-Turn	ECI 1319 - EnDat		
		D	30 = 3000 rpm	190 Frame			190 Frame	RA = SinCos Multi-Turn	SRM 50 (GEN 2) - HIPERFACE		
		10 = 1000 rpm	190 Frame		190 Frame	190 Frame		SA = SinCos Single-Turn	SRS 50 (GEN 2) - HIPERFACE		
	15 = 1500 rpm	190 Frame		190 Frame			190 Frame	AE = Resolver			
	20 = 2000 rpm		190 Frame		190 Frame	190 Frame					

NOTES:

- *Half key provided to create a smooth shaft and balance
- **Holding brakes are not designed for dynamic use
- ‡Refer to 142 mm Frame Ratings and Dimensions table for commector size data
- †Add **Bolt Circle Diameter (BCD)** and **Shaft Diameter** code for 055 frame only (11 and 14 mm are standard). ex. 055EDC600BACRA**063110**

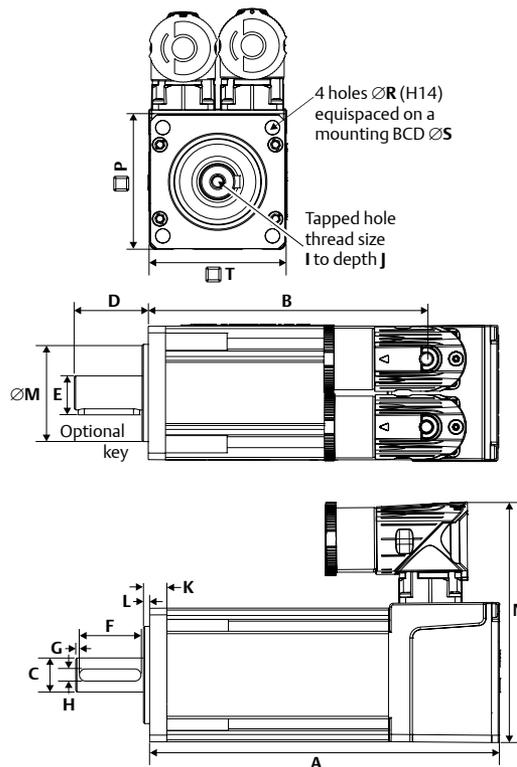
The Unimotor hd series servo motor expands the capabilities of Emerson Industrial Automation motion systems that provide high torque in a small size as well as support for incremental encoders, absolute encoders and resolver motor feedback.



UNIMOTOR HD

Unimotor hd 55 mm Frame Ratings and Dimensions

Motor Frame Size (mm)		055ED			055UD		
Voltage (Vrms)		230			460		
Frame Length		A	B	C	A	B	C
Continuous Stall Torque (lb-in)		6.37	10.44	14.6	6.37	10.44	14.6
Continuous Stall Torque (Nm)		0.72	1.18	1.65	0.72	1.18	1.65
Peak Torque (lb-in)		25.49	41.78	58.42	25.49	41.78	58.42
Peak Torque (Nm)		2.88	4.72	6.6	2.88	4.72	6.6
Inertia (lb-in-sec ²)		0.00012	0.00022	0.00032	0.00012	0.00022	0.00032
Inertia (kgm ²)		0.000014	0.000025	0.000036	0.000014	0.000025	0.000036
Motor Weight (lb)		2.64	3.3	3.96	2.64	3.3	3.96
Motor Weight (kg)		1.2	1.5	1.8	1.2	1.5	1.8
Number of Poles		8	8	8	8	8	8
3000 rpm	Kt (lb-in/A) =	6.55	7.7	8.05	6.55	13.19	14.6
	Kt (Nm/A) =	0.74	0.87	0.91	0.74	1.49	1.65
	Ke (V/k rpm) =	45	52.5	55	45	90	100
Rated Torque (lb-in)		6.2	9.29	13.1	6.2	9.29	13.1
Rated Torque (Nm)		0.7	1.05	1.48	0.7	1.05	1.48
Stall Current (A)		0.97	1.36	1.81	0.97	0.79	1
Rated Power (hp)		0.29	0.44	0.62	0.29	0.44	0.62
Rated Power (kW)		0.22	0.33	0.46	0.22	0.33	0.46
R (ph-ph) (Ohms)		28.0	14.12	9.53	28.0	45.0	31.0
L (ph-ph) (mH)		50.0	32.00	23.0	50.0	100.0	75.0
6000 rpm	Kt (lb-in/A) =	3.98	3.81	4.25	6.55	6.99	7.35
	Kt(Nm/A) =	0.45	0.43	0.48	0.74	0.79	0.83
	Ke (V/k rpm) =	27	26	29	45	47.5	50
Rated Torque (lb-in)		6.02	7.97	10.62	6.02	7.97	10.62
Rated Torque (Nm)		0.68	0.9	1.2	0.68	0.9	1.2
Stall Current (A)		1.61	2.74	3.44	0.97	1.49	1.99
Rated Power (hp)		0.58	0.76	1.01	0.58	0.76	1.01
Rated Power (kW)		0.43	0.57	0.75	0.43	0.57	0.75
R (ph-ph) (Ohms)		8.50	3.55	2.38	28.00	10.70	7.80
L (ph-ph) (mH)		16.00	8.20	6.30	50.00	25.00	20.00



UNIMOTOR HD

Shaft Dimensions	Shaft Diameter Code	Shaft Diameter Code					
		9.0 mm		11.0 mm		14.0 mm	
		(in)	(mm)	(in)	(mm)	(in)	(mm)
Shaft Diameter (J6)	C	0.354	9.0	0.433	11.0	0.551	14.0
Shaft Length	D	0.790	20.0	0.906	23.0	1.181	30.0
Key Height	E	0.402	10.2	0.492	12.5	0.629	16.0
Key Length	F	0.591	15.0	0.591	15.0	0.886	22.0
Key-to-Shaft End	G	0.039	1.0	0.059	1.5	0.142	3.6
Key Width (H9)	H	0.118	3.0	0.157	4.0	0.197	5.0
Tapped Hole Thread Size	I	M4 x 10		M4 x 10		M5 x 12.5	
Tapped Hole Depth	J	0.394	10.0	0.531	13.5	0.492	12.5

