

# Nidec Motion

Motor



***Nidec***

NIDEC MOTOR CORPORATION

# Servo motors for every application

## Reliability and Innovation

Nidec Motion designs its products using a proven development program that prioritizes innovation and reliability. This program gives Nidec a market share in terms of performance and quality that can be flexibly configured for a variety of applications. High inertia option available. leading reputation.

Nidec Motion offers a range of reliable servo motors designed to meet specific application needs. When combined with Nidec Motion brand servo drive products, the resulting drive/motor combination is optimized for rating, performance, cost and ease of use.

Today, businesses of all sizes are looking for a partner who understands the unique needs of today's global economy. They turned to Nidec Motion again and again. With our world-class brand, deep industry experience and broad global reach, Nidec Motion is uniquely positioned to provide cost-effective solutions to the ever-changing industrial manufacturing market.

## performance advantage

### FM

- Rated voltage: 230V/460V
- Continuous Torque: 10.6 to 1,204 lb-in (1.2 to 136 Nm)
- Feedback options: Resolver, incremental and absolute encoders with various

connector options

Models (with NEMA flange options): 75, 95, 115, 142, 190 and 250mm

- Rating: IP65, UL, CE and RoHS

### HD

compact low inertia servo motors for highly dynamic applications

- Rated voltage: 230V/460V
- Continuous torque: 6.4 to 752 lb-in (0.72 to 85.0Nm)
- Feedback options: resolver, encoder and absolute encoder
- Models: 55, 67, 89, 115, 142 and 190 mm
- Rating: IP65, UL, CE and RoHS

### NT series

Compact NEMA or metric flange motors

- Rated voltage: 230V
- Continuous Torque: 7.5 to 56 lb-in (0.85 to 6.3 Nm)
- Feedback option: incremental encoder
- Flying lead option
- Model: Imperial (NEMA 23 or 34) or Metric (IEC-72-1)
- Rating: IP65, UL and RoHS



# HD 230 V | 460 V

## Compact, powerful and highly dynamic AC servo motor

Designed for maximum torque density, the HD brushless AC servo motor series provides a very compact, low inertia solution for applications requiring high torque during rapid acceleration and deceleration.

HD motors are equipped with high-resolution sine-cosine or absolute encoders and have motor "electronic amplitude" data pre-loaded during the manufacturing process. This data can be read by most of Nidec Motion's servo drives and is automatically used to optimize drive settings.

Set. This feature simplifies commissioning and maintenance, ensures consistent performance and saves

time. The HD torque configuration is perfectly matched to the ST servo drive and provides 300% peak overload capability for maximum dynamic performance.

### Main features

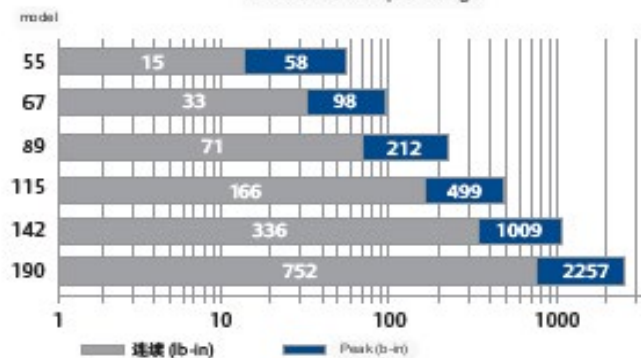
- Torque range: 6.4 to 752 lb-in (0.72 to 85.0 Nm)
- High torque-to-inertia ratio for high dynamic performance
- Compact and powerful
- Optional holding brake
- Meets IP65 requirements
- Segmented Stator Design
- World class performance
- Windings meet voltage requirements of 230 V and 460V
- Speeds include 2000, 3000, 4000 and 6000 rpm
- Larger shaft for increased torsional stiffness
- Various feedback options:
  - Incremental encoder: high precision, medium resolution
  - Absolute: medium accuracy, medium resolution, single and multi-turn
  - Sin Cos/Absolute: high accuracy, high resolution, single and multi-turn
  - Supports HIPERFACE (SICK) and EnDat (Heidenhain) protocols
  - Resolver: suitable for extreme applications and conditions, low accuracy, medium resolution

certified



HD motor

HD Series Torque Range



All HD motors feature swivel connections for easy cable routing and installation.



