

TORQUE



Applimotion
Motors & Actuators

PRODUCT DATA SHEET

Omni™ Series Motors

Low-Profile Direct Drive
Motors for the World's
Machines and Robots

The Omni Series enables OEMs to design high performance, reliable, small and lightweight systems using flexible and easy-to-integrate rotary motor components.

› CELERAMOTION.COM



Omni™ Series Motors

Low-Profile Direct Drive Motors for the World's Machines and Robots



Compact and Powerful.

Designed for easy integration into OEM assemblies, the Omni Series is offered in a wide range of low-profile form factors with a large through hole for convenient routing of cables, optics, and other system elements. Frameless direct drive kit construction enables easy integration into machinery, robot joints, rotary stages and actuators.

Built using state-of-the-art magnetic designs, the Omni Series delivers high torque density, low cogging and low stator and rotor mass in a thermally efficient package. Direct drive technology provides high speeds and accelerations with good mechanical stiffness and zero backlash, reducing settling times and increasing system performance and throughput.

Three models of the Omni Series motors are available: ULT for low-mid range torque requirements; UTH for high torque requirements; and UTO for applications that require an outside rotating configuration. All models are compatible with a wide range of controllers and drives. Windings and form factors can be customized to meet application requirements.

Benefits

- High torque density in low-profile form factors enables small footprint
- Large through hole for convenient routing of cables, optics, plumbing and other system elements
- High mechanical stiffness and low rotor inertia for efficient control of highly dynamic axes
- Low cogging for accurate and smooth motion
- Easy integration into system design
- Compatible with wide range of drives and controllers
- Custom windings and form factors available to meet application requirements

Specifications	Units	ULT Models	UTH Models	UTO Models
Continuous Torque:	Nm	0.04 to 6.58	0.53 to 4.56	0.01 to 0.35
Peak Torque:	Nm	0.12 to 19.74	1.61 to 13.70	0.04 to 1.05
Diameter:	mm	25 to 165 (Stator OD)	63 to 127 (Stator OD)	20 to 52 (Rotor OD)
Through Hole:	mm	11.6 to 109.2 (Rotor ID)	12.68 to 53.34 (Rotor ID)	9 to 17.8 (Stator ID)

Product groups listed and corresponding data are provided as a reference. Actual motor attributes are model and configuration specific. Standard and custom models are available within each group. Peak torque output is based on a 3:1 peak to continuous current ratio, and is based on limited duty cycle. Operating voltage up to 300V. Contact Celera Motion for torque-speed specifications. Specifications subject to change.

RoHS
CE



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Omni™ Series Motors

Low-Profile Direct Drive Motors for the World's Machines and Robots

Omni UTH High Performance Motors

SIZE	UTH-63		UTH-100	
MODEL NUMBER	UTH-63-B-24-A-H-000	UTH-63-B-24-A-N-000	UTH-100-A-25-E-H-000	UTH-100-A-25-E-N-000

PERFORMANCE SPECIFICATIONS

Continuous Torque*	Nm	0.53	0.53	1.70	1.70
	oz-in	76	76	241	241
Peak Torque	Nm	1.61	1.61	5.11	5.11
	oz-in	228	228	723	723

ELECTRICAL SPECIFICATIONS

Continuous Current*	A _{DC}	4.1	4.1	18.8	18.8
Resistance _{phase-phase}	Ohm	1.82	1.82	0.17	0.17
Inductance _{phase-phase}	mH	4.50	4.50	0.19	0.19
Ke _{phase-phase}	V _{peak} /krpm	13.9	13.9	9.5	9.5
Kt _{TRAP}	Nm/A _{DC}	0.133	0.133	0.091	0.091
Kt _{SINE}	Nm/A _{peak}	0.115	0.115	0.079	0.079
Km	Nm/√W	0.098	0.098	0.220	0.220

THERMAL SPECIFICATIONS

Thermal Resistance	°C/W	3.0	3.0	1.5	1.5
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MECHANICAL SPECIFICATIONS

