



Automation for a Changing World

Delta Linear Motion Products



www.deltaww.com

 **DELTA**
Smarter. Greener. Together.

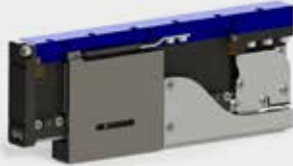
Delta Linear Motion Product Introduction

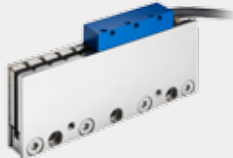
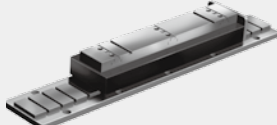
Delta's linear motion products provide the perfect combination of mechanism, drives and motor system which not only offer immediate use, quick installation and high precision but also feature high performance and robust control of motion. These products deliver automation solutions that include single-axis, gantries (dual-axis), and multiaxis linear systems for a variety of applications and industries to help customers save on labor costs, shorten development time, and optimize use of resources.

To satisfy full application requirements, Delta's linear motion products are designed with high accuracy, compact size and response. These high quality devices can significantly enhance the stability of the system and easily achieve precise positioning control for equipment upgrades and improvements along with Delta's professional technical support and service.

Delta's linear motion products feature designs for applications in all fields, including electronics, food packaging, metal processing, semiconductors and more.

Delta's linear motion products provide a complete solution for your automated applications.

Product Line-up	Linear Stage		Mini Actuator
	LU	LA-S	LPA
	Ball Screw Driven	Linear Motor Driven	Linear Motor Driven
			
	P3	P17	Coming soon

Product Line-up	Direct Drive Motor Series	
	ECML-U	ECM-LU
	U Shaped Coreless	Ironless Linear Motor
		
	P39	P47
	ECML-S	ECM-LF
	Linear Shaft Motor	Ironcore Linear Motor
		
	P23	P73

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Linear Stage LU Series

- ### Product Features
- ▶ Non-coupling installation design
 - ▶ Compact size for space saving
 - ▶ Fast response
 - ▶ Low inertia ratio



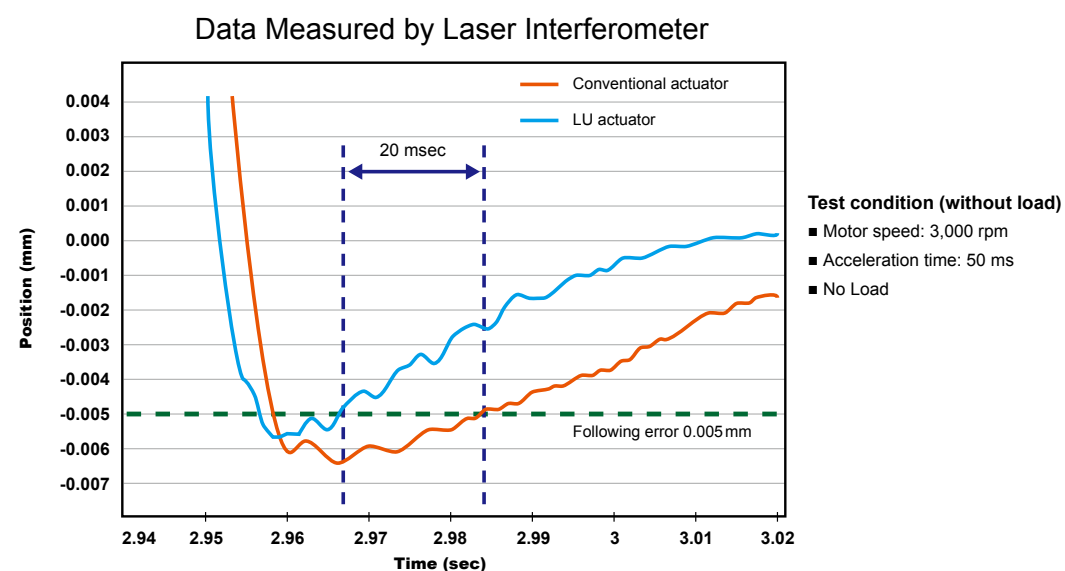
Characteristic Analysis



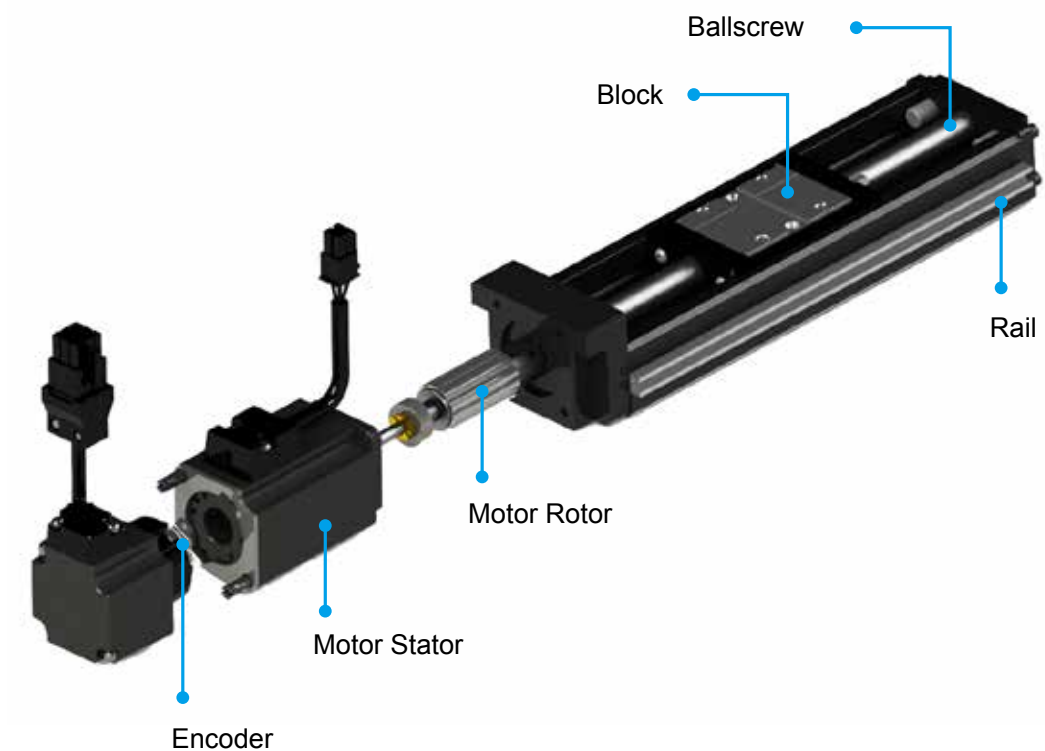
Delta LU Series
(without coupling)



Conventional Linear Stage
(with coupling)



Internal Structure



LU Series and Servo Drive Selection Table

Part Number of LU Series	Servo Drives	Motor Output (W)	Lead (mm)	Rated Torque (N-m)	Max. Torque (N-m)
LU-26110 □□□□□□	ASD-A3-0121-□ ASD-A2-0121-□ ASD-B2-0121-□	50	2 / 6	0.159	0.477
LU-26111 □□□□□□		100	2 / 6	0.32	0.96
LU-33111 □□□□□□		100	5 / 10	0.32	0.96
LU-46214 □□□□□□	ASD-A3-0421-□ ASD-A2-0421-□ ASD-B2-0421-□	400	10 / 20	1.27	3.82

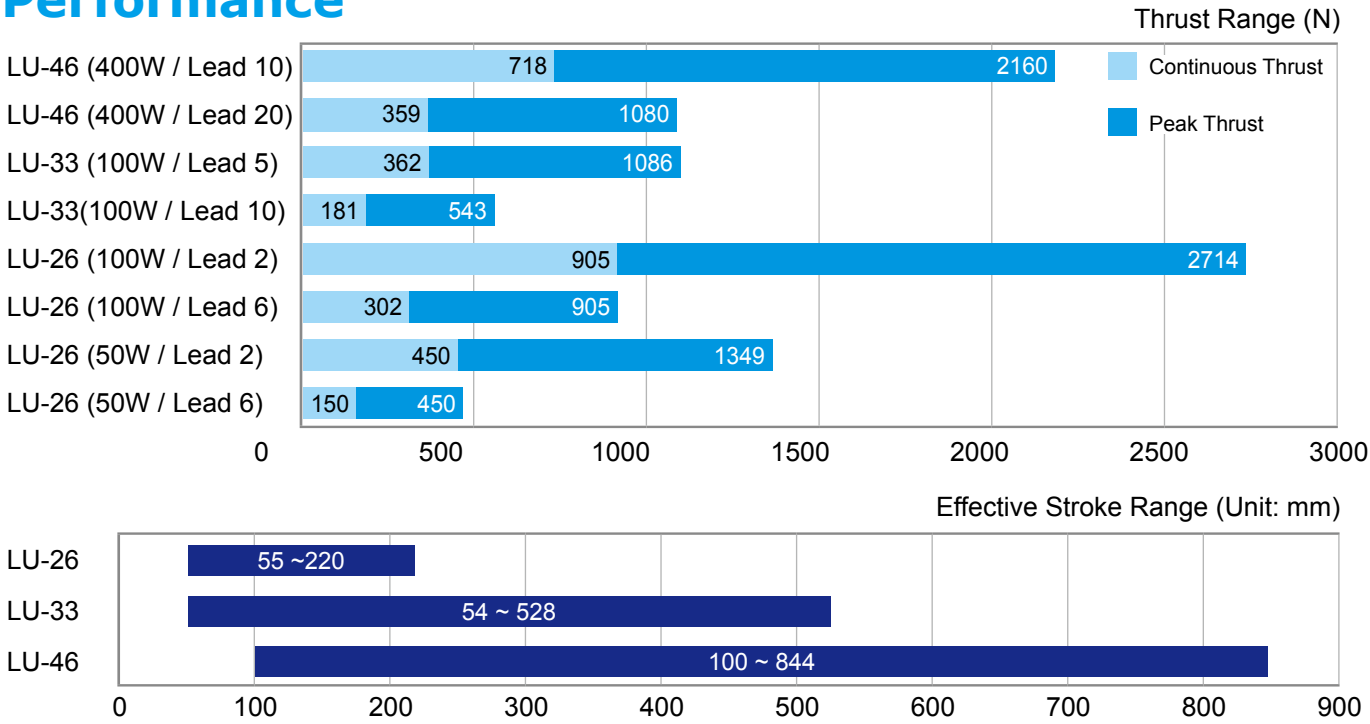
*The boxes (□) at the end of the servo drive model names are codes for the ASDA Series. For more detailed information, please refer to the catalogues for the ASDA Series servo drives.

Ordering Information

LU - 33 1 1 1 15 0 A P 0 S
1 2 3 4 5 6 7 8 9 10

	LU	Product	Linear Stage LU Series												
1	33	Nominal Width	26, 33, 46												
2	1	Motor Frame Size and Input Voltage	1: F40 220V 2: F60 220V												
3	1	Encoder Type	1: Incremental Encoder, 20-bit												
4	1	Motor Output	Model No.	Code	Watt	Model No.	Code	Watt	Model No.	Code	Watt				
			LU-26	0	50W	LU-33	1	100W	LU-46	4	400W				
				1	100W										
5	15	U-rail Length	Model No.	Units: mm											
			LU-26	Code	15	20	25	30							
				Length	150	200	250	300							
			LU-33	Code	15	20	30	40	50	60					
				Length	150	200	300	400	500	600					
			LU-46	Code	34	44	54	64	74	94					
Length	340	440		540	640	740	940								
6	0	Lead	Model No.	Units: mm			Model No.	Units: mm			Model No.	Units: mm			
			LU-26	Code	2	6	LU-33	Code	5	0	LU-46	Code	0	A	
				Length	2	6		Length	5	10		Length	10	20	
7	A	Block Type	A: 1 Normal Type Block				B: 2 Normal Type Blocks		C: 1 Short Type Block			D: 2 Short Type Blocks			
8	P	Accuracy Grade	N: Normal				P: Precision								
9	0	Cover	0: Standard Type, Without Cover				1: With Cover			C: Fully enclosed (coming soon)					
10	S	Special Order	S: Delta Standard Product												

Performance



Specifications

Basic Specifications

Ball screw Specifications		Maximum Stroke (mm)				Screw Overall Length	Screw Shaft Diameter
Model No.	Rail Length (mm)	A	B	C	D	L (mm)	D (mm)
LU-26	150	70	-	-	-	191	8
	200	120	55	-	-	241	8
	250	170	105	-	-	291	8
	300	220	155	-	-	341	8
LU-33	150	54.5	-	78.8	26.6	194	12
	200	104.5	-	128.8	76.6	244	12
	300	204.5	128	228.8	176.6	344	12
	400	304.5	228	328.8	276.6	444	12
	500	404.5	328	428.8	376.6	544	12
	600	504.5	428	528.8	476.6	644	12
LU-46	340	208.2	100.4	244.7	173.4	399	15
	440	308.2	200.4	344.7	273.4	499	15
	540	408.2	300.4	444.7	373.4	599	15
	640	508.2	400.4	544.7	473.4	699	15
	740	608.2	500.4	644.7	573.4	799	15
	940	808.2	700.4	844.7	773.4	999	15



Weight (Standard Type, Without Cover)

LU Series Specifications		LU-26110 □□□□□□□		LU-26111 □□□□□□□	
		A	B	A	B
Model No.	Rail Length (mm)	Kg		Kg	
LU-26	150	1.4	-	1.48	-
	200	1.6	1.79	1.68	1.87
	250	1.8	1.99	1.88	2.07
	300	2.01	2.2	2.09	2.28

LU Series Specifications		LU-33111 □□□□□□□			
		A	B	C	D
Model No.	Rail Length (mm)	Kg			
LU-33	150	2.17	-	2.07	2.3
	200	2.48	-	2.36	2.59
	300	3.06	3.41	2.95	3.18
	400	3.65	4	3.55	3.78
	500	4.35	4.7	4.23	4.46
	600	4.96	5.31	4.84	5.07

LU Series Specifications		LU-46214 □□□□□□□			
		A	B	C	D
Model No.	Rail Length (mm)	Kg			
LU-46	340	9.25	10.45	8.85	9.65
	440	10.54	11.74	10.14	10.94
	540	11.84	13.04	11.44	12.24
	640	13.15	14.35	12.75	13.55
	740	14.55	15.75	14.15	14.95
	940	16.84	18.04	16.44	17.24

Weight (With Cover)

Ballscrew Specifications		LU-26110 □□□□□□□		LU-26111 □□□□□□□	
		A	B	A	B
Model No.	Rail Length (mm)	Kg		Kg	
LU-26	150	1.48	-	1.56	-
	200	1.68	1.87	1.76	1.95
	250	1.88	2.07	1.96	2.15
	300	2.09	2.28	2.17	2.36

Ballscrew Specifications		LU-33111 □□□□□□□			
		A	B	C	D
Model No.	Rail Length (mm)	Kg			
LU-33	150	2.36	-	2.18	2.43
	200	2.68	-	2.49	2.74
	300	3.26	3.71	3.12	3.37
	400	3.88	4.33	3.76	4.01
	500	4.59	5.04	4.49	4.74
	600	5.21	5.66	5.14	5.39

Ballscrew Specifications		LU-46214 □□□□□□□			
		A	B	C	D
Model No.	Rail Length (mm)	Kg			
LU-46	340	9.85	11.25	9.05	10.05
	440	11.14	12.54	10.34	11.34
	540	12.44	13.84	11.64	12.64
	640	13.75	15.15	12.95	13.95
	740	15.15	16.55	14.35	15.35
	940	17.44	18.84	16.64	17.64

LU

LA-S

ECML-S

ECML-U

ECML-U

ECML-SP

ECML-LF

ECM-DD

ECM-LCVC



Loading Specifications

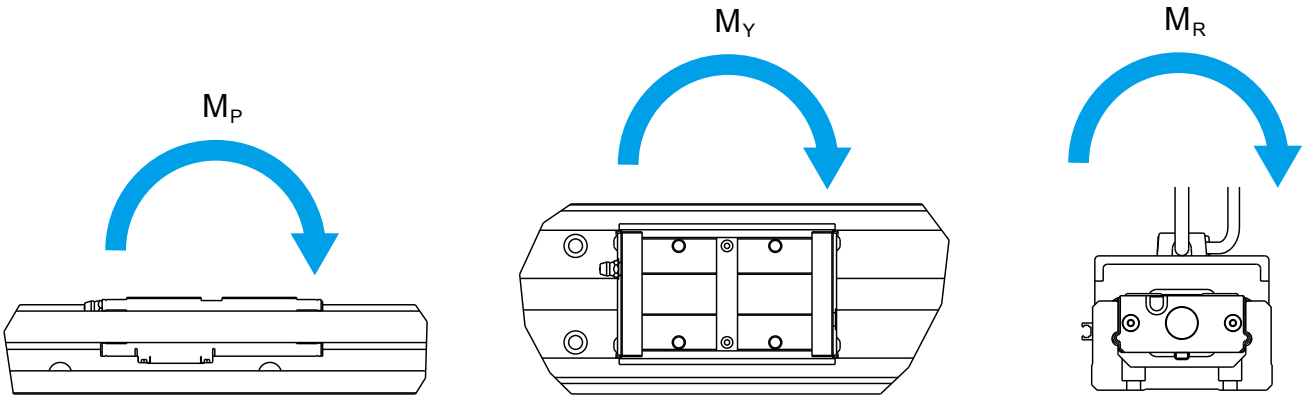
Loading Capacity

Model No.	Lead (mm)	Linear Guideway				BallscREW			
		Basic Dynamic Load Rating C (kN)		Basic Static Load Rating C ₀ (kN)		Basic Dynamic Load Rating C (kN)		Basic Static Load Rating C ₀ (kN)	
		A,B	C,D	A,B	C,D	Normal (N)	High (H) Precision (P)	Normal (N)	High (H) Precision (P)
LU-26	2	7.99	-	15.230	-	1.790	2.500	2.940	4.020
	6					0.880	1.180	1.180	1.670
LU-33	5	12.210	7.910	22.110	11.900	2.250	2.940	4.310	5.100
	10					2.160	2.840	3.720	4.510
LU-46	10	26.350	16.260	46.650	23.330	5.000	6.660	8.920	11.860
	20					3.720	5.000	6.370	8.530

* A, B, C, D refer to block types

Static Permissible Moment

Model No.	Lead (mm)	Static Permissible Moment											
		M _P				M _Y				M _R			
		Block Type				Block Type				Block Type			
		A	B	C	D	A	B	C	D	A	B	C	D
LU-26	2	107.3	501.8	-	-	107.3	501.8	-	-	278.6	557.3	-	-
	6												
LU-33	5	156.6	858.5	43.8	326.4	156.6	858.5	43.8	326.4	462	924	248.8	497.6
	10												
LU-46	10	575	2678	120	1245.6	575	2678	120	1245.6	1397.9	2795.8	798.8	1597.6
	20												



Accuracy Grade

Unit: mm										
BallscREW Specifications		Positioning Repeatability		Positioning Accuracy		Running of Parallelism		Backlash		
Model No.	Rail Length	Normal (N)	Precision (P)	Normal (N)	Precision (P)	Normal (N)	Precision (P)	Normal (N)	Precision (P)	
LU-26	150	±0.01	±0.003	-	0.02	-	0.01	0.02	0.003	
	200									
	250									
	300									
LU-33	150	±0.01	±0.003	-	0.02	-	0.01	0.02	0.003	
	200									
	300									
	400				0.025		0.015			
	500									
600	±0.01	±0.003	-	0.025	-	0.015	0.02	0.003		
340										
440										
540									0.03	0.02
640										
740										
940										

Maximum Travel Speed

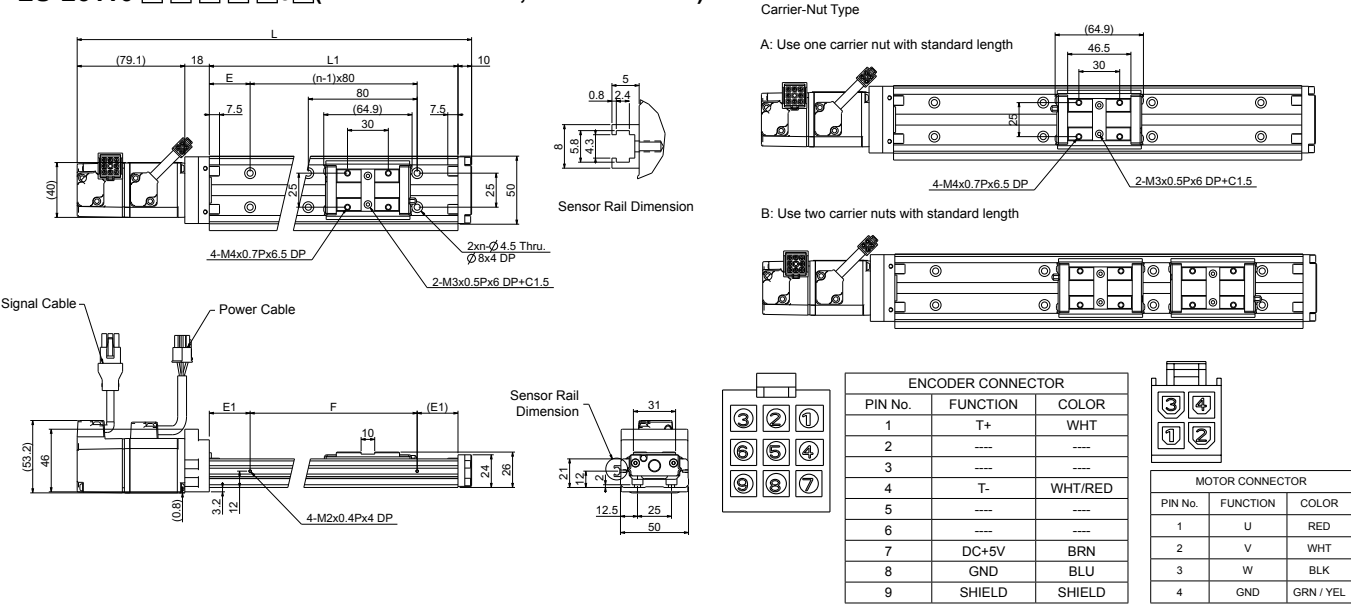
BallscREW Specifications (mm)			Maximum Travel Speed (mm/s) / Maximum Motor RPM	
Model No.	BallscREW Lead	Rail Length	Normal (N)	Precision (P)
LU-26	2	150	167 / 5000	167 / 5000
		200		
		250		
		300		
		300		
LU-26	6	150	500 / 5000	500 / 5000
		200		
		250		
		300		
		300		
LU-33	5	150	390 / 4680	417 / 5000
		200		
		300		
		400		
		500		
	10	600	340 / 4080	340 / 4080
		150		
		200		
		300		
		400		
LU-46	10	500	790 / 4740	833 / 5000
		600		
		600		
		650 / 3900		
		650 / 3900		
	20	340	520 / 3120	740 / 4440
		440		
		540		
		640		
		740		
	20	940	1050 / 3150	1480 / 4440
		340		
		440		
		540		
		640		
	20	740	840 / 2520	1440 / 4320
		740		
		940		
		940		
		940		

