

## Frameless Servo Motors



杭州摩森机电科技有限公司

系统集成商

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# Frameless High Speed Motor - HKW Series

## Overview

### Description

HKW motors are high performance permanent magnet synchronous servomotors for spindle applications up to 276 kW.

Delivered as separate components to be integrated into the mechanical structure of the machine, HKW motors benefit from the use of field weakening, in order to achieve both high torque at slow speed, and very high maximum speed at constant power.



### Advantages

- High speed
- High power
- Large hollow shaft
- High resistance (oil proof on request)
- Compatible with Parker drives and third parties
- Accurate speed for the spindle
  - for the best surface finish
  - for a shorter cycle time
  - for a longer tool life time
- Cold permanent magnet technology: reduced heating in the bearings compared to induction motors, low dilatation effect
- Global cost reduction
- Increased reliability and reduced maintenance
- High dynamic performance and power density: increased productivity and reduced size when compared to induction motors
- Simple, light and compact machine design
- No coupling systems needed
- Greater stiffness and robustness of the system
- Low noise level
- Integration assistance available

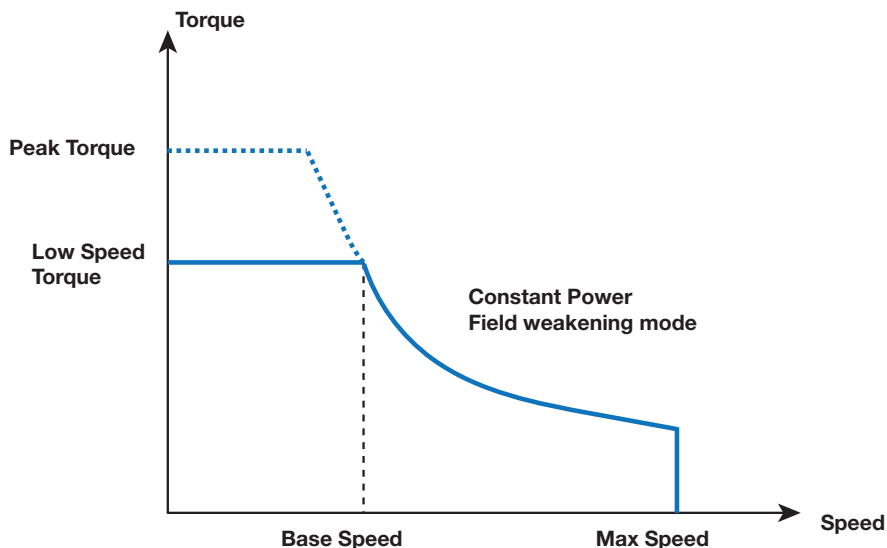
### Applications

- Machines Tools
- Special Machines
- Textile Machines
- Centrifuges
- Compressors

### Technical Characteristics - Overview

<b>Cooling</b>	Water cooling
<b>Power</b>	2.3...276 kW
<b>Torque</b>	4.5...1 250 Nm
<b>Speed</b>	50 000 min <sup>-1</sup>
<b>Number of poles</b>	4 - HKW085 6 - HKW108 / HKW155 / HKW195 8 - HKW242 16 - HKW310
<b>Diameter</b>	85 – 108 – 155 – 195 – 242 - 310mm

