


## 11.2 Specifications of Servo Motor (ECMA Series)

### Low Inertia Servo Motor

Model: ECMA Series	C204	C206		C208		C209		C210	
	01	02	04	04	07	07	10	10	20
Rated output power (kW)	0.1	0.2	0.4	0.4	0.75	0.75	1.0	1.0	2.0
Rated torque (N-m) *1	0.32	0.64	1.27	1.27	2.39	2.38	3.18	3.18	6.37
Maximum torque (N-m)	0.96	1.92	3.82	3.82	7.16	7.14	8.78	9.54	19.11
Rated speed (r/min)	3000								
Maximum speed (r/min)	5000					3000		5000	
Rated current (A)	0.90	1.55	2.60	2.60	5.10	3.66	4.25	7.30	12.05
Maximum current (A)	2.70	4.65	7.80	7.74	15.3	11	12.37	21.9	36.15
Power rating (kW/s) (without brake)	27.7	22.4	57.6	22.1	48.4	29.6	38.6	38.1	90.6
Rotor moment of inertia ( $\times 10^{-4}$ kg.m <sup>2</sup> ) (without brake)	0.037	0.177	0.277	0.68	1.13	1.93	2.62	2.65	4.45
Mechanical time constant (ms) (without brake)	0.75	0.80	0.53	0.73	0.62	1.72	1.20	0.74	0.61
Torque constant-KT (N-m/A)	0.36	0.41	0.49	0.49	0.47	0.65	0.75	0.43	0.53
Voltage constant-KE (mV/(r/min))	13.6	16.0	17.4	18.5	17.2	27.5	24.2	16.8	19.2
Armature resistance (Ohm)	9.30	2.79	1.55	0.93	0.42	1.34	0.897	0.20	0.13
Armature inductance (mH)	24.0	12.07	6.71	7.39	3.53	7.55	5.7	1.81	1.50
Electrical time constant (ms)	2.58	4.30	4.30	7.96	8.36	5.66	6.35	9.30	11.4
Insulation class	Class A (UL), Class B (CE)								
Insulation resistance	>100M $\Omega$ , DC 500V								
Insulation strength	1500V AC, 60 seconds								
Weight (kg) (without brake)	0.5	1.2	1.6	2.1	3.0	2.9	3.8	4.3	6.2
Weight (kg) (with brake)	0.8	1.5	2.0	2.9	3.8	3.69	5.5	4.7	7.2
Max. radial shaft load (N)	78.4	196	196	245	245	245	245	490	490
Max. thrust shaft load (N)	39.2	68	68	98	98	98	98	98	98
Power rating (kW/s) (with brake)	25.6	21.3	53.8	22.1	48.4	29.3	37.9	30.4	82.0
Rotor moment of inertia ( $\times 10^{-4}$ kg.m <sup>2</sup> ) (with brake)	0.04	0.192	0.30	0.73	1.18	1.95	2.67	3.33	4.95
Mechanical time constant (ms) (with brake)	0.81	0.85	0.57	0.78	0.65	1.74	1.22	0.93	0.66
Brake holding torque [Nt-m (min)]	0.3	1.3	1.3	2.5	2.5	2.5	2.5	8.0	8.0
Brake power consumption (at 20°C) [W]	7.2	6.5	6.5	8.2	8.2	8.2	8.2	18.5	18.5

Model: ECMA Series	C204		C206		C208		C209		C210	
	01	02	04	04	07	07	10	10	20	
Brake release time [ms (Max)]	5	10	10	10	10	10	10	10	10	10
Brake pull-in time [ms (Max)]	25	70	70	70	70	70	70	70	70	70
Vibration grade (um)	15									
Operating temperature	0 ~ 40°C									
Storage temperature	-10 ~ 80°C									
Operating humidity	20% to 90% RH (non-condensing)									
Storage humidity	20% to 90% RH (non-condensing)									
Vibration capacity	2.5G									
IP rating	IP65 (when waterproof connectors are used, or when an oil seal is used to be fitted to the rotating shaft (an oil seal model is used))									
Approvals										

## 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
- \*2 For the specifications of the motors with rotary magnetic encoders, please refer to the specifications of the corresponding standard models.