Dimensions of the LU Series

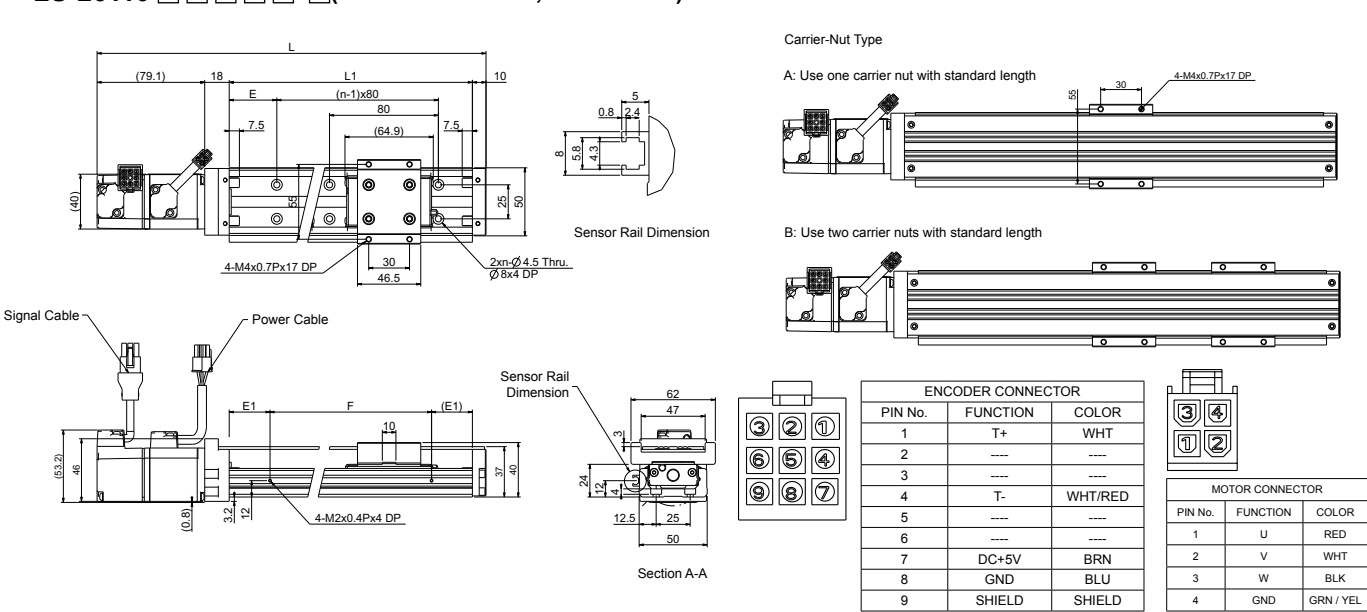
LU-26

LU Series Specifications		Maximum Stroke (mm)				Overall Length L (mm)		E	n	E1	n1	F
Model No.	Rail Length L1 (mm)	A	B	C	D	50W	100W	mm	-	mm	-	mm
LU-26	150	70	-	-	-	257.1	278.6	35	2	35	-	80
	200	120	55	-	-	307.1	328.6	20	3	20	-	160
	250	170	105	-	-	357.1	378.6	45	3	45	-	160
	300	220	155	-	-	407.1	428.6	30	4	30	-	240

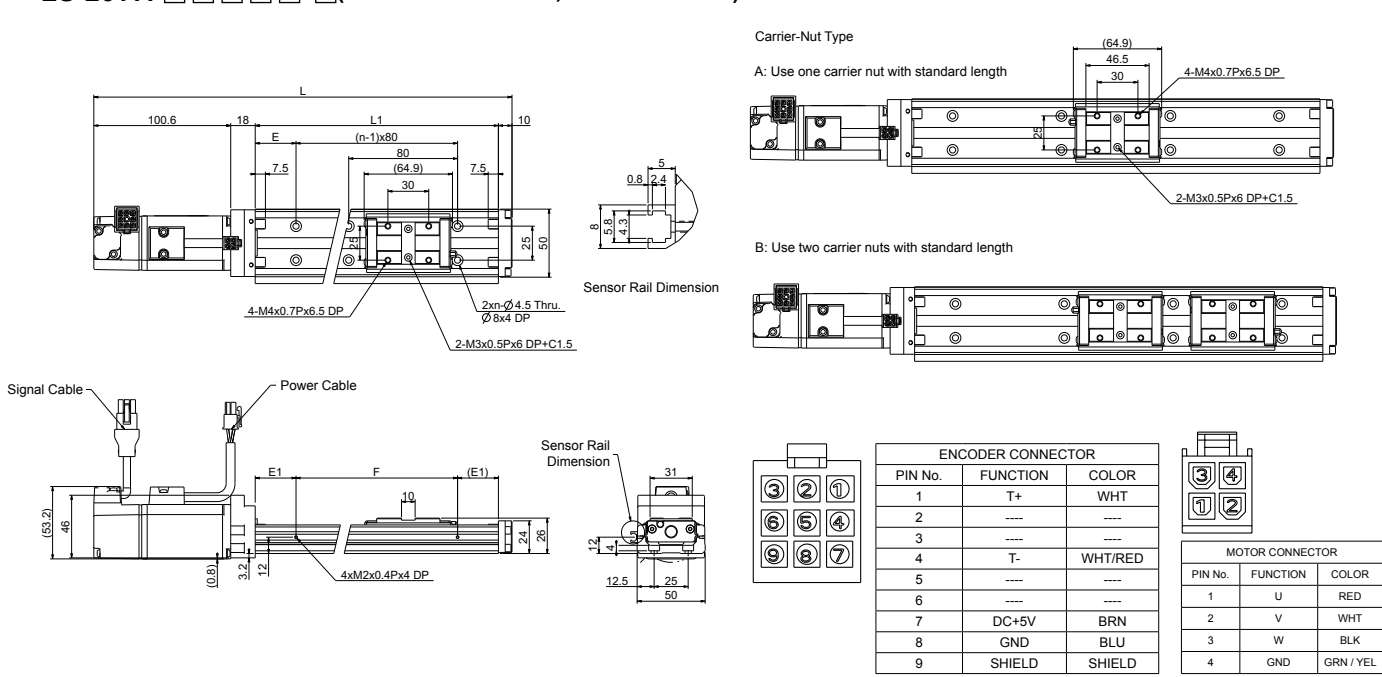
LU-26110 (50W Servo Motor, Without Cover)



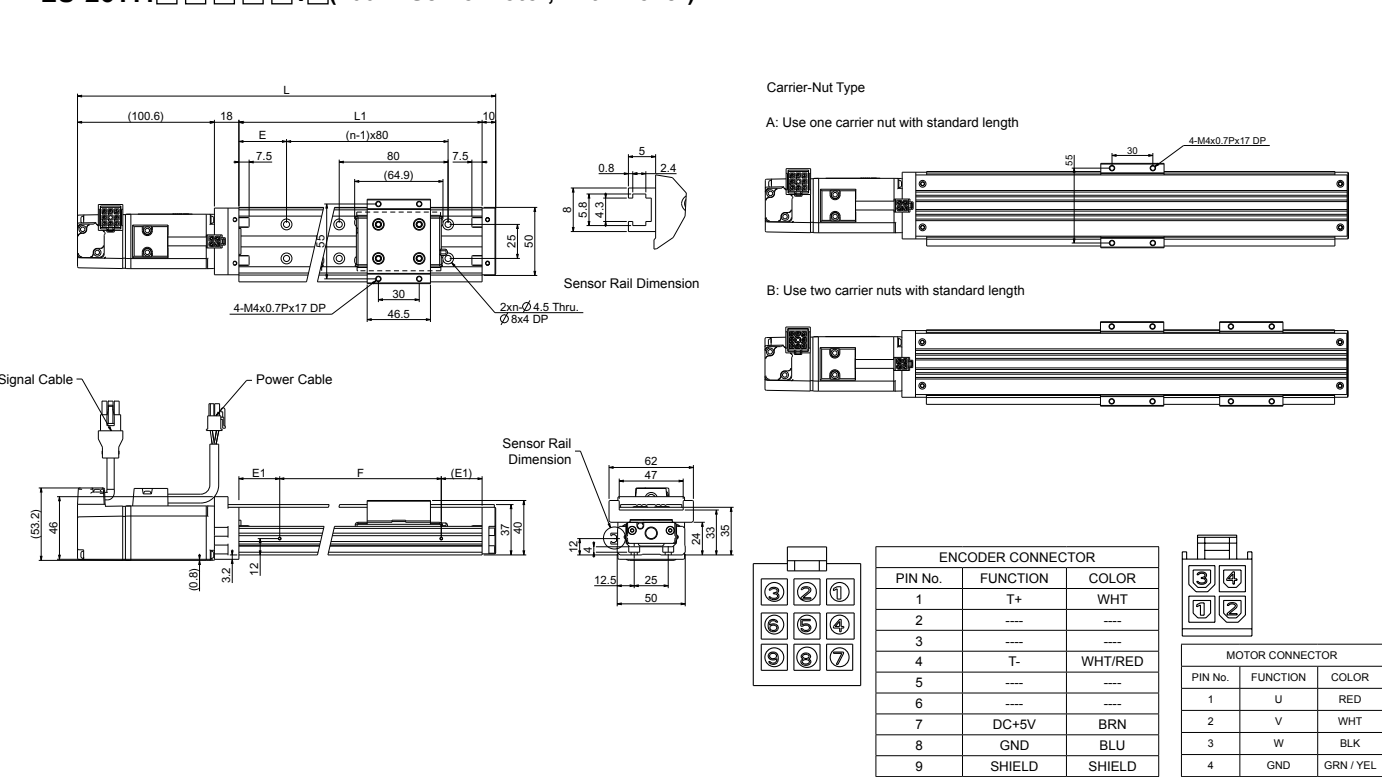
LU-26110 (50W Servo Motor, With Cover)



LU-26111 (100W Servo Motor, Without Cover)



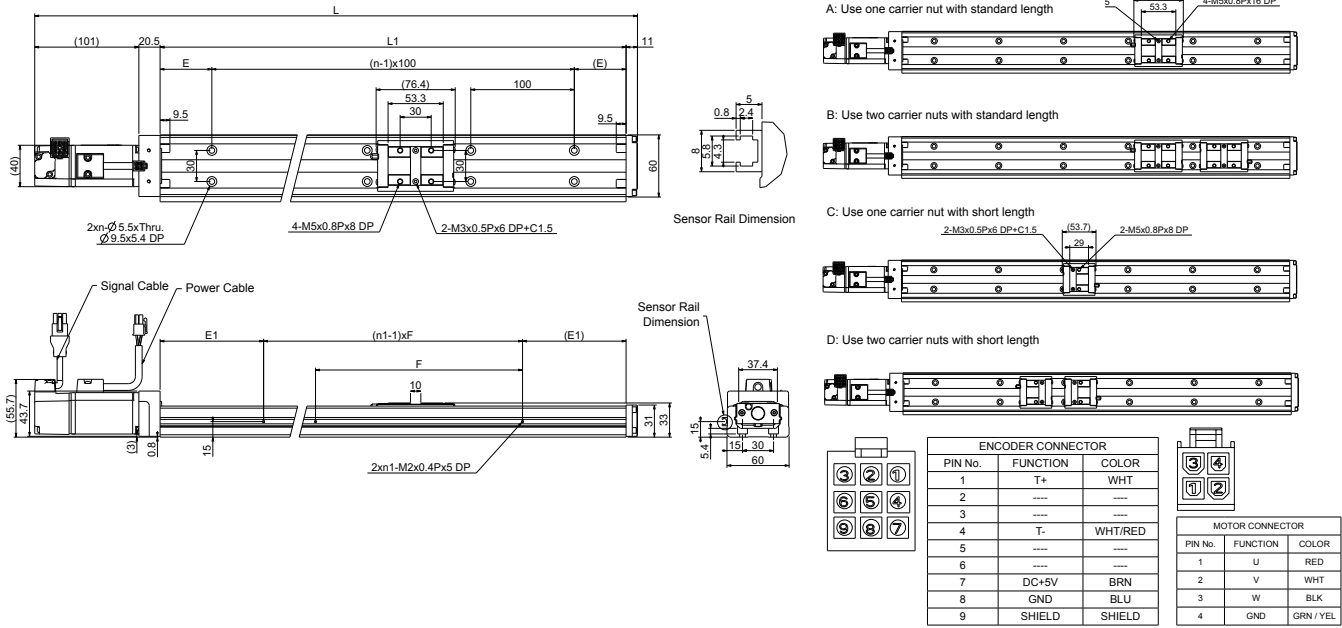
LU-26111 (100W Servo Motor, With Cover)



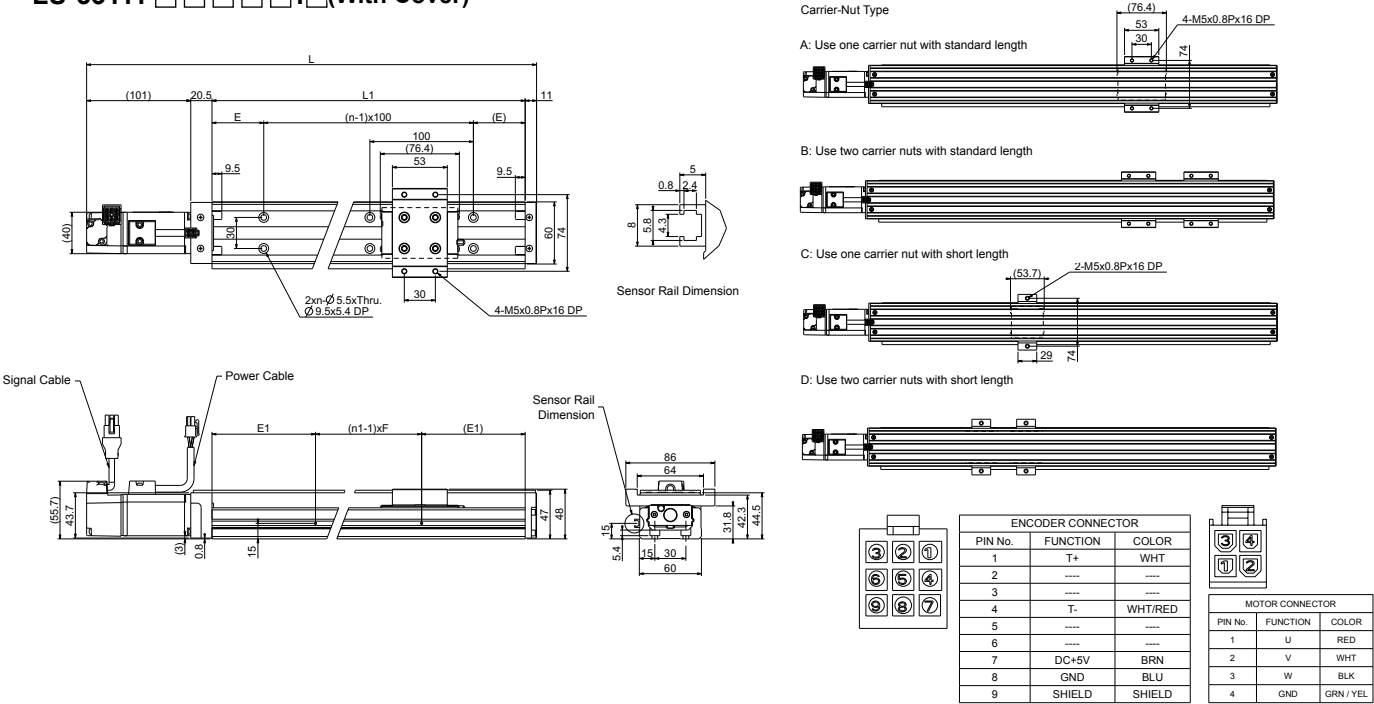
LU-33

LU Series Specifications		Maximum Stroke (mm)				Total Length L (mm)	E	n	E1	n1	F
Model No.	Rail Length L1 (mm)	A	B	C	D	100W	mm	-	mm	-	mm
LU-33	150	54.5	-	78.8	26.6	282.5	25	2	25	2	100
	200	104.5	-	128.8	76.6	332.5	50	2	50	2	100
	300	204.5	128	228.8	176.6	432.5	50	3	50	2	200
	400	304.5	228	328.8	276.6	532.5	50	4	100	2	200
	500	404.5	328	428.8	376.6	632.5	50	5	50	3	200
	600	504.5	428	528.8	476.6	732.5	50	6	100	3	200

LU-33111 000000 (Without Cover)



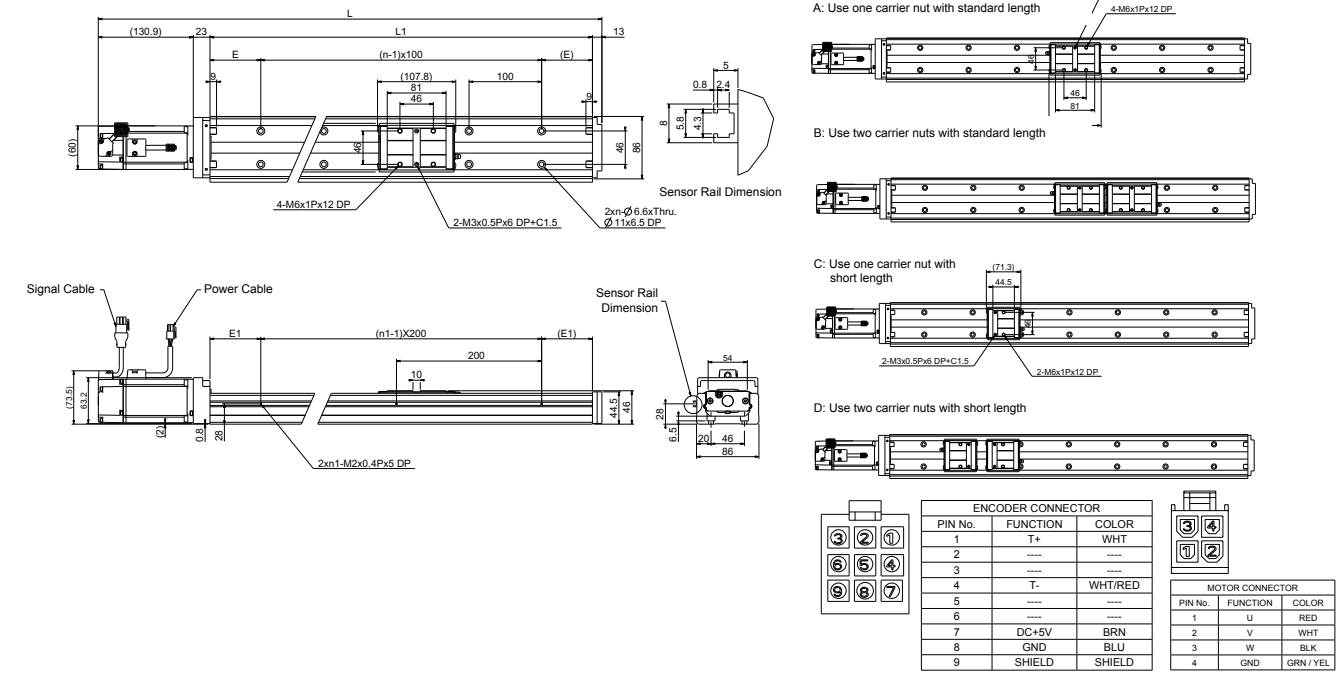
LU-33111 000001 (With Cover)



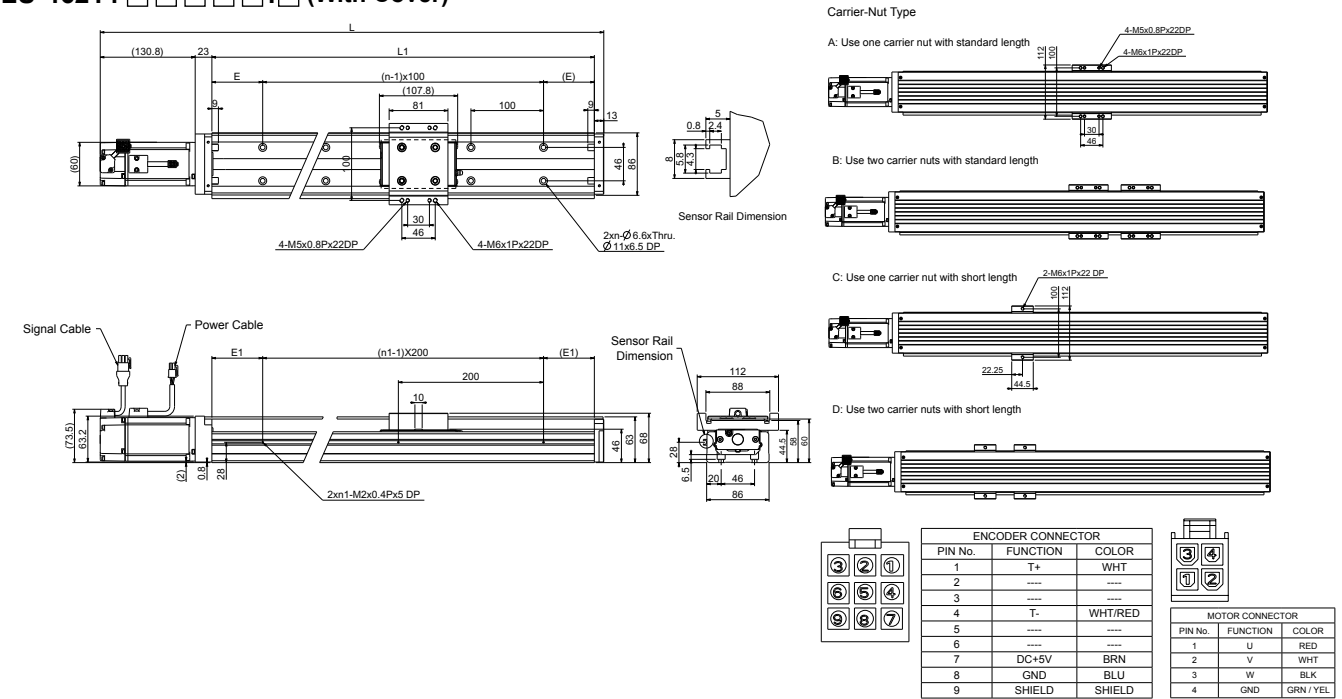
LU-46

LU Series Specifications		Maximum Stroke (mm)				Total Length L (mm)	E	n	E1	n1	F
Model No.	Rail Length L1 (mm)	A	B	C	D	400W	mm	-	mm	-	mm
LU-46	340	208.2	100.4	244.7	173.4	506.9	70	3	70	2	-
	440	308.2	200.4	344.7	273.4	606.9	70	4	20	3	-
	540	408.2	300.4	444.7	373.4	706.9	70	5	70	3	-
	640	508.2	400.4	544.7	473.4	806.9	70	6	20	4	-
	740	608.2	500.4	644.7	573.4	906.9	70	7	70	4	-
	940	808.2	700.4	844.7	773.4	1106.9	70	9	70	5	-

LU-46214 000000 (Without Cover)



LU-46214 000001 (With Cover)

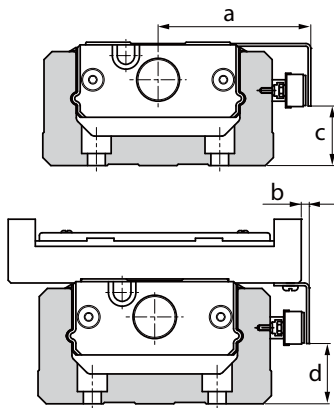


LU Series Recommended Sensor Model

Installation dimensions for detecting plate & mounting plate

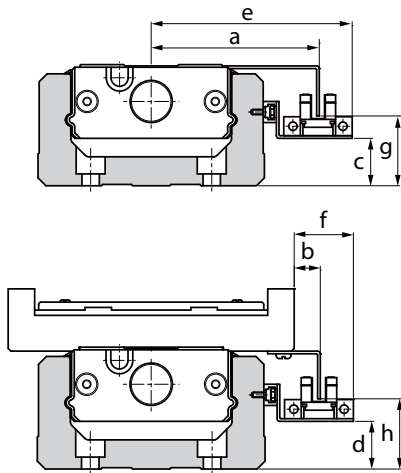
Panasonic
GX-F12A, GX-F12B

Unit: mm				
Model No.	a	b	c	d
LU-26	38.9	7.9	6.2	6.2
LU-33	44	1	9.2	10
LU-46	57	1	22.2	23