HD series

# HD 230 V | 460 V

## Ordering code information

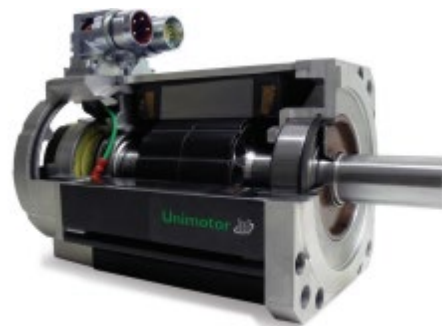
Use the following information to create an order code for the HD (the first behavior example)

089	UD	B	30	5	B	A	CA		A	XXX	XXX
Model	Motor voltage	Stator length	Rated Speed	Brake (24 V)	Connection type	Output shaft	Feedback device		Inertia	BCD	Shaft diameter
		Type 055-089	Type 055-067	Type 055-190	Type 055-115		Type 055				
055	ED = 230 V	A	30 = 3000 rpm	0 = Not equipped	B = 1.0 type power and signal 90. Rotatable	A = With Full Keys Installed Keyway	CR = Incremental Encoder (Renco) **	4096 ppr (R35i)	A = Standard	063	9.0 A-C
067	UD = 460 V	B	60 = 6000 rpm	5 = Hold Brake **							Type 142 t
089		C	Type 089		Model 115	B = 1.0 type power and signal 90. Rotatable	FM = sine-cosine single revolution	ECI 1118 - EnDat	14.0 A-C		
115		Model 115	30 = 3000 rpm	Type 142					F = Key with full & half keys provided Slot *	AR = Resolver	Type 67
142		B	40 = 4000 rpm		Model 190	J = 1.5 type power and signal 90. Rotatable	CR = Incremental Encoder (Renco) **	4096 ppr (R35i)			
190		C	60 = 6000 rpm	Model 190					J = 1.5 type power and signal 90. Rotatable	EM = Sine/Cosine Multiturn	EQI 1130 - EnDat
		D	Model 115		Type 142	J = 1.5 type power and signal 90. Rotatable	FM = sine-cosine single revolution	ECI 1118 - EnDat			
		Type 142	20 = 2000 rpm	Type 142					J = 1.5 type power and signal 90. Rotatable	AR = Resolver	Type 089-190
		C	30 = 3000 rpm		Model 190	J = 1.5 type power and signal 90. Rotatable	CA = Incremental Encoder (SICK)	4096 ppr (CFS50)			
		D	Type 142	Model 190					J = 1.5 type power and signal 90. Rotatable	EC = Sine/Cosine Multiturn	EQI 1331 - EnDat
		E	10 = 1000 rpm		Model 190	J = 1.5 type power and signal 90. Rotatable	EB = Sine/Cosine Multiturn	EQN 1325 - EnDat			
		Model 190	15 = 1500 rpm	Model 190					J = 1.5 type power and signal 90. Rotatable	FB = sine-cosine single revolution	ECN 1313 - EnDat
		C	20 = 2000 rpm		Model 190	J = 1.5 type power and signal 90. Rotatable	FC = sine-cosine single revolution	ECI 1319 - EnDat			
		D	30 = 3000 rpm	Model 190					J = 1.5 type power and signal 90. Rotatable	RA = Sine/Cosine Multiturn	SRM 50 - HIPERFACE
		F	Model 190		Model 190	J = 1.5 type power and signal 90. Rotatable	SA = sine-cosine single revolution	SRS 50 - HIPERFACE			
			10 = 1000 rpm	Model 190					J = 1.5 type power and signal 90. Rotatable	AE = Resolver	
			15 = 1500 rpm		Model 190	J = 1.5 type power and signal 90. Rotatable					
			20 = 2000 rpm	Model 190					J = 1.5 type power and signal 90. Rotatable		
			Model 190		Model 190	J = 1.5 type power and signal 90. Rotatable					

**Remark**  
 \* Half keys provided to achieve shaft balance  
 \*\* Holding brakes shall not be used for dynamic applications

Refer to the Type 142mm Ratings and Dimensions table for connector model number data \$Add BCD and shaft diameter codes for Type 055 only (11 and 14 mm are standard codes), e.g. 055EDC600BACRA063110

The HD series servo motors extend the capabilities of the Nidec Motion system to provide high torque in a small footprint and support incremental encoder, absolute encoder, and resolver motor reversals.