# Technical Data



Motor	S1 Power	Max. Speed	Frequency at max speed	Low speed torque	Low speed Current	Peak Torque	Peak Current	Base Speed	Moment of Inertia
	Ps1	Nmax	at max speed	Mo	Io	M peak	I peak	Nb	J
	[kW]	[min <sup>-1</sup> ]	[Hz]	[Nm]	[Arms]	[Nm]	[Arms]	[min <sup>-1</sup> ]	[kgm <sup>2</sup> ]
<b>400 VAC power supply - three-phased - Water cooled</b>									
HKW085_066BAU	2.3	50000	1667	4.9	6.8	7.3	13.5	4480	0.00049
HKW085_066BAP	4.9	50000	1667	4.5	12.2	7.3	27	10400	0.00049
HKW085_066BAK	10.2	50000	1667	4.2	22.4	7.3	54	23200	0.00049
HKW085_099BAQ	4.7	50000	1667	7.4	12.6	11	25.1	6070	0.00068
HKW085_099BAL	10	50000	1667	7.3	24.7	11	50.2	13100	0.00068
HKW085_099BAI	15.6	50000	1667	6.8	35	11	78.1	21900	0.00068
HKW108_080CAN	4.9	30000	1500	10	9.6	15	14.5	4680	0.00082
HKW108_080CAI	10.4	30000	1500	10	19.2	15	28.9	9930	0.00082
HKW108_080CAF	16	30000	1500	10	28.9	15	43.4	15300	0.00082
HKW108_140CAI	10.2	30000	1500	20	21.9	30	33	4870	0.00143
HKW108_140CAF	15.6	30000	1500	20	32.9	30	49.6	7450	0.00143
HKW108_140CAD	25	30000	1500	20	49.4	30	74.3	11900	0.00143
HKW108_200CAJ	9	30000	1500	30	20.7	45	31.2	2870	0.00204
HKW108_200CAF	15.5	30000	1500	30	34.5	45	52	4940	0.00204
HKW108_200CAD	25	30000	1500	30	51.8	45	78	7960	0.00204
HKW155_080CRR	8.8	24000	1200	22	18.2	33	27.6	3820	0.0052
HKW155_080CRP	14	24000	1200	22	28.5	33	43.1	6080	0.0052
HKW155_080CAR	10.3	18000	900	28	19	42	29.4	3510	0.0052
HKW155_080CAP	16	18000	900	28	29.6	42	46	5500	0.0052
HKW155_120CAR	10	24000	1200	48	21.8	75	36.3	1990	0.0078
HKW155_120CAK	23	24000	1200	48	49.5	75	82.5	4600	0.0078
HKW155_120CAH	32	24000	1200	46	65.1	75	113	6640	0.0078
HKW155_120CAF	43	24000	1200	44	82.9	75	151	9330	0.0078
HKW155_160CAR	10	24000	1200	68	23.2	100	36.3	1410	0.0104
HKW155_160CAP	16	24000	1200	68	36.3	100	56.7	2250	0.0104
HKW155_160CAH	32	24000	1200	68	72.6	100	113	4500	0.0104
HKW155_160CAF	44	24000	1200	66	93.8	100	151	6370	0.0104
HKW155_160CAD	63	24000	1200	58	123	100	227	10300	0.0104
HKW195_120CAV	7.2	18000	900	80	19.4	120	35.1	860	0.016
HKW195_120CAP	16	20000	1000	80	42.1	120	76	1910	0.016
HKW195_120CAI	34	20000	1000	80	84.1	120	152	4050	0.016
HKW195_120CAF	52	20000	1000	75	117	120	228	6620	0.016
HKW195_120CAE	62	20000	1000	75	140	120	274	7900	0.016