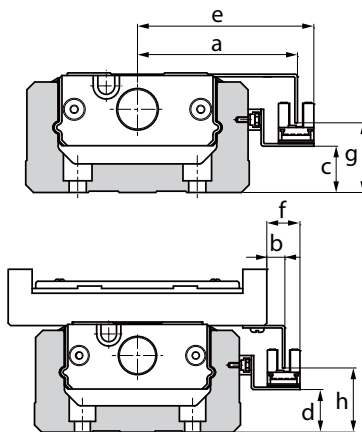
Omron EE-SX671/SX971

Unit: mm								
Model No.	a	b	c	d	e	f	g	h
LU-26	46	15	2	2	58.5	27.5	10.5	10.5
LU-33	50.9	7.9	5	5	63.4	20.4	13.8	15
LU-46	63.9	7.9	18	18	76.4	20.4	26.5	28

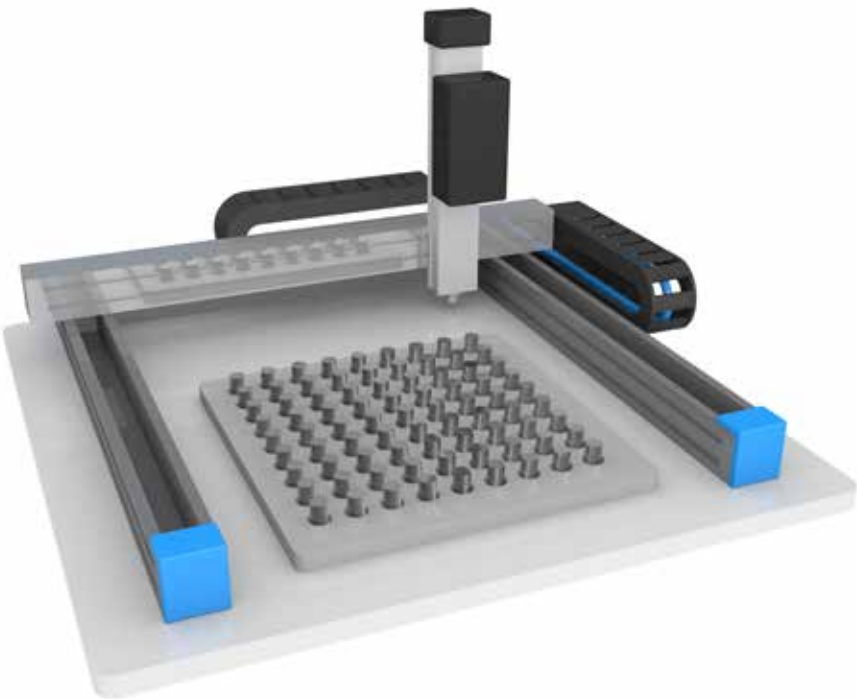
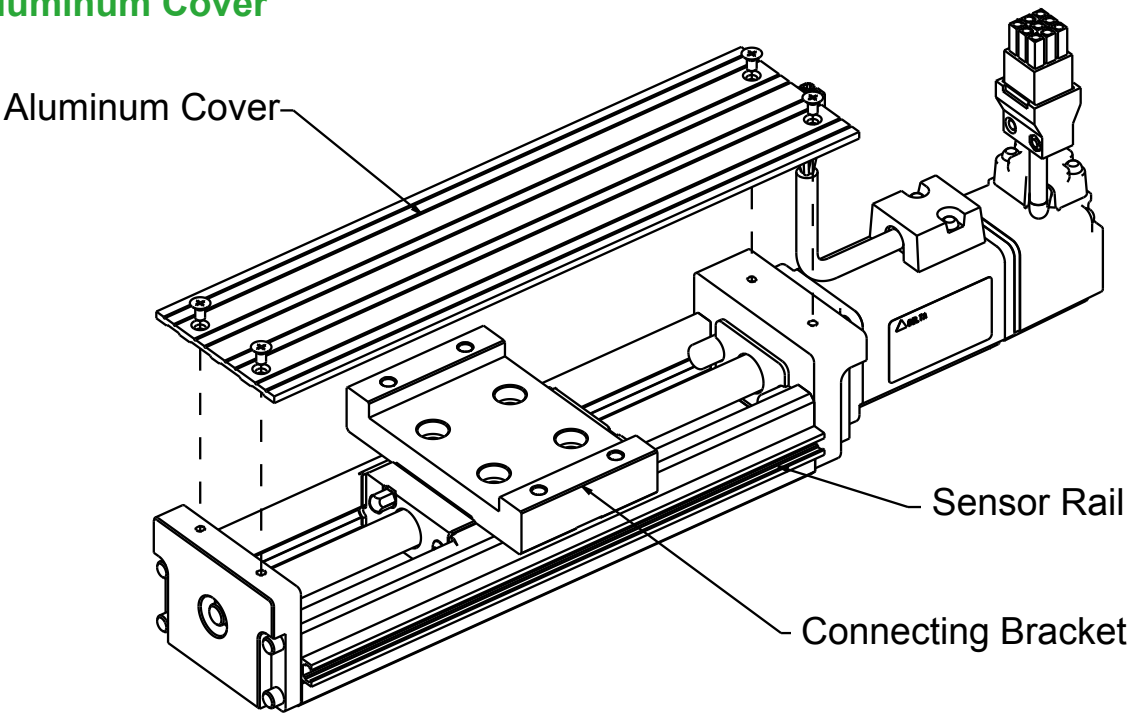


Omron EE-SX671/SX971

Unit: mm								
Model No.	a	b	c	d	e	f	g	h
LU-26	43.7	12.7	1.8	1.8	50	19	10.8	10.8
LU-33	48.6	5.6	4.8	4.8	54.9	11.9	13.8	14
LU-46	61.6	5.6	17.8	17.8	67.9	11.9	26.8	28.1



Aluminum Cover



Linear Stage

LA-S Series

Product Features

► Direct driving with zero backlash

Directly driven by a Delta linear motor, coupling with zero backlash for no alignment issues.

► High speed and high precision

High speed capability of up to 4 m/s is possible, high accuracy and superior stability of motion is guaranteed.

► Cog-free design with low thrust ripple

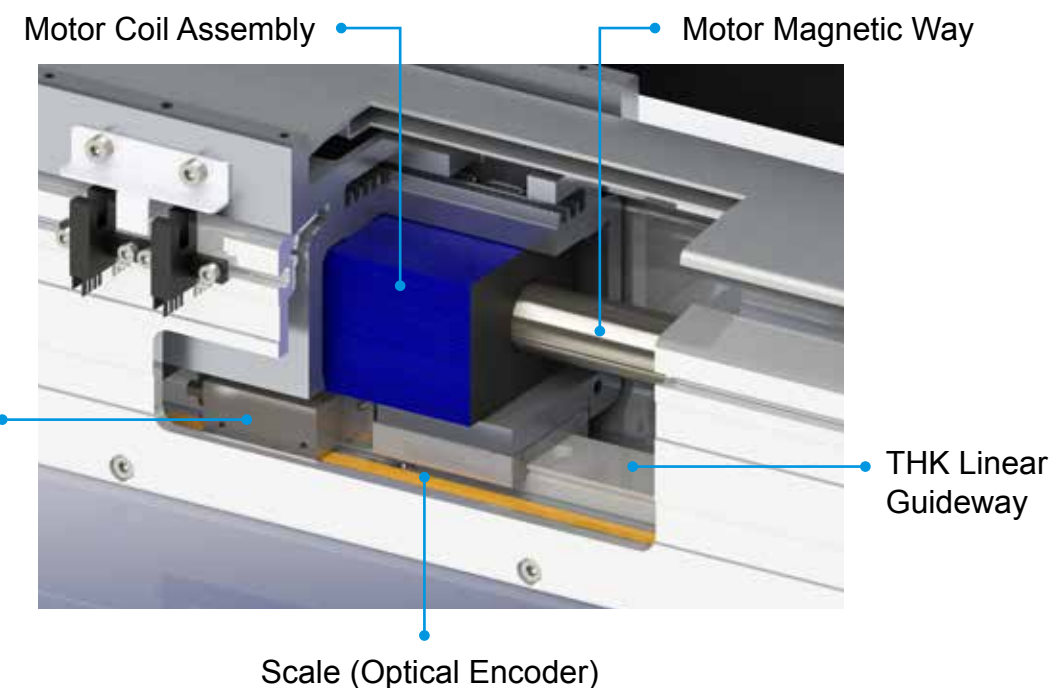
Utilizes an ironless forcer for zero cogging and low thrust ripple to achieve outstanding smoothness of motion even at low speed.

► Save on Cost and Space for Application Scalability

Good performance on long travel distances (up to 2m) for almost any positioning applications. Multiple sliders move independently within a one stage unit for efficient space savings and better performance than two separate ball screw driven stages.



Internal Structure



* Optical encoder head specification: RENISHAW RH200

LA-S Series and Servo Drive Selection Table

Model No.	Servo Drive	Motor Output (W)
LA-S4	ASD-A3-0221-□	200 W
LA-S5	ASD-A2R-0221-□	
LA-S6	ASD-A3-0421-□	400 W
LA-S7	ASD-A2R-0421-□	
LA-S8	ASD-A3-0721-□	750 W
LA-SA	ASD-A2R-0721-□	
LA-SB	ASD-A2R-0721-□	

*The boxes (□) at the end of the servo drive model names are codes for the ASDA-A2R Series. For more detailed information, please refer to the catalogues for the ASDA-A2R Series servo drives.

Ordering Information

LA - S5 1 012 D 1 M S00

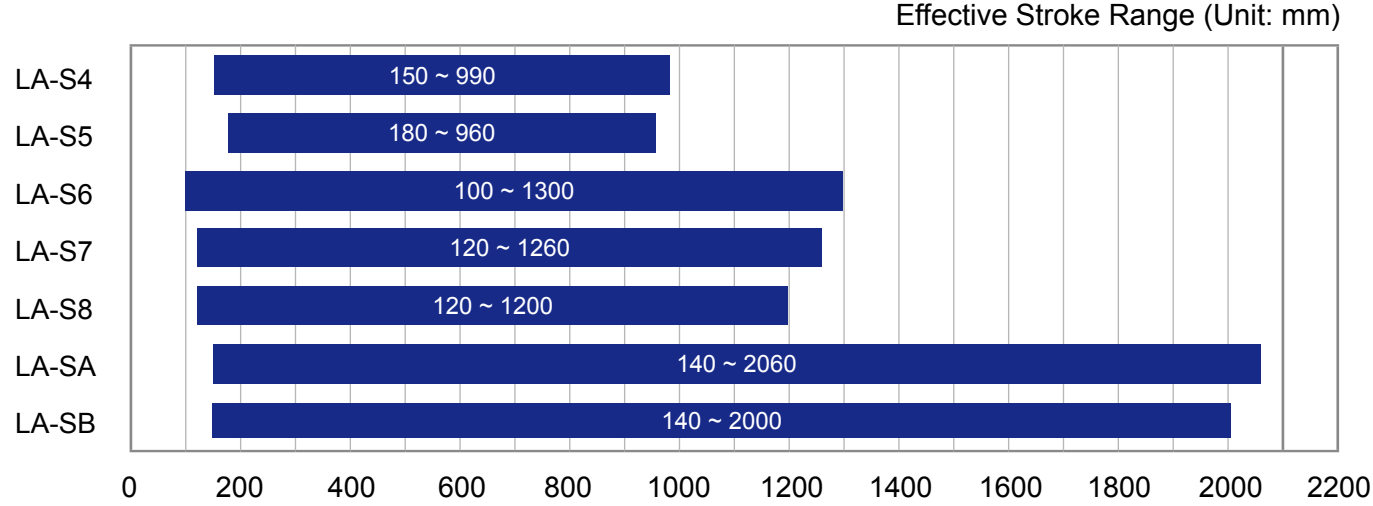
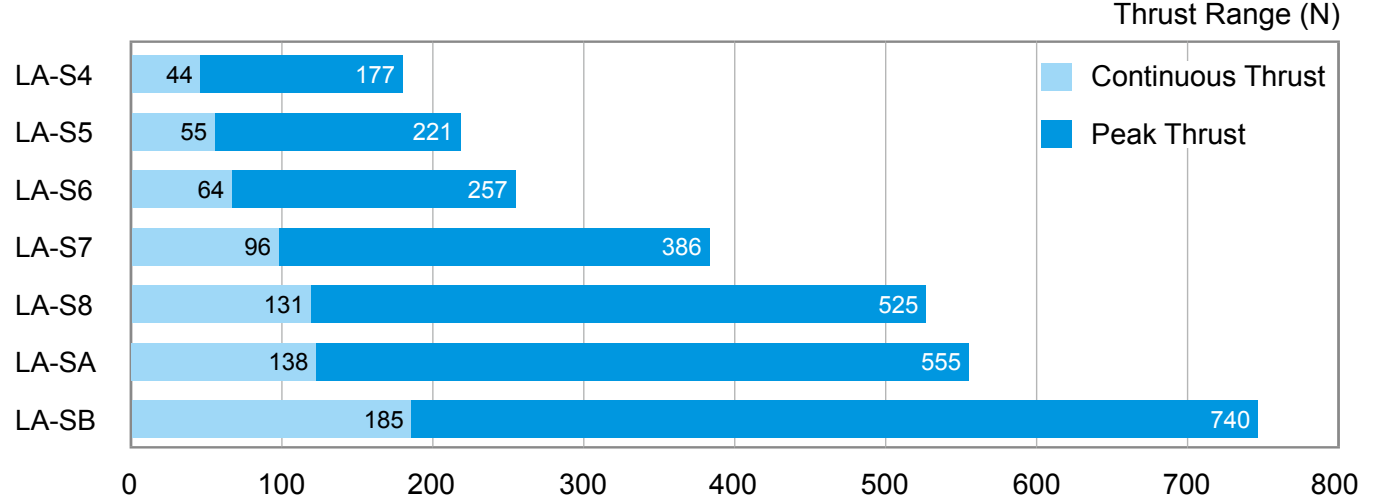
1 2 3 4 5 6 7

LA	Product	Linear Stage LA-S Series			
1	S5	Linear MOTOR MODEL	S4: ECML-S 2004 S5: ECML-S 2005	S6: ECML-S 2504 S7: ECML-S 2506	S8: ECML-S 2508 SA: ECML-S 3206 SB: ECML-S 3208
2	1	Q'ty of Forcer	Motors on single axis 1: one 2: two 3: three 4: four and so forth		
3	012	Travel	E.g. 052: 520 mm	034: 340 mm	106: 1060 mm 206: 2060 mm
4	D	Encoder Type	D: REINSHAW RH200, digital output, resolution 1μm		
5	1	Mounting Direction	1: Horizontal Mounting (Vertical Cable Chains)		2: Horizontal Mounting (Horizontal Cable Chains)
			3: Lateral Mounting (Vertical Cable Chains)		4: Lateral Mounting (Horizontal Cable Chains)
			5: Upside-down Mounting (Vertical Cable Chains)		6: Upside-down Mounting (Horizontal Cable Chains)
6	M	Cover	M: Aluminum Extrusion		
7	S00	Special Order	S00: Delta Standard Product		

* LA-S standard cable length is 5m. Please contact Delta sales offices or distributors for other customized requirements.

** LA-S Standard equipment include 2 optical sensors <Brand and Model Name: Omron EE-SX672+2m cable>

Performance



Specifications

	LA-S4	LA-S5	LA-S6	LA-S7	LA-S8	LA-SA	LA-SB
Peak Thrust N	177	221	257	386	525	555	740
Continuous Thrust N	44	55	64	96	131	138	185
Maximum Speed (*1) m/s	4						
Resolution μm	1						
Repeatability μm	±1						
Moving Part Weight (*2) kg	2.9	3.3	3.9	4.7	5.7	5.8	6.9

*1 Maximum speed will be different based on the load and stroke of applications
*2 Moving part weights only include motor and slider. External load is not included.

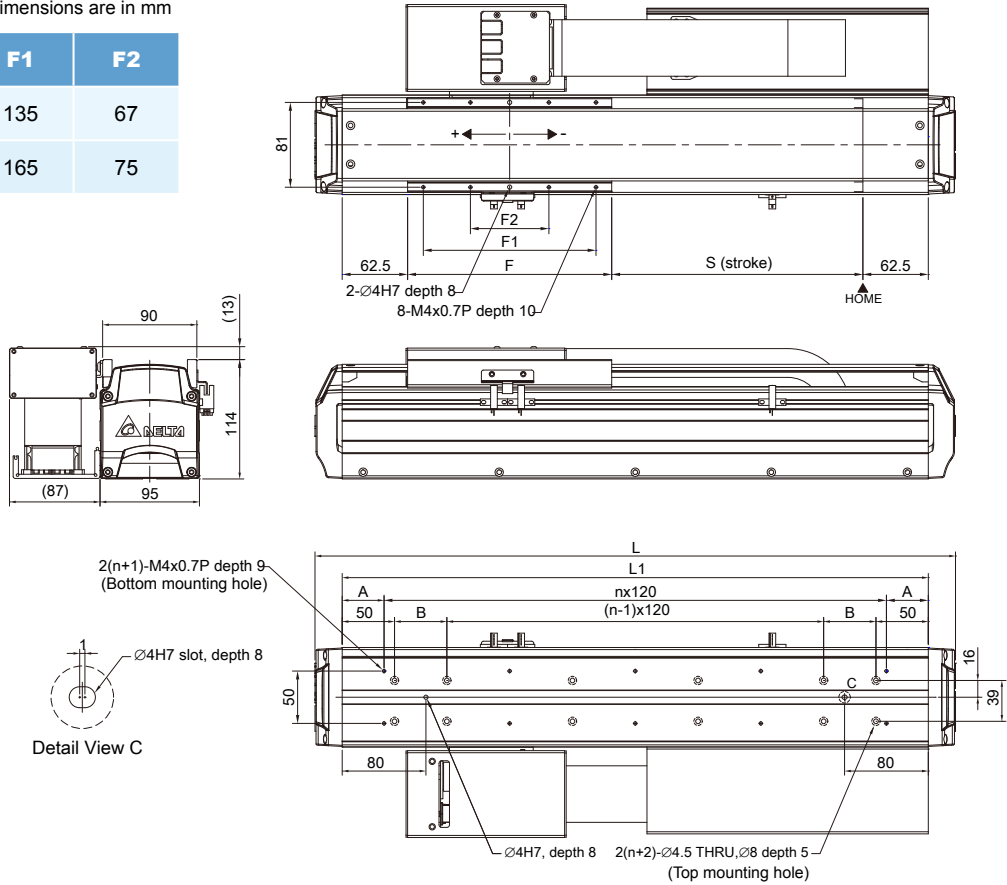
Dimensions of the LA-S Series

LA-S4 / LA-S5

ø20 Magnetic Way / Effective Stroke Range: 150 ~ 990 mm

Slider Dimensions Dimensions are in mm

Model No.	Slider Total Length F	F1	F2
LA-S4	165	135	67
LA-S5	195	165	75



Stroke and Base Mounting Dimensions

LA-S4	Stroke (S)	150	210	270	330	390	450	510	570	630	690	750	810	870	930	990
	Total Weight (kg)	11.2	11.9	12.6	13.3	13.9	14.6	15.3	15.9	16.6	17.3	18	18.7	19.4	20	20.7
LA-S5	Stroke (S)	–	180	240	300	360	420	480	540	600	660	720	780	840	900	960
	Total Weight (kg)	–	12.2	12.8	13.6	14.3	14.9	15.6	16.3	16.9	17.6	18.3	19	19.7	20.4	21
	Stage Total Length (L)	492	552	612	672	732	792	852	912	972	1032	1092	1152	1212	1272	1332
	L1	440	500	560	620	680	740	800	860	920	980	1040	1100	1160	1220	1280
	A	40	10	40	10	40	10	40	10	40	10	40	10	40	10	40
	B	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50
	n	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10



Linear Shaft Motor

ECML-S Series

Product Features

- ▶ Simple mechanism structure for quick installation
- ▶ Direct driving mechanism, easy to replace ballscrew mechanism
- ▶ No cogging forces, low thrust ripple
- ▶ Excellent dynamic response
- ▶ No backlash
- ▶ Built-in temperature sensor and hall sensor
- ▶ Large air gap for easy installation
- ▶ Installation holes on both sides in the coil assembly for easy mounting to customer's system



S Series and Servo Drive Selection Table

Coil Assembly	Magnetic Way	Servo Drive Model No.	Drive Output (W)
ECML-S1606A2DNS	ECML-SM16□□□□	ASD-A3-0121-□	100 W
ECML-S1608A2DNS		ASD-A2R-0121-□	
ECML-S2003A2DNS	ECML-SM20□□□□	ASD-A3-0221-□	200 W
ECML-S2004A2DNS		ASD-A2R-0221-□	
ECML-S2005A2DNS			
ECML-S2504A2DNS	ECML-SM25□□□□	ASD-A3-0421-□	400 W
ECML-S2506A2DNS		ASD-A2R-0421-□	
ECML-S3204A2DNS	ECML-SM32□□□□		
ECML-S2508A2DNS	ECML-SM25□□□□	ASD-A3-0721-□ ASD-A2R-0721-□	750 W
ECML-S3206A2DNS	ECML-SM32□□□□		
ECML-S3208A2DNS			
ECML-S3505A2DNS	ECML-SM35□□□□	ASD-A3-0721-□ ASD-A2R-0721-□	750W
ECML-S3506A2DNS		ASD-A3-1021-□ ASD-A2R-1021-□	1 kW

*The boxes (□) at the end of the servo drive model names are codes for the ASDA-A3/A2R Series. For more detailed information, please refer to the catalogues of the ASDA-A2R Series servo drives.