 **NOTE**

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

## Medium / High Inertia Servo Motor

Model: ECMA Series	E213				E218		F218	G213		
	05	10	15	20	20	30	30	03	06	09
Rated output power (kW)	0.5	1.0	1.5	2.0	2.0	3.0	3.0	0.3	0.6	0.9
Rated torque (N-m) <sup>*1</sup>	2.39	4.77	7.16	9.55	9.55	14.32	19.10	2.86	5.73	8.59
Maximum torque (N-m)	7.16	14.32	21.48	28.65	28.65	42.97	57.29	8.59	17.19	21.48
Rated speed (r/min)	2000						1500	1000		
Maximum speed (r/min)	3000						2000			
Rated current (A)	2.9	5.6	8.3	11.01	11.22	16.1	19.4	2.5	4.8	7.5
Maximum current (A)	8.7	16.8	24.81	33.0	33.66	48.3	58.2	7.44	14.49	22.5
Power rating (kW/s) (without brake)	7.0	27.1	45.9	62.5	26.3	37.3	66.4	10.0	39.0	66.0
Rotor moment of inertia ( $\times 10^4 \text{kg}\cdot\text{m}^2$ )	8.17	8.41	11.18	14.59	34.68	54.95	54.95	8.17	8.41	11.18
Mechanical time constant (ms)	1.91	1.51	1.11	0.96	1.62	1.06	1.28	1.84	1.40	1.07
Torque constant-KT (N-m/A)	0.83	0.85	0.87	0.87	0.85	0.89	0.98	1.15	1.19	1.15
Voltage constant-KE (mV/(r/min))	30.9	31.9	31.8	31.8	31.4	32.0	35.0	42.5	43.8	41.6
Armature resistance (Ohm)	0.57	0.47	0.26	0.174	0.119	0.052	0.077	1.06	0.82	0.43
Armature inductance (mH)	7.39	5.99	4.01	2.76	2.84	1.38	1.27	14.29	11.12	6.97
Electrical time constant (ms)	12.96	12.88	15.31	15.86	23.87	26.39	16.51	13.55	13.55	16.06
Insulation class	Class A (UL), Class B (CE)									
Insulation resistance	>100M $\Omega$ , DC 500V									
Insulation strength	AC 1500V $\cdot$ 60 sec									
Weight (kg) (without brake)	6.8	7.0	7.5	7.8	13.5	18.5	18.5	6.8	7.0	7.5
Weight (kg) (with brake)	8.2	8.4	8.9	9.2	17.5	22.5	22.5	8.2	8.4	8.9
Max. radial shaft load (N)	490	490	490	490	1176	1470	1470	490	490	490
Max. thrust shaft load (N)	98	98	98	98	490	490	490	98	98	98
Power rating (kW/s) (with brake)	6.4	24.9	43.1	59.7	24.1	35.9	63.9	9.2	35.9	62.1
Rotor moment of inertia ( $\times 10^4 \text{kg}\cdot\text{m}^2$ ) (with brake)	8.94	9.14	11.90	15.88	37.86	57.06	57.06	8.94	9.14	11.9
Mechanical time constant (ms) (with brake)	2.07	1.64	1.19	1.05	1.77	1.10	1.33	2.0	1.51	1.13
Brake holding torque [Nt-m (min)]	10.0	10.0	10.0	10.0	25.0	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	20.4	19.0	19.0	19.0

Model: ECMA Series	E213				E218		F218	G213		
	05	10	15	20	20	30	30	03	06	09
Brake release time [ms (Max)]	10	10	10	10	10	10	10	10	10	10
Brake pull-in time [ms (Max)]	70	70	70	70	70	70	70	70	70	70
Vibration grade (um)	15									
Operating temperature	0 ~ 40 °C									
Storage temperature	-10 ~ 80 °C									
Operating humidity	20% to 90% RH (non-condensing)									
Storage humidity	20% to 90% RH (non-condensing)									
Vibration capacity	2.5G									
IP rating	IP65 (when waterproof connectors are used, or when an oil seal is used to be fitted to the rotating shaft (an oil seal model is used))									
Approvals										