# Type HD 67 mm Ratings and Dimensions

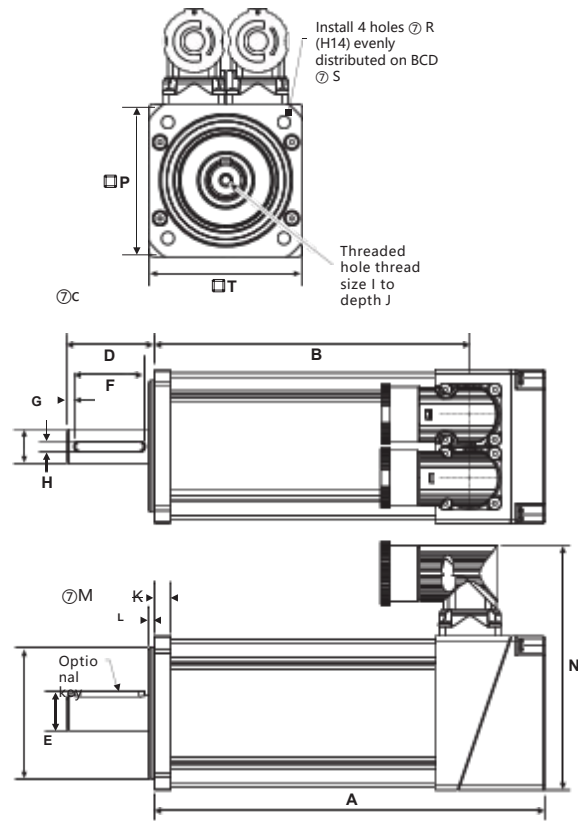
Motor model (mm)		067ED			067UD		
Voltage (vrms)		230			460		
Rack length		A	B	C	A	B	C
Continuous locked-rotor torque (lb-in)		12.8	22.6	32.7	12.8	22.5	32.7
Continuous locked-rotor torque (Nm)		1.45	2.55	3.70	1.45	2.55	3.70
Peak torque (lb-in)		38.5	67.7	98.2	38.5	67.7	98.2
Peak torque (Nm)		4.35	7.65	11.10	4.35	7.65	11.10
Inertia (lb-in-sec <sup>2</sup> )		0.00027	0.00047	0.00066	0.00027	0.00047	0.00066
Inertia (kgm <sup>2</sup> )		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		
	kt (Nm/A) =	0.93			0.80		
	ke (v/k rpm) =	57.0			49.0		
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
Locked-rotor 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
Locked-rotor 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

Motor size		Rack length					
		A		B		C	
		(in)	(mm)	(in)	(mm)	(in)	(mm)
Length without brake	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
There is brake 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

**Remark**

Δt= 212. Maximum ambient temperature of F (100 powder) winding 104. F (40 powder); all data tolerance is +/-10%

Locked-rotor torque, rated torque, and power at ambient temperature of 68. F (20 powder), the maximum intermittent winding temperature measured at the maximum continuous operation of the driver at a carrier frequency above 12 kHz is 284. F (140 powder)



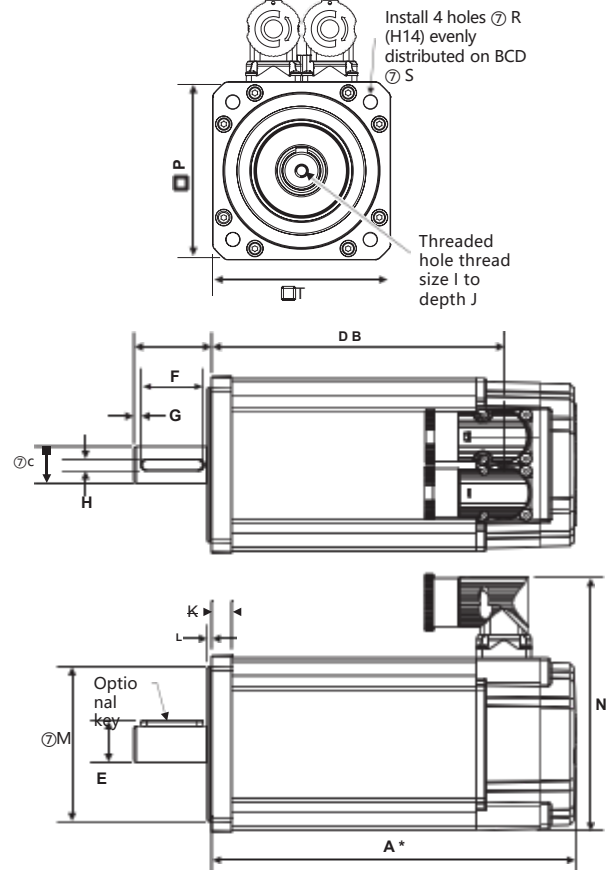
Shaft size	Shaft diameter code	14.0 mm	
		(in)	(mm)
		Shaft diameter	C
Shaft length	D	1.181	30.0
Key height	E	0.629	16.0
Key length	F	0.964	25.0
Key to shaft end	G	0.142	3.6
Key width	H	0.197	5.0
Threaded hole thread size	I	M5 x 0.8	
Threaded hole depth	J	0.53	13.5

Flange size	BCD code	Standard configuration	
		075	
		(in)	(mm)
Flange thickness	K	0.295	7.5
Guide rod thickness	L	0.098	2.5
Guide rod diameter	M	2.362	60.0
Total height	N	4.389	111.5
Square flange edge	P	2.755	70.0
Diameter of the mounting hole	R	0.228	5.8
Mounting hole BCD	S	2.953	75.0
Motor housing	T	2.637	67.0
Install the bolts		M5	