Ordering Information

Coil Assembly

ECML - S 1608 A 2 D N S
 ① ② ③ ④ ⑤ ⑥ ⑦

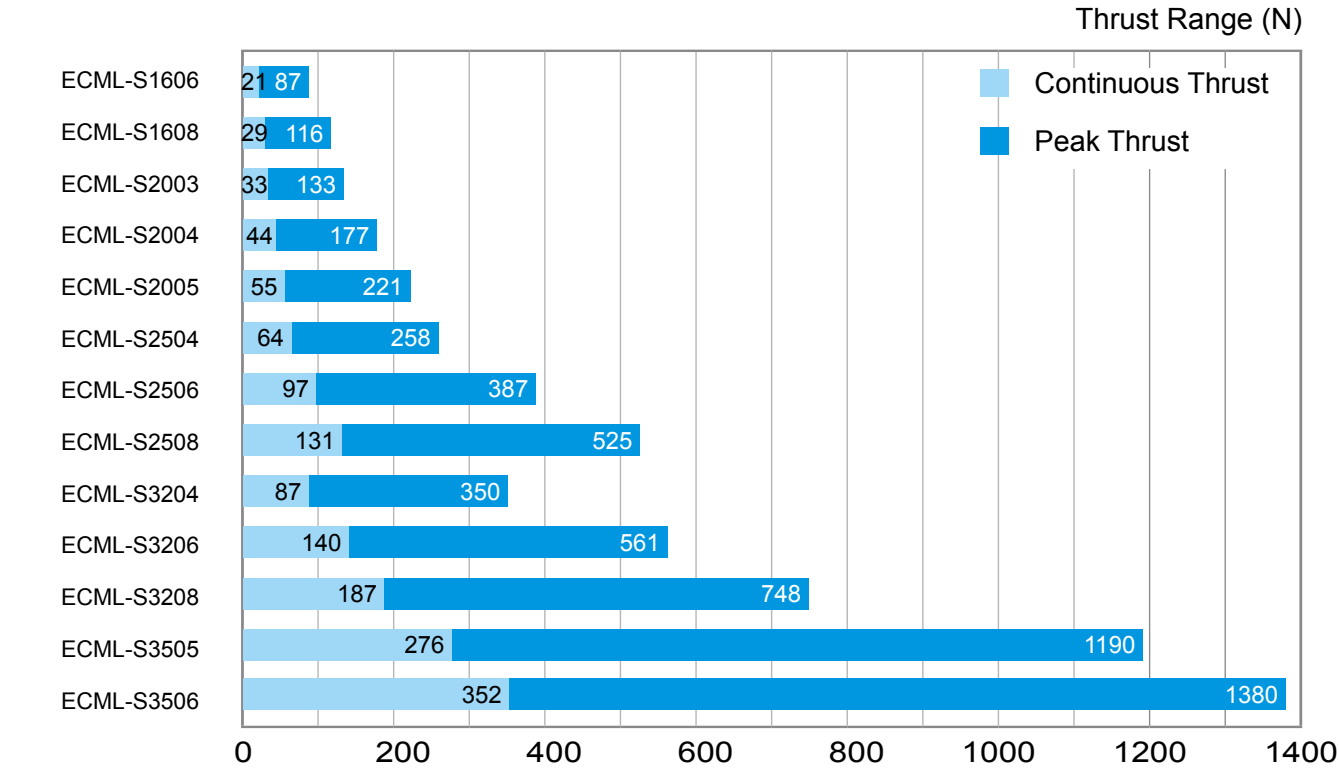
	ECML	Product	ECML: Linear Motor					
①	S	Linear Motor Type	S: Shaft Type Coreless					
②	1608	Magnetic Way Dimensions	Magnetic Way Diameter (mm)	Ø16	Ø20	Ø25	Ø32	Ø35
			Codes	1606	2003	2504	3204	3505
				1608	2004	2506	3206	3506
				□	2005	2508	3208	
③	A	Wiring Method	A: Wiring Method A					
④	2	Input Voltage	2: 220 V					
⑤	D	Hall Sensor Type	D: Digital					
⑥	N	Cooling Type	N: N/A					
⑦	S	Special Order	Delta Standard Product					

Magnetic Way

ECML - SM 16 1000
 ① ② ③

	ECML	Product	ECML: Linear Motor		
①	SM	Linear Motor Type	S: Shaft Type Coreless		
②	16	Magnetic Way Diameter	16: Ø16 mm 20: Ø20 mm	25: Ø25 mm 32: Ø32 mm	35: Ø35 mm
③	1000	Magnetic Way Length	Range: 250~2310 mm	E.g.: 0340: 340 mm 0520: 520 mm 1060: 1060 mm	

Performance



Length of Magnetic Way

Shaft Diameter	Length of Magnetic Way (Dimensions are in mm)		
	Minimum Length	Maximum Length	Increments
Ø16	250	1240	30
Ø20	250	1270	60
Ø25	330	1650	60
Ø32	450	2310	60
Ø35	810	2490	120



Specifications

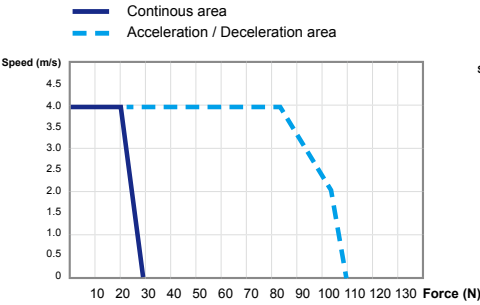
Electrical Specifications

ECML	S16		S20			S25			S32			S35	
	06	08	03	04	05	04	06	08	04	06	08	05	06
Continuous Force (N)	21.8	29	33.2	44.3	55.3	64.4	96.7	131.3	87.4	140.3	187.1	276.2	352.8
Peak. Force (N)	87.12	116.16	132.8	177.3	221.3	257.7	386.9	525	349.6	561.3	748.4	1190	1379.7
Continuous Current (A _{rms})	0.66	0.66	1.1	1.1	1.1	1.7	1.7	2.5	1.9	2.7	2.7	2.8	5.6
Peak Current (A _{rms})	2.64	2.64	4.4	4.4	4.4	6.8	6.8	10.0	7.6	10.8	10.8	11.2	21.9
Force Constant (N/A _{rms})	33	44	30.2	40.3	50.3	37.9	56.9	52.5	46	51.9	69.3	106.24	63
BEMF Constant (V _{rms} /(m/s))	11	14.7	10.1	13.4	16.8	12.6	19	17.5	15.3	17.3	23.1	35.4	21.0
Armature Resistance (Ohm)	55.7	74.2	15.5	21.6	25.9	11.6	17.4	12.6	13.36	10.7	14.3	18	5.3
Armature Inductance (mH)	10.5	14	7	9	11	14.6	22	23	16	12.5	16.6	38.32	11.54
Rated Power (W)	47	62.6	46.9	62.3	78	64.9	97.4	152.5	93.4	151	201.8	273.24	321.82
Max. Instantaneous Power (W)	751.7	1001.3	749.7	997.1	1248.3	1038.6	1557.8	2439.6	1494.1	2416.5	3229.5	4371.85	4921.77
Motor Constant (N/√W)	3.2	4.6	4.3	5	5.6	8.0	9.8	10.6	9.0	11.4	13.2	18	19.7
Electric Constant (ms)	0.19	0.19	0.35	0.34	0.33	1.26	1.26	1.83	1.2	1.17	1.16	2.13	2.18
Thermal Resistance (°C/W)	1.6	1.2	1.6	1.2	0.96	1.16	0.77	0.49	0.8	0.5	0.37	0.27	0.23
Weight of Coil Assembly (kg)	0.35	0.45	0.65	0.83	1.0	1.1	1.6	2.1	1.5	2.2	2.8	3.2	3.84
Length of Coil Assembly (mm)	108	138	108	138	168	138	198	258	138	198	258	318	378
Vertical Attraction Force (N)	0	0	0	0	0	0	0	0	0	0	0	0	0
Magnetic Pole Pitch (mm)	30		60			60			60			120	120
Air Gap (mm)	0.75					1			1.75			3	3
Allowable Winding Temp. (°C)	130												
Insulation Resistance	>10MΩ, DC 500V												
Withstand Voltage	1500V _{AC} , 60sec												
Operating Ambient Temperature	0°C ~ 40°C												
Storage Temperature	-10°C ~ 80°C												
Operating Relative Humidity	20 ~ 80% RH (non-condensing)												
Storage Humidity	20 ~ 80% RH (non-condensing)												
Approvals	CE												

Thrust-Speed Curve

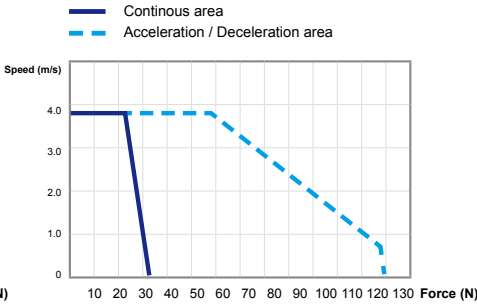
ECML-S1606

- ECML-S1606A2DNS



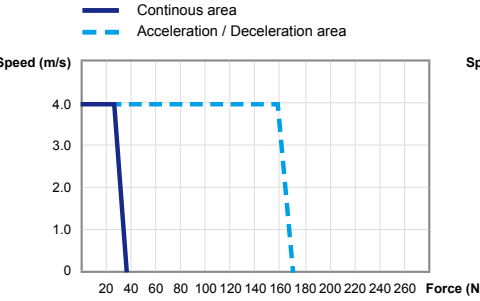
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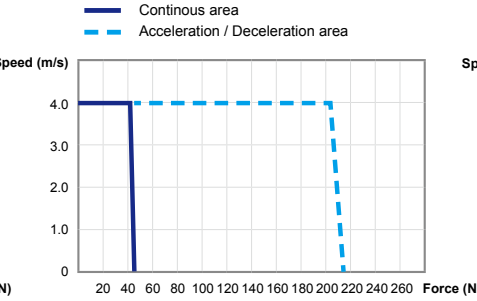
ECML-S2003

- ECML-S2003A2DNS



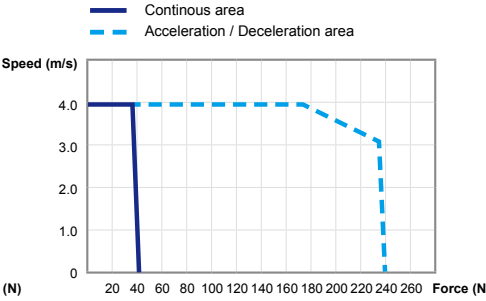
ECML-S2004

- ECML-S2004A2DNS



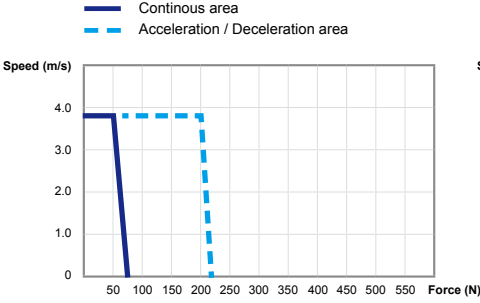
ECML-S2005

- ECML-S2005A2DNS



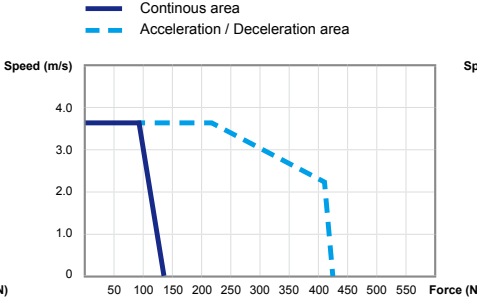
ECML-S2504

- ECML-S2504A2DNS



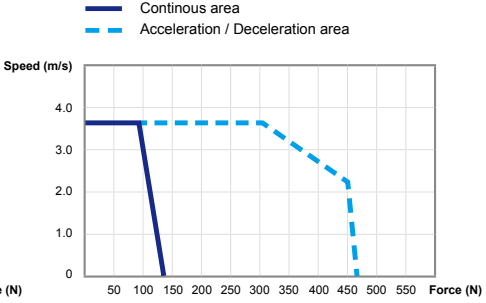
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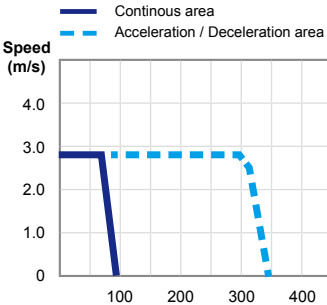
ECML-S2508

- ECML-S2508A2DNS



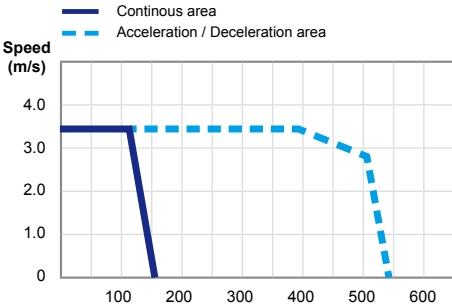
ECML-S3204

- ECML-S3204A2DNS



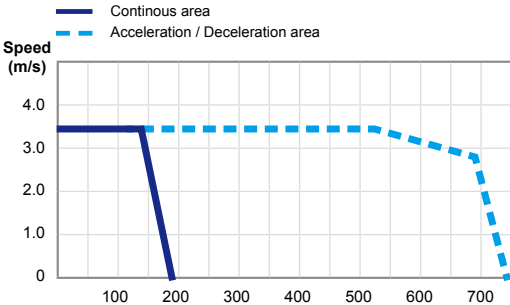
ECML-S3206

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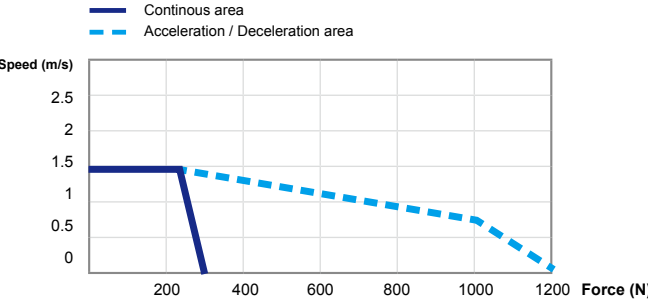
ECML-S3208

- ECML-S3208A2DNS



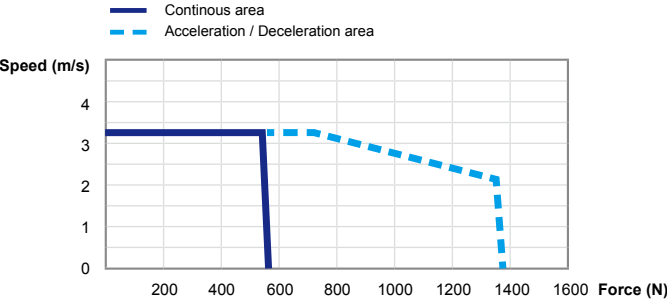
ECML-S3505

- ECML-S3505A2DNS



ECML-S3506

- ECML-S3506A2DNS



Coil Assembly Dimensions

- ECML-S1606

ECML-S1608

ECML-S2003

ECML-S2004

ECML-S2005
- ECML-S2504

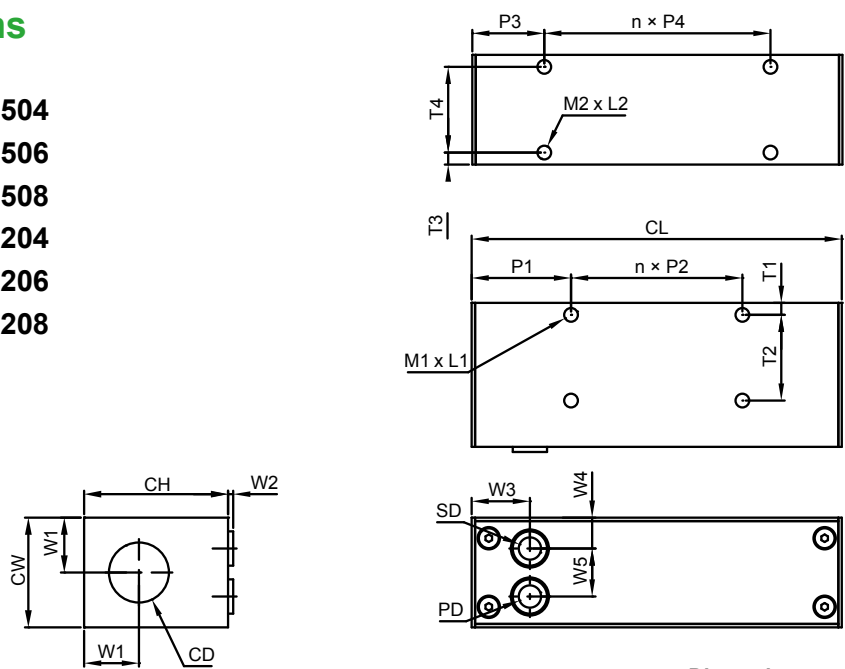
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ECML-S2508

ECML-S3204

ECML-S3206

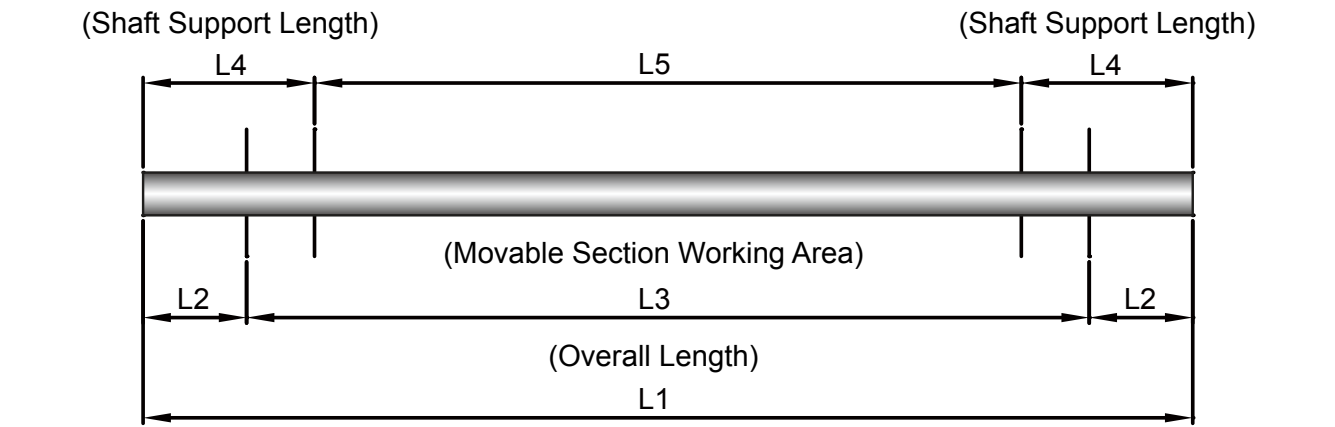
ECML-S3208



Dimensions are in mm

Model	S1606	S1608	S2003	S2004	S2005	S2504	S2506	S2508	S3204	S3206	S3208	S3505	S3506
CH	42	42	52	52	52	62	62	62	70	70	70	70	70
CW	32	32	42	42	42	52	52	52	60	60	60	60	60
CD	17.5	17.5	21.5	21.5	21.5	27	27	27	35.5	35.5	35.5	38	38
CL	108	138	108	138	168	138	198	258	138	198	258	318	378
P1	29	29	29	29	29	37	37	37	37	37	37	37	37
n × P2	50	80	50	80	110	64	124	2×92	64	124	2×92	122 × 2	76 × 4
P3	21	21	21	21	21	27	27	27	27	27	27	27	27
n × P4	66	96	66	96	126	84	144	3×68	84	144	3×68	88 × 3	108 × 3
T1	3.5	3.5	3.5	3.5	3.5	5	5	5	5	5	5	5	5
T2	25	25	35	35	35	42	42	42	50	50	50	50	50
T3	3.5	3.5	3.5	3.5	3.5	5	5	5	5	5	5	5	5
T4	25	25	35	35	35	42	42	42	50	50	50	50	50
M1 × L1	M4×4.5	M4×4.5	M4×7	M4×7	M4×7	M5×8	M5×8	M5×8	M6×10	M6×10	M6×10	M6 × 9	M6 × 9
M2 × L2	M4×4.5	M4×4.5	M4×7	M4×7	M4×7	M5×8	M5×8	M5×8	M6×10	M6×10	M6×10	M6 × 9	M6 × 9
W1	16	16	21	21	21	26	26	26	30	30	30	30	30
W2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
W3	17	17	17	17	17	21	21	21	21	21	21	21	21
W4	9	9	11	11	11	11	11	11	13	13	13	13	13
W5	14	14	20	20	20	30	30	30	34	34	34	34	34
PD	6	6	6	6	6	7	7	7	7	7	7	7	7
SD	6	6	6	6	6	6	6	6	6	6	6	6	6

Magnetic Way Explanation

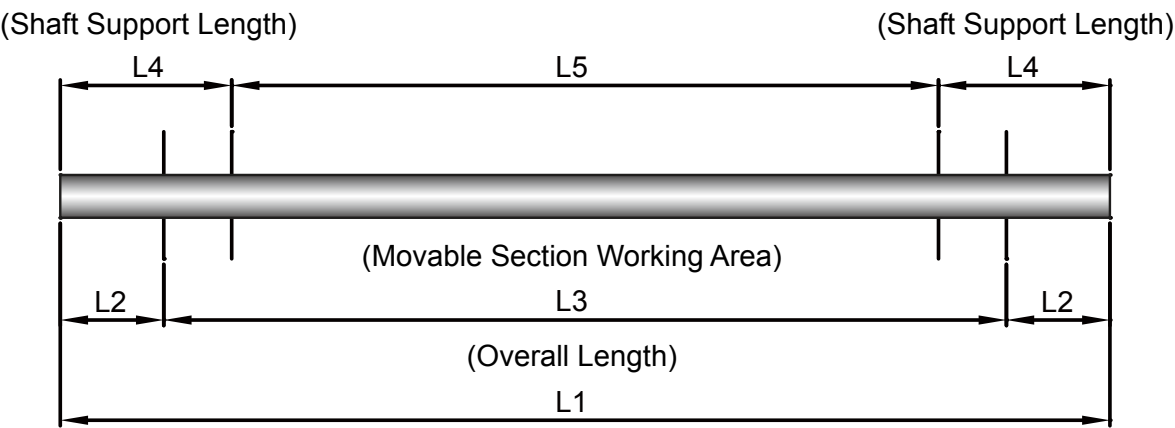


► Ø16 Magnetic Way Dimensions

Dimensions are in mm

Model: SM16	L1	L2	L3	L4	L5	Approx. Mass(kg)
250	250	35	180	25	200	0.37
280	280	35	210	25	230	0.42
310	310	35	240	25	260	0.46
340	340	35	270	25	290	0.51
370	370	35	300	25	320	0.55
400	400	35	330	40	320	0.60
430	430	35	360	40	350	0.64
460	460	35	390	40	380	0.69
490	490	35	420	40	410	0.73
520	520	35	450	40	440	0.78
550	550	35	480	40	470	0.82
580	580	35	510	40	500	0.87
610	610	35	540	40	530	0.91
640	640	35	570	40	560	0.96
670	670	35	600	40	590	1.00
700	700	35	630	40	620	1.05
730	730	35	660	40	650	1.09
760	760	35	690	40	680	1.14
790	790	35	720	40	710	1.18
820	820	35	750	60	700	1.23
850	850	35	780	60	730	1.27
880	880	35	810	60	760	1.32
910	910	35	840	60	790	1.36
940	940	35	870	60	820	1.41
970	970	35	900	60	850	1.45
1000	1000	35	930	60	880	1.50
1030	1030	35	960	60	910	1.54
1060	1060	35	990	60	940	1.59
1090	1090	35	1020	60	970	1.63
1120	1120	35	1050	60	1000	1.68
1150	1150	35	1080	60	1030	1.72
1180	1180	35	1110	60	1060	1.77
1210	1210	35	1140	60	1090	1.81
1240	1240	35	1170	60	1120	1.86

Magnetic Way Explanation



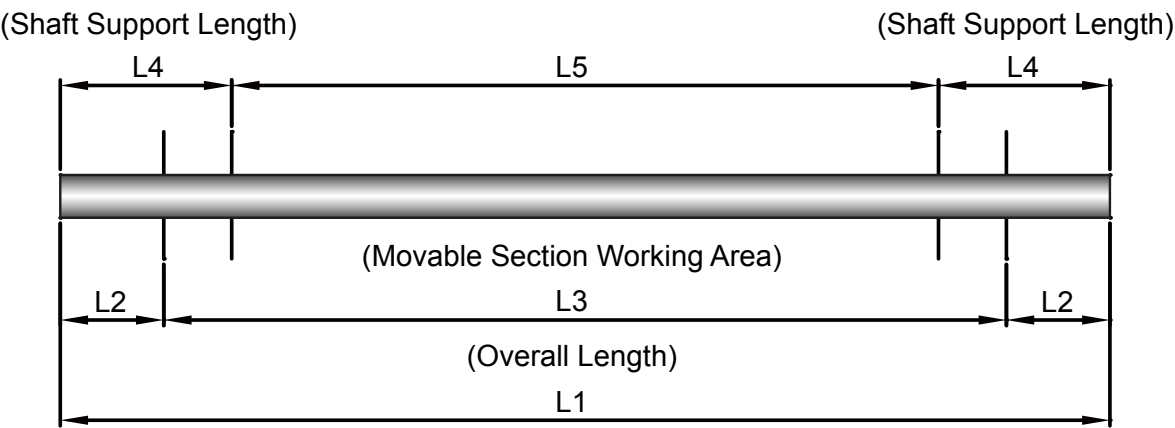
► Ø20 Magnetic Way Dimensions

Dimensions are in mm						
Model: SM20	L1	L2	L3	L4	L5	Approx. Mass (kg)
250	250	35	180	35	180	0.59
310	310	35	240	35	240	0.73
370	370	35	300	35	300	0.87
430	430	35	360	35	360	1.01
490	490	35	420	35	420	1.15
550	550	35	480	50	450	1.29
610	610	35	540	50	510	1.43
670	670	35	600	50	570	1.57
730	730	35	660	50	630	1.71
790	790	35	720	50	690	1.85
850	850	35	780	50	750	1.99
910	910	35	840	60	790	2.13
970	970	35	900	60	850	2.27
1030	1030	35	960	60	910	2.41
1090	1090	35	1020	60	970	2.55
1150	1150	35	1080	60	1030	2.69
1210	1210	35	1140	60	1090	2.83
1270	1270	35	1200	60	1150	2.97