Frameless Permanent Magnet High Speed Motors - HKW Series  
 Technical Data

Motor	S1 Power Ps1	Max. Speed Nmax	Frequency at max speed	Low speed torque Mo	Low speed Current Io	Peak Torque M peak	Peak Current I peak	Base Speed Nb	Moment of Inertia J
	[kW]	[min <sup>-1</sup> ]	[Hz]	[Nm]	[Arms]	[Nm]	[Arms]	[min <sup>-1</sup> ]	[kgm <sup>2</sup> ]
<b>400 VAC power supply - three-phased - Water cooled</b>									
HKW195_180CAT	10	16000	800	120	26.1	180	47.2	795	0.024
HKW195_180CAP	16	20000	1000	120	42.1	180	76	1280	0.024
HKW195_180CAM	23	20000	1000	120	58.2	180	105	1830	0.024
HKW195_180CAJ	31	20000	1000	120	75.7	180	137	2470	0.024
HKW195_180CAF	52	20000	1000	120	126	180	228	4140	0.024
HKW195_180CAC	101	20000	1000	110	227	180	456	8770	0.024
HKW195_300CAM	23	20000	1000	200	58.2	300	105	1100	0.04
HKW195_300CAJ	30	20000	1000	200	75.7	300	137	1440	0.04
HKW195_300CAF	52	20000	1000	200	126	300	228	2490	0.04
HKW195_300CAE	63	20000	1000	200	151	300	274	3010	0.04
HKW195_300CAC	105	20000	1000	200	252	300	456	5010	0.04
HKW195_300CAX	175	20000	1000	200	454	300	821	8350	0.04
HKW195_300CBU	127	20000	1000	270	289	350	419	1500	0.04
HKW195_360CBU	135	20000	1000	340	308	420	419	3790	0.048
HKW195_420CBU	126	20000	1000	400	311	490	419	3000	0.056
HKW195_420CBX	230	18000	900	390	542	490	754	5630	0.056
HKW242_225DAN	15	11000	733	280	37.2	360	49,9	510	0.105
HKW242_225DAF	33	13000	867	280	74.4	360	99,7	1130	0.105
HKW242_225DAD	50	13000	867	280	112	360	150	1710	0.105
HKW242_225DAC	67	13000	867	275	146	360	199	2330	0.105
HKW242_225DAB	101	13000	867	260	206	360	299	3710	0.105
HKW242_375DAF	30	13000	867	480	76.8	600	99,7	600	0.175
HKW242_375DAD	49	13000	867	480	115	600	150	975	0.175
HKW242_375DAC	67	13000	867	480	154	600	199	1330	0.175
HKW242_375DAB	101	13000	867	480	230	600	299	2010	0.175
HKW242_375DAA	200	13000	867	460	439	600	598	4150	0.175
HKW242_375DBB	195	13000	867	620	465	800	653	3000	0.175
HKW242_375DBY	276	13000	867	585	578	800	870	4500	0.175
HKW242_375DBW	158	10000	667	630	316	800	435	2400	0.175
HKW310_200HAJ	37	8000	1067	600	87.1	900	141	590	0.23
HKW310_200HAH	46	8000	1067	580	105	900	177	760	0.23
HKW310_200HAE	77	8000	1067	575	166	900	282	1280	0.23
HKW310_200HAD	95	8000	1067	565	204	900	353	1610	0.23
HKW310_200HAC	115	8000	1067	550	265	900	471	2000	0.23
HKW310_300HAJ	35.4	8000	1067	940	91.2	1350	141	360	0.34
HKW310_300HAH	45	8000	1067	940	114	1350	177	460	0.34
HKW310_300HAE	76	8000	1067	930	180	1350	282	780	0.34
HKW310_300HAD	95	8000	1067	920	223	1350	353	990	0.34
HKW310_300HAC	120	8000	1067	900	290	1350	471	1270	0.34
HKW310_400HAJ	34	6000	800	1250	91	1800	141	260	0.45
HKW310_400HAH	44.5	8000	1067	1250	114	1800	177	340	0.45
HKW310_400HAF	62	8000	1067	1250	152	1800	235	475	0.45
HKW310_400HAE	75	8000	1067	1250	182	1800	282	575	0.45
HKW310_400HAD	94	8000	1067	1250	227	1800	353	720	0.45
HKW310_400HAC	120	8000	1067	1250	303	1800	471	910	0.45
HKW310_400HAY	230	8000	1067	1080	520	1800	942	2030	0.45
HKW310_500HBX	160	5000	667	1890	380	2700	569	810	0.56
HKW310_500HBB	200	6000	800	1880	472	2700	711	1030	0.56
HKW310_500HBY	270	7000	933	1840	616	2700	949	1400	0.56

## Associated Drives

540 VDC voltage supply		
Motor	PARKER AC890SD	
	Drive	Speed limit <sup>(1)</sup> N <sub>max</sub> [min <sup>-1</sup> ]
HKW085_066BAU	890SD-532160B0-B00-...	13800
HKW085_066BAP	890SD-232300C0-B00-...	27500
HKW085_066BAK	890SD-532450D0-B00-...	30000
HKW085_099BAQ	890SD-232300C0-B00-...	17000
HKW085_099BAL	890SD-532450D0-B00-...	30000
HKW085_099BAI	890SD-432730E0-0...	30000
HKW108_080CAN	890SD-232240C0-B00-...	9900
HKW108_080CAI	890SD-532390D0-B00-...	19800
HKW108_080CAF	890SD-532590D0-B00-...	20000
HKW108_140CAI	890SD-532390D0-B00-...	11300
HKW108_140CAF	890SD-532590D0-B00-...	17000
HKW108_140CAD	890SD-432870E0-0...	20000
HKW108_200CAJ	890SD-532390D0-B00-...	7100
HKW108_200CAF	890SD-532590D0-B00-...	11900
HKW108_200CAD	890SD-432870E0-0...	17800
HKW155_080CRR	890SD-232300C0-B00-...	8600
HKW155_080CRP	890SD-532450D0-B00-...	13500
HKW155_080CAR	890SD-532390D0-B00-...	7000
HKW155_080CAP	890SD-532450D0-B00-...	11000
HKW155_120CAR	890SD-532390D0-B00-...	4700
HKW155_120CAP	890SD-532450D0-B00-...	7300
HKW155_120CAK	890SD-432730E0-0...	10700
HKW155_120CAH	890SD-433105F...	14700
HKW155_120CAF	890SD-433156F...	19600
HKW155_160CAR	890SD-532390D0-B00-...	3500
HKW155_160CAP	890SD-532590D0-B00-...	5500
HKW155_160CAH	890SD-433105F...	11000
HKW155_160CAF	890SD-433156F...	14700
HKW155_160CAD	890SD-433316G...	20000
HKW195_120CAV	890SD-232300C0-B00-...	2400
HKW195_120CAP	890SD-432730E0-0...	5200
HKW195_120CAI	890SD-433156F...	10400
HKW195_120CAF	890SD-433316G...	15500
HKW195_120CAE	890SD-433361G...	18600
HKW195_180CAT	890SD-532450D0-B00-...	2100
HKW195_180CAP	890SD-432730E0-0...	3500
HKW195_180CAM	890SD-432870E0-0...	4800
HKW195_180CAJ	890SD-433156F...	6200
HKW195_180CAF	890SD-433316G...	10400
HKW195_180CAC	890SD-433520H...	20000
HKW195_300CAM	890SD-432870E0-0...	2900
HKW195_300CAJ	890SD-433156F...	3700
HKW195_300CAF	890SD-433316G...	6200
HKW195_300CAE	890SD-433361G...	7500
HKW195_300CAC	890SD-433520H...	12400
HKW195_300CAX	consult us	
HKW195_300CBU	890SD-433480H...	10300
HKW195_360CBU	890SD-433520H...	8600
HKW195_420CBU	890SD-433520H...	7400
HKW195_420CBX	consult us	

