

SLOTLESS



**Applimotion**  
*Motors & Actuators*

PRODUCT DATA SHEET

# Agility™ Series Motors

Zero Cogging Direct Drive  
Motors for Exceptionally  
Smooth Motion

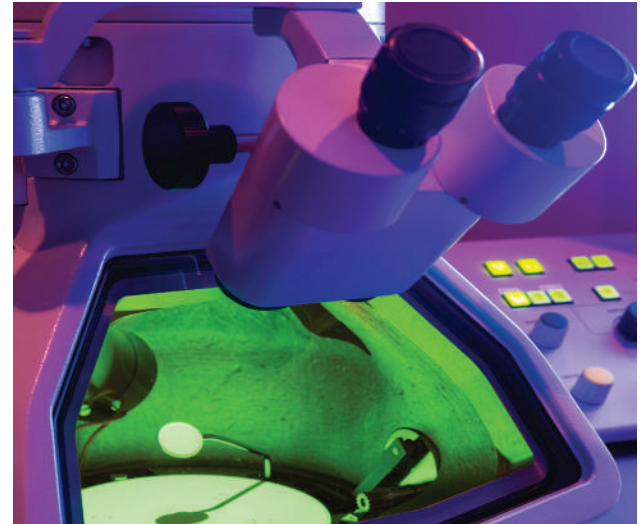
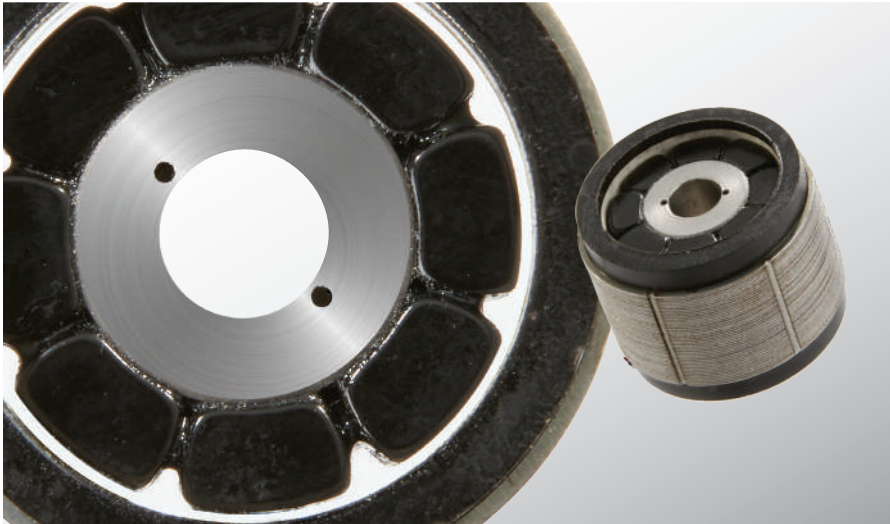
Designed with ZeroCog™ slotless motor technology from Applimotion, the Agility Series enables OEMs to achieve extremely smooth and highly accurate motion profiles using flexible and easy-to-integrate motor components.

› [CELERAMOTION.COM](http://CELERAMOTION.COM)



# Agility™ Series Motors

Zero Cogging Direct Drive Motors for Exceptionally Smooth Motion



## Smooth and Accurate.

Ideally suited for scanning, pointing, measuring and cutting applications that require extremely smooth velocity control and highly accurate positioning, the Agility Series delivers best-in-class torque ripple and zero cogging.

Engineered with ZeroCog™ slotless motor technology from Applimotion, the effects of cogging torque, magnetic forces, flux harmonics and phase balance and alignment are minimized to counteract the causes of torque ripple. Agility magnetic designs and construction techniques can achieve less than 2% torque ripple.

The Agility Series is offered in a wide range of low-profile form factors with a large through hole for convenient routing of cables, optics, sensing technologies and other system elements.

Frameless direct drive kit construction, high torque density and low mass enables Agility to be tightly integrated into compact, lightweight precision assemblies.

All models are compatible with a wide range of controllers and drives. Windings and form factors can be customized to meet application requirements.