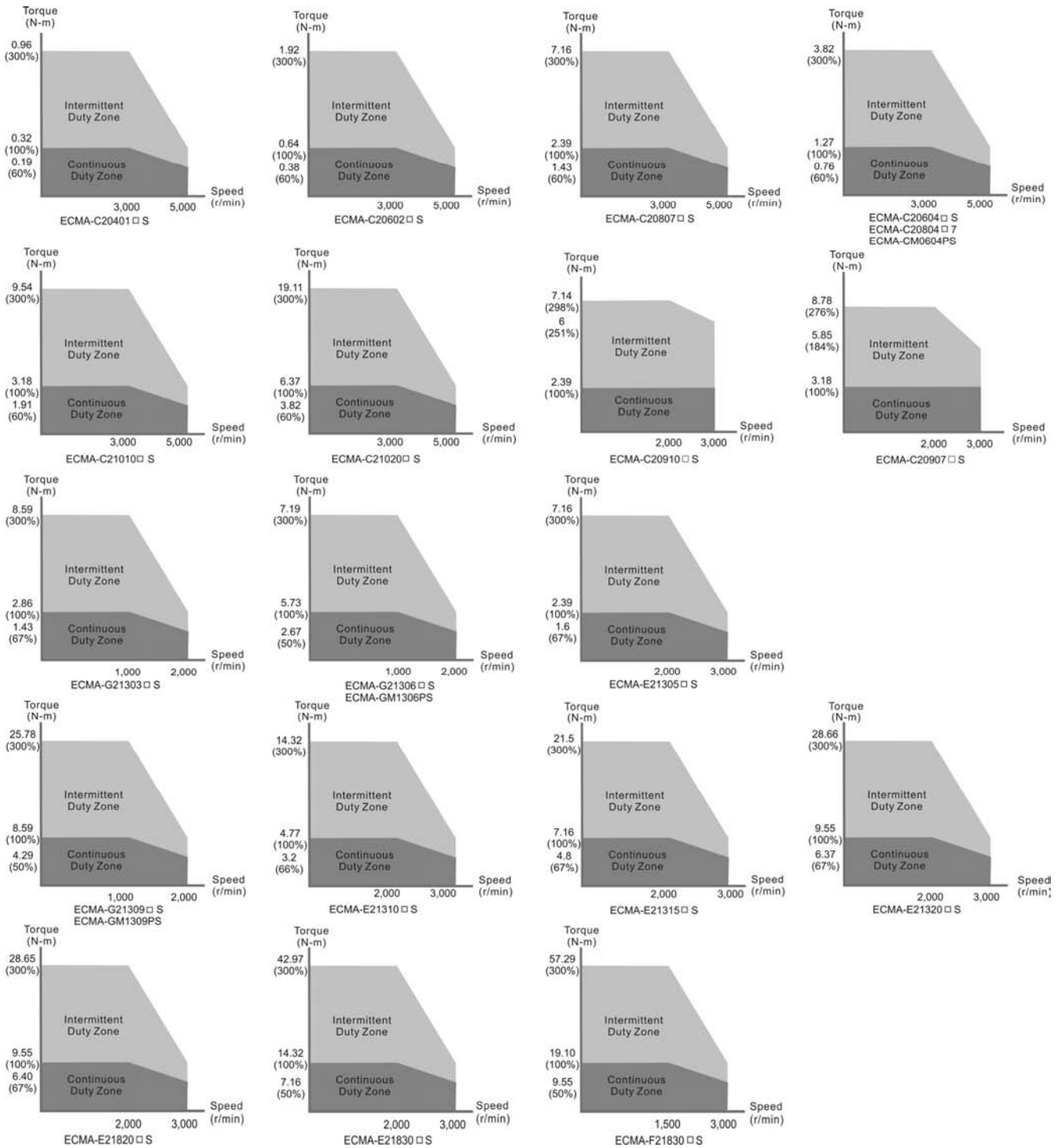
## Footnote:

- \*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
- \*2 For the specifications of the motors with rotary magnetic encoders, please refer to the specifications of the corresponding standard models.