► Ø25 Magnetic Way Dimensions

Dimensions are in mm						
Model: SM25	L1	L2	L3	L4	L5	Approx. Mass (kg)
330	330	45	240	45	240	1.21
390	390	45	300	45	300	1.43
450	450	45	360	45	360	1.65
510	510	45	420	45	420	1.87
570	570	45	480	45	480	2.08
630	630	45	540	45	540	2.30
690	690	45	600	60	570	2.52
750	750	45	660	60	603	2.74
810	810	45	720	60	690	2.96
870	870	45	780	60	750	3.18
930	930	45	840	60	810	3.4
990	990	45	900	60	870	3.62
1050	1050	45	960	60	930	3.84
1110	1110	45	1020	60	990	4.06
1170	1170	45	1080	60	1050	4.28
1230	1230	45	1140	60	1110	4.50
1290	1290	45	1200	60	1170	4.72
1350	1350	45	1260	70	1210	4.94
1410	1410	45	1320	70	1270	5.16
1470	1470	45	1380	70	1330	5.38
1530	1530	45	1440	70	1390	5.60
1590	1590	45	1500	70	1450	5.81
1650	1650	45	1560	70	1510	6.03

Magnetic Way Explanation



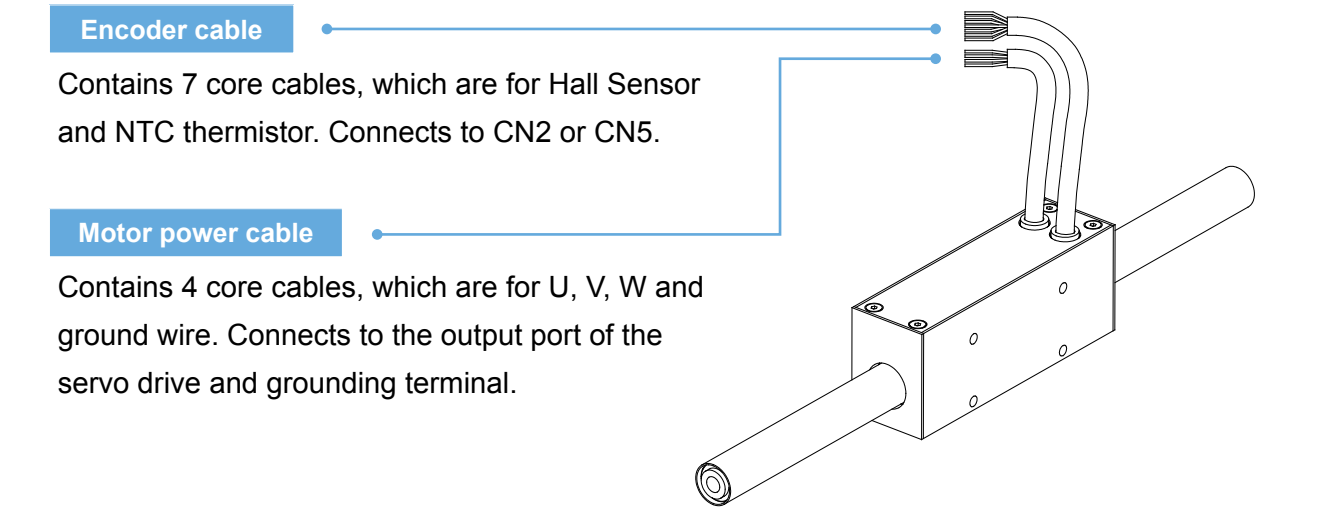
► Ø32 Magnetic Way Dimensions

Model: SM32	L1	L2	L3	L4	L5	Approx. Mass(kg)
450	450	45	360	60	330	2.70
510	510	45	420	60	390	3.06
570	570	45	480	60	450	3.42
630	630	45	540	60	510	3.77
690	690	45	600	60	570	4.13
750	750	45	660	60	630	4.49
810	810	45	720	60	690	4.85
870	870	45	780	60	750	5.21
930	930	45	840	90	750	5.57
990	990	45	900	60	810	5.93
1050	1050	45	960	90	870	6.29
1110	1110	45	1020	90	930	6.65
1170	1170	45	1080	90	990	7.01
1230	1230	45	1140	90	1050	7.37
1290	1290	45	1200	90	1110	7.73
1350	1350	45	1260	90	1170	8.09
1410	1410	45	1320	90	1230	8.45
1470	1470	45	1380	90	1290	8.81
1530	1530	45	1440	90	1350	9.17
1590	1590	45	1500	100	1390	9.53
1650	1650	45	1560	100	1450	9.89
1710	1710	45	1620	100	1510	10.25
1770	1770	45	1680	100	1570	10.61
1830	1830	45	1740	100	1630	10.96
1890	1890	45	1800	100	1690	11.32
1950	1950	45	1860	100	1750	11.68
2010	2010	45	1920	100	1810	12.04
2070	2070	45	1980	100	1870	12.40
2130	2130	45	2040	100	1930	12.76
2190	2190	45	2100	100	1990	13.12
2250	2250	45	2160	100	2050	13.48
2310	2310	45	2220	100	2110	13.84

Unit: mm

Model: SM35	L1	L2	L3	L4	L5	Approx. Mass (kg)
810	810	45	720	60	690	5.81
930	930	45	840	90	750	6.67
1050	1050	45	960	90	870	7.53
1170	1170	45	1080	90	990	8.39
1290	1290	45	1200	90	1110	9.25
1410	1410	45	1320	90	1230	10.11
1530	1530	45	1440	100	1330	10.97
1650	1650	45	1560	100	1450	11.83
1770	1770	45	1680	100	1570	12.69
1890	1890	45	1800	100	1690	13.55
2010	2010	45	1920	100	1810	14.41
2130	2130	45	2040	100	1930	15.27
2250	2250	45	2160	100	2050	16.13
2370	2370	45	2280	100	2170	16.99
2490	2490	45	2400	100	2290	17.85

Wiring



MOTOR MODEL	Power Cable Definition	Color	AWG
ECML-S16□□□□□S ECML-S20□□□□□S	U	Red	20
	V	White	20
	W	Black	20
	CASE GROUND	Green	20
ECML-S25□□□□□S ECML-S32□□□□□S ECML-S35□□□□□S	U	Red	18
	V	White	18
	W	Black	18
	CASE GROUND	Green	18

- U, V, W are bare wire, which has no connector and terminal.
- The total length of standard cable is 500 mm.
- The cover of the green grounding cable is heat-shrink tubing. If you cut off the grounding cable and re-connect it, please connect it to the shielded net for better noise separation.

MOTOR MODEL	Motor Signal Cable Definition	Color	AWG
ECML-S16□□□□□S ECML-S20□□□□□S ECML-S25□□□□□S ECML-S32□□□□□S ECML-S35□□□□□S	Hall sensor 5 V	Black	26
	Hall sensor 0 V	Black / Red	26
	U phase signal of hall sensor	White	26
	V phase signal of hall sensor	Brown	26
	W phase signal of hall sensor	Blue	26
	Temperature signal +	Orange	26
	Temperature signal -	Orange / Red	26

- U, V, W are bare wire, which has no connector and terminal.
- The total length of standard cable is 500 mm.
- The cover of the green grounding cable is heat-shrink tubing. If you cut off the grounding cable and re-connect it, please connect it to the shielded net for better noise separation.

Installation of Linear Shaft Motor

- When installing a linear shaft motor, please ensure there is no physical contact between the coil assembly and magnet shaft as their contact may cause intermittent friction and errors in the setup and adjustment of the system.
- When the magnet shaft is fixed by shaft supports on two sides and an application requires a very long stroke, the magnet shaft may bend due to gravitational force or the force of magnetic attraction. Please see Figure 1.

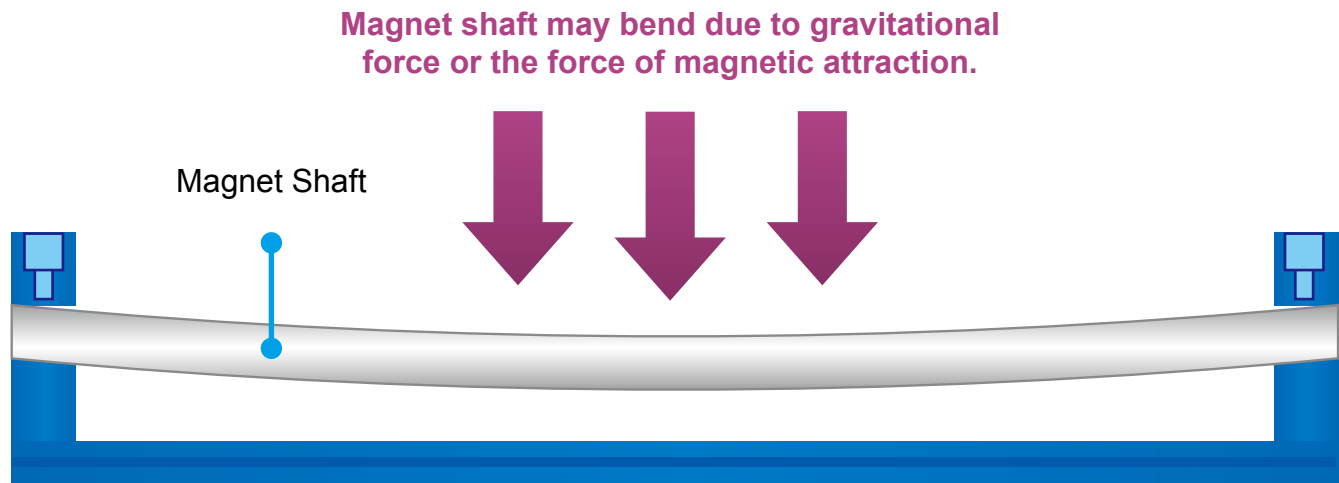


Figure 1

- When the magnet shaft bends out of tolerance, it may touch the coil assembly and cause intermittent friction. Please insert two pieces of sheet metal to the fixed points of the shaft or adjust the fixed angle of the shaft on two sides to offset the bending deformation.

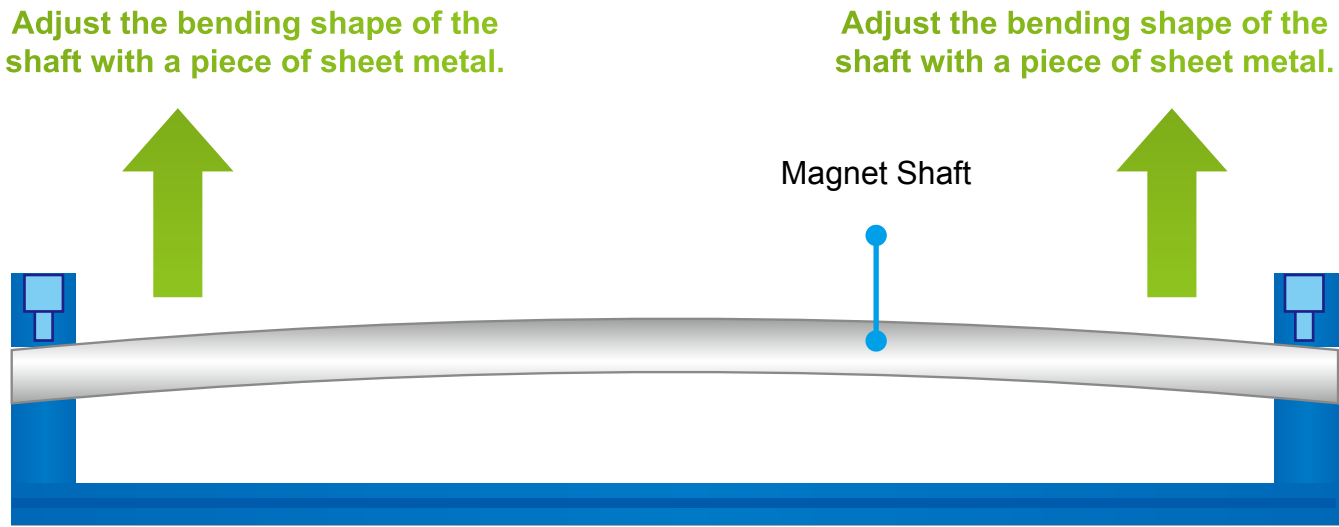


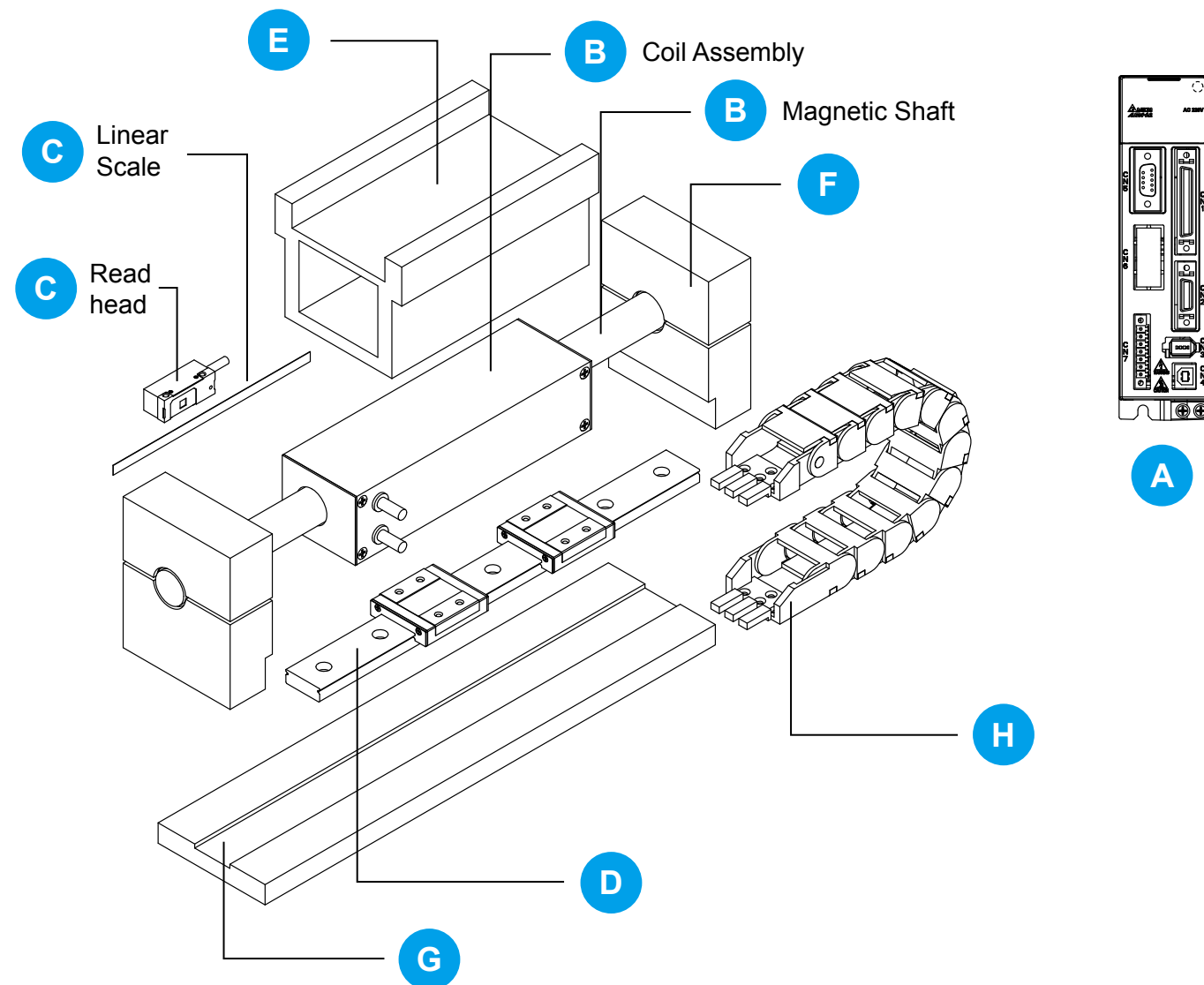
Figure 2

Linear Motor System Configuration

Basic Elements

A linear motor system consists of

- | | |
|---|---|
| A Servo drive | E Load table: connects load and linear motor |
| B Linear motor is composed of coil assembly and magnetic shaft | F Shaft support: holds the magnetic shaft |
| C Linear position sensor: optical or magnetic sensing | G Base |
| D Linear bearing: linear ball rail is the most common employment | H Cable carrier |



Applications

Multiple Slider Operation:

Multiple coil assemblies controlled by independent motor drives are used on a single magnetic axis. See Fig.1

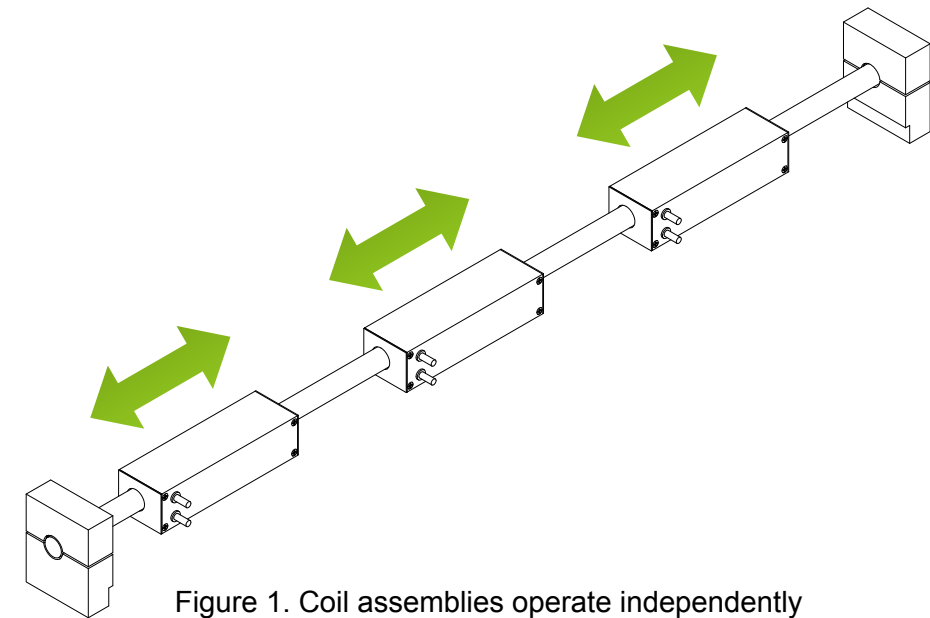


Figure 1. Coil assemblies operate independently

Gantry Systems:

A gantry architecture comprises two sets of linear motors in parallel architecture. One application is using dual-drive to simultaneously run 2 axes motion. The other application is using a single drive to control two parallel motors. See fig. 2

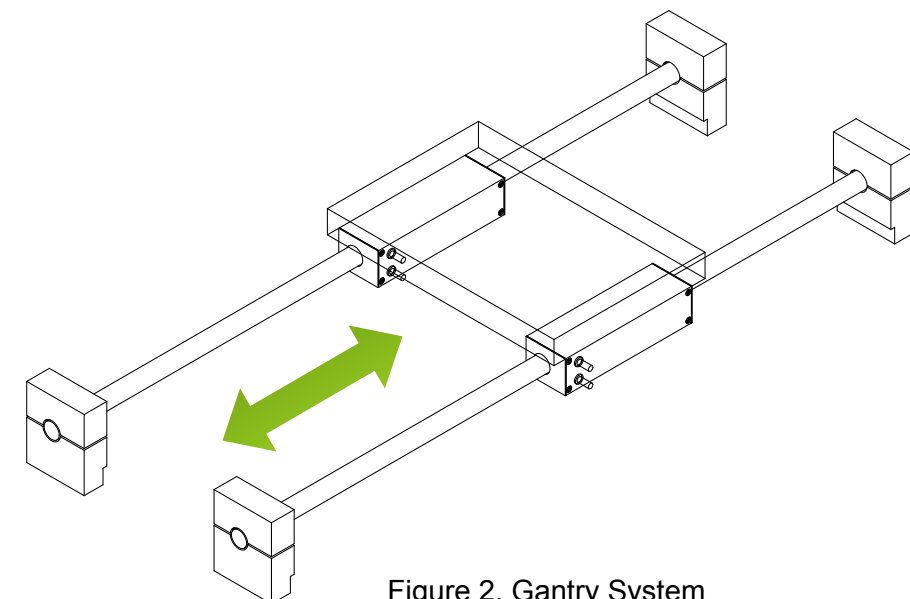


Figure 2. Gantry System

Linear U-Shape Motor

ECML-U Series

Product Features

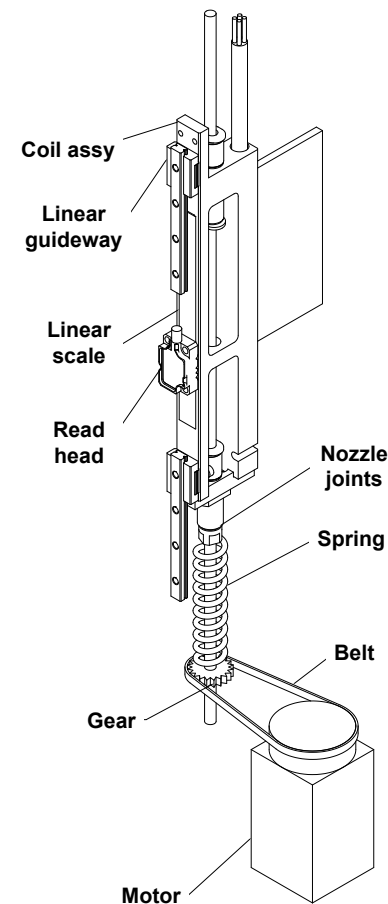
- **Design for Z axis application**
Mechanism Design for Nozzle joints, Linear Guideway, Linear Scale
- **Compact and space-saving**
Measured width: 12 & 15 mm, light weight: 50 g
- **High speed, high acceleration**
- **Zero backlash, Low speed/force ripple, Fast dynamic response**



ECML-U Series and Servo Drive Selection Table

Coil Assembly	Magnet Track	Servo Drive Model	Drive Output (W)
ECML-U1202A2NNS	ECML-UM120126L	ASD-A3-0121-□ ASD-A2R-0121-□	100 W
	ECML-UM120126T		
ECML-U1501A2NNS	ECML-UM150072S		
ECML-U1502A2NNS	ECML-UM150108S		
ECML-U1503A2NNS	ECML-UM150252S		

* The boxes () at the end of the servo drive model names are codes for the ASDA-A3/A2R Series. For more detailed information, please refer to the catalogues for the ASDA-A3/A2R Series servo drives.