Motor Dimensions		Frame Length					
		A		B		C	
		(in)	(mm)	(in)	(mm)	(in)	(mm)
Unbraked Length	A	4.65	118	5.59	142	6.54	166
	B	3.55	90	4.49	114	5.43	138
Braked Length	A	6.22	158	7.17	182	8.11	206
	B	5.12	130	6.06	154	7.01	178

Flange Dimensions		BCD Code	
		Standard	
		(in)	(mm)
Flange Thickness	K	0.276	7.0
Pilot Thickness	L	0.098	2.5
Pilot Diameter (J6)	M	1.584	40.0
Flange Square	N	3.897	99.0
Mounting Hole Diameter (H14)	P	2.165	55.0
Mounting Hole BCD	R	0.228	5.8
Motor Housing	S	2.480	63.0
Terminal Box Width	T	2.115	55.0
Mounting Bolts		M5	

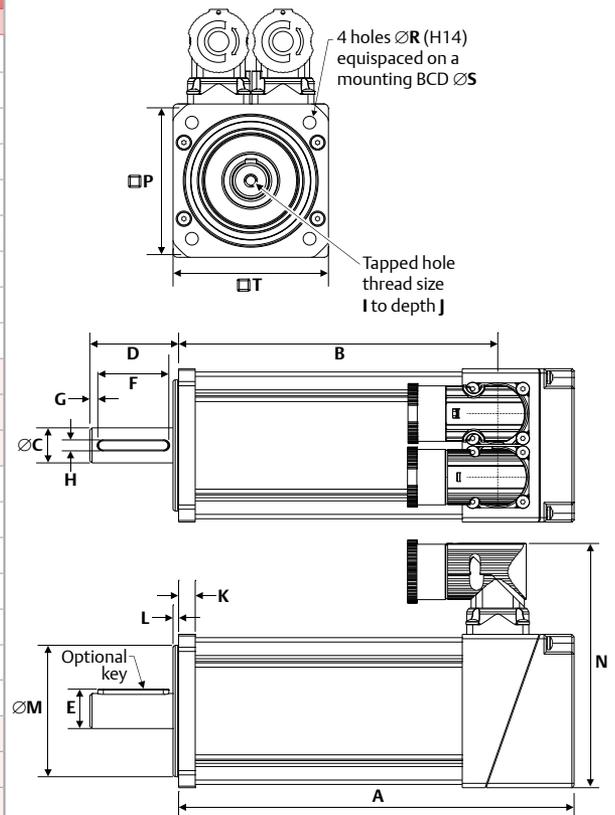
Unimotor hd 67 mm Frame Ratings and Dimensions

Motor Frame Size (mm)		067ED			067UD		
Voltage (Vrms)		230			460		
Frame Length		A	B	C	A	B	C
Continuous Stall Torque (lb-in)		12.8	22.6	32.7	12.8	22.5	32.7
Continuous Stall Torque (Nm)		1.45	2.55	3.70	1.45	2.55	3.70
Peak Torque (lb-in)		38.5	67.7	98.2	38.5	67.7	98.2
Peak Torque (Nm)		4.35	7.65	11.10	4.35	7.65	11.10
Inertia (lb-in-sec ²)		0.00027	0.00047	0.00066	0.00027	0.00047	0.00066
Inertia (kgm ²)		0.000030	0.000053	0.000075	0.000030	0.000053	0.000075
Motor Weight (lb)		4.40	5.72	7.04	4.41	5.73	7.05
Motor Weight (kg)		2.00	2.60	3.20	2.00	2.60	3.20
Number of Poles		10	10	10	10	10	10
3000 rpm	Kt (lb-in/A) =	8.23			7.08	14.16	
	Kt (Nm/A) =	0.93			0.80	1.60	
	Ke (V/k rpm) =	57.0			49.0	98.0	
Rated Torque (lb-in)	12.4	21.7	31.0	12.4	21.7	31.0	
Rated Torque (Nm)	1.40	2.45	3.50	1.40	2.45	3.50	
Stall Current (A)	1.56	2.74	3.98	1.81	1.59	2.31	
Rated Power (hp)	0.59	1.03	1.48	0.59	1.03	1.48	
Rated Power (kW)	0.44	0.77	1.10	0.44	0.77	1.10	
R (ph-ph) (Ohms)	14.92	4.88	3.33	11.69	15.20	10.70	
L (ph-ph) (mH)	45.43	17.40	12.70	35.18	54.20	40.80	
6000 rpm	Kt (lb-in/A) =	4.16			7.08		
	Kt (Nm/A) =	0.47			0.80		
	Ke (V/k rpm) =	28.5			49.0		
Rated Torque (lb-in)	11.5	19.5		11.5	19.5	27.4	
Rated Torque (Nm)	1.30	2.20		1.30	2.20	3.10	
Stall Current (A)	3.12	5.48		1.81	3.19	4.63	
Rated Power (hp)	1.10	1.85		1.10	1.85	2.61	
Rated Power (kW)	0.82	1.38		0.82	1.38	1.95	
R (ph-ph) (Ohms)	3.86	1.22		11.69	3.79	2.68	
L (ph-ph) (mH)	11.06	4.35		35.18	13.60	10.20	

NOTES:

- $\Delta t = 212^\circ\text{F}$ (100°C) winding 104°F (40°C) maximum ambient; all data subject to +/-10% tolerance
- Stall torque, rated torque and power relate to maximum continuous operation tested in a 68°F (20°C) ambient above 12 kHz drive switching frequency
- Maximum intermittent winding temperature is 284°F (140°C)