 **NOTE**

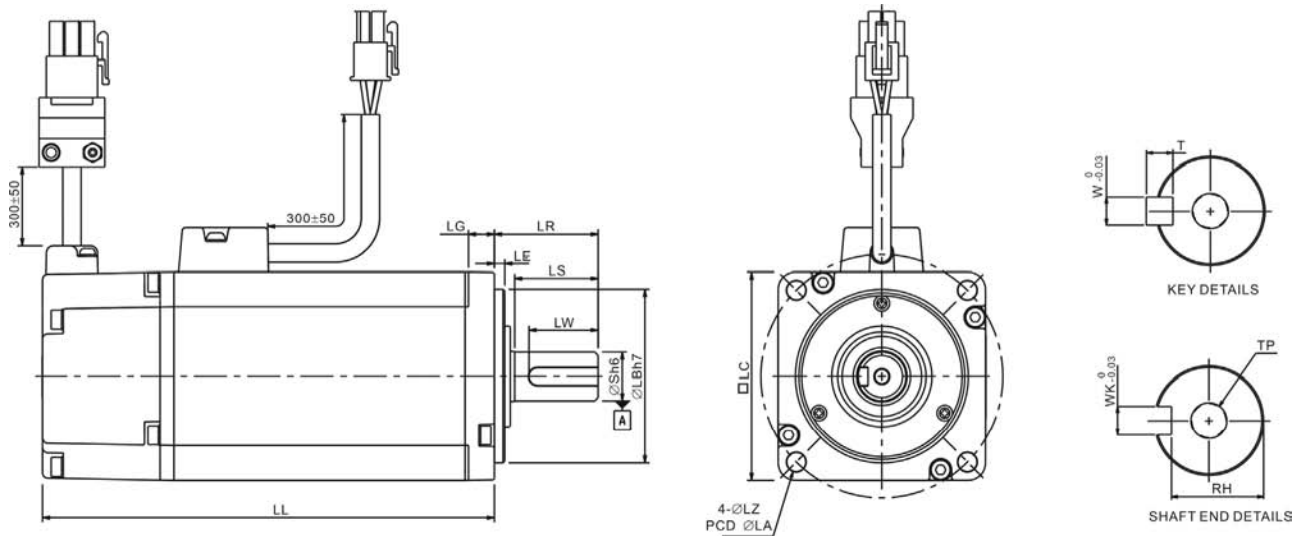
- 1) Please refer to Section 1.2 for details about the model explanation.