Z Axis Application: Linear & Rotary

Ordering Information

Coil Assembly

ECML - U 15 01 A N N S

① ② ③ ④ ⑤ ⑥ ⑦

①	ECML	Product	ECML: Linear Motor		
	U	Linear Motor Type	U: U Shape Coreless		
②	1501	Motor Spec.	Width of Motor	12 (mm)	15 (mm)
			Codes	1202	1501
③	A	Wiring Method	A: Wiring Method A		
④	2	Input Voltage	2: 220V		
⑤	N	Hall Sensor Type	N: N/A		
⑥	N	Cooling Type	N: N/A		
⑦	S	Special Order	Delta Standard Product		

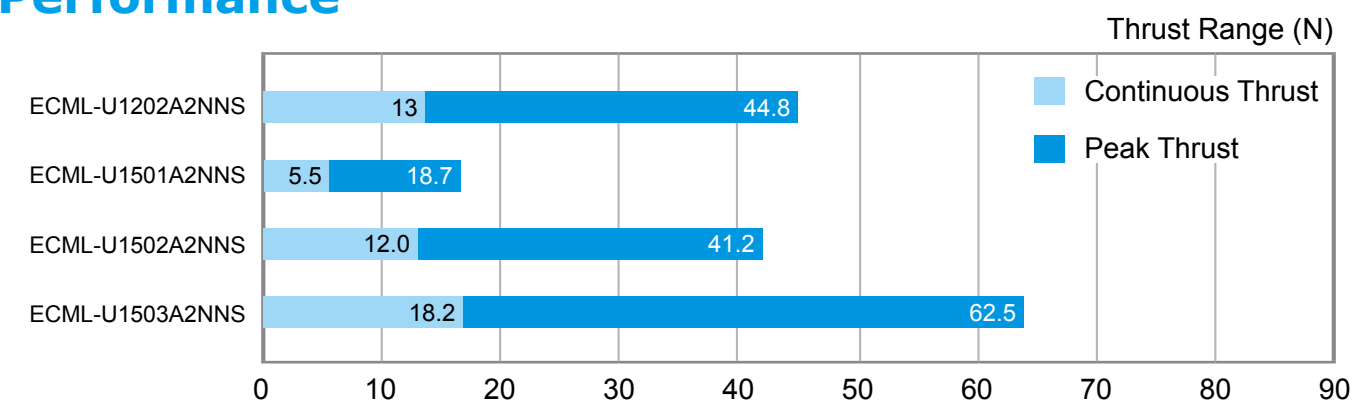
Magnetic Track

ECML - UM 15 0072

① ② ③

①	ECML	Product	ECML: Linear Motor		
	UM	Linear Motor Type	UM: U Shape Coreless Magnet Track		
②	15	Motor Spec.	Width of Motor	12 = 12 mm	
				15 = 15 mm	
③	0072	Magnetic Way Length	0072: 72 mm		
			0108: 108 mm		
			0252: 252 mm		

Performance



Specifications

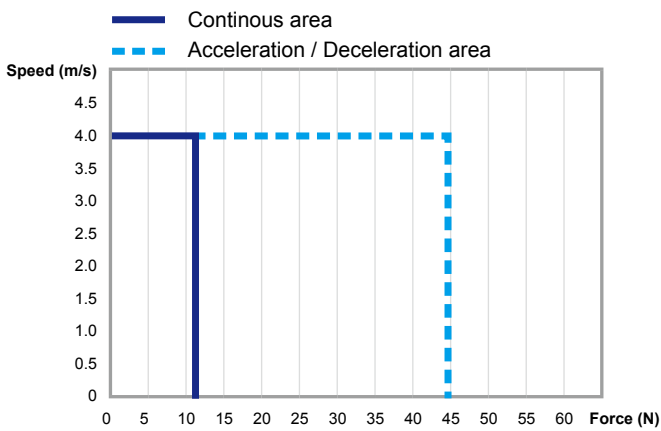
Electrical Specifications

ECML	U12	U15		
	02	01	02	03
Continuous Force (N)	13.08	5.46	12.03	18.25
Peak Force (N)	44.86	18.74	41.24	62.57
Continuous Current (Arms)	0.70	0.70	0.70	0.70
Peak Current (Arms)	2.40	2.40	2.40	2.40
Force Constant (N/Arms)	18.69	7.81	17.18	26.07
BEMF Constant-KE (Vrms/(m/s))	15.26	6.37	14.03	21.29
Armature Resistance (Ohm)	13.46	6.37	13.34	20.10
Armature Inductance (mH)	2.38	1.17	2.34	3.52
Rated Power (W)	12.03	5.69	11.92	17.97
Max. Instantaneous Power (W)	141.43	66.92	140.17	211.20
Motor Constant (N/√W)	3.77	2.29	3.48	4.31
Electric Constant (ms)	5.66	5.44	5.70	5.71
Thermal Resistance (°C/W)	6.23	12.47	6.26	4.17
Weight of Coil Assembly (Kg)	0.12	0.05	0.09	0.13
Vertical Attraction Force (N)	0	0	0	0
Magnetic Pole Pitch (mm)	18	18	18	18
Air Gap (mm)	0.5	0.5	0.5	0.5
Allowable Winding Temp. (°C)	100	100	100	100
Insulation Resistance	>10 MΩ, 500 V _{DC}			
Withstand Voltage	1500 V _{AC} , 60 sec			
Operating Ambient Temperature	0~40°C			
Storage Temperature	-10 ~80°C			
Operating Relative Humidity	20~80% RH (non-condensing)			
Approvals	CE			

Thrust-Speed Curve

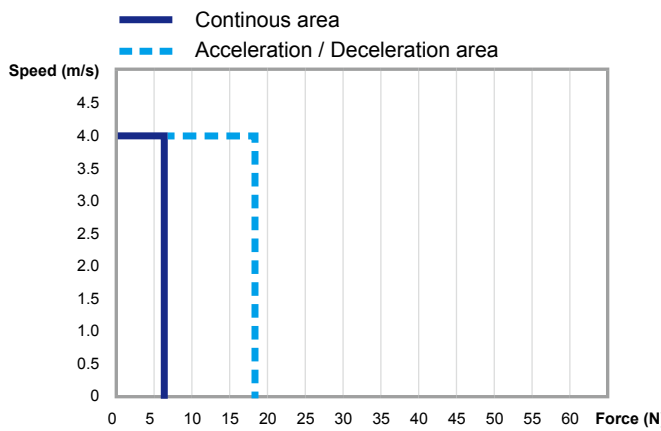
ECML-U1202

• ECML-U1202A2NNS



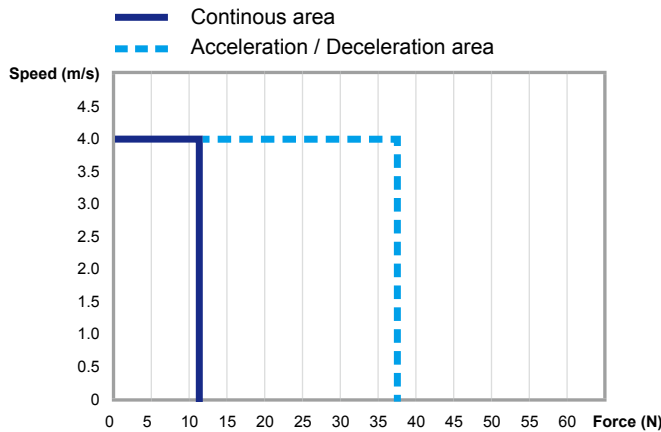
ECML-U1501

• ECML-U1501A2NNS



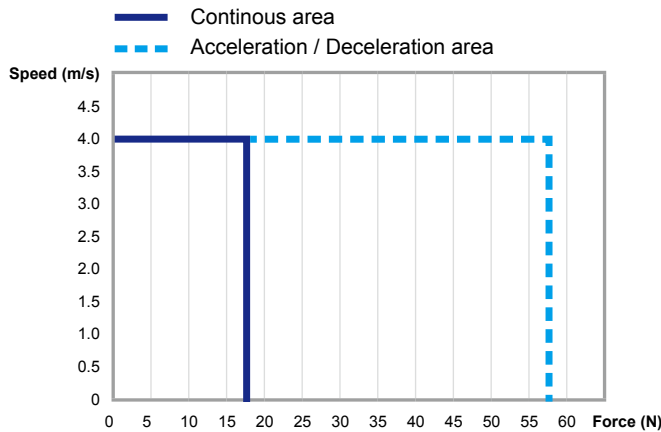
ECML-U1502

• ECML-U1502A2NNS



ECML-U1503

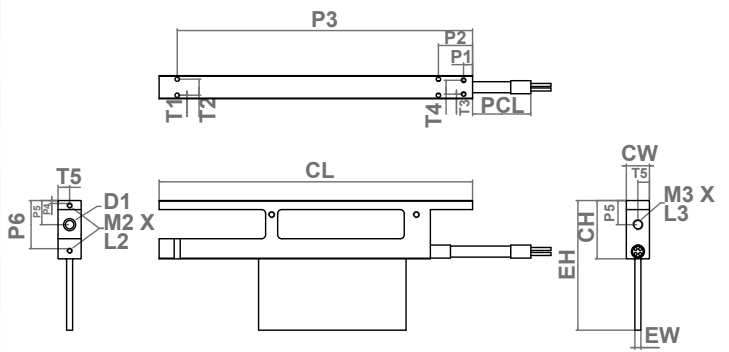
• ECML-U1503A2NNS



Coil Assembly Dimensions

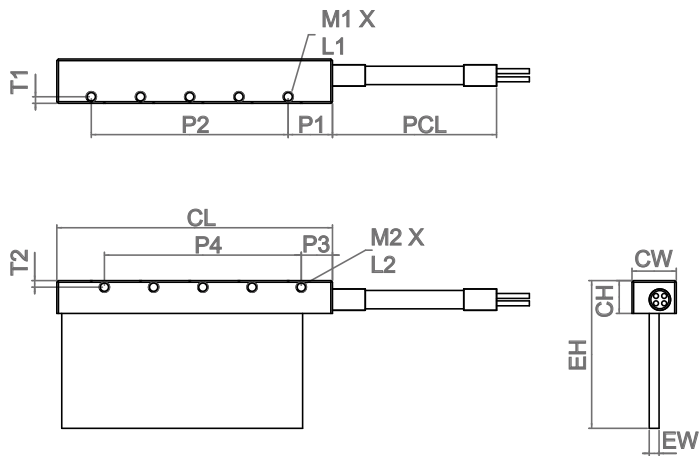
ECML-U1202A2NNS

Model name	ECML-U1202A2NNS		
CW (mm) ±0.3	11.5	P2 (mm)	17
CH (mm) ±0.1	29	P3 (mm)	147
CL (mm) ±0.3	156	P4 (mm)	2.5
EH (mm) ±0.1	64.5	P5 (mm)	12
EW (mm)	3	P6 (mm)	25
T1 (mm)	1.8	M1×L1 (mm)	M2.6×THR
T2 (mm)	8	M2×L2 (mm)	M2.6×L4.5
T3(mm)	2.3	M3×L3 (mm)	M5×THR
T4 (mm)	7	D1	Ø2.2 ×THR
T5(mm)	5.75	D2	Ø6 ×THR
P1 (mm)	4.5	PCL (mm) ±25	500



ECML-U15 Series

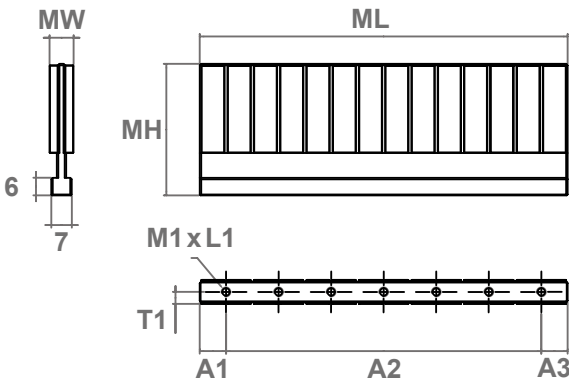
Model name	ECML-U15		
	01A2NNS	02A2NNS	03A2NNS
CW (mm) ±0.3	13.5		
CH (mm) ±0.1	10		
CL (mm) ±0.3	48	84	120
EH (mm) ±0.1	45		
EW (mm)	3		
T1 (mm)	2		
T2 (mm)	2		
P1 (mm)	13.5		
P2 (mm)	15×2	15×4	15×6
P3 (mm)	9.5		
P4 (mm)	15×2	15×4	15×6
M1×L1 (mm)	M3×4		
M2×L2 (mm)	M3×4		
PCL (mm) ±25	500		



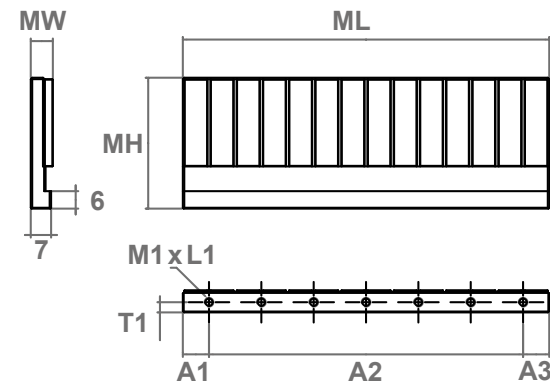
Magnet Track Dimensions

ECML-UM120126T

Model name	ECML-UM12	
	0126T	0126L
ML (mm) ±0.1	126	126
MH (mm) ±0.1	45	45
MW (mm) ±0.2	8.2	7.6
T1 (mm)	3.5	4.1
A1 (mm)	9	9
A2 (mm)	18×6	18×6
A3 (mm)	9	9
M1×L1	M3×5	M3×5
Mass (Kg)	0.28	0.3

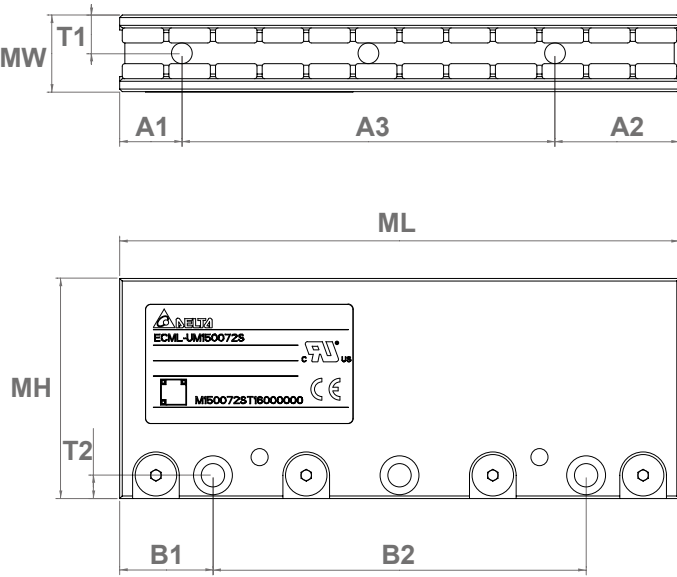


ECML-UM120126L



Model name	ECML-UM15		
	0072	0108	0252
ML (mm) ±0.1	72	108	252
MH (mm) ±0.1	42.5		
MW (mm) ±0.2	14.8		
A1 (mm)	12		
A2 (mm)	24		
A3 (mm)	36×1	36×2	36×6
B1 (mm)	18		
B2 (mm)	36×1	36×2	36×6
T1 (mm)	7.4		
T2 (mm)	4.5		
Mass(Kg)	0.24	0.36	0.84

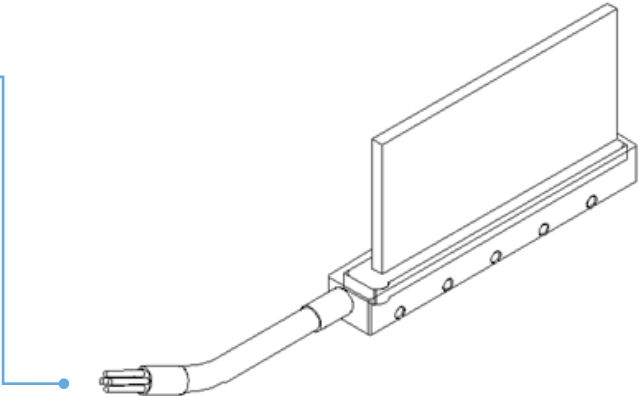
ECML-UM15



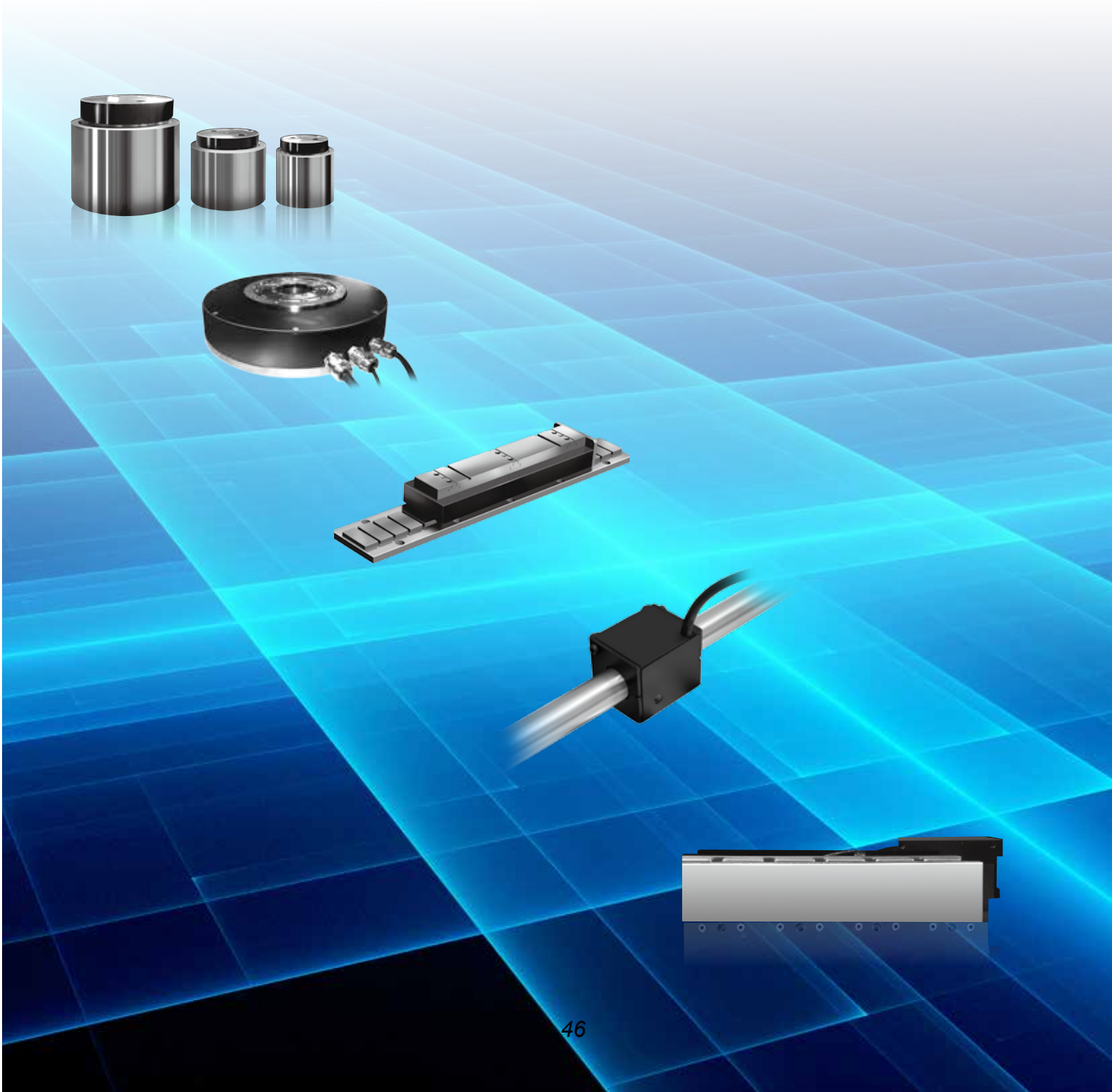
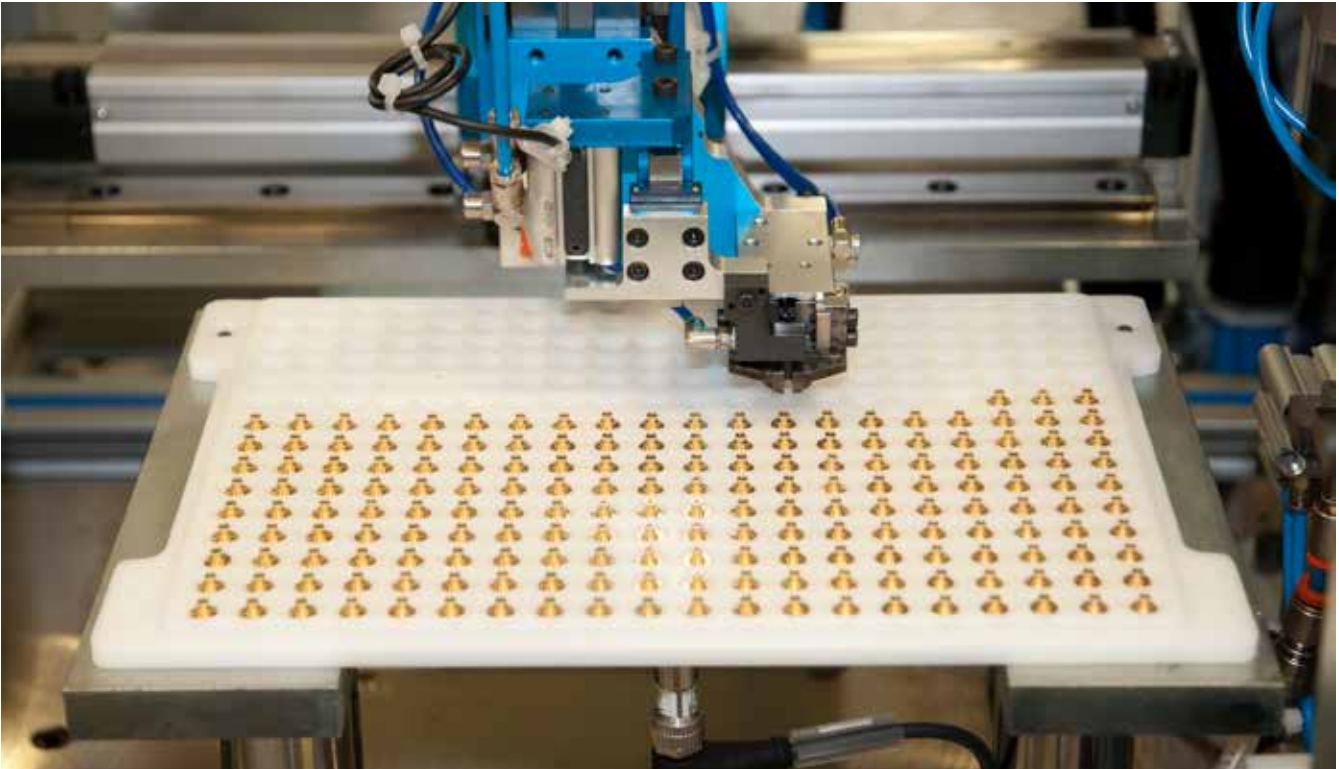
Wiring

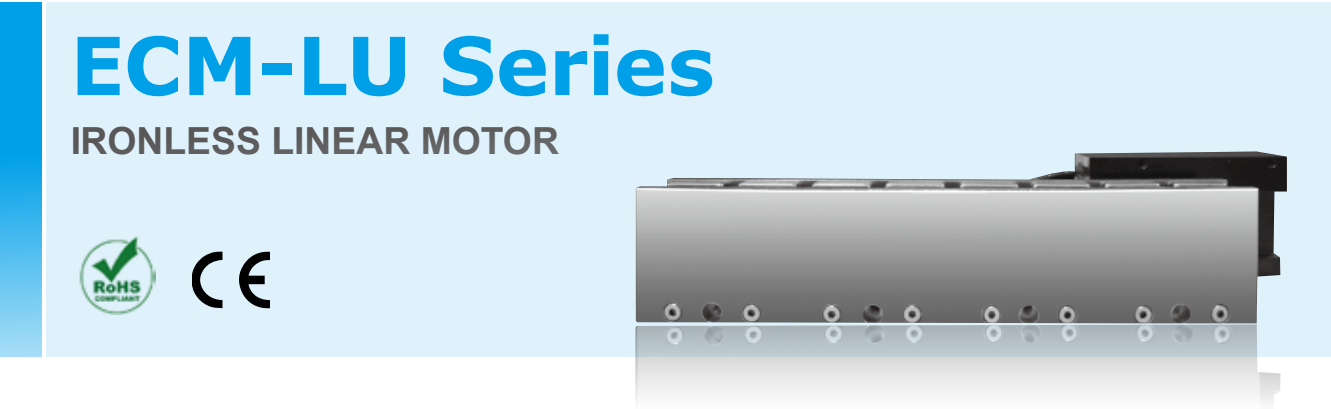
Motor power cable

Contains 4 core cables, which are for U, V, W and ground wire. Connects to the output port of the servo drive and grounding terminal.