Motor Dimensions		Frame Length					
		A		B		C	
		(in)	(mm)	(in)	(mm)	(in)	(mm)
Unbraked Length	A	5.62	142.7	6.80	172.7	7.98	202.7
	B	4.28	108.8	5.46	138.8	6.65	168.8
Braked Length	A	7.00	177.7	8.18	207.7	9.37	237.7
	B	5.66	143.8	6.84	173.8	8.02	203.8



Shaft Dimensions		Shaft Diameter Code	
		14.0 mm	
		(in)	(mm)
Shaft Diameter	C	0.551	14.0
Shaft Length	D	1.181	30.0
Key Height	E	0.629	16.0
Key Length	F	0.964	25.0
Key-to-Shaft End	G	0.142	3.6
Key Width	H	0.197	5.0
Tapped Hole Thread Size	I	M5 x 0.8	
Tapped Hole Depth	J	0.53	13.5

Flange Dimensions		BCD Code	
		Standard	
		075	
		(in)	(mm)
Flange Thickness	K	0.295	7.5
Pilot Thickness	L	0.098	2.5
Pilot Diameter	M	2.362	60.0
Overall Height	N	4.389	111.5
Flange Square	P	2.755	70.0
Mounting Hole Diameter	R	0.228	5.8
Mounting Hole BCD	S	2.953	75.0
Motor Housing	T	2.637	67.0
Mounting Bolts		M5	

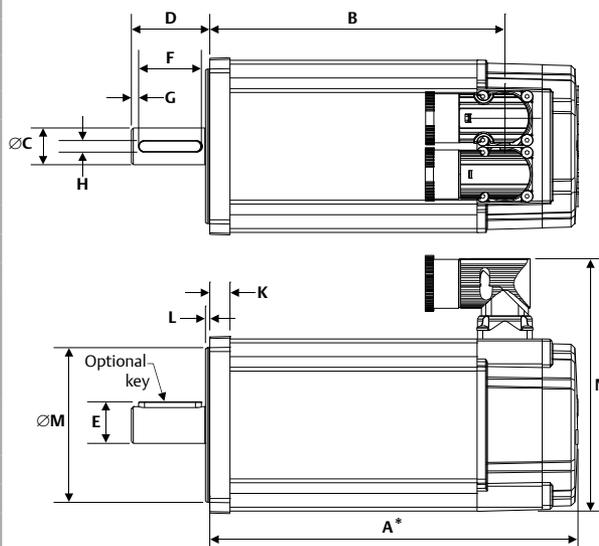
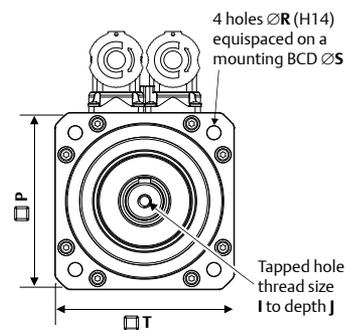
Unimotor hd 89 mm Frame Ratings and Dimensions

Motor Frame Size (mm)	089ED			089UD		
Voltage (Vrms)	230			460		
Frame Length	A	B	C	A	B	C
Continuous Stall Torque (lb-in)	28.3	48.7	70.8	28.3	48.7	70.8
Continuous Stall Torque (Nm)	3.20	5.50	8.00	3.20	5.50	8.00
Peak Torque (lb-in)	85.0	146.0	212.4	85.0	146.0	212.4
Peak Torque (Nm)	9.60	16.50	24.00	9.60	16.50	24.00
Inertia (lb-in-sec ²)	0.00077	0.00142	0.00207	0.00077	0.00142	0.00207
Inertia (kgm ²)	0.000087	0.000161	0.000234	0.000087	0.000161	0.000234
Motor Weight (lb)	6.8	9.2	11.7	6.8	9.2	11.7
Motor Weight (kg)	3.30	4.40	5.50	3.30	4.40	5.50
Number of Poles	10	10	10	10	10	10
3000 rpm	Kt (lb-in/A) =		8.2			14.2
	Kt (Nm/A) =		0.93			1.60
	Ke (V/k rpm) =		57.0			98.0
Rated Torque (lb-in)	26.6	42.9	61.1	26.6	42.9	61.1
Rated Torque (Nm)	3.0	4.85	6.90	3.00	4.85	6.90
Stall Current (A)	3.44	5.91	8.60	2.00	3.44	5.00
Rated Power (hp)	1.26	2.04	2.91	1.26	2.04	2.91
Rated Power (kW)	0.94	1.52	2.17	0.94	1.52	2.17
R (ph-ph) (Ohms)	3.28	1.57	0.89	10.10	5.05	2.68
L (ph-ph) (mH)	21.55	11.84	7.09	65.17	38.36	21.72
4000 rpm	Kt (lb-in/A) =		6.2			10.6
	Kt (Nm/A) =		0.70			1.20
	Ke (V/k rpm) =		42.8			73.5
Rated Torque (lb-in)	25.7	40.3	56.2	25.7	40.3	56.2
Rated Torque (Nm)	2.90	4.55	6.35	2.90	4.55	6.35
Stall Current (A)	4.57	7.86	11.43	2.67	4.58	6.67
Rated Power (hp)	1.62	2.56	3.57	1.62	2.56	3.57
Rated Power (kW)	1.21	1.91	2.66	1.21	1.91	2.66
R (ph-ph) (Ohms)	2.04	0.79	0.54	6.16	2.47	1.75
L (ph-ph) (mH)	13.20	5.97	4.38	39.78	18.8	14.03
6000 rpm	Kt (lb-in/A) =		4.2			7.1
	Kt (Nm/A) =		0.47			0.80
	Ke (V/k rpm) =		28.5			49.0
Rated Torque (lb-in)	23.5	33.6	44.3	23.5	33.6	44.3
Rated Torque (Nm)	2.65	3.80	5.00	2.65	3.80	5.00
Stall Current (A)	6.88	11.83	17.20	4.00	6.88	10.00
Rated Power (hp)	2.24	3.21	4.21	2.24	3.21	4.21
Rated Power (kW)	1.67	2.39	3.14	1.67	2.39	3.14
R (ph-ph) (Ohms)	0.98	0.39	0.23	2.52	1.27	0.83
L (ph-ph) (mH)	6.24	2.96	1.89	16.29	9.59	6.66

