Chapter 11 Specifications

11.1 Specifications of Servo Drive (ASDA-AB Series)

Model: ASD-A□□□□□□			100W	200W	400W	100W	200W	400W	750W	1kW	1.5kW	2kW	3kW
			01	02	04	01	02	04	07	10	15	20	30
Power supply	Phase / Voltage		None			Three-phase: 170~255VAC, 50 / 60Hz ±5%						Three-phase 170~255VAC, 50 / 60Hz ±5%	
			Single-phase: 100 -10% ~ 115 +10% VAC, 50 / 60Hz ±5%			Single-phase: 200~255VAC, 50 / 60Hz ±5%							
	Continuous Output Current		2.0 Arms	3.4 Arms	6.2 Arms	0.8 Arms	1.3 Arms	2.6 Arms	4.7 Arms	6.2 Arms	8.0 Arms	9.1 Arms	13.6 Arms
Cooling System			Natural Air Circulation						Fan Cooling				
Encoder Resolution / Feedback Resolution			2500ppr / 10000ppr										
Control of Main Circuit			SVPWM Control										
Tuning Modes			Auto / Manual										
Dynamic Brake			Built-in										
Position Control Mode	Max. Input Pulse Frequency		Max. 500Kpps (Line driver) / Max. 200Kpps (Open collector)										
	Pulse Type		Pulse + Direction, A phase + B phase, CCW pulse + CW pulse										
	Command Source		External pulse train / Internal parameters										
	Smoothing Strategy		Low-pass and P-curve filter										
	Electronic Gear		Electronic gear N/M multiple N: 1~32767, M: 1:32767(1/50<N/M<200)										
	Torque Limit Operation		Set by parameters										
	Feed Forward Compensation		Set by parameters										
Speed Control Mode	Analog Input Command	Voltage Range	0 ~ ±10 V_{DC}										
		Input Resistance	10KΩ										
		Time Constant	2.2 μs										
	Speed Control Range*1		1:5000										
	Command Source		External analog signal / Internal parameters										
	Smoothing Strategy		Low-pass and S-curve filter										
	Torque Limit Operation		Set by parameters or via Analog input										
	Responsiveness Characteristic		Maximum 450Hz										
	Speed Fluctuation Rate*2		0.01% or less at load fluctuation 0 to 100% (at rated speed)										
			0.01% or less at power fluctuation ±10% (at rated speed)										
			0.01% or less at ambient temperature fluctuation 0 °C to 50 °C(at rated speed)										

Model: ASD-A□□□□□□			100W	200W	400W	100W	200W	400W	750W	1kW	1.5kW	2kW	3kW
			01	02	04	01	02	04	07	10	15	20	30
Torque Control Mode	Analog Input Command	Voltage Range	0 ~ ±10 V_{DC}										
		Input Resistance	10KΩ										
		Time Constant	2.2 μs										
	Command Source		External analog signal / Internal parameters										
	Smoothing Strategy		Low-pass filter										
	Speed Limit Operation		Parameter Setting or via Analog input										
Analog Monitor Output			Monitor signal can set by parameters (Output voltage range: ±8V)										
Digital Input/Output		Input	Servo On, Reset, Gain switching, Pulse clear, Zero speed CLAMP, Speed/Torque limit enabled, Emergency stop, Forward / Reverse inhibit limit, Position / Speed mode switching, Speed / Torque mode switching, Torque / Position mode switching, Feed step selection input, Feed step mode input, Auto run input, Electronic gear ratio (Numerator) selection										
		Output	Encoder signal output (A, B, Z Line Driver / Z Open collector)										
			Servo ready, Servo On, At Zero speed, At Speed reached, At Positioning completed, At Torques limit, Servo alarm (Servo fault) activated, Electromagnetic brake control, Homing completed, Output overload warning Servo warning activated, Internal position command completed										
Protective Functions			Overcurrent, Overvoltage, Undervoltage, Regeneration error, Overload, Overspeed, Abnormal pulse control command, Excessive deviation, Watch dog execution time out, Encoder error, Adjustment error, Emergency stop activated, Reverse/ Forward limit switch error, IGBT temperature error, Memory error, DSP communication error, Serial communication error, Input power phase loss, Serial communication time out, Command write-in error, terminals with short circuit protection (U, V ,W , CN1, CN2, CN3 terminals)										
Communication Interface			RS-232 / RS-485 / RS-422										
Environment	Installation Site		Indoor location (free from direct sunlight), no corrosive liquid and gas (far away from oil mist, flammable gas, dust)										
	Altitude		Altitude 1000m or lower above sea level										
	Atmospheric pressure		86kPa to 106kPa										
	Operating Temperature		0 °C to 55 °C (32°F to 131°F) (If operating temperature is above specified range, forced cooling will be required)										
	Storage Temperature		-20 °C to 65 °C (-4°F to 149°F)										
	Humidity		0 to 90% (non-condensing)										
	Vibration		9.80665m/s^2 (1G) less than 20Hz, 5.88m/ s^2 (0.6G) 20 to 50Hz										
	IP Rating		IP20										
	Power System		TN System*3										
	Standards/Requirement		IEC/EN 61800-5-1, UL 508C, C-tick, TUV										

Footnote:

*1 Rated rotation speed: When full load, speed ratio is defined as the minimum speed (the motor will not pause).