# Type HD 89 mm Ratings and Dimensions

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



Motor size		Rack length						
		A		B		C		
		(in)	(mm)	(in)	(mm)	(in)	(mm)	
Anti-performance EC only And FC*	Length without brake	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
	There is brake 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 size		(in)		(mm)				
	Flange thickness	K	0.406			10.3		
	Guide rod thickness	L	0.087			2.2		
	Guide rod diameter	M	3.150			80.0		
	Total height	N	5.140			130.5		
	Square flange edge	P	3.583			91.0		
	Diameter of the mounting hole	R	0.276			7.0		
	Mounting hole BCD	S	3.940			100.0		
	Motor housing	T	3.504			89.0		
	Install the bolts	M6						
Shaft size		(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		
	Threaded hole thread size	I	M6 x 1.0					
	Threaded hole depth	J	0.670			17.0		

Remark  
 $\Delta t = 212$ . Maximum ambient temperature of F (100 powder) winding 104. F (40 powder);  
 All data have a tolerance of +/-10 percent  
 Locked-rotor torque, rated torque, and power at ambient temperature of 68. F (20 powder),  
 the maximum intermittent winding temperature measured at the maximum continuous  
 operation of the driver at a carrier frequency above 12 kHz is 284. F (140 powder)

\* For anti-performance options FB, EB, CA, SA, and Ra, 0.512 in (13 mm) increase in motor length; For the inverse option Ae, Motor length reduced by 0.394 in (10 mm)

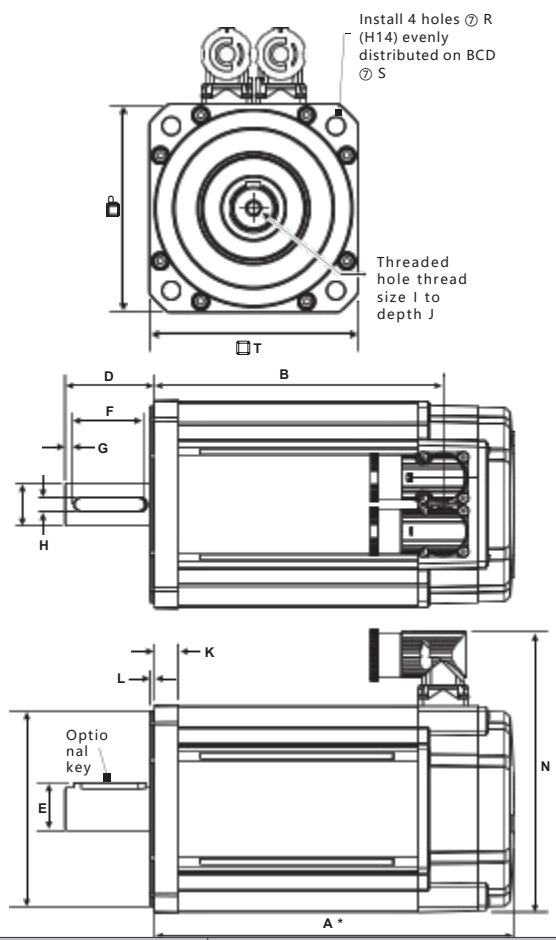


# Type HD 115 mm Ratings and Dimensions

Motor model (mm)	115ED			115UD		
	230			460		
Voltage (vrms)						
Rack length	B	C	D	B	C	D
Continuous locked-rotor torque (lb-in)	90.3	129.2	166.4	90.3	129.2	166.4
Continuous locked-rotor 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 <sup>2</sup> )	0.00390	0.00566	0.00742	0.00391	0.00566	0.00742
Inertia (kgm <sup>2</sup> )	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
Locked-rotor 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
Locked-rotor 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

Remark  
 $\Delta t = 212$ . Maximum ambient temperature of F (100 powder) winding 104. F (40 powder); all data tolerance is +/- 10%  
 Locked-rotor torque, rated torque, and power at ambient temperature of 68. F (20 powder), driver carrier frequency higher than 12 kHz  
 The maximum intermittent winding temperature measured at the maximum continuous operating condition is 284. F (140 powder)

\* For anti-performance options FB, EB, CA, SA, and Ra, 0.512 in (13 mm) increase in motor length; for reverse performance option Ae, Motor length reduced by 0.394 in (10 mm)