Stator OD	mm	63.50	63.50	101.60	101.60
Stator ID	mm	29.16	29.16	65.02	65.02
Rotor OD	mm	28.14	28.14	62.99	62.99
Rotor ID	mm	12.68	12.68	43.18	43.18
Stator Length	mm	26.42	25.40	26.92	24.38
End Turn, Lead Side	mm	7.37	6.35	7.11	4.57
Stack Height	mm	12.70	12.70	15.24	15.24
End Turn, Non-Lead Side	mm	6.35	6.35	4.57	4.57
Rotor Length	mm	15.27	15.27	17.78	17.78
Weight - Total**	kg	0.274	0.274	0.714	0.714
Stator Weight	kg	0.213	0.213	0.474	0.474
Rotor Weight	kg	0.061	0.061	0.240	0.240
Pole Count	#	8	8	12	12
Rotor Inertia	lb-in-sec ²	6.32E-05	6.32E-05	1.50E-03	1.50E-03
	kg-m ²	7.14E-06	7.14E-06	1.70E-04	1.70E-04
Halls		Yes	No	Yes	No

All data measured at 40° C ambient. *At continuous current, assuming a 90° C temperature rise. **Weights are estimated as motor leads can become significant to total weight. Contact Celeramotion for torque-speed specifications. Specifications subject to change.



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Omni™ Series Motors

Low-Profile Direct Drive Motors for the World's Machines and Robots

Omni UTH High Performance Motors

SIZE	UTH-127	
MODEL NUMBER	UTH-127-A-30-A-H-000	UTH-127-A-30-A-N-000

PERFORMANCE SPECIFICATIONS

Continuous Torque*	Nm	4.56	4.56
	oz-in	647	647
Peak Torque	Nm	13.70	13.70
	oz-in	1941	1941

ELECTRICAL SPECIFICATIONS

Continuous Current*	A _{DC}	5.70	5.70
Resistance _{phase-phase}	Ohm	3.13	3.13
Inductance _{phase-phase}	mH	9.30	9.30
Ke _{phase-phase}	V _{peak} /krpm	84.60	84.60
Kt _{TRAP}	Nm/A _{DC}	0.808	0.808
Kt _{SINE}	Nm/A _{peak}	0.699	0.699
Km	Nm/√W	0.457	0.457

THERMAL SPECIFICATIONS

Thermal Resistance	°C/W	0.9	0.9
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MECHANICAL SPECIFICATIONS

Stator OD	mm	127.00	127.00
Stator ID	mm	76.45	76.45
Rotor OD	mm	74.96	74.96
Rotor ID	mm	53.34	53.34
Stator Length	mm	32.64	27.94
End Turn, Lead Side	mm	11.05	6.35
Stack Height	mm	16.51	16.51
End Turn, Non-Lead Side	mm	5.08	5.08
Rotor Length	mm	20.57	20.57
Weight - Total**	kg	1.262	1.262
Stator Weight	kg	0.895	0.895
Rotor Weight	kg	0.367	0.367
Pole Count	#	12	12
Rotor Inertia	lb-in-sec ²	3.32E-03	3.32E-03
	kg-m ²	3.76E-04	3.76E-04
Halls		Yes	No

All data measured at 40° C ambient. *At continuous current, assuming a 90° C temperature rise. **Weights are estimated as motor leads can become significant to total weight. Contact Celeramotion for torque-speed specifications. Specifications subject to change.



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Omni™ Series Motors

Low-Profile Direct Drive Motors for the World's Machines and Robots

Omni ULT Ultra Thin Motors

SIZE	ULT-25	ULT-45		ULT-63			
MODEL NUMBER	ULT-25-A-10-A-N-000	ULT-45-A-34-A-H-000	ULT-45-A-34-A-N-000	ULT-63-A-8-A-H-000	ULT-63-A-8-A-N-000	ULT-63-B-18-B-H-000	ULT-63-B-18-B-N-000

PERFORMANCE SPECIFICATIONS

Continuous Torque*	Nm	0.04	0.12	0.12	0.09	0.09	0.20	0.20
	oz-in	6	17	17	13	13	29	29
Peak Torque	Nm	0.12	0.36	0.36	0.27	0.27	0.61	0.61
	oz-in	18	51	51	39	39	87	87

ELECTRICAL SPECIFICATIONS

Continuous Current*	A _{DC}	1.4	2.7	2.7	5.6	5.6	2.0	2.0
Resistance _{phase-phase}	Ohm	6	2.7	2.7	0.96	0.96	7.5	7.5
Inductance _{phase-phase}	mH	1.44	0.43	0.43	0.10	0.10	1.20	1.20
K _e _{phase-phase}	V _{peak} /krpm	3	4.6	4.6	1.7	1.7	10.7	10.7
K _t _{TRAP}	Nm/A _{DC}	0.028	0.044	0.044	0.016	0.016	0.102	0.102
K _t _{SINE}	Nm/A _{peak}	0.024	0.038	0.038	0.014	0.014	0.089	0.089
K _m	Nm/√W	0.012	0.027	0.027	0.017	0.017	0.037	0.037