### 11.3 Servo Motor Speed-Torque Curves



## 11.6 Dimensions of Servo Motor

### Motor Frame Size: 86mm and below Models

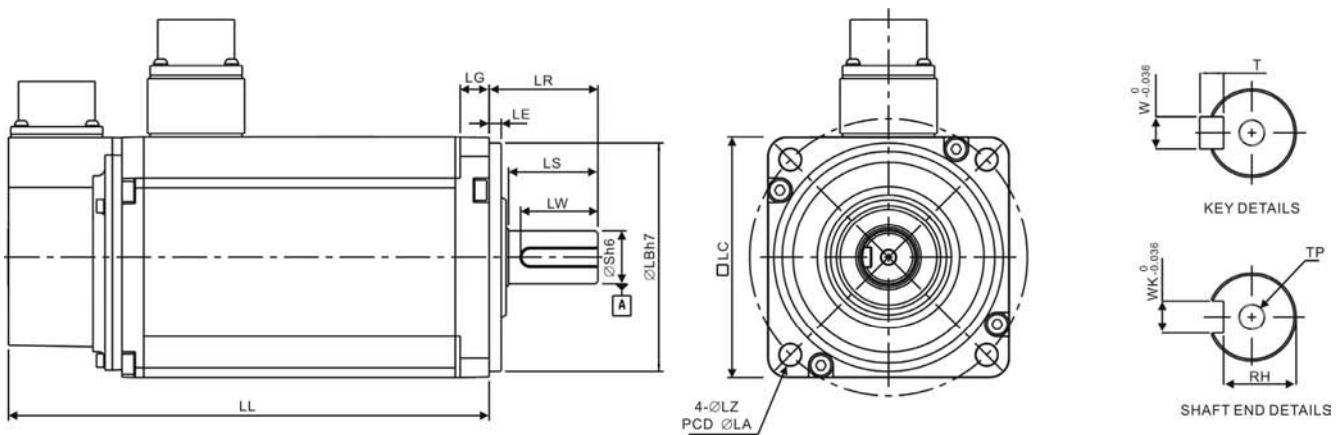


Model	C20401□S	C20602□S	C20604□S	C20804□S	C20807□S	C20907□S	C20910□S
LC	40	60	60	80	80	86	86
LZ	4.5	5.5	5.5	6.6	6.6	6.6	6.6
LA	46	70	70	90	90	100	100
S	8 <sup>(+0)</sup> <sub>(-0.009)</sub>	14 <sup>(+0)</sup> <sub>(-0.011)</sub>	14 <sup>(+0)</sup> <sub>(-0.011)</sub>	14 <sup>(+0)</sup> <sub>(-0.011)</sub>	19 <sup>(+0)</sup> <sub>(-0.013)</sub>	16 <sup>(+0)</sup> <sub>(-0.011)</sub>	16 <sup>(+0)</sup> <sub>(-0.011)</sub>
LB	30 <sup>(+0)</sup> <sub>(-0.021)</sub>	50 <sup>(+0)</sup> <sub>(-0.025)</sub>	50 <sup>(+0)</sup> <sub>(-0.025)</sub>	70 <sup>(+0)</sup> <sub>(-0.030)</sub>	70 <sup>(+0)</sup> <sub>(-0.030)</sub>	80 <sup>(+0)</sup> <sub>(-0.030)</sub>	80 <sup>(+0)</sup> <sub>(-0.030)</sub>
LL (without brake)	100.6	105.5	130.7	112.3	138.3	130.2	153.2
LL (with brake)	136.6	141.6	166.8	152.8	178	161.3	184.3
LS (without oil seal)	20	27	27	27	32	30	30
LS (with oil seal)	20	24	24	24.5	29.5	30	30
LR	25	30	30	30	35	35	35
LE	2.5	3	3	3	3	3	3
LG	5	7.5	7.5	8	8	8	8
LW	16	20	20	20	25	20	20
RH	6.2	11	11	11	15.5	13	13
WK	3	5	5	5	6	5	5
W	3	5	5	5	6	5	5
T	3	5	5	5	6	5	5
TP	M3 Depth 8	M4 Depth 15	M4 Depth 15	M4 Depth 15	M6 Depth 20	M5 Depth 15	M5 Depth 15

### NOTE

- 1) Dimensions are in millimeters.
- 2) Dimensions and weights of the servo motor may be revised without prior notice.
- 3) The boxes (□) in the model names are for optional configurations. (Please refer to section 1.2 for model explanation.)
- 4) Except ECMA-CM0604PS LL: 116.2mm, for the specifications of the motors with rotary magnetic encoders, please refer to the specifications of the corresponding standard models.