(1) Due to the back emf or the maximal drive frequency



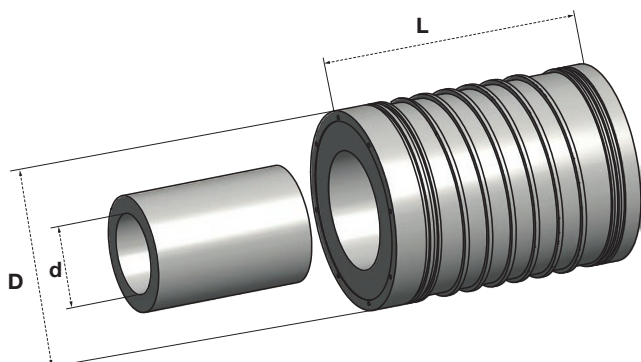
## Associated Drives

540 VDC voltage supply		
Motor	PARKER AC890SD	
	Drive	Speed limit <sup>(1)</sup> N <sub>max</sub> [min <sup>-1</sup> ]
HKW242_225DAN	890SD-532590D0-B00-...	1300
HKW242_225DAF	360 / 302	2600
HKW242_225DAD	360 / 302	3800
HKW242_225DAC	360 / 301	5100
HKW242_225DAB	890SD-433361G...	7600
HKW242_375DAF	890SD-433105F...	1500
HKW242_375DAD	480 / 401	2300
HKW242_375DAC	480 / 402	3100
HKW242_375DAB	890SD-433375H...	4600
HKW242_375DAA	consult us	
HKW242_375DBB	consult us	
HKW242_375DBY	consult us	
HKW242_375DBW	890SD-433520H...	4700
HKW310_200HAJ	890SD-433156F...	1400
HKW310_200HAH	890SD-433216G...	1800
HKW310_200HAE	890SD-433361G...	2900
HKW310_200HAD	890SD-433375H...	3600
HKW310_200HAC	890SD-433520H...	4800
HKW310_300HAJ	890SD-433156F...	1000
HKW310_300HAH	890SD-433216G...	1200
HKW310_300HAE	890SD-433361G...	1900
HKW310_300HAD	890SD-433375H...	2400
HKW310_300HAC	890SD-433520H...	3200
HKW310_400HAJ	890SD-433156F...	700
HKW310_400HAH	890SD-433216G...	900
HKW310_400HAF	890SD-433316G...	1200
HKW310_400HAE	890SD-433361G...	1400
HKW310_400HAD	890SD-433375H...	1800
HKW310_400HAC	890SD-433520H...	2400
HKW310_400HAY	consult us	
HKW310_500HBX	890SD-532730E0-0...	1900
HKW310_500HBB	consult us	
HKW310_500HBY	consult us	