NOTES:

- $\Delta t = 212^\circ\text{F}$ (100°C) winding 104°F (40°C) maximum ambient; all data subject to +/-10% tolerance
- Stall torque, rated torque and power relate to maximum continuous operation tested in a 68°F (20°C) ambient above 12 kHz drive switching frequency
- Maximum intermittent winding temperature is 284°F (140°C)

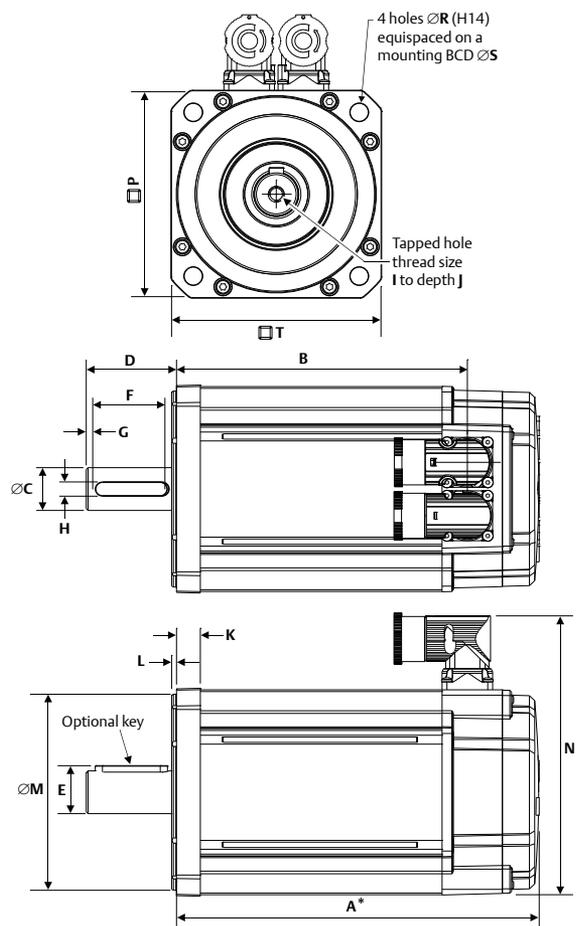
* Motor length increases 0.512 in (13 mm) for feedback options FB, EB, CA, SA and RA; motor length decreases 0.394 in (10 mm) for feedback option AE



Motor Dimensions		Frame Length						
		A		B		C		
		(in)	(mm)	(in)	(mm)	(in)	(mm)	
Feedback EC and FC only*	Unbraked Length	A*	5.82	147.8	7.00	177.8	8.16	207.8
		B	4.35	110.5	5.53	140.5	6.71	170.5
	Braked Length	A*	7.40	187.9	8.58	217.9	9.76	247.9
		B	5.93	150.6	7.11	180.6	8.29	210.6
Flange Dimensions		(in) (mm)						
Flange Thickness	K	0.406		10.3				
Pilot Thickness	L	0.087		2.2				
Pilot Diameter	M	3.150		80.0				
Overall Height	N	5.140		130.5				
Flange Square	P	3.583		91.0				
Mounting Hole Diameter	R	0.276		7.0				
Mounting Hole BCD	S	3.940		100.0				
Motor Housing	T	3.504		89.0				
Mounting Bolts		M6						
Shaft Dimensions		(in)		(mm)				
Shaft Diameter	C	0.750		19.0				
Shaft Length	D	1.575		40.0				
Key Height	E	0.850		21.5				
Key Length	F	1.260		32.0				
Key-to-Shaft End	G	0.146		3.7				
Key Width	H	0.236		6.0				
Tapped Hole Thread Size	I	M6 x 1.0						
Tapped Hole Depth	J	0.670		17.0				

Unimotor hd 115 mm Frame Ratings and Dimensions

Motor Frame Size (mm)	115ED			115UD		
	230			460		
Voltage (Vrms)	B	C	D	B	C	D
Frame Length						
Continuous Stall Torque (lb-in)	90.3	129.2	166.4	90.3	129.2	166.4
Continuous Stall Torque (Nm)	10.20	14.60	18.80	10.20	14.60	18.80
Peak Torque (lb-in)	270.8	387.6	499.1	270.8	387.6	499.1
Peak Torque (Nm)	30.60	43.80	56.40	30.60	43.80	56.40
Inertia (lb-in-sec ²)	0.00390	0.00566	0.00742	0.00391	0.00566	0.00742
Inertia (kgm ²)	0.000441	0.000639	0.000838	0.000441	0.000639	0.000838
Motor Weight (lb)	15.87	19.62	23.6	15.87	19.62	23.6
Motor Weight (kg)	7.20	8.90	10.70	7.20	8.90	10.70
Number of Poles	10	10	10	10	10	10
2000 rpm	Kt (lb-in/A) =	12.4			21.2	
	Kt (Nm/A) =	1.40			2.40	
	Ke (V/k rpm) =	85.5			147.0	
Rated Torque (lb-in)	76.1	105.3	138.1	76.1	105.3	138.1
Rated Torque (Nm)	8.60	11.90	15.60	8.60	11.90	15.60
Stall Current (A)	7.29	10.43	13.43	4.25	6.08	7.83
Rated Power (hp)	2.41	3.34	4.38	2.41	3.34	4.38
Rated Power (kW)	1.80	2.49	3.27	1.80	2.49	3.27
R (ph-ph) (Ohms)	1.40	0.77	0.61	4.41	2.41	1.80
L (ph-ph) (mH)	12.84	7.87	6.62	40.59	24.69	19.45
3000 rpm	Kt (lb-in/A) =	8.2			14.2	
	Kt (Nm/A) =	0.93			1.60	
	Ke (V/k rpm) =	57.0			98.0	
Rated Torque (lb-in)	68.2	92.9		68.2	92.9	120.4
Rated Torque (Nm)	7.70	10.50		7.70	10.50	13.60
Stall Current (A)	10.97	15.70		6.38	9.13	11.75
Rated Power (hp)	3.25	4.43		3.25	4.43	5.73
Rated Power (kW)	2.42	3.30		2.42	3.30	4.27
R (ph-ph) (Ohms)	0.58	0.39		1.83	1.21	0.78
L (ph-ph) (mH)	5.40	4.01		16.93	12.72	8.65