*2 When command is rated rotation speed, the speed fluctuation rate is defined as:

(Empty load rotation speed – Full load rotation speed) / Rated rotation speed

*3 TN system: A power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to that points by protective earth conductor.

*4 Please refer to “Chart of load and operating time” in section 11.7 “Overload Characteristics”.

11.2 Specifications of Servo Motor (ECMA Series)

Low Inertia Servo Motor

Model: ECMA Series	C304	C306		C308		C310	
	100W	200W	400W	400W	750W	1kW	2kW
	01	02	04	04	07	10	20
Rated output power (kW)	0.1	0.2	0.4	0.4	0.75	1.0	2.0
Rated torque (N-m) *1	0.32	0.64	1.27	1.27	2.39	3.18	6.37
Maximum torque (N-m)	0.96	1.92	3.82	3.82	7.16	9.54	19.11
Rated speed (r/min)	3000						
Maximum speed (r/min)	5000						
Rated current (A)	0.90	1.55	2.60	2.60	5.10	7.30	12.05
Maximum current (A)	2.70	4.65	7.80	7.80	15.3	21.9	36.15
Power rating (kW/s) (without brake)	27.7	22.4	57.6	24.0	50.4	38.1	90.6
Rotor moment of inertia ($\times 10^{-4}$kg.m^2) (without brake)	0.037	0.177	0.277	0.68	1.13	2.65	4 45
Mechanical time constant (ms) (without brake)	0.75	0.80	0.53	0.74	0.63	0.74	0.61
Torque constant-KT (N-m/A)	0.36	0.41	0.49	0.49	0.47	0.44	0.53
Voltage constant-KE (mV/(r/min))	13.6	16.0	17.4	18.5	17.2	16.8	19.2
Armature resistance (Ohm)	9.30	2.79	1.55	0.93	0.42	0.20	0.13
Armature inductance (mH)	24.0	12.07	6.71	7.39	3.53	1.81	1.50
Electrical time constant (ms)	2.58	4.30	4.30	7.96	8.37	9.30	11.4
Insulation class	Class A (UL), Class B (CE)						
Insulation resistance	>100MΩ, DC 500V						
Insulation strength	1500V AC, 60 seconds						
Weight (kg) (without brake)	0.5	1.2	1.6	2.1	3.0	4.3	6.2
Weight (kg) (with brake)	0.8	1.5	2.0	2.9	3.8	4.7	7.2
Max. radial shaft load (N)	78.4	196	196	245	245	490	490
Max. thrust shaft load (N)	39.2	68	68	98	98	98	98
Power rating (kW/s) (with brake)	25.6	21.3	53.8	22.1	48.4	30.4	82.0
Rotor moment of inertia ($\times 10^{-4}$kg.m^2) (with brake)	0.04	0.19	0.30	0.73	1.18	3.33	4.95
Mechanical time constant (ms) (with brake)	0.81	0.85	0.57	0.78	0.65	0.93	0.66
Brake holding torque [Nt-m (min)]	0.3	1.3	1.3	2.5	2.5	8.0	8.0
Brake power consumption (at 20°C) [W]	7.3	6.5	6.5	8.2	8.2	19.4	19.4

Model: ECMA Series	C304	C306		C308		C310	
	100W	200W	400W	400W	750W	1kW	2kW
	01	02	04	04	07	10	20
Brake release time [ms (Max)]	5	10	10	10	10	10	10
Brake pull-in time [ms (Max)]	25	70	70	70	70	70	70
Vibration grade (um)	15						
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)						
Storage temperature	-10 °C to 80 °C (-14 °F to 176 °F)						
Operating humidity	20% to 90% RH (non-condensing)						
Storage humidity	20% to 90% RH (non-condensing)						
Vibration capacity	2.5G						
IP rating	IP65 (when both waterproof connectors and shaft seal installation (or selecting oil seal models, an oil seal is used to be fitted to the rotating shaft, making the connectors waterproof (IP65 applicable)) are used.						
Approvals	CE c UL us						

Footnote:

*1 Rate torque values are continuous permissible values at 0~40 °C ambient temperature when attaching with the sizes of heatsinks listed below:

ECMA-_04 / 06 / 08 : 250mm x 250mm x 6mm

ECMA-_10 : 300mm x 300mm x 12mm

ECMA-_13 : 400mm x 400mm x 20mm

ECMA-__18 : 550mm x 550mm x 30mm

Material type : Aluminum – F40, F60, F80, F100, F130, F180

NOTE

1) Please refer to Section 1.2 for details about the model explanation.