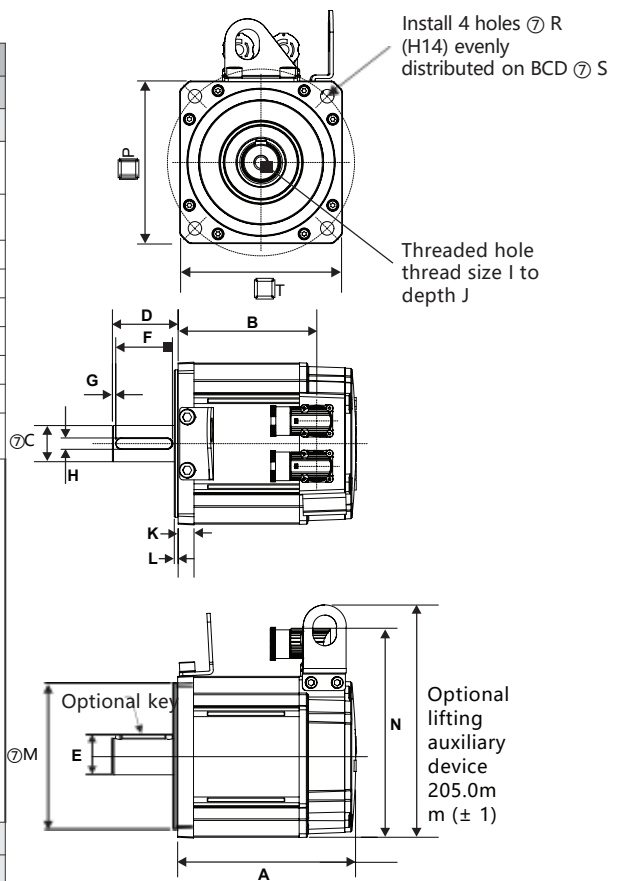
HD series

Motor size		Rack length						
		B		C		D		
		(in)	(mm)	(in)	(mm)	(in)	(mm)	
Anti-performance EC only And FC*	Length without brake	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
	There is brake 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 size		(in)		(mm)				
	Flange thickness	K	0.519			13.2		
	Guide rod thickness	L	0.106			2.7		
	Guide rod diameter	M	4.33			110.0		
	Total height	N	6.16			156.5		
	Square flange edge	P	4.57			116.0		
	Diameter of the mounting hole	R	0.394			10.0		
	Mounting hole BCD	S	5.12			130.0		
	Motor housing	T	4.53			115.0		
	Install the bolts	M8						
Shaft size		(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		
	Threaded hole thread size	I	M8 x 1.25					
	Threaded hole depth	J	0.79			20.0		



# Type HD 142 mm Ratings and Dimensions

Motor model (mm)		142ED			142UD		
Voltage (vrms)		230			460		
Rack length		C	D	E	C	D	E
Continuous locked-rotor torque (lb-in)		221.3	278.8	336.3	221.3	278.8	336.3
Continuous locked-rotor 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 <sup>2</sup> )		.01505	.01956	.02407	.01505	.01956	.02407
Inertia (kgm <sup>2</sup> )		.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			
	Locked-rotor 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 dimensions	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			
	Locked-rotor 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 dimensions	12.39	1.0					
2000 rpm	kt (lb-in/A) =	21.24					
	kt (Nm/A) =	2.4					
	ke (v/k rpm) =	85.5					
	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
	Locked-rotor 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 dimensions	1.5*			1.0			
3000 rpm	kt (lb-in/A) =	14.16					
	kt (Nm/A) =	1.6					
	ke (v/k rpm) =	57.0					
	Rated torque (lb-in)	162.8	184.9	203.6	162.8	184.9	203.6
	Rated torque (Nm)	18.4	20.9	23.0	18.4	20.9	23.0
	Locked-rotor current (A)	26.9	33.9	23.8	15.6	19.7	23.8
	Rated power (HP)	7.75	8.81	9.70	7.75	8.81	9.70
	Rated power (kw)	5.78	6.57	7.23	5.78	6.57	7.23
	R (ph-ph) (ohms)	0.12	0.10	0.18	0.34	0.24	0.18
	L (ph-ph) (mH)	1.90	1.57	3.07	5.33	3.79	3.07
Power connector dimensions	1.5*			1.0	1.5*		



HD series

Motor size		Rack length					
		C		D		E	
		(in)	(mm)	(in)	(mm)	(in)	(mm)
Length without brake	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
There is brake 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 size		(in)			(mm)		
Flange thickness	K	0.551			14.00		
Guide rod thickness	L	0.134			3.40		
Guide rod diameter	M	5.120			130.0		
Total height	N	4.1/8.1*			104/205*		
Square flange edge	P	5.591			142.0		
Diameter of the mounting hole	R	0.472			12.0		
Mounting hole BCD	S	6.500			165.0		
Motor housing	T	5.591			142.0		
Install the bolts		M10					
Shaft size		(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		
Threaded hole thread size	I	M12 x 1.75					
Threaded hole depth	J	1.142			29.0		

\* These models use Ordering Code Connection Type Option "J".