UNIMOTOR HD

NOTES:

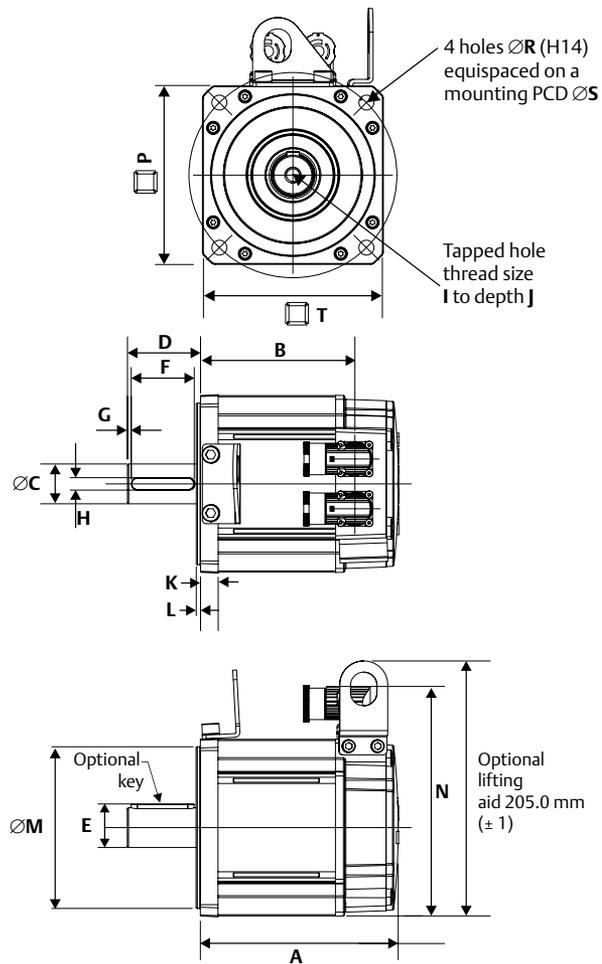
- $\Delta t = 212^\circ\text{F}$ (100°C) winding 104°F (40°C) maximum ambient; all data subject to +/-10% tolerance
- Stall torque, rated torque and power relate to maximum continuous operation tested in a 68°F (20°C) ambient above 12 kHz drive switching frequency
- Maximum intermittent winding temperature is 284°F (140°C)

Motor Dimensions		Frame Length						
		B		C		D		
		(in)	(mm)	(in)	(mm)	(in)	(mm)	
Feedback EC and FC only*	Unbraked Length	A*	7.63	193.8	8.81	223.8	9.99	253.8
		B	6.06	154.0	7.24	184.0	8.43	214.0
	Braked Length	A*	9.09	230.9	10.27	260.9	11.45	290.9
		B	7.52	191.1	8.70	221.1	9.89	251.1
Flange Dimensions		(in)		(mm)				
	Flange Thickness	K	0.519	13.2				
	Pilot Thickness	L	0.106	2.7				
	Pilot Diameter	M	4.33	110.0				
	Overall Height	N	6.16	156.5				
	Flange Square	P	4.57	116.0				
	Mounting Hole Diameter	R	0.394	10.0				
	Mounting Hole BCD	S	5.12	130.0				
	Motor Housing	T	4.53	115.0				
	Mounting Bolts	M8						
Shaft Dimensions		(in)		(mm)				
	Shaft Diameter	C	0.945	24.0				
	Shaft Length	D	1.97	50.0				
	Key Height	E	1.06	27.0				
	Key Length	F	1.57	40.0				
	Key-to-Shaft End	G	0.209	5.3				
	Key Width	H	0.315	8.0				
	Tapped Hole Thread Size	I	M8 x 1.25					
	Tapped Hole Depth	J	0.79	20.0				

* Motor length increases 0.512 in (13 mm) for feedback options FB, EB, CA, SA and RA; motor length decreases 0.394 in (10 mm) for feedback option AE