## Motor Frame Size: 100mm ~ 130mm Models

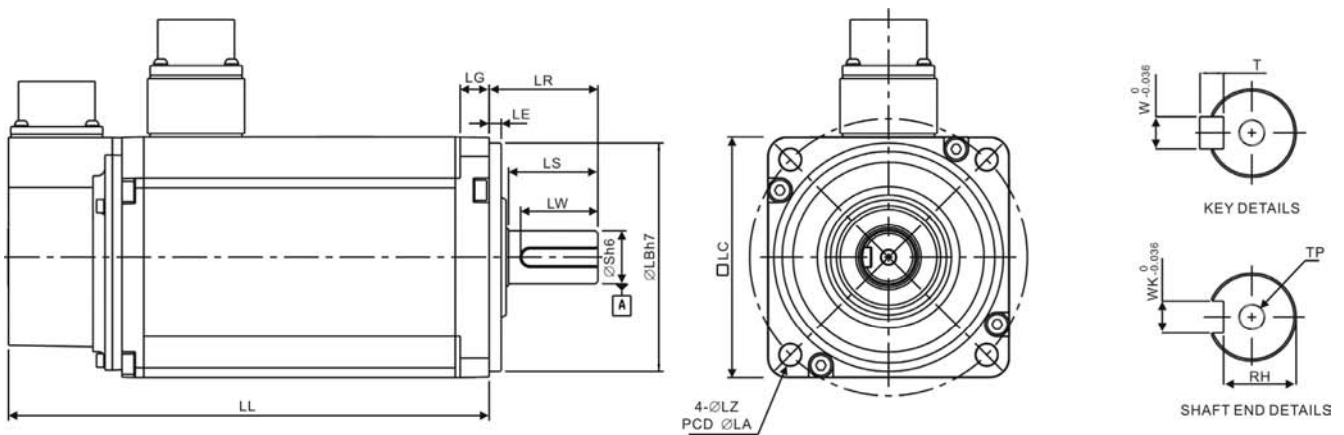


Model	G21303□S	E21305□S	G21306□S	G21309□S	C21010□S
LC	130	130	130	130	100
LZ	9	9	9	9	9
LA	145	145	145	145	115
S	$22^{+0}_{-0.013}$	$22^{+0}_{-0.013}$	$22^{+0}_{-0.013}$	$22^{+0}_{-0.013}$	$22^{+0}_{-0.013}$
LB	$110^{+0}_{-0.035}$	$110^{+0}_{-0.035}$	$110^{+0}_{-0.035}$	$110^{+0}_{-0.035}$	$95^{+0}_{-0.035}$
LL (without brake)	147.5	147.5	147.5	163.5	153.3
LL (with brake)	183.5	183.5	183.5	198	192.5
LS	47	47	47	47	37
LR	55	55	55	55	45
LE	6	6	6	6	5
LG	11.5	11.5	11.5	11.5	12
LW	36	36	36	36	32
RH	18	18	18	18	18
WK	8	8	8	8	8
W	8	8	8	8	8
T	7	7	7	7	7
TP	M6 Depth 20	M6 Depth 20	M6 Depth 20	M6 Depth 20	M6 Depth 20

 **NOTE**

- 1) Dimensions are in millimeters.
- 2) Dimensions and weights of the servo motor may be revised without prior notice.
- 3) The boxes (□) in the model names are for optional configurations. (Please refer to section 1.2 for model explanation.)
- 4) For the specifications of the motors with rotary magnetic encoders, please refer to the specifications of the corresponding standard models.

Motor Frame Size: 100mm ~ 130mm Models



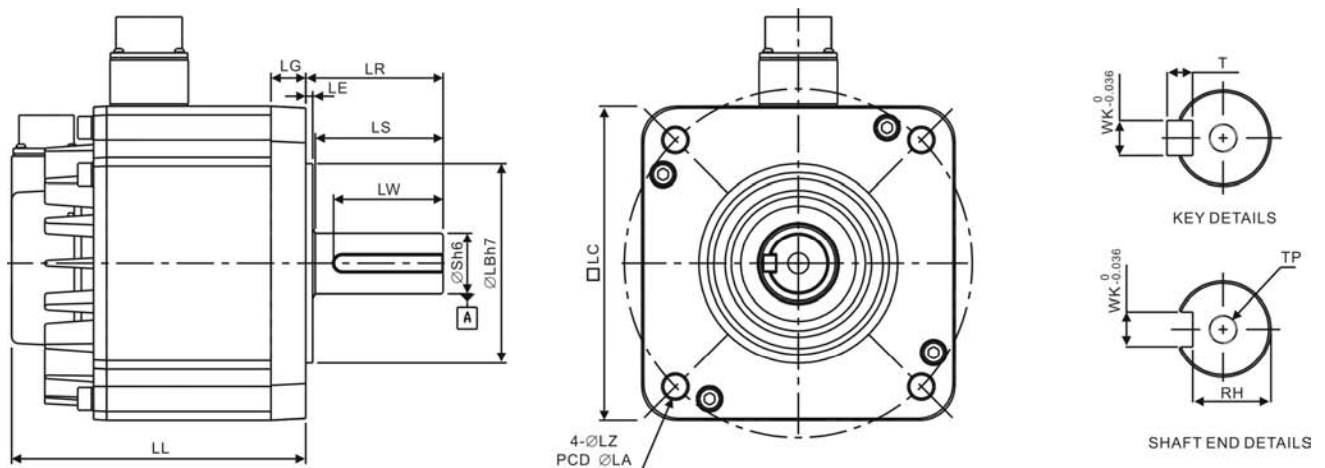
Model	E21310□S	E21315□S	C21020□S	E21320□S
LC	130	130	100	130
LZ	9	9	9	9
LA	145	145	115	145
S	22 <sup>(+0/-0.013)</sup>	22 <sup>(+0/-0.013)</sup>	22 <sup>(+0/-0.013)</sup>	22 <sup>(+0/-0.013)</sup>
LB	110 <sup>(+0/-0.035)</sup>	110 <sup>(+0/-0.035)</sup>	95 <sup>(+0/-0.035)</sup>	110 <sup>(+0/-0.035)</sup>
LL (without brake)	147.5	167.5	199	187.5
LL (with brake)	183.5	202	226	216
LS	47	47	37	47
LR	55	55	45	55
LE	6	6	5	6
LG	11.5	11.5	12	11.5
LW	36	36	32	36
RH	18	18	18	18
WK	8	8	8	8
W	8	8	8	8
T	7	7	7	7
TP	M6 Depth 20	M6 Depth 20	M6 Depth 20	M6 Depth 20