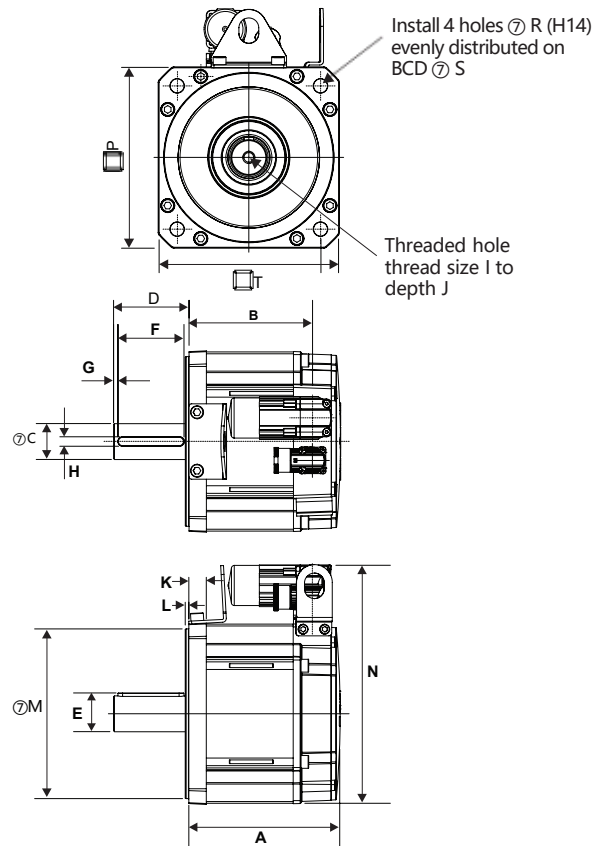




# HD Model 190 mm Ratings and Dimensions

HD series

Motor model (mm)		190ED			190UD		
Voltage (vrms)		230			460		
Rack length		C	D	F	C	D	F
Continuous locked-rotor torque (lb-in)		460.2	548.7	752.3	460.2	548.7	752.3
Continuous locked-rotor 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 <sup>2</sup> )		.04833	.06275	.09161	.04833	.06275	.09161
Inertia (kgm <sup>2</sup> )		.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			
	Locked-rotor 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
	Locked-rotor 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		
	Locked-rotor 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			



Motor size		Rack length					
		C		D		E	
		(in)	(mm)	(in)	(mm)	(in)	(mm)
Length without brake	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
There is brake 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 size		(in)		(mm)			
Flange thickness	K	0.728		18.5			
Guide rod thickness	L	0.154		3.9			
Guide rod diameter	M	7.090		180.0			
Total height	N	9.940		252.5			
Square flange edge	P	7.490		190.3			
Diameter of the mounting hole	R	0.571		14.5			
Mounting hole BCD	S	8.465		215.0			
Motor housing	T	7.480		190.0			
Install the bolts		M12					
Shaft size		(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			
Threaded hole thread size	I	M12 x 1.75					
Threaded hole depth	J	1.142		29.0			

**Remark**  
 $\Delta t = 212$  Maximum ambient temperature of F (100 powder) winding 104. F (40 powder); all data tolerance is +/-10%

Locked-rotor torque, rated torque, and power at ambient temperature of 68. F (20 powder), the maximum intermittent winding temperature measured at the maximum continuous operation of the driver at a carrier frequency above 12 kHz is 284. F (140 powder)



# HD Selection Considerations

## Inverse performance option

Anti-performance device Order code	Anti-performance type	Encoder Supply voltage	Sine and cosine cycles or incremental pulses per revolution	Position Ring Available resolution	Inverse performance precision
<b>Type 055-067 motor</b>					
AR	Resolver 1	7 vrms	1	Medium	Low
		Excitation 5 KHz		16384 (14-bit)	+/-600 arcsec
CR	Incremental encoder	5 vdc	4096	Medium	Medium
				16384 (14-bit)	+/-150 arcsec
EM (multi-turn) FM (single-turn)	Inductance absolute Encoder EnDat2	5 vdc	16	High	Medium
				2.62 X 105 (18 bit)	+/-480 arcsec
<b>Type 089, 115, 142 and 190 motors</b>					
AE	Resolver 1	6 vrms	1	Medium	Medium
		Excitation 6 KHz		16384 (14-bit)	+/-720 arcsec
CA	Incremental encoder	5 vdc	4096	Medium	High
				16384 (14-bit)	+/-60 arcsec
EC (multi-turn) FC (single-turn)	Inductance absolute Encoder EnDat2/3	7 - 10 vdc	32	Medium absolute position 524288 (19 bits)	Medium
				+/-280 arcsec	
RA (multi-turn) SA (single-turn)	Optical sine and cosine Encoder 2 HIPERFACE	7 - 12 vdc	1024	Very high	High
				1.04 X 106 (20 bit)	+/-45 arcsec for sine and cosine integral nonlinearity; +/-7 arcsec for sine and cosine differential nonlinearity (Total accuracy +/-52 arcsec)
EB (multi-turn) FB (single-turn)	Optical absolute Encoder EnDat2/3	3.6 - 14 vdc	2048	Very high	Very high
				2.08 X 106 (21 bit)	+/-20 arcsec (Differential nonlinearity +/-1% of signal period)