Unimotor hd 142 mm Frame Ratings and Dimensions

Motor Frame Size (mm)	142ED			142UD			
Voltage (Vrms)	230			460			
Frame Length	C	D	E	C	D	E	
Continuous Stall Torque (lb-in)	221.3	278.8	336.3	221.3	278.8	336.3	
Continuous Stall Torque (Nm)	25.0	31.5	38.0	25.0	31.5	38.0	
Peak Torque (lb-in)	662.9	836.4	1008.9	662.9	836.4	1008.9	
Peak Torque (Nm)	74.9	94.5	114.0	74.9	94.5	114.0	
Inertia (lb-in-sec ²)	.01505	.01956	.02407	.01505	.01956	.02407	
Inertia (kgm ²)	.0017	.00221	.00272	.0017	.00221	.00272	
Motor Weight (lb)	25.4	33.1	40.8	25.4	33.1	40.8	
Motor Weight (kg)	11.5	15.0	18.5	11.5	15.0	18.5	
Number of Poles	10	10	10	10	10	10	
1000 rpm	Kt (lb-in/A) =	24.78					
	Kt (Nm/A) =	2.8					
	Ke (V/k rpm) =	171.0					
	Rated Torque (lb-in)	206.2	256.7	305.4			
	Rated Torque (Nm)	23.3	29.0	34.5			
	Stall Current (A)	8.9	11.2	13.6			
	Rated Power (hp)	3.27	4.08	4.84			
	Rated Power (kW)	2.44	3.04	3.61			
	R (ph-ph) (Ohms)	1.36	0.94	0.72			
	L (ph-ph) (mH)	21.34	15.17	12.3			
Power Connector Size	1.0						
1500 rpm	Kt (lb-in/A) =			28.32			
	Kt (Nm/A) =			3.2			
	Ke (V/k rpm) =			196.0			
	Rated Torque (lb-in)			197.4	238.9	280.6	
	Rated Torque (Nm)			22.3	27.0	31.7	
	Stall Current (A)			7.8	9.8	11.9	
	Rated Power (hp)			4.69	5.63	6.71	
	Rated Power (kW)			3.5	4.2	5.0	
	R (ph-ph) (Ohms)			1.36	0.94	0.72	
	L (ph-ph) (mH)			21.34	15.17	12.3	
Power Connector Size			1.0				
2000 rpm	Kt (lb-in/A) =	12.39		21.24			
	Kt (Nm/A) =	1.4		2.4			
	Ke (V/k rpm) =	85.5		147.0			
	Rated Torque (lb-in)	189.4	227.5	261.9	189.4	227.5	261.9
	Rated Torque (Nm)	21.4	25.7	29.6	21.4	25.7	29.6
	Stall Current (A)	17.8	22.5	27.1	10.4	13.1	15.8
	Rated Power (hp)	6.01	7.21	8.31	6.01	7.21	8.31
	Rated Power (kW)	4.48	5.38	6.2	4.48	5.38	6.2
	R (ph-ph) (Ohms)	0.34	0.24	0.18	0.79	0.62	0.49
	L (ph-ph) (mH)	5.33	3.79	3.07	12.15	9.66	8.34
Power Connector Size	1.5*		1.0				
3000 rpm	Kt (lb-in/A) =	8.23		14.16			
	Kt (Nm/A) =	0.93		1.6			
	Ke (V/k rpm) =	57.0		98.0			
	Rated Torque (lb-in)	162.8	184.9		162.8	184.9	203.6
	Rated Torque (Nm)	18.4	20.9		18.4	20.9	23.0
	Stall Current (A)	26.9	33.9		15.6	19.7	23.8
	Rated Power (hp)	7.75	8.81		7.75	8.81	9.70
	Rated Power (kW)	5.78	6.57		5.78	6.57	7.23
	R (ph-ph) (Ohms)	0.12	0.10		0.34	0.24	0.18
	L (ph-ph) (mH)	1.90	1.57		5.33	3.79	3.07
Power Connector Size	1.5*		1.0				



Motor Dimensions		Frame Length					
		C		D		E	
		(in)	(mm)	(in)	(mm)	(in)	(mm)
Unbraked Length	A	8.54	217.0	9.72	247.0	10.91	277.0
	B	7.19	182.5	8.37	212.5	9.55	242.5
Braked Length	A	11.12	282.5	12.30	312.5	13.48	342.5
	B	9.76	248.0	10.94	278.0	12.13	308.0
Flange Dimensions		(in)			(mm)		
Flange Thickness	K	0.551		14.00			
Pilot Thickness	L	0.134		3.40			
Pilot Diameter	M	5.120		130.0			
Overall Height	N	4.1/8.1*		104/205*			
Flange Square	P	5.591		142.0			
Mounting Hole Dia.	R	0.472		12.0			
Mounting Hole BCD	S	6.500		165.0			
Motor Housing	T	5.591		142.0			
Mounting Bolts		M10					
Shaft Dimensions		(in)			(mm)		
Shaft Diameter	C	1.260		32.0			
Shaft Length	D	2.283		58.0			
Key Height	E	1.380		35.0			
Key Length	F	1.970		50.0			
Key-to-Shaft End	G	0.118		3.0			
Key Width	H	0.394		10.0			
Tapped Hole Thread Size	I	M12 x 1.75					
Tapped Hole Depth	J	1.142		29.0			

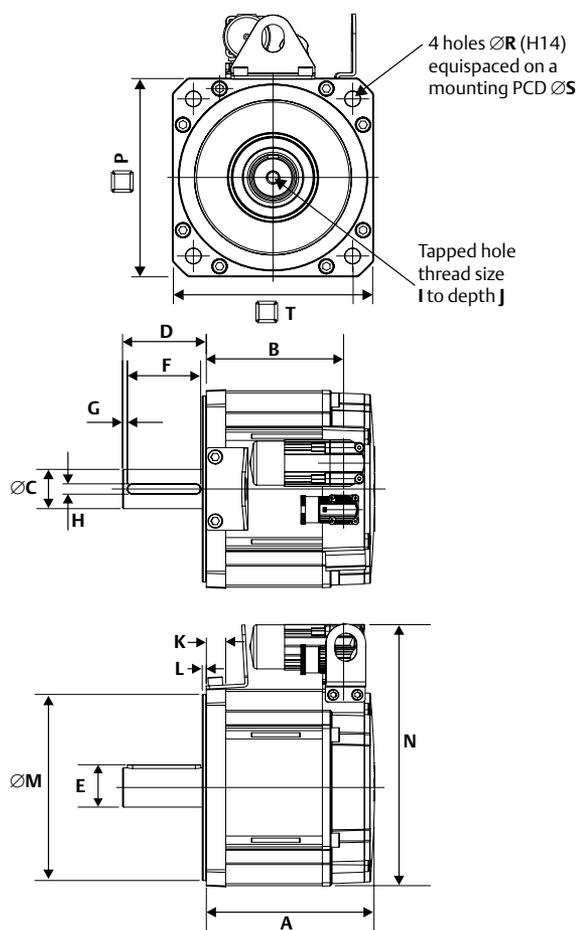
*These frames use Order Code Connection Type option "J".