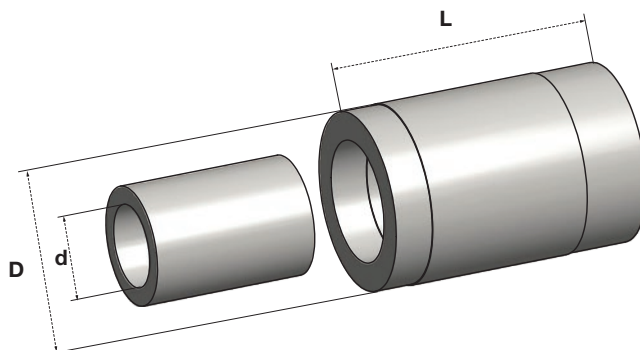
(1) Due to the back emf or the maximal drive frequency

# Dimensions

Stator with cooling jacket



Stator without housing



Dimensions [mm]	Without housing			With cooling jacket		
	d	D	L	d	D	L
Product						
HKW085_066	32	85	134	32	100	136
HKW085_099			167			169
HKW108_080	47	108	148	47	130	150
HKW108_140			208			210
HKW108_200			268			270
HKW155_080	75	155.5	152	75	180	154
HKW155_120			192			194
HKW155_160			232			234
HKW155_160CAD			241			243
HKW195_120CAX	90	195	214	90	220	216
HKW195_120CAF			223			225
HKW195_120CAE			231			233
HKW195_180CAx			274			276
HKW195_180CAF			283			285
HKW195_180CAC			291			293
HKW195_300CAM/J			394			396
HKW195_300CAF			403			405
HKW195_300CAE/C			411			413
HKW195_300CAX			464			466
HKW195_300CBU			464			413
HKW195_360CBU			524			499
HKW195_420CBU			584			559
HKW195_420CBX			584			559

Dimensions [mm]	Without housing			With cooling jacket		
	d	D	L	d	D	L
Product						
HKW242_225DAN/F	130	242	313	130	270	315
HKW242_225DAD			322			324
HKW242_225DAC			330			332
HKW242_225DAB			333			335
HKW242_375DAF			463			465
HKW242_375DAD			472			474
HKW242_375DAC			480			482
HKW242_375DAB			477			479
HKW242_375DAA			513			515
HKW242_375DBB			513			515
HKW242_375DBY	513	515				
HKW310_200HAJ	180	310	308	180	340	310
HKW310_200HAH			317			319
HKW310_200HAE			328			330
HKW310_200HAD			322			324
HKW310_200HAC			325			327
HKW310_300HAJ			408			410
HKW310_300HAH			417			419
HKW310_300HAE			428			430
HKW310_300HAD			422			424
HKW310_300HAC			425			427
HKW310_400HAJ			508			510
HKW310_400HAH			517			519
HKW310_400HAF			525			527
HKW310_400HAE			528			530
HKW310_400HAD			522			524
HKW310_400HAC			525			527
HKW310_400HAY	540	542				
HKW310_500HBX	640	642				
HKW310_500DBB	640	642				
HKW310_500DBY	640	642				

# Order Code

## HKW Series

	1	2	3	4	5	6	7	8	9
Order example	<b>HK</b>	<b>W</b>	<b>155</b>	<b>-</b>	<b>080</b>	<b>CAP</b>	<b>R</b>	<b>0</b>	<b>000</b>

<b>1 Motor type</b>	<b>HK</b>	Frameless permanent magnet servomotors
<b>2 Cooling</b>	<b>W</b>	Water cooling (standard)
<b>3 External diameter</b>	<b>085</b>	85 mm
	<b>108</b>	108 mm
	<b>155</b>	155 mm
	<b>195</b>	195 mm
	<b>242</b>	242 mm
	<b>310</b>	310 mm
<b>4 Element</b>	<b>-</b>	Motor (stator + rotor)
	<b>S</b>	Stator
	<b>R</b>	Rotor
<b>5 Length L [mm]</b>	<b>080</b>	
	<b>140</b>	see table "Dimensions"
	<b>200</b>	
	<b>...</b>	
<b>6 Torque/Speed characteristics</b>	<b>BAU</b>	
	<b>BAP</b>	see table "Technical data"
	<b>BAK</b>	
	<b>...</b>	
<b>7 Fix Code</b>	<b>R</b>	
<b>8 Mechanical options</b>	<b>0</b>	Without housing, without hub
	<b>1</b>	With housing, without hub
	<b>2</b>	Without housing, with hub
	<b>3</b>	With housing, with hub
<b>9 Interface</b>	<b>000</b>	Standard motor





## 杭州摩森机电科技有限公司

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