HD series

**Remark**

1 shows the resolution value when used with the M servo drive resolver input or the SM-Resolver option module (SP servo drive and ST servo drive)  
 2 shows the resolution value when used with an M servo driver, an SP servo driver, or an ST servo driver (encoder type is set to SC EnDat or SC Hiper, Encoder dependent)-Resolution of 4096 (12 bit) for multi-turn units  
 3 Optical EnDat encoders are recommended for heavy duty applications. Inductive EnDat encoders are recommended for standard applications.

## Motor selection

### Motor derating

Adverse operating conditions require reduced motor performance. These conditions include ambient temperatures above 104. F (40), motor mounting position, driver carrier frequency, or driver size is too large.

### Ambient temperature

For motors up to 3000 rpm, if the ambient temperature is above 104. F (40), the following formula must be used as a guide to reduce the torque. Consult factory for derating of higher speed motors.

New torque after derating =

Specified torque X V 1- ([ambient temperature \* -40]/100)

\* Measured in units of

For example, the ambient temperature is 169. F (76 calibration), the new torque after derating is 0.8 X specified torque.

### Driver carrier frequency

If the carrier frequency is higher, the current rating of most drivers will need to be reduced. For more information, refer to the appropriate drive manual.

Motor derating factors are shown in the following table (these data are for reference only)

Carrier wave Frequency	Motor type/model					
	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

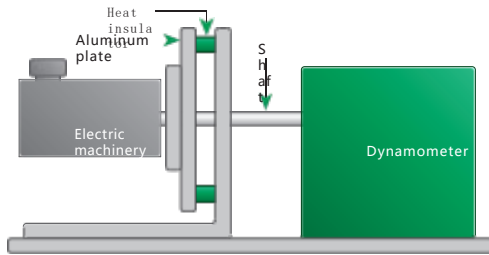
### Installation method

In general, motor torque shall be derated if the motor mounting surface is heated by an external source (e.g., gearbox), the motor is connected to a poor thermal conductor, or the motor is mounted in a confined space with restricted airflow.



### Thermal test conditions

Performance data is shown at an ambient temperature of 68. F (20) and the motor is installed on the insulated aluminum plate.



Motor type/model	Heat-dissipating aluminum 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

293 . F (145) thermistor protection is built into the motor windings to indicate severe overheating problems. The installer must connect the thermistor to the drive. Otherwise, the winding will be burnt out and the warranty will be invalid.

### Environmental conditions

Any liquid or gas that may come into contact with the motor must be identified to ensure compliance with the correct international standards.

### Brake operation!

Do not use the brake while the motor shaft is rotating.

The brakes shall only be used for a limited number of emergency braking operations and shall not be used for repetitive dynamic braking.

### Seal protection

IP65 compliant; sealed to prevent ingress of water spray and dust during installation and connection.

### HD Holding Brake Specifications

Motor model (mm)	Power source (vdc)	Power (W)	Static torque (lb-in) (Nm)		Release time (ms) nom.	Increase the inertia (lb-in-sec2) (kgcm2)		Backlash Degree *	Add weight (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

### Remark

The data displayed in the independent motor part is that the ambient temperature is 68. Data at F (20)

If the motor temperature is greater than 212. F (100%), apply a derating factor of 0.7 to the standard brake torque data \* Backlash will increase over times

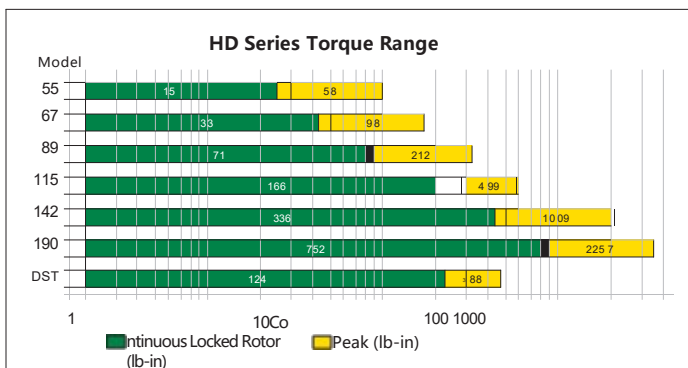


## HD 230 V | 460 V

HD is a family of high dynamic servo motors designed for maximum torque density. This series of brushless AC servomotors provides a very compact, low inertia solution for applications requiring high torque during rapid acceleration and deceleration.