Unimotor hd 190 mm Frame Ratings and Dimensions

Motor Frame Size (mm)		190ED			190UD		
Voltage (Vrms)		230			460		
Frame Length		C	D	F	C	D	F
Continuous Stall Torque (lb-in)		460.2	548.7	752.3	460.2	548.7	752.3
Continuous Stall Torque (Nm)		52.0	62.0	85.0	52.0	62.0	85.0
Peak Torque (lb-in)		1380.7	1646.2	2256.9	1380.7	1646.2	2256.9
Peak Torque (Nm)		156.0	186.0	255.0	156.0	186.0	255.0
Inertia (lb-in-sec ²)		.04833	.06275	.09161	.04833	.06275	.09161
Inertia (kgm ²)		.00546	.00709	.0103	.00546	.00709	.0103
Motor Weight (lb)		51.8	66.1	85.5	51.8	66.1	85.5
Motor Weight (kg)		23.5	28.6	38.8	23.5	28.6	38.6
Number of Poles		10	10	10	10	10	10
1000 rpm	Kt (lb-in/A) =	24.78					
	Kt (Nm/A) =	2.8					
	Ke (V/k rpm) =	171.0					
	Rated Torque (lb-in)	433.7	500.1	685.9			
	Rated Torque (Nm)	49.0	56.5	77.5			
	Stall Current (A)	18.6	22.1	30.4			
	Rated Power (hp)	6.88	7.94	10.89			
Rated Power (kW)	5.13	5.92	8.12				
R (ph-ph) (Ohms)	0.47	0.4	0.23				
L (ph-ph) (mH)	12.3	10.4	6.79				
1500 rpm	Kt (lb-in/A) =				28.32		
	Kt (Nm/A) =				3.2		
	Ke (V/k rpm) =				196.0		
	Rated Torque (lb-in)				408.9	462.0	606.3
	Rated Torque (Nm)				46.2	52.2	68.5
	Stall Current (A)				16.3	19.4	26.6
	Rated Power (hp)				9.74	11.00	14.43
Rated Power (kW)				7.26	8.2	10.76	
R (ph-ph) (Ohms)				0.47	0.4	0.23	
L (ph-ph) (mH)				12.3	10.4	6.79	
2000 rpm	Kt (lb-in/A) =	12.39			21.24		
	Kt (Nm/A) =	1.4			2.4		
	Ke (V/k rpm) =	85.5			147		
	Rated Torque (lb-in)	376.2			376.2		
	Rated Torque (Nm)	42.5			42.5		
	Stall Current (A)	37.1			21.7		
	Rated Power (hp)	11.9			11.9		
	Rated Power (kW)	8.9			8.9		
	R (ph-ph) (Ohms)	0.12			0.34		
	L (ph-ph) (mH)	3.07			8.2		

NOTES:

- $\Delta t = 212^\circ\text{F}$ (100°C) winding 104°F (40°C) maximum ambient; all data subject to +/-10% tolerance
- Stall torque, rated torque and power relate to maximum continuous operation tested in a 68°F (20°C) ambient above 12 kHz drive switching frequency
- Maximum intermittent winding temperature is 284°F (140°C)



Motor Dimensions		Frame Length					
		C	D	E			
		(in)	(mm)	(in)	(mm)	(in)	(mm)
Unbraked Length	A	8.69	220.6	9.87	250.6	12.23	310.6
	B	7.52	191.1	8.70	221.1	9.89	251.1
Braked Length	A	12.56	319.1	13.74	349.1	16.11	409.1
	B	11.40	289.6	12.58	319.6	14.94	379.6
Flange Dimensions		(in)		(mm)			
Flange Thickness	K	0.728		18.5			
Pilot Thickness	L	0.154		3.9			
Pilot Diameter	M	7.090		180.0			
Overall Height	N	9.940		252.5			
Flange Square	P	7.490		190.3			
Mounting Hole Diameter	R	0.571		14.5			
Mounting Hole BCD	S	8.465		215.0			
Motor Housing	T	7.480		190.0			
Mounting Bolts		M12					
Shaft Dimensions		(in)		(mm)			
Shaft Diameter	C	1.500		38.0			
Shaft Length	D	3.150		80.0			
Key Height	E	1.614		41.0			
Key Length	F	2.760		70.0			
Key-to-Shaft End	G	0.181		4.6			
Key Width	H	0.394		10.0			
Tapped Hole Thread Size	I	M12 x 1.75					
Tapped Hole Depth	J	1.142		29.0			