### Benefits

- Zero cogging and low torque ripple for extremely smooth velocity control and low vibration
- Slotless magnetic design and direct drive technology enable highly accurate position control
- High torque density in low-profile form factors enables small footprint
- Large through hole for convenient routing of cables, optics, sensing technologies and other system elements
- High mechanical stiffness and low rotor inertia for efficient control of highly dynamic axes
- 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	UTS-19	UTS-53	UTS-89	UTS-102	UTS-165	UTS-222	UTS-292
Continuous Torque:	Nm	0.05	0.12	0.62	0.89	1.83	2.84	13.59
Peak Torque:	Nm	0.15	0.35	1.87	2.67	5.48	8.53	40.76
Diameter (Stator OD):	mm	19.0	53.0	89.0	192.0	165.0	222.0	292.0
Through Hole (Rotor ID):	mm	5.0	35.5	50.8	66.0	140.9	190.5	241.3
Stator Length:	mm	30.0	20.2	25.0	25.4	24.1	24.1	48.3
Pole Count:	#	6	12	12	28	48	64	32

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 in the amplifier, and is based on limited duty cycle. Specifications subject to change.

RoHS  
CE



**Applimotion**  
Motors & Actuators

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2

# Agility™ Series Motors

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## Agility Slotless Motors

SIZE	UTS-19	UTS-21	UTS-29	UTS-41
MODEL NUMBER	UTS-19-A-30-A-X-000	UTS-29-A-21-A-X-000	UTS-29-A-51-A-X-000	UTS-41-A-20-A-X-000

### PERFORMANCE SPECIFICATIONS

Continuous Torque	Nm	0.041	0.067	0.134	0.078
	oz-in	5.8	9.5	18.9	11.1
Peak Torque	Nm	0.123	0.201	0.401	0.235
	oz-in	17.4	28.4	56.7	33.3

### ELECTRICAL SPECIFICATIONS

Continuous Current	Amp	1.3	0.9	1.1	1.7
Resistance	Ohm	6.600	18.950	13.600	4.250
Inductance	mH	0.18	0.87	0.63	0.20
Ke	V/krpm	3.3	8.75	14.8	4.34
Kt	Nm/amp	0.032	0.084	0.141	0.041
Kt sine	Nm/amp	0.027	0.072	0.122	0.036
Km	Nm/w <sup>1/2</sup>	0.012	0.019	0.038	0.020

### THERMAL SPECIFICATIONS

Thermal Resistance	°C/w	8	6	6	5.5
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### MECHANICAL SPECIFICATIONS

Stator OD	mm	18.97	29.21	29.21	40.64
Stator ID	mm	14.48	22.35	22.35	31.93
Rotor OD	mm	13.84	21.34	21.34	30.66
Rotor ID	mm	5.00	6.35	6.35	16.26
Stator Length	mm	29.97	21.34	50.80	19.81
End Turn, Lead Side	mm	5.08	2.92	6.35	5.46
Stack Height	mm	20.32	15.24	40.64	10.16
End Turn, Non-Lead Side	mm	4.57	3.18	3.81	4.19
Weight	kg	0.043	0.064	0.098	n/a
Poles Count	#	6	8	8	8
Rotor Inertia	lb-in-sec <sup>2</sup>	1.00E-05	1.80E-05	n/a	n/a
	kg-m <sup>2</sup>	1.13E-06	2.03E-06	n/a	n/a
Halls (optional)		external	external	external	external



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# Agility™ Series Motors

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## Agility Slotless Motors

SIZE	UTS-53			UTS-70	
MODEL NUMBER	UTS-53-A-20-B-X-000	UTS-53-B-20-A-X-000	UTS-53-A-20-A-X-000	UTS-70-A-39-A-X-000	UTS-70-A-39-B-X-000

### PERFORMANCE SPECIFICATIONS

Continuous Torque	Nm	0.114	0.186	0.117	0.753	0.804
	oz-in	16.1	26.3	16.6	106.6	113.9
Peak Torque	Nm	0.342	0.558	0.352	2.258	2.412
	oz-in	48.4	79.0	49.9	319.8	341.6