The SD torque configuration is perfectly matched to the ST servo drive and provides 300% peak overload capability for maximum dynamic performance. HD incorporates a number of unique performance-enhancing design features.

- . High torque to inertia ratio for high dynamic performance
- . High energy consumption brake
- . Compact and powerful
- . IP65 rated, UL, CE and RoHS compliant
- . Rigorous testing ensures high performance and reliability



### Sample motor and driver combination

ST servo driver and HD-230 V, 3 O															
Drive Model	Driver carrier frequency	Motor model	Continuous locked-rotor Torque		Peak value Torque		Rated Torque		Rated power		Rated Operating speed	Inertia		kt	
	kHz		lb-in	Nm	lb-in	Nm	lb-in	Nm	HP	kw	rpm	lb-in-sec2	kgm2	lb-in/Arms	Nm/Arms
DST1202	12	055EDC300	14.60	1.65	58.41	6.60	13.10	1.48	0.60	0.46	3000	0.0003186	0.000036	8.05	0.91
DST1203	12	055EDC600	14.60	1.65	58.41	6.60	10.62	1.20	1.00	0.75	6000	0.0003186	0.000036	4.25	0.48
DST1204	12	067EDB600	22.57	2.55	67.70	7.65	19.47	2.20	1.81	1.38	6000	0.0004691	0.000053	4.16	0.47
DST1204	12	089EDB300	48.68	5.50	146.03	16.50	42.93	4.85	1.81	1.52	3000	0.0014249	0.000161	8.23	0.93

ST servo driver and HD-460 V, 3 O															
Drive Model	Driver carrier frequency	Motor model	Continuous locked-rotor Torque		Peak torque		Rated Torque		Rated power		Rated Operating speed	Inertia		kt	
	kHz		lb-in	Nm	lb-in	Nm	lb-in	Nm	HP	kw	rpm	lb-in-sec2	kgm2	lb-in/Arms	Nm/Arms
DST1402	12	055UDC300	14.60	1.65	58.41	6.60	13.10	1.48	0.60	0.46	3000	0.0003186	0.000036	14.60	1.65
DST1403	12	067UDB300	22.57	2.55	67.70	7.65	21.68	2.45	1.03	0.77	3000	0.0004691	0.000053	14.16	1.60
DST1404	8	089UDB300	46.91	5.30	146.03	16.50	41.60	4.70	1.98	1.48	3000	0.0014249	0.000161	14.16	1.60
DST1405	6	115UDC200	123.90	14.00	387.63	43.80	100.89	11.40	1.98	2.39	2000	0.0014868	0.000168	21.24	2.40



## Fan kit

FM and HD motors (Type 075 to 250) are available with field mounted cooling fans. These fan kits are designed for use when the motor is operating close to its thermal limits. Each motor has a built-in winding thermistor for thermal protection. If the motor experiences a thermal trip and is found to be operating close to the thermal limit, the fan kit may help provide continuous operation during periods of high continuous torque output. Never break or bypass the motor thermal protection as this may cause permanent damage to the motor.

The fan kit is IP20 rated and includes mounting hardware. A junction box mounted above and behind the fan shroud allows connection of 230V fan leads.

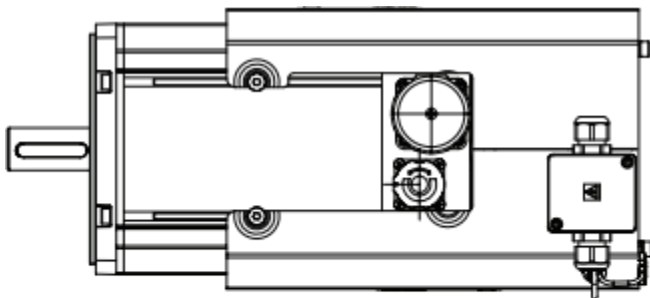


## Fan kit

Part number	Description	Clear distance behind fan box (mm)	Freedom Flow (m3/H)	Fan rating Current (A)
075FB21	075 FM Motor Fan Box	40	50	0.05
095FB21	095 FM Motor Fan Box	40	67	0.05
115FB21	Fan box for 115 FM and HD motors	40	160	0.08
142FB21	142 FM and HD Motor Fan Box	50	180	0.07
190FB21	Fan box for 190 FM and HD motors	60	325	0.13
250FB21	250 FM Motor Fan Box	Consult the factory		

## Fan box wiring

Electrical Specifications:  
230V AC O.IA



Neutral (1)

Grounding