Medium / High Inertia Servo Motor

Model: ECMA Series	E313				E318		G313		
	500W	1kW	1.5kW	2kW	2kW	3kW	300W	600W	900W
	05	10	15	20	20	30	03	06	09
Rated output power (kW)	0.5	1.0	1.5	2.0	2.0	3.0	0.3	0.6	0.9
Rated torque (N-m) *1	2.39	4.77	7.16	9.55	9.55	14.32	2.86	5.73	8.59
Maximum torque (N-m)	7.16	14.3	21.48	28.65	28.65	42.97	8.59	17.19	21.48
Rated speed (r/min)	2000						1000		
Maximum speed (r/min)	3000						2000		
Rated current (A)	2.9	5.6	8.3	11.01	11.22	16.1	2.5	4.8	7.5
Maximum current (A)	8.7	16.8	24.9	33.03	33.66	48.3	7.5	14.4	22.5
Power rating (kW/s) (without brake)	7.0	27.1	45.9	62.5	26. 3	37.3	10.0	39.0	66.0
Rotor moment of inertia ($\times 10^{-4}$kg.m^2) (without brake)	8.17	8.41	11.181	.5934.	685	.958.17	8.41	11.1	
Mechanical time constant (ms) (without brake)	1.91	1.51	1.10	0.96	1.62	1.06	1.84	1.40	1.06
Torque constant-KT (N-m/A)	0.83	0.85	0.87	0.87	0.85	0.89	1.15	1.19	1.15
Voltage constant-KE (mV/(r/min))	30.9	31.9	31.8	31.8	31.4	32.0	42.5	43.8	41.6
Armature resistance (Ohm)	0.57	0.47	0.26	0.174	0.119	0.052	1.06	0.82	0.43
Armature inductance (mH)	7.39	5.99	4.01	2.76	2.84	1.38	14.29	11.12	6.97
Electrical time constant (ms)	12.96	12.88	15.31	15.86	23.87	26.39	13.55	13.50	16.06
Insulation class	Class A (UL), Class B (CE)								
Insulation resistance	>100MΩ, DC 500V								
Insulation strength	1500V AC, 60 seconds								
Weight (kg) (without brake)	6.8	7.0	7.5	7.8	13.5	18.5	6.8	7.0	7.5
Weight (kg) (with brake)	8.2	8.4	8.9	9.2	17.5	22.5	8.2	8.4	8.9
Max. radial shaft load (N)	490	490	490	490	1176	1470	490	490	490
Max. thrust shaft load (N)	98	98	98	98	490	490	98	98	98
Power rating (kW/s) (with brake)	6.4	24.9	43.1	59.7	24. 1	35.9	9.2	35.9	62.1
Rotor moment of inertia ($\times 10^{-4}$kg.m^2) (with brake)	8.94	9.14	11.901	.8837.	865	.068.94	9.14	11.9	
Mechanical time constant (ms) (with brake)	2.07	1.64	1.19	1.05	1.77	1.10	2.0	1.51	1.13
Brake holding torque [Nt-m (min)]	10.0	10.0	10.0	10.0	25.0	25.0	10.0	10.0	10.0
Brake power consumption (at 20°C) [W]	19.0	19.0	19.0	19.0	20.4	20.4	19.0	19.0	19.0
Brake release time [ms (Max)]	10	10	10	10	10	10	10	10	10

Model: ECMA Series	E313				E318		G313		
	500W	1kW	1.5kW	2kW	2kW	3kW	300W	600W	900W
	05	10	15	20	20	30	03	06	09
Brake pull-in time [ms (Max)]	70	70	70	70	70	70	70	70	70
Vibration grade (um)	15								
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)								
Storage temperature	-10 °C to 80 °C (-14 °F to 176 °F)								
Operating humidity	20% to 90% RH (non-condensing)								
Storage humidity	20% to 90% RH (non-condensing)								
Vibration capacity	2.5G								
IP rating	IP65 (when both waterproof connectors and shaft seal installation (or selecting oil seal models, an oil seal is used to be fitted to the rotating shaft, making the connectors waterproof (IP65 applicable)) are used.								
Approvals	CE c UL us								

Footnote:

*1 Rate torque values are continuous permissible values at 0~40 °C ambient temperature when attaching with the sizes of heatsinks listed below:

ECMA-_04 / 06 / 08 : 250mm x 250mm x 6mm

ECMA-_10 : 300mm x 300mm x 12mm

ECMA-_13 : 400mm x 400mm x 20mm

ECMA-__18 : 550mm x 550mm x 30mm

Material type : Aluminum – F40, F60, F80, F100, F130, F180

NOTE

1) Please refer to Section 1.2 for details about the model explanation.