**NOTE**

- 1) Dimensions are in millimeters.
- 2) Dimensions and weights of the servo motor may be revised without prior notice.
- 3) The boxes (□) in the model names are for optional configurations. (Please refer to section 1.2 for model explanation.)



## Motor Frame Size: 180mm Models



Model	E21820□S	E21830□S	F21830□S
LC	180	180	180
LZ	13.5	13.5	13.5
LA	200	200	200
S	35 <sup>(+0)</sup> <sub>(-0.016)</sub>	35 <sup>(+0)</sup> <sub>(-0.016)</sub>	35 <sup>(+0)</sup> <sub>(-0.016)</sub>
LB	114.3 <sup>(+0)</sup> <sub>(-0.035)</sub>	114.3 <sup>(+0)</sup> <sub>(-0.035)</sub>	114.3 <sup>(+0)</sup> <sub>(-0.035)</sub>
LL (without brake)	169	202.1	202.1
LL (with brake)	203.1	235.3	235.3
LS	73	73	73
LR	79	79	79
LE	4	4	4
LG	20	20	20
LW	63	63	63
RH	30	30	30
WK	10	10	10
W	10	10	10
T	8	8	8
TP	M12 Depth 25	M12 Depth 25	M12 Depth 25

 **NOTE**

- 1) Dimensions are in millimeters.
- 2) Dimensions and weights of the servo motor may be revised without prior notice.
- 3) The boxes (□) in the model names are for optional configurations. (Please refer to section 1.2 for model explanation.)

### 1.3 Servo Drive and Servo Motor Combinations

The table below shows the possible combination of Delta ASDA-B2 series servo drives and ECMA series servo motors. The boxes (□) in the model names are for optional configurations. (Please refer to Section 1.2 for model explanation)

Power	Servo Drive	Servo Motor
100W	ASD-B2-0121-B	ECMA-C20401□S (S=8mm)
200W	ASD-B2-0221-B	ECMA-C20602□S (S=14mm)
400W	ASD-B2-0421-B	ECMA-C20604□S (S=14mm) ECMA-CM0604□S (S=14mm) ECMA-C20804□7 (7=14mm) ECMA-E21305□S (S=22mm) ECMA-G21303□S (S=22mm)
750W	ASD-B2-0721-B	ECMA-C20807□S (S=19mm) ECMA-C20907□S (S=16mm) ECMA-G21306□S (S=22mm) ECMA-GM1306□S (S=22mm)
1000W	ASD-B2-1021-B	ECMA-C21010□S (S=22mm) ECMA-C20910□S (S=16mm) ECMA-E21310□S (S=22mm) ECMA-G21309□S (S=22mm) ECMA-GM1309□S (S=22mm)
1500W	ASD-B2-1521-B	ECMA-E21315□S (S=22mm)
2000W	ASD-B2-2023-B	ECMA-C21020□S (S=22mm) ECMA-E21320□S (S=22mm) ECMA-E21820□S (S=35mm)
3000W	ASD-B2-3023-B	ECMA-E21830□S (S=35mm) ECMA-F21830□S (S=35mm)

The servo drives shown in the above table are designed for use in combination with the specific servo motors. Check the specifications of the drives and motors you want to use.

Also, please ensure that both the servo drive and motor are correctly matched for size (power rating). If the power of motor and drive is not within the specifications, the drive and motor may overheat and servo alarm would be activated. For the detail specifications of servo drives and motors, please refer to Chapter 11 "Specifications".

The drives shown in the above table are designed according to the three multiple of rated current of motors shown in the above table. If the drives which are designed according to the six multiple of rated current of motors are needed, please contact our distributors or your local Delta sales representative.