THERMAL SPECIFICATIONS

Thermal Resistance	°C/W	6.0	4.5	4.5	3.0	3.0	3.0	3.0
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MECHANICAL SPECIFICATIONS

Stator OD	mm	25	43.18	43.18	63.50	63.50	63.50	63.50
Stator ID	mm	15.66	33.53	33.53	49.53	49.53	49.53	49.53
Rotor OD	mm	15.17	32.00	32.00	48.39	48.39	48.39	48.39
Rotor ID	mm	11.6	25.40	25.40	38.10	38.10	38.10	38.10
Stator Length	mm	8.64	37.47	34.30	13.21	8.26	22.74	18.24
End Turn, Lead Side	mm	2.22	6.35	3.18	6.73	1.91	6.99	2.49
Stack Height	mm	4.2	27.94	27.94	4.57	4.57	13.72	13.72
End Turn, Non-Lead Side	mm	2.22	3.18	3.18	1.91	1.78	2.03	2.03
Rotor Length	mm	5.18	32.51	32.51	5.08	5.08	14.73	14.73
Weight – Total**	kg	0.014	0.162	0.162	0.060	0.060	0.172	0.172
Stator Weight	kg	0.011	0.083	0.083	0.031	0.031	0.087	0.087
Rotor Weight	kg	0.0026	0.079	0.079	0.029	0.029	0.085	0.085
Pole Count	#	12	12	12	12	12	12	12
Rotor Inertia	lb-in-sec ²	1.24E-06	1.42E-04	1.42E-04	1.18E-04	1.18E-04	3.42E-04	3.42E-04
	kg-m ²	1.40E-07	1.60E-05	1.60E-05	1.33E-05	1.33E-05	3.87E-05	3.87E-05
Halls		No	Yes	No	Yes	No	Yes	No

All data measured at 40° C ambient. *At continuous current, assuming a 90° C temperature rise. **Weights are estimated as motor leads can become significant to total weight. Contact Celeramotion for torque-speed specifications. Specifications subject to change.



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Omni ULT Ultra Thin Motors

SIZE	ULT-165	
MODEL NUMBER	ULT-165-A-38-A-H-000	ULT-165-A-38-A-N-000

PERFORMANCE SPECIFICATIONS

Continuous Torque*	Nm	6.581	6.581
	oz-in	932	932
Peak Torque	Nm	19.744	19.744
	oz-in	2796	2796

ELECTRICAL SPECIFICATIONS

Continuous Current*	A _{DC}	6.30	6.30
Resistance _{phase-phase}	Ohm	3.00	3.00
Inductance _{phase-phase}	mH	6.90	6.90
Ke _{phase-phase}	V _{peak} /krpm	109.0	109.0
Kt _{TRAP}	Nm/A _{DC}	1.040	1.040
Kt _{SINE}	Nm/A _{peak}	0.901	0.901
Km	Nm/√W	0.601	0.601

THERMAL SPECIFICATIONS

Thermal Resistance	°C/W	0.8	0.8
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MECHANICAL SPECIFICATIONS

Stator OD	mm	165.10	165.10
Stator ID	mm	128.52	128.52
Rotor OD	mm	127.00	127.00
Rotor ID	mm	109.22	109.22
Stator Length	mm	37.80	37.80
End Turn, Lead Side	mm	4.65	4.65
Stack Height	mm	28.58	28.58
End Turn, Non-Lead Side	mm	4.57	4.57
Rotor Length	mm	29.69	29.69
Weight – Total**	kg	2.080	2.080
Stator Weight	kg	1.280	1.280
Rotor Weight	kg	0.801	0.801
Pole Count	#	36	36
Rotor Inertia	lb-in-sec ²	2.41E-02	2.41E-02
	kg-m ²	2.72E-03	2.72E-03
Halls		Yes	No

All data measured at 40° C ambient. *At continuous current, assuming a 90° C temperature rise. **Weights are estimated as motor leads can become significant to total weight. Contact Celer Motion for torque-speed specifications. Specifications subject to change.