### ELECTRICAL SPECIFICATIONS

Continuous Current	Amp	1.4	2.2	3.3	9.1	5.0
Resistance	Ohm	15.700	6.400	2.700	0.364	1.220
Inductance	mH	0.71	0.300	0.12	0.04	0.15
Ke	V/krpm	9.6	9.000	4.1	9.65	18.87
Kt	Nm/amp	0.092	0.086	0.039	0.092	0.180
Kt sine	Nm/amp	0.079	0.074	0.034	0.080	0.156
Km	Nm/w <sup>1/2</sup>	0.023	0.034	0.024	0.153	0.163

### THERMAL SPECIFICATIONS

Thermal Resistance	°C/w	3	3	3	3	3
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### MECHANICAL SPECIFICATIONS

Stator OD	mm	52.83	52.83	52.83	69.85	69.85
Stator ID	mm	42.67	42.67	42.67	58.42	58.42
Rotor OD	mm	41.91	41.91	41.91	57.40	57.40
Rotor ID	mm	29.21	16.26	35.56	38.86	38.86
Stator Length	mm	19.94	19.94	20.27	38.66	47.22
End Turn, Lead Side	mm	4.09	4.09	4.09	7.11	7.11
Stack Height	mm	12.80	12.80	12.80	25.96	25.96
End Turn, Non-Lead Side	mm	3.05	3.05	3.05	5.59	5.59
Weight	kg	0.111	0.111	0.111	n/a	n/a
Poles Count	#	12	12	12	12	12
Rotor Inertia	lb-in-sec <sup>2</sup>	3.80E-05	3.80E-05	3.80E-05	0.0016	0.0016
	kg-m <sup>2</sup>	4.29E-06	4.29E-06	4.29E-06	1.81E-04	1.81E-04
Halls (optional)		external	external	external	external	external



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## Agility Slotless Motors

SIZE	UTS-89			UTS-102
MODEL NUMBER	UTS-89-A-25-C-X-000	UTS-89-A-28-B-X-000	UTS-89-A-40-A-X-000	UTS-102-A-25-A-X-000

### PERFORMANCE SPECIFICATIONS

Continuous Torque	Nm	0.537	0.492	1.168	0.863
	oz-in	76.0	69.6	165.5	122.2
Peak Torque	Nm	1.611	1.475	3.505	2.589
	oz-in	228.1	208.9	496.4	366.6

### ELECTRICAL SPECIFICATIONS

Continuous Current	Amp	2.3	8.9	4.1	3.1
Resistance	Ohm	4.000	0.380	2.650	4.800
Inductance	mH	0.54	0.03	0.30	0.26
Ke	V/krpm	27	6.44	33	32.8
Kt	Nm/amp	0.258	0.061	0.315	0.313
Kt sine	Nm/amp	0.223	0.053	0.273	0.271
Km	Nm/w <sup>1/2</sup>	0.129	0.100	0.194	0.143

### THERMAL SPECIFICATIONS

Thermal Resistance	°C/w	3	3	2	2
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### MECHANICAL SPECIFICATIONS

Stator OD	mm	88.90	88.90	88.90	101.60
Stator ID	mm	75.69	75.69	75.69	92.96
Rotor OD	mm	74.17	74.17	74.17	91.44
Rotor ID	mm	50.80	50.80	50.80	66.04
Stator Length	mm	25.02	28.45	40.26	25.40
End Turn, Lead Side	mm	5.46	7.62	5.46	7.62
Stack Height	mm	15.24	15.24	30.48	10.92
End Turn, Non-Lead Side	mm	4.32	5.59	4.32	6.86
Weight	kg	n/a	n/a	n/a	0.459
Poles Count	#	12	12	12	28
Rotor Inertia	lb-in-sec <sup>2</sup>	0.002	0.002	0.002	0.004
	kg-m <sup>2</sup>	2.26E-04	2.26E-04	2.26E-04	4.52E-04
Halls (optional)		external	external	external	external



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## Agility Slotless Motors

SIZE	UTS-114	UTS-165	UTS-222	UTS-292
MODEL NUMBER	UTS-114-A-43-A-X-000	UTS-165-A-24-B-X-000	UTS-222-A-24-A-X-000	UTS-292-A-48-A-X-000