Unimotor hd Selection Considerations

Feedback Options

Feedback Device Order Code	Feedback Type	Encoder Supply Voltage	SinCos Cycles or Incremental Pulses per Revolution	Resolution Available to Position Loop	Feedback Accuracy
055-067 Motors					
AR	Resolver ¹	7 Vrms Excitation 5 kHz	1	Medium 16384 (14 bit)	Low +/- 600 arc second
CR	Incremental encoder	5 Vdc	4096	Medium 16384 (14 bit)	Medium +/- 150 arc second
EM (Multi-Turn) FM (Single-Turn)	Inductive Absolute encoder EnDat ²	5 Vdc	16	High 2.62 x 10 ⁵ (18 bits)	Medium +/- 480 arc second
089, 115, 142 and 190 Motors					
AE	Resolver ¹	6 Vrms Excitation 6 kHz	1	Medium 16384 (14 bit)	Medium +/- 720 arc second
CA	Incremental encoder	5 Vdc	4096	Medium 16384 (14 bit)	High +/- 60 arc second
EC (Multi-Turn) FC (Single-Turn)	Inductive Absolute encoder EnDat ²	7 - 10 Vdc	32	Medium absolute position 524288 (19 bits)	Medium +/- 280 arc second
RA (Multi-Turn) SA (Single-Turn)	Optical SinCos encoder ² HIPERFACE	7 - 12 Vdc	1024	Very high 1.04 x 10 ⁶ (20 bits)	High For SinCos integral non-linearity +/- 45 arc second For SinCos differential non-linearity +/- 7 arc second (total accuracy +/- 52 arc second)
EB (Multi-Turn) FB (Single-Turn)	Optical Absolute encoder EnDat ²	3.6 - 14 Vdc	2048	Very high 2.08 x 10 ⁶ (21 bits)	Very high +/- 20 arc second (differential non-linearity +/- 1% signal period)

NOTES:

¹Resolution value shown when used with the Unidrive M resolver input or SM-Resolver Option Module (Unidrive SP and Digitax ST)

²Resolution value shown when used with the Unidrive M, Unidrive SP or Digitax ST when the encoder type is set to either SC EnDat or SC Hiper, depending on the encoder - multi-turn devices have 4096 (12 bit) resolution

Motor Selection

Motor Derating

Adverse operating conditions require that the motor performance be derated. These conditions include ambient temperature above 104 °F (40 °C), motor mounting position, drive switching frequency or a drive oversized for the motor.

Ambient Temperatures

For ambient temperatures above 104 °F (40 °C), the torque must be derated using the following formula as a guideline for motors up to 3000 rpm. Consult factory for higher-speed motor derating information.

New derated torque =

$$\text{Specified torque} \times \sqrt{1 - ([\text{ambient temperature}^* - 40] / 100)}$$

*Measured in °C

For example, with an ambient temperature of 169 °F (76 °C), the new derated torque will be 0.8 x specified torque.

Drive Switching Frequency

Most drive current ratings are reduced at higher switching frequencies. See individual drive manuals for details.

See the table below for motor derating factors (these figures are for guidance only).

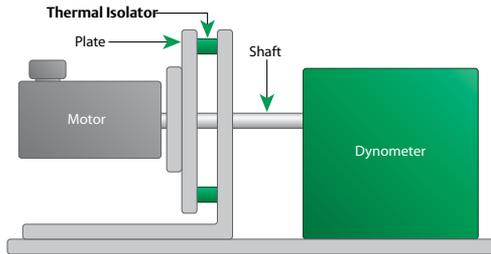
Switching Frequency	Motor Type/Frame					
	055	067	089	115	142	190
3 kHz	0.92	0.93	0.89	0.89	0.83	0.90
4 kHz	0.93	0.94	0.91	0.92	0.85	0.95
5/6 kHz	0.95	0.95	0.95	0.96	0.88	1
8 kHz	0.96	0.98	0.97	0.98	0.91	1
10/12/16 kHz	1	1	1	1	1	1

Mounting Arrangements

In general, motor torque should be derated if the motor mounting surface is heated from an external source such as a gearbox, the motor is connected to a poor thermal conductor, or the motor is mounted in a confined space with restricted air flow.

Thermal Test Conditions

The performance data shown was recorded with an ambient temperature of 68 °F (20 °C) and the motor mounted on a thermally-isolated aluminum plate.



Motor Type/Frame	Aluminum Heatsink Plate	
	(in)	(mm)
055	4.3 x 4.3 x 1.06	110 x 110 x 27
067, 089	9.8 x 9.8 x 0.6	250 x 250 x 15
115 to 142	13.8 x 13.8 x 0.8	350 x 350 x 20
190	19.7 x 19.7 x 0.8	500 x 500 x 20

Thermal Protection

Thermistor protection to 293 °F (145 °C) is built into the motor windings and gives an indication of serious overheating problems. **The installer must connect the thermistor to the drive. Failure to do so will invalidate the motor warranty if winding burns out.**

Environmental Conditions

Any liquids or gases that may come into contact with the motor must be confirmed to ensure compliance with the correct international standards.

Brake Operation

Do not apply the brake while the motor shaft is rotating. The brake can only take a limited number of emergency braking operations and must not be used for repeated dynamic braking.

Ingress Protection

IP65 conformance; sealed against water spray and dust when mounted and connected.

Unimotor hd Holding Brake Specifications

Motor Frame Size (mm)	Power Supply (Vdc)	Power (W)	Static Torque		Release Time (ms) nom.	Added Inertia		Backlash Degrees*	Added Weight	
			(lb-in)	(Nm)		(lb-in-sec ²)	(kgcm ²)		(lbs)	(kg)
055	24	6.3	15.9	1.8	22	0.00003	0.03	0.73	0.88	0.4
067	24	10.2	35.4	4	<50	0.00006	0.073	0.75	1.1	0.5
089	24	23.4	88.5	10	<50	0.00010	0.115	0.75	1.3	0.6
115	24	19.5	117	20	120	0.00029	0.327	0.75	2.6	1.2
142	24	25	371	42	95	0.00225	2.54	0.77	6.2	2.8
190 C-D	24	25	592	67	120	0.00404	4.57	0.77	11.7	5.3
190 F	24	54.5	885	100	CF	0.00683	7.72	0.75	11.7	5.3

NOTES:

- Figures shown in individual motor sections are at 68 °F (20 °C) ambient
- Apply a derate factor of 0.7 to standard brake torque figures if motor temperature is above 212 °F (100 °C)
- *Backlash will increase over time