MOTOR MODEL	Power Cable Definition	Color	AWG
ECML-U1202A2NNS	U	Red	24
ECML-U1501A2NNS	V	White	24
ECML-U1502A2NNS	W	Black	24
ECML-U1503A2NNS	Case Ground	Green	24





High Speed Ironless Linear Motors With Minimal Velocity Ripple

ECM-LU Series' ironless patented overlapping winding formers provide excellent force density Vs coil size ratio resulting in high force and acceleration generation. The ECM-LU Series coil's overlapping manufacturing technology allows for the selection of smaller size motors in comparison to the competition due to its higher force density and further improved heat dissipation achieved through optional forced air-cooling methods.

All ECM-LU Series are designed with high flex cables, embedded hall effect sensors and over temperature protection (thermostats or PT100) that makes it the ideal choice for the most demanding applications. The Modular U-channel Magnet tracks available in 60 mm length increments allows for easy assembly of un-restricted stroke length.

- Low speed/torque ripple
- Fast dynamic response
- Zero backlash
- Maintenance free
- High acceleration
- Long strokes without performance loss
- Easy assembly over long stroke lengths

Application

- Laser Trimming
 - Precise Positioning
 - Linear Stages
 - Photonics
 - Biotech Handlers
 - Fpd/Lcd Transfer
 - Wire And Die Bonding
- Microscope Stages
 - Semiconductor
 - Industrial Machinery
 - Diamond Cutting
 - Micro Precision
 - Manufacturing
 - Precision Stamping

Model	Peak Force (N)	Continuous Force AC (N)	Peak Current (A ^{pk})	Continuous Current AC (A ^{pk})	Coil Length (mm)
ECM-LU22	63.3	12.7	14.01	2.8	22-85
ECM-LU22H	229	60	21	5.46	61-151
ECM-LU36	724	188	47.25	12.29	61-301
ECM-LU39	1339	348	52.50	13.65	61-361
ECM-LU50	5191	1247	93.75	22.50	121-901
ECM-LU54	5366	1234	67.50	15.53	121-721

Ordering Information

Coil Assembly

ECM-L

U

22

1

S

2

N

N

1

N

S

1

2

3

4

5

6

7

8

9

10

ECM-L	Product	ECM-L Linear Motor Series (Delta-PBA)							
1	U	Linear Motor Type	U: U Shape Coreless						
2	22	Motor Spec.	Width of Motor (mm)						
			Codes	22	22H	36	39	50	54
3	1	Coil Assembly Specification	1 , 2 , 3 , 4 ,5						
4	S	Wiring Method	S: Serial ; P: Parallel						
5	2	Input Voltage	2: 220 V						
6	N	Temperature Sensor Specification	C = PT 100 Sensor M: Thermostat (U22 & U22H Excluded)						
7	N	Cooling Type	N: Standard A: Air Cooling (Customized) W: Water Cooling (Customized)						
8	1	Cable Length	D: 0.5 m (Standard) 1 = 1 m ; 3 =3 m ; 5 = 5 m						
9	B	Connector Type	B = 9 Pin D-SUB Male (For Hall Sensor)						
10	S	Special Order	S = Delta-PBA Standard Product						

Magnet Track

ECM-L

UM

22

120

1

2

3

ECM-L	Product	ECM-L Linear Motor Series (Delta-PBA)							
1	UM	Linear Motor Type	UM: U Shape Coreless Magnet Track						
2	22	Motor Spec.	Width of Motor (mm)						
			Codes	22	22H	36	39	50	54
3	120	Magnet Way Length	063 = 63 mm 240 = 240 mm 084 = 84 mm 600 = 600 mm 105 = 105 mm 300 = 300 mm 120 = 120 mm 660 = 660 mm 180 = 180 mm 360 = 360 mm 480 = 480 mm 900 = 900 mm						

ECM-LU22

- Ironless Motor
- Peak force to 63N, Continuous force to 12N
- Ideal for high precision/smooth motion

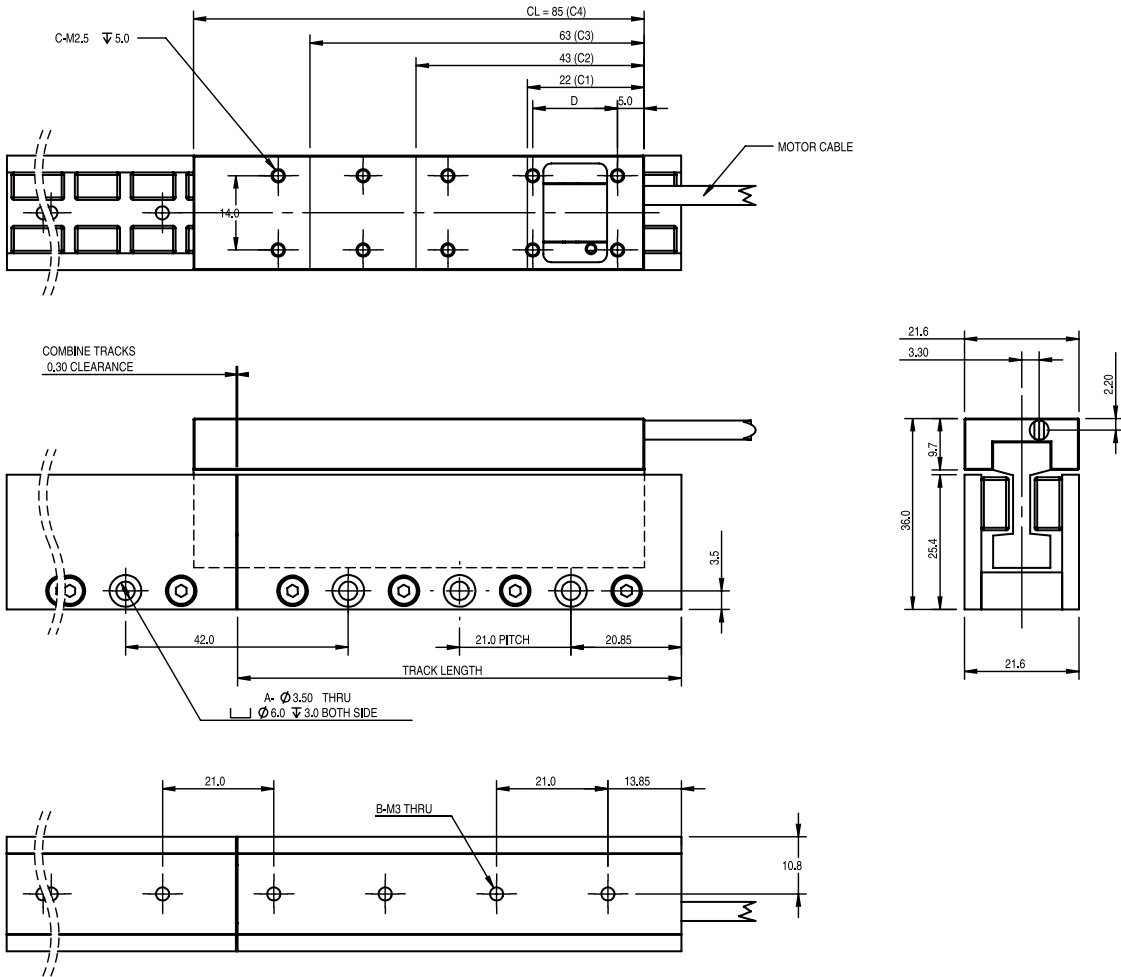


SPECIFICATIONS		ECM-LU221S	ECM-LU222S	ECM-LU223S	ECM-LU224S
Peak Force	N	15.8	31.6	47.5	63.3
Continuous Force @ 120°C*	N	3.2	6.3	9.5	12.7
Peak Power @ 120°C	W	316	631	947	1262
Continuous Power @ 120°C*	W	12.6	25.2	37.9	50.5
Peak Current	A ^{pk}	14.01			
Continuous Current @ 120°C*	A ^{pk}	2.80			
Continuous Stall Current @ 120°C*	Arms	1.98			
Force Constant	N/A ^{pk}	1.1	2.3	3.4	4.5
Back EMF Constant	V ^{pk} /m/s	1.3	2.6	3.9	5.2
Coil Resistance L-L @ 25°C	ohm	1.6	3.1	4.7	6.2
Coil Resistance L-L @ 120°C*	ohm	2.1	4.3	6.4	8.6
Inductance L-L @ 1kHz	mH	0.11	0.22	0.33	0.44
Motor Constant @ 25°C*	N/√W	1.05	1.48	1.81	2.09
Motor Constant @ 120°C*	N/√W	0.89	1.26	1.54	1.78
Max. Terminal Voltage	V _{DC}	60			
Thermal Resistance @ 120°C*	°C/W	7.53	3.66	2.51	1.88
Max. Coil Temperature	°C	120			
Coil Weight	kg	0.02	0.04	0.06	0.08
Coil Length	mm	22	43	64	85
Attractive Force	N	0			
Electrical Cycle Length	mm	21			

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%.
4. Only available in series winding.

Dimensions

ECM-LU22



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLES A	NUMBER OF MOUNTING HOLES B
63	62.7	0.15	2	3
84	83.7	0.20	3	4
105	104.7	0.25	4	5

Motor Coil

MOTOR MODEL	WEIGHT (kg)	NUMBER OF MOUNTING HOLES C (TOP MOUNT)	MOUNTING HOLE PITCH D (mm)
ECM-LU221S	0.02	4	12.0
ECM-LU222S	0.04	6	16.0
ECM-LU223S	0.06	8	16.0
ECM-LU224S	0.08	10	16.0

For COOLING OPTIONS, please ask for detail drawing

ECM-LU22H

- Ironless Motor
- Peak force to 229N, Continuous force to 60N
- Integrated Hall Sensor



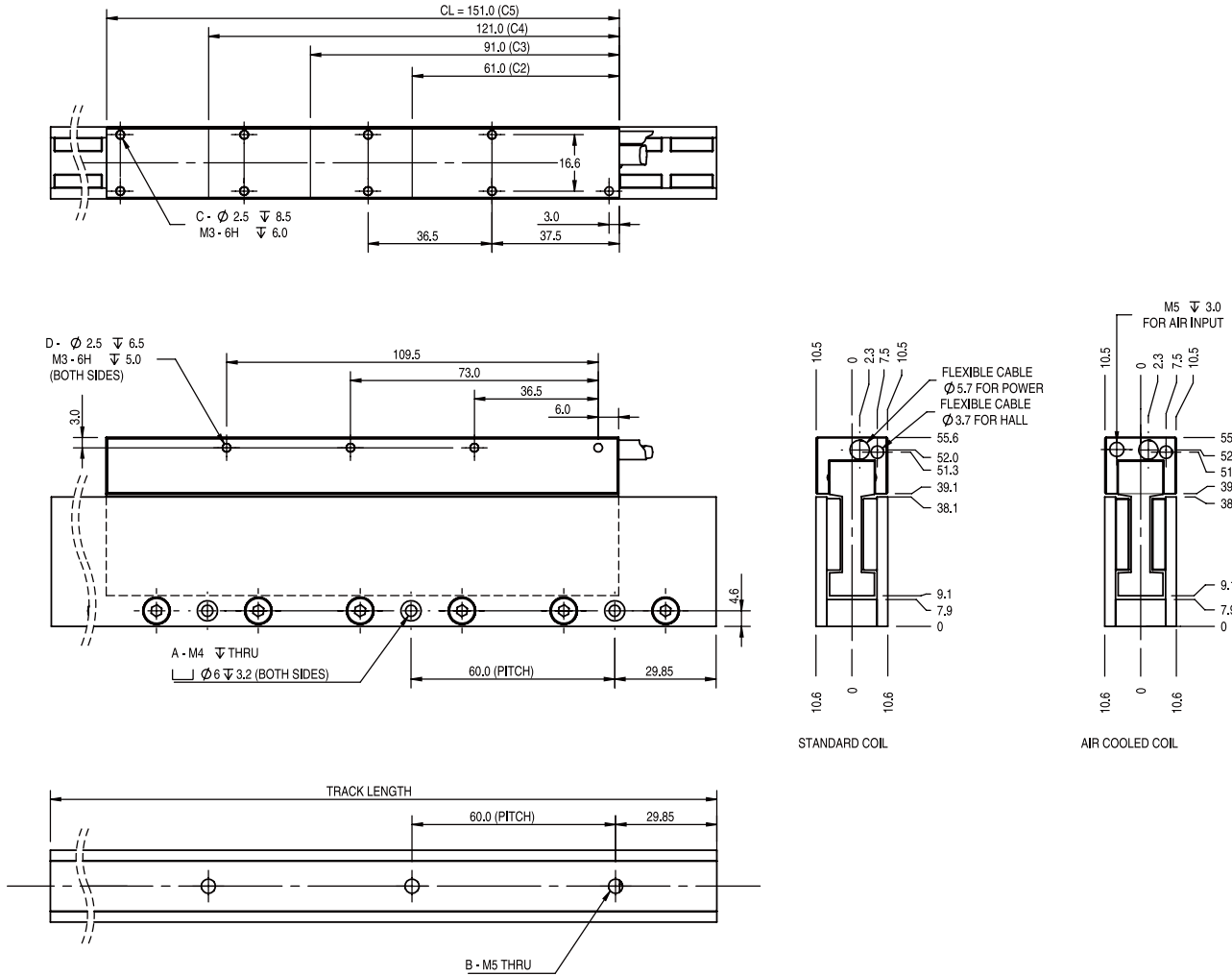
IRONLESS LINEAR MOTOR

SPECIFICATIONS		ECM-LU22H2		ECM-LU22H3		ECM-LU22H4		ECM-LU22H5	
Connection Type	N	S	P	S	P	S	P	S	P
Peak Force	N	92		137		183		229	
Continuous Force @ 120°C*	N	18		27		37		46	
Continuous Force AC @ 120°C^	N	24		36		48		60	
Peak Power @ 120°C	W	744		1116		1488		1860	
Continuous Power @ 120°C*	W	30		45		60		74	
Continuous Power AC @ 120°C^	W	50		75		101		126	
Peak Current	A ^{pk}	10.50	21.00	10.50	21.00	10.50	21.00	10.50	21.00
Continuous Current @ 120°C*	A ^{pk}	2.10	4.20	2.10	4.20	2.10	4.20	2.10	4.20
Continuous Current AC @ 120°C^	A ^{pk}	2.73	5.46	2.73	5.46	2.73	5.46	2.73	5.46
Continuous Stall Current @ 120°C*	Arms	1.40	2.80	1.40	2.80	1.40	2.80	1.40	2.80
Force Constant	N/A ^{pk}	8.70	4.40	13.10	6.50	17.40	8.70	21.80	10.9
Back EMF Constant	V ^{pk} /m/s	10.0	5.0	15.0	7.50	20.1	10.0	25.10	12.5
Coil Resistance L-L @ 25°C	ohm	6.5	1.6	9.8	2.4	13.0	3.3	16.3	4.1
Coil Resistance L-L @ 120°C*	ohm	9.0	2.2	13.5	3.4	18.0	4.5	22.5	5.6
Inductance L-L @ 1kHz	mH	1.53	0.38	2.30	0.57	3.06	0.77	3.83	0.96
Motor Constant @ 25°C*	N/√W	3.95		4.84		5.59		6.24	
Motor Constant @ 120°C*	N/√W	3.36		4.11		4.75		5.31	
Max. Terminal Voltage	V _{DC}	400							
Thermal Resistance @ 120°C*	°C/W	3.19		2.13		1.60		1.28	
Thermal Resistance AC @ 120°C^	°C/W	1.89		1.26		0.94		0.76	
Max. Coil Temperature	°C	120							
Coil Weight	kg	0.11		0.17		0.23		0.28	
Coil Weight AC^	kg	0.11		0.17		0.23		0.28	
Coil Length	mm	61		91		121		151	
Attractive Force	N	0							
Electrical Cycle Length	mm	30							

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%.

Dimensions

ECM-LU22H



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLES A	NUMBER OF MOUNTING HOLES B
120	119.7	0.44	2	2
180	179.7	0.66	3	3
240	239.7	0.88	4	4
300	299.7	1.10	5	5
360	359.7	1.32	6	6
480	479.7	1.76	8	8
660	659.7	2.42	11	11

Motor Coil

MOTOR MODEL	WEIGHT (kg)	NUMBER OF MOUNTING HOLES C (TOP MOUNT)	MOUNTING HOLE PITCH D (mm)
ECM-LU22H2	0.11	3	2
ECM-LU22H3	0.17	5	3
ECM-LU22H4	0.23	7	4
ECM-LU22H5	0.28	9	5

For COOLING OPTIONS, please ask for detailed drawing

ECM-LU36

- Ironless Motor
- Peak force to 724N, Continuous force to 188N
- Integrated Hall Sensor



IRONLESS LINEAR MOTOR

SPECIFICATIONS		ECM-LU361		ECM-LU362			ECM-LU363	
Connection Type	N	S	P	S	P	Q	S	P
Peak Force	N	145		289			434	
Continuous Force @ 120 °C*	N	29		58			87	
Continuous Force AC @ 120 °C^	N	38		75			113	
Peak Power @ 120 °C	W	695		1390			2086	
Continuous Power @ 120 °C*	W	28		56			83	
Continuous Power AC @ 120 °C^	W	47		94			141	
Peak Current	A ^{pk}	11.81	23.63	11.81	23.63	47.25	11.81	23.63
Continuous Current @ 120 °C*	A ^{pk}	2.36	4.73	2.36	4.73	9.45	2.36	4.73
Continuous Current AC @ 120 °C^	A ^{pk}	3.07	6.14	3.07	6.14	12.29	3.07	6.14
Continuous Stall Current @ 120 °C*	Arms	1.75	3.50	1.75	3.50	7.00	1.75	3.50
Force Constant	N/A ^{pk}	12.3	6.1	24.5	12.3	6.1	36.8	18.4
Back EMF Constant	V ^{pk} /m/s	14.1	7.0	28.2	14.1	7.0	42.3	21.1
Coil Resistance L-L @ 25 °C	ohm	4.8	1.2	9.6	2.4	0.6	14.4	3.6
Coil Resistance L-L @ 120 °C*	ohm	6.6	1.7	13.3	3.3	0.8	19.9	5.0
Inductance L-L @ 1kHz	mH	3.00	0.75	6.00	1.50	0.38	9.00	2.25
Motor Constant @ 25 °C*	N/√W	6.46		9.13			11.18	
Motor Constant @ 120 °C*	N/√W	5.49		7.76			9.51	
Max. Terminal Voltage	V _{DC}	400						
Thermal Resistance @ 120 °C*	°C/W	3.42		1.71			1.14	
Thermal Resistance AC @ 120 °C^	°C/W	2.02		1.01			0.67	
Max. Coil Temperature	°C	120						
Coil Weight	kg	0.21		0.41		0.43	0.62	
Coil Weight AC^	kg	0.23		0.46		0.48	0.69	
Coil Length	mm	61		121			181	
Attractive Force	N	0						
Electrical Cycle Length	mm	60						

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25 °C, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.

ECM-LU36

- Ironless Motor
- Peak force to 724N, Continuous force to 188N
- Integrated Hall Sensor



IRONLESS LINEAR MOTOR

SPECIFICATIONS		ECM-LU364			ECM-LU365	
Connection Type	N	S	P	Q	S	P
Peak Force	N	579			724	
Continuous Force @ 120°C*	N	116			145	
Continuous Force AC @ 120°C^	N	150			188	
Peak Power @ 120 °C	W	2781			3476	
Continuous Power @ 120 °C*	W	111			139	
Continuous Power AC @ 120 °C^	W	188			235	
Peak Current	A ^{pk}	11.81	23.63	47.25	11.81	23.63
Continuous Current @ 120 °C*	A ^{pk}	2.36	4.73	9.45	2.36	4.73
Continuous Current AC @ 120 °C^	A ^{pk}	3.07	6.14	12.29	3.07	6.14
Continuous Stall Current @ 120 °C*	Arms	1.75	3.50	7.00	1.75	3.50
Force Constant	N/A ^{pk}	49.0	24.5	12.3	61.3	30.6
Back EMF Constant	V ^{pk} /m/s	56.4	28.2	14.1	70.4	35.2
Coil Resistance L-L @ 25°C	ohm	19.2	4.8	1.2	24.0	6.0
Coil Resistance L-L @ 120 °C*	ohm	26.6	6.6	1.7	33.2	8.3
Inductance L-L @ 1kHz	mH	12.00	3.00	0.75	15.00	3.75
Motor Constant @ 25 °C*	N/√W	12.91			14.44	
Motor Constant @ 120 °C*	N/√W	10.98			12.27	
Max. Terminal Voltage	V _{DC}	400				
Thermal Resistance @ 120 °C*	°C/W	0.85			0.68	
Thermal Resistance AC @ 120 °C^	°C/W	0.51			0.40	
Max. Coil Temperature	°C	120				
Coil Weight	kg	0.83		0.88	1.04	
Coil Weight AC^	kg	0.93		0.97	1.16	
Coil Length	mm	241			301	
Attractive Force	N	0				
Electrical Cycle Length	mm	60				

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25 °C, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.