### PERFORMANCE SPECIFICATIONS

Continuous Torque	Nm	2.809	1.553	3.074	13.589
	oz-in	397.7	219.9	435.3	1924.3
Peak Torque	Nm	8.426	4.659	9.222	40.767
	oz-in	1193.2	659.7	1306.0	5773.0

### ELECTRICAL SPECIFICATIONS

Continuous Current	Amp	5.1	6.8	4.5	6.5
Resistance	Ohm	2.300	1.290	4.500	2.700
Inductance	mH	0.80	0.12	0.60	0.45
Ke	V/krpm	64	26.5	80	245
Kt	Nm/amp	0.611	0.253	0.764	2.339
Kt sine	Nm/amp	0.529	0.219	0.661	2.026
Km	Nm/w <sup>1/2</sup>	0.403	0.223	0.360	1.424

### THERMAL SPECIFICATIONS

Thermal Resistance	°C/w	1.5	1.5	1	0.8
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### MECHANICAL SPECIFICATIONS

Stator OD	mm	114.30	165.07	222.25	281.94
Stator ID	mm	96.77	156.34	208.66	265.68
Rotor OD	mm	95.25	154.69	207.01	263.65
Rotor ID	mm	73.66	138.56	190.50	241.30
Stator Length	mm	42.93	24.13	30.51	48.26
End Turn, Lead Side	mm	9.91	6.35	6.05	6.99
Stack Height	mm	25.40	12.70	12.07	38.10
End Turn, Non-Lead Side	mm	7.62	5.08	6.05	3.18
Weight	kg	n/a	n/a	n/a	n/a
Poles Count	#	16	48	64	32
Rotor Inertia	lb-in-sec <sup>2</sup>	0.013	0.013	0.045	n/a
	kg-m <sup>2</sup>	1.47E-03	1.47E-03	5.09E-03	n/a
Halls (optional)		external	external	external	external



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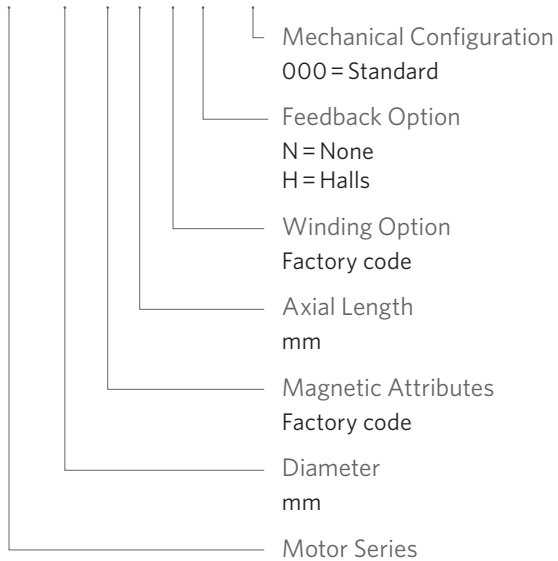
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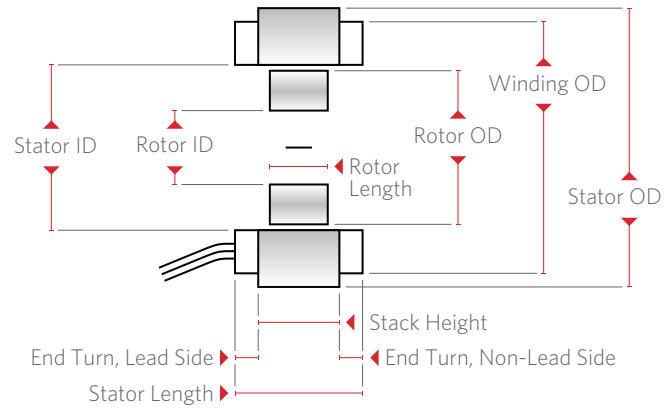
## How to Order

Motor

UTS-100-A-15-A-N-000 (example)



Dimensional Interface



## 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.



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