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Omni™ Series Motors

Low-Profile Direct Drive Motors for the World's Machines and Robots

Omni UTO Outside Running Motors

SIZE	UTO-20	UTO-52
MODEL NUMBER	UTO-20-A-8-A-N-000	UTO-52-A-18-A-N-000

PERFORMANCE SPECIFICATIONS

Continuous Torque*	Nm	0.014	0.353
	oz-in	2	50
Peak Torque	Nm	0.042	1.059
	oz-in	6	150

ELECTRICAL SPECIFICATIONS

Continuous Current*	A _{DC}	2.10	6.90
Resistance _{phase-phase}	Ohm	2.65	0.63
Inductance _{phase-phase}	mH	0.26	0.40
Ke _{phase-phase}	V _{peak} /krpm	0.6	5.4
Kt _{TRAP}	Nm/A _{DC}	0.006	0.052
Kt _{SINE}	Nm/A _{peak}	0.005	0.045
Km	Nm/√W	0.004	0.065

THERMAL SPECIFICATIONS

Thermal Resistance	°C/W	8.0	3.0
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MECHANICAL SPECIFICATIONS

Stator OD	mm	15.79	40.89
Stator ID	mm	8.99	17.84
Rotor OD	mm	19.94	52.07
Rotor ID	mm	16.41	45.72
Stator Length	mm	7.80	17.53
End Turn, Lead Side	mm	1.04	3.18
Stack Height	mm	5.72	11.43
End Turn, Non-Lead Side	mm	1.04	2.92
Rotor Length	mm	6.60	13.46
Weight - Total**	kg	0.018	0.176
Stator Weight	kg	0.004	0.071
Rotor Weight	kg	0.014	0.105
Pole Count	#	12	16
Rotor Inertia	lb-in-sec ²	3.89E-06	2.76E-04
	kg-m ²	4.39E-07	3.12E-05
Halls		No	No

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How to Order

Motor

UTH-100-A-25-A-N-000 (example)

Mechanical Configuration

000 = Standard

001 = No back iron

Feedback Option

N = None

H = Halls

Winding Option

Factory code

Axial Length

mm

Magnetic Attributes

Factory code

Diameter

mm

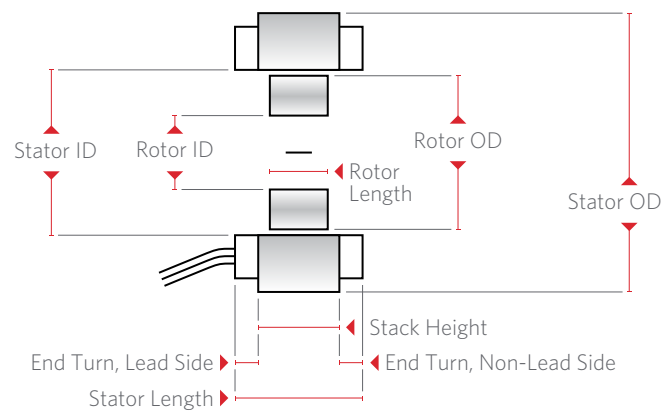
Motor Series

UTH = High performance

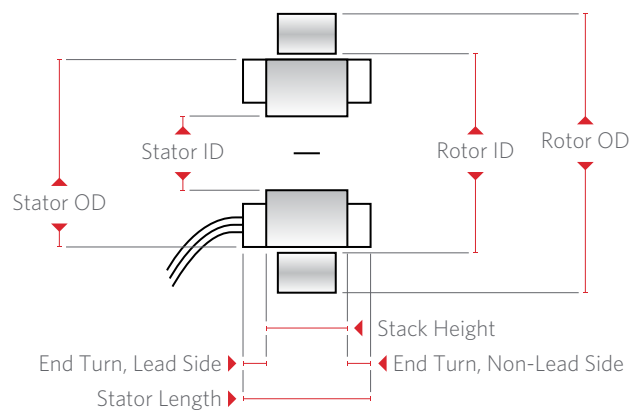
ULT = Ultra thin

UTO = Outside rotating

Dimensional Interface — UTH, ULT Models



Dimensional Interface — UTO Models



Notes

1. Ring magnets are limited to 5000 rpm, contact factory for higher speed magnet material.
2. Mechanical speed limits are imposed on all motors, contact factory for special options for higher speeds.
3. Kt value is calculated from the Ke value and is a static value. Amplifier design will impact actual running torque, contact factory.
4. Peak torque output is based on a 3:1 peak to continuous current ratio in the amplifier, and is limited to 10% duty cycle.
5. Dimensions are for -N-000 configurations; consult celeramotion.com or contact us for other configurations.