ECM-LU39

- Ironless Motor
- Peak force to 1339N, Continuous force to 348N
- Integrated Hall Sensor

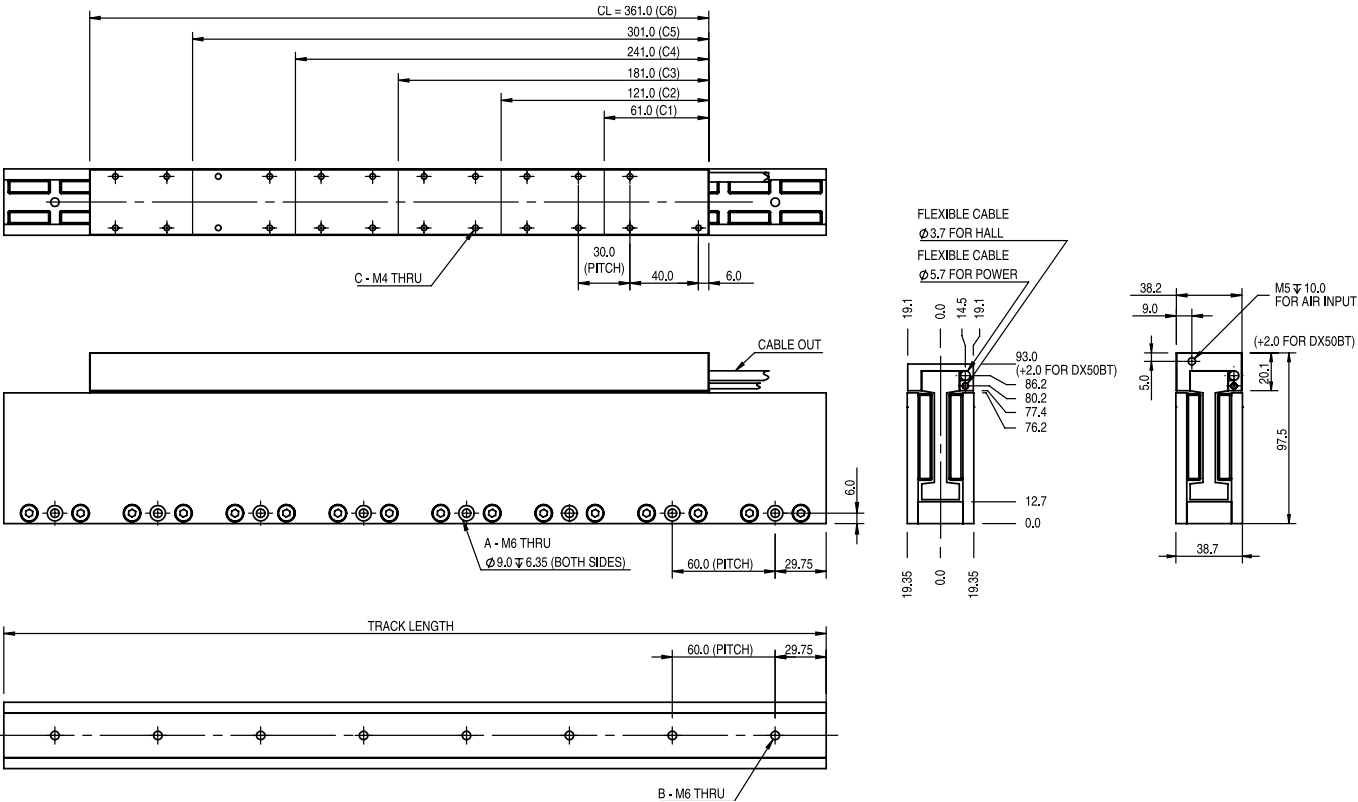


SPECIFICATIONS		ECM-LU394		ECM-LU394	ECM-LU395		ECM-LU396	
Connection Type	N	S	P	Q	S	P	S	P
Peak Force	N	893			1116		1339	
Continuous Force @ 120 °C*	N	179			223		268	
Continuous Force AC @ 120 °C^	N	232			290		348	
Peak Power @ 120 °C	W	3004			3755		4506	
Continuous Power @ 120 °C*	W	120			150		180	
Continuous Power AC @ 120 °C^	W	203			254		305	
Peak Current	A ^{pk}	13.13	26.25	52.50	13.13	26.25	52.50	
Continuous Current @ 120 °C*	A ^{pk}	2.63	5.25	10.50	2.63	5.25	10.50	
Continuous Current AC @ 120 °C^	A ^{pk}	3.41	6.83	13.65	3.41	6.83	13.65	
Continuous Stall Current @ 120 °C*	Arms	2.10	4.20	8.40	2.10	4.20	8.40	
Force Constant	N/A ^{pk}	68.0	34.0	17.0	85.0	42.5	25.5	
Back EMF Constant	V ^{pk} /m/s	78.2	39.1	19.6	97.8	48.9	29.3	
Coil Resistance L-L @ 25 °C	ohm	16.8	4.2	1.1	21.0	5.3	1.6	
Coil Resistance L-L @ 120 °C*	ohm	23.2	5.8	1.5	29.1	7.3	2.2	
Inductance L-L @ 1kHz	mH	12.44	3.11	0.78	15.55	3.89	1.17	
Motor Constant @ 25 °C*	N/√W	19.16			21.42		23.46	
Motor Constant @ 120 °C*	N/√W	16.28			18.21		19.94	
Max. Terminal Voltage	V _{DC}	400						
Thermal Resistance @ 120 °C*	°C/W	0.79			0.63		0.53	
Thermal Resistance AC @ 120 °C^	°C/W	0.47			0.37		0.31	
Max. Coil Temperature	°C	120						
Coil Weight	kg	1.07		1.05	1.25		1.58	
Coil Weight AC^	kg	1.19		1.17	1.40		1.75	
Coil Length	mm	241			301		361	
Attractive Force	N	0						
Electrical Cycle Length	mm	60						

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.

Dimensions

ECM-LU39



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLES A	NUMBER OF MOUNTING HOLES B
120	119.5	1.73	2	2
180	179.5	2.60	3	3
240	239.5	3.46	4	4
300	299.5	4.33	5	5
360	359.5	5.20	6	6
480	479.5	6.92	10	10

Motor Coil

MOTOR MODEL	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLES C (TOP MOUNT)
ECM-LU391	0.25	0.28	3
ECM-LU392	0.52	0.57	7
ECM-LU393	0.76	0.85	11
ECM-LU394	1.07	1.19	15
ECM-LU395	1.25	1.40	19
ECM-LU396	1.58	1.75	23

ECM-LU50

- Ironless Motor
- Peak force to 5191N, Continuous force to 1038N
- Integrated Hall Sensor



IRONLESS LINEAR MOTOR

SPECIFICATIONS		ECM-LU502		ECM-LU503		ECM-LU504		ECM-LU505	
Connection Type	N	S	P	S	P	S	P	S	P
Peak Force	N	692		1038		1384		1730	
Continuous Force @ 120°C*	N	138		208		277		346	
Continuous Force AC @ 120°C^	N	173		260		346		415	
Peak Power @ 120°C	W	1951		2927		3902		4878	
Continuous Power @ 120°C*	W	78		117		156		195	
Continuous Power AC @ 120°C^	W	122		183		244		281	
Peak Current	A ^{pk}	15.63	31.25	15.63	31.25	15.63	31.25	15.63	31.25
Continuous Current @ 120°C*	A ^{pk}	3.13	6.25	3.13	6.25	3.13	6.25	3.13	6.25
Continuous Current AC @ 120°C^	A ^{pk}	3.91	7.81	3.91	7.81	3.91	7.81	3.75	7.50
Continuous Stall Current @ 120°C*	Arms	2.50	5.00	2.50	5.00	2.50	5.00	2.50	5.00
Force Constant	N/A ^{pk}	44.3	22.2	66.5	33.2	88.6	44.3	110.8	55.4
Back EMF Constant	V ^{pk} /m/s	50.9	25.5	76.4	38.2	101.9	50.9	127.4	63.7
Coil Resistance L-L @ 25°C	ohm	7.7	1.9	11.6	2.9	15.4	3.9	19.3	4.8
Coil Resistance L-L @ 120°C*	ohm	10.7	2.7	16.0	4.0	21.3	5.3	26.6	6.7
Inductance L-L @ 1kHz	mH	9.11	2.28	13.67	3.42	18.22	4.56	22.78	5.69
Motor Constant @ 25°C*	N/√W	18.4		22.6		26.1		29.1	
Motor Constant @ 120°C*	N/√W	15.7		19.2		22.2		24.8	
Max. Terminal Voltage	V _{DC}	600							
Thermal Resistance @ 120°C*	°C/W	1.22		0.81		0.61		0.49	
Thermal Resistance AC @ 120°C^	°C/W	0.78		0.52		0.39		0.34	
Max. Coil Temperature	°C	120							
Coil Weight	kg	1.05		1.57		2.09		2.61	
Coil Weight AC^	kg	1.13		1.69		2.25		2.81	
Coil Length	mm	121		181		241		301	
Attractive Force	N	0							
Electrical Cycle Length	mm	60							

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.

ECM-LU50

- Ironless Motor
- Peak force to 5191N, Continuous force to 1038N
- Integrated Hall Sensor



IRONLESS LINEAR MOTOR

SPECIFICATIONS		ECM-LU506		ECM-LU506	ECM-LU508		ECM-LU508	
Connection Type	N	S	P	Q	S	P	S	P
Peak Force	N	2077			2769			
Continuous Force @ 120°C*	N	415			554			
Continuous Force AC @ 120°C^	N	498			-			
Peak Power @ 120°C	W	5854			7805			
Continuous Power @ 120°C*	W	234			312			
Continuous Power AC @ 120°C^	W	337			-			
Peak Current	A ^{pk}	15.63	31.25	62.5	15.63	15.63	15.63	
Continuous Current @ 120°C*	A ^{pk}	3.13	6.25	12.5	3.13	3.13	3.13	
Continuous Current AC @ 120°C^	A ^{pk}	3.75	7.50	15.00	-	-	-	
Continuous Stall Current @ 120°C*	Arms	2.50	5.00	10.00	2.50	2.50	2.50	
Force Constant	N/A ^{pk}	132.9	66.5	33.2	177.2	177.2	177.2	
Back EMF Constant	V ^{pk} /m/s	152.8	76.4	38.2	203.8	203.8	203.8	
Coil Resistance L-L @ 25°C	ohm	23.1	5.8	1.4	30.8	30.8	30.8	
Coil Resistance L-L @ 120°C*	ohm	32.0	8.0	2.0	42.6	42.6	42.6	
Inductance L-L @ 1kHz	mH	27.33	6.83	1.71	36.44	36.44	36.44	
Motor Constant @ 25°C*	N/√W	31.9			36.9			
Motor Constant @ 120°C*	N/√W	27.1			31.3			
Max. Terminal Voltage	V _{DC}	600						
Thermal Resistance @ 120°C*	°C/W	0.41			0.30			
Thermal Resistance AC @ 120°C^	°C/W	0.28			-			
Max. Coil Temperature	°C	120						
Coil Weight	kg	3.13		3.23	4.36		4.43	
Coil Weight AC^	kg	3.37		3.47	-		-	
Coil Length	mm	361			481			
Attractive Force	N	0						
Electrical Cycle Length	mm	60						

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.

ECM-LU50

- Ironless Motor
- Peak force to 5191N, Continuous force to 1247N
- Integrated Hall Sensor

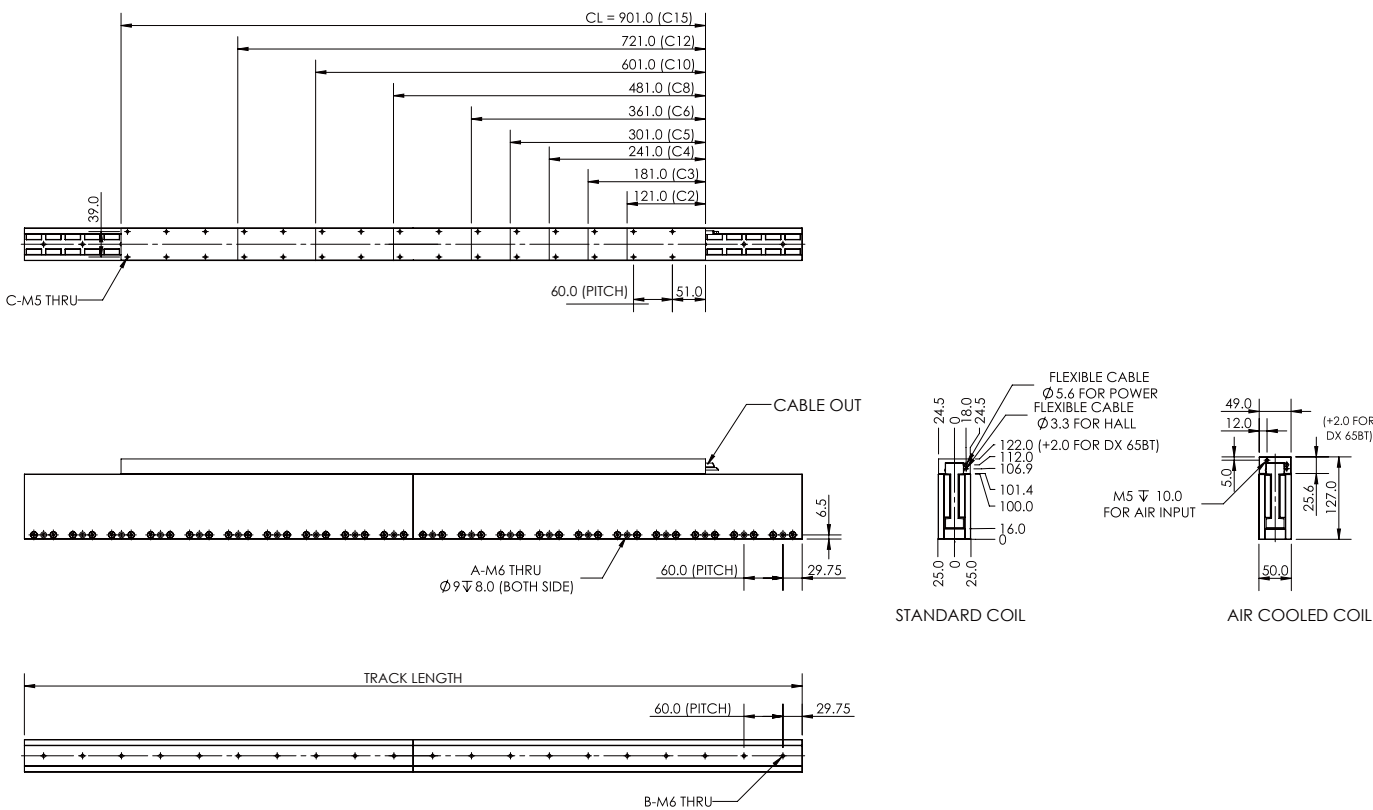


SPECIFICATIONS		ECM-LU50A		ECM-LU50A	ECM-LU50C	ECM-LU50F
Connection Type	N	S	P	Q	P	P
Peak Force	N	3461			4153	5191
Continuous Force @ 120 °C*	N	692			831	1038
Continuous Force AC @ 120 °C^	N	-			-	-
Peak Power @ 120 °C	W	9756			11707	14634
Continuous Power @ 120 °C*	W	390			468	585
Continuous Power AC @ 120 °C^	W	-			-	-
Peak Current	A ^{pk}	15.63	31.25	62.50	62.50	93.75
Continuous Current @ 120 °C*	A ^{pk}	3.13	6.25	12.5	12.50	18.75
Continuous Current AC @ 120 °C^	A ^{pk}	-	-	-	-	-
Continuous Stall Current @ 120 °C*	Arms	2.50	5.00	10		15.00
Force Constant	N/A ^{pk}	221.5	110.8	55.4	66.5	55.4
Back EMF Constant	V ^{pk} /m/s	254.7	127.4	63.7	76.4	63.7
Coil Resistance L-L @ 25 °C	ohm	38.5	9.6	2.4	2.9	1.6
Coil Resistance L-L @ 120 °C*	ohm	53.3	13.3	3.3	4.0	2.2
Inductance L-L @ 1kHz	mH	45.55	11.39	2.85	3.42	1.90
Motor Constant @ 25 °C*	N/√W	41.2			45.2	50.5
Motor Constant @ 120 °C*	N/√W	35.0			38.4	42.9
Max. Terminal Voltage	V _{dc}	600				
Thermal Resistance @ 120 °C*	°C/W	0.24			0.20	0.16
Thermal Resistance AC @ 120 °C^	°C/W	-	-	-	-	-
Max. Coil Temperature	°C	120				
Coil Weight	kg	5.45	5.54	6.64	8.55	
Coil Weight AC^	kg	-	-	-	-	-
Coil Length	mm	601			721	901
Attractive Force	N	0				
Electrical Cycle Length	mm	60				

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.

Dimensions

ECM-LU50



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLES A	NUMBER OF MOUNTING HOLES B
180	179.5	4.50	3	3
240	239.5	6.00	4	4
300	299.5	7.50	5	5
360	359.5	9.00	6	6
480	479.5	12.00	8	8

Motor Coil

MOTOR MODEL	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLES C (TOP MOUNT)
ECM-LU502	1.05	1.13	4
ECM-LU503	1.57	1.69	6
ECM-LU504	2.09	2.25	8
ECM-LU505	2.61	2.81	10
ECM-LU506	3.13	3.37	12
ECM-LU508	4.36	4.69	16
ECM-LU50A	5.45	5.86	20
ECM-LU50C	6.64	7.14	24
ECM-LU50F	8.55	9.16	30

ECM-LU54

- Ironless Motor
- Peak force to 5366N, Continuous force to 1234N
- Integrated Hall Sensor



IRONLESS LINEAR MOTOR

SPECIFICATIONS		ECM-LU542		ECM-LU543		ECM-LU544		ECM-LU546		ECM-LU546
Connection Type	N	S	P	S	P	S	P	S	P	P
Peak Force	N	894		1342		1789		2683		
Continuous Force @ 120°C*	N	179		268		358		537		
Continuous Force AC @ 120°C^	N	215		322		429		617		
Peak Power @ 120°C	W	2217		3325		4433		6650		
Continuous Power @ 120°C*	W	89		133		177		266		
Continuous Power AC @ 120°C^	W	128		192		255		352		
Peak Current	A ^{pk}	16.88	33.75	16.88	33.75	16.88	33.75	16.88	33.75	67.50
Continuous Current @ 120°C*	A ^{pk}	3.38	6.75	3.38	6.75	3.38	6.75	3.38	6.75	13.50
Continuous Current AC @ 120°C^	A ^{pk}	4.05	8.10	4.05	8.10	4.05	8.10	3.88	7.76	15.53
Continuous Stall Current @ 120°C*	Arms	2.70	5.40	2.70	5.40	2.70	5.40	2.70	5.40	10.80
Force Constant	N/A ^{pk}	53.0	26.5	79.5	39.8	106.0	53.0	159.0	79.5	39.8
Back EMF Constant	V ^{pk} /m/s	61.0	30.5	91.4	45.7	121.9	61.0	182.9	91.4	45.7
Coil Resistance L-L @ 25°C	ohm	7.5	1.9	11.3	2.8	15.0	3.8	22.5	5.6	1.4
Coil Resistance L-L @ 120°C*	ohm	10.4	2.6	15.6	3.9	20.8	5.2	31.1	7.8	1.9
Inductance L-L @ 1kHz	mH	8.51	2.13	12.77	3.19	17.03	4.26	25.54	6.39	1.60
Motor Constant @ 25°C*	N/√W	22.3		27.4		31.6		38.7		
Motor Constant @ 120°C*	N/√W	19.0		23.3		26.9		32.9		
Max. Terminal Voltage	V _{DC}	600								
Thermal Resistance @ 120°C*	°C/W	1.07		0.71		0.54		0.36		
Thermal Resistance AC @ 120°C^	°C/W	0.74		0.50		0.37		0.27		
Max. Coil Temperature	°C	120								
Coil Weight	kg	1.30		1.95		2.56		3.90		4.00
Coil Weight AC^	kg	1.39		2.08		2.74		4.16		4.27
Coil Length	mm	121		181		241		361		
Attractive Force	N	0								
Electrical Cycle Length	mm	60								

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.

ECM-LU54

- Ironless Motor
- Peak force to 5366N, Continuous force to 1234N
- Integrated Hall Sensor



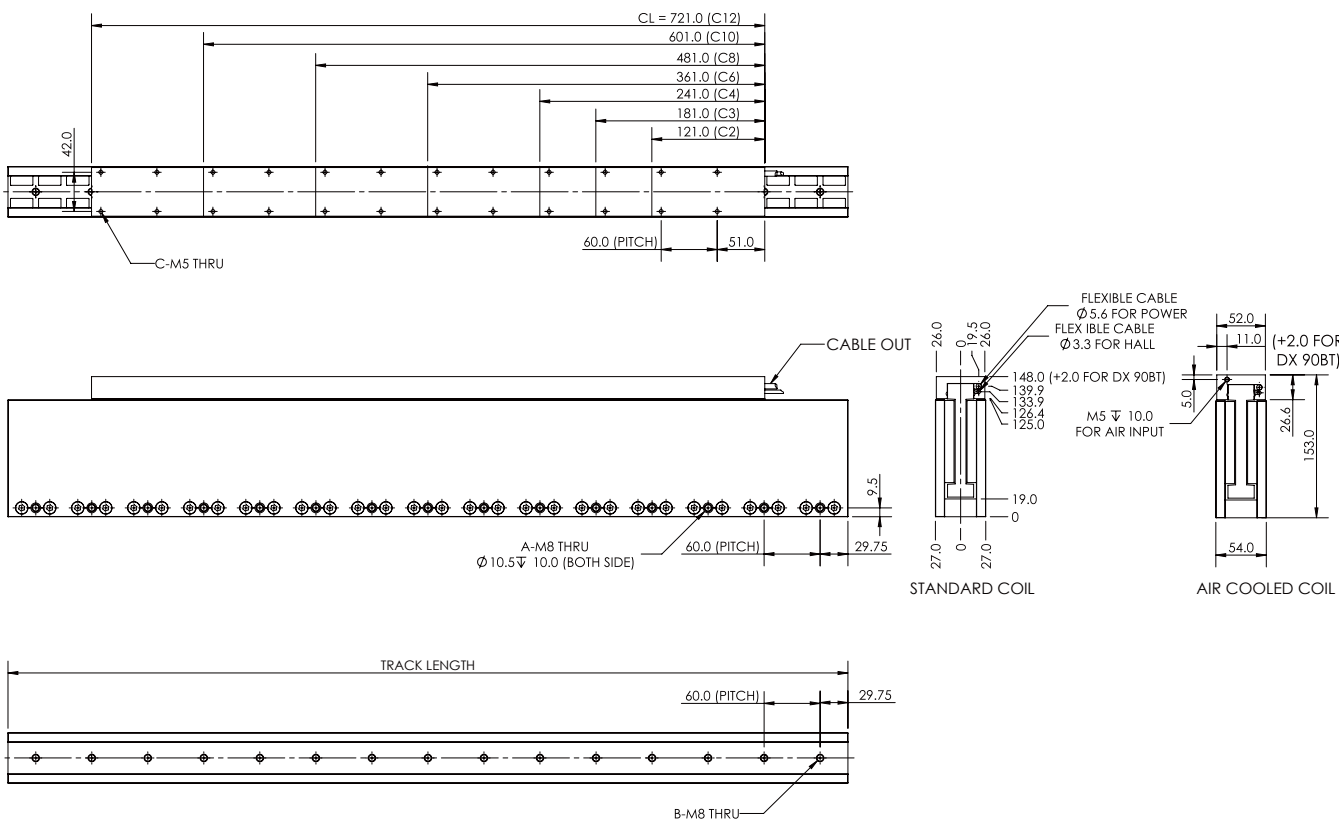
IRONLESS LINEAR MOTOR

SPECIFICATIONS		ECM-LU548		ECM-LU548	ECM-LU54A		ECM-LU54A	ECM-LU54C
Connection Type	N	S	P	Q	S	P	Q	Q
Peak Force	N	3578			4472			5366
Continuous Force @ 120°C*	N	716			894			1073
Continuous Force AC @ 120°C^	N	-			-			-
Peak Power @ 120°C	W	8867			11084			13300
Continuous Power @ 120°C*	W	355			443			532
Continuous Power AC @ 120°C^	W	-			-			-
Peak Current	A ^{pk}	16.88	33.75	67.50	16.88	33.75	67.50	
Continuous Current @ 120°C*	A ^{pk}	3.38	6.75	13.50	3.38	6.75	13.50	
Continuous Current AC @ 120°C^	A ^{pk}	-	-	-	-	-	-	
Continuous Stall Current @ 120°C*	Arms	2.70	5.40	10.80	2.70	5.40	10.80	
Force Constant	N/A ^{pk}	212.0	106.0	53.0	265.0	132.5	66.3	79.5
Back EMF Constant	V ^{pk} /m/s	243.8	121.9	61.0	304.8	152.4	76.2	91.4
Coil Resistance L-L @ 25°C	ohm	30.0	7.5	1.9	37.5	9.4	2.3	2.8
Coil Resistance L-L @ 120°C*	ohm	41.5	10.4	2.6	51.9	13.0	3.2	3.9
Inductance L-L @ 1kHz	mH	34.06	8.51	2.13	42.57	10.64	2.66	3.19
Motor Constant @ 25°C*	N/√W	44.7			50.0			54.7
Motor Constant @ 120°C*	N/√W	38.0			42.5			46.5
Max. Terminal Voltage	V _{DC}	600						
Thermal Resistance @ 120°C*	°C/W	0.27			0.21			0.18
Thermal Resistance AC @ 120°C^	°C/W	-			-			-
Max. Coil Temperature	°C	120						
Coil Weight	kg	5.17		5.31	6.46		6.63	7.96
Coil Weight AC^	kg	-		-	-		-	-
Coil Length	mm	481			601			721
Attractive Force	N	0						
Electrical Cycle Length	mm	60						

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.

Dimensions

ECM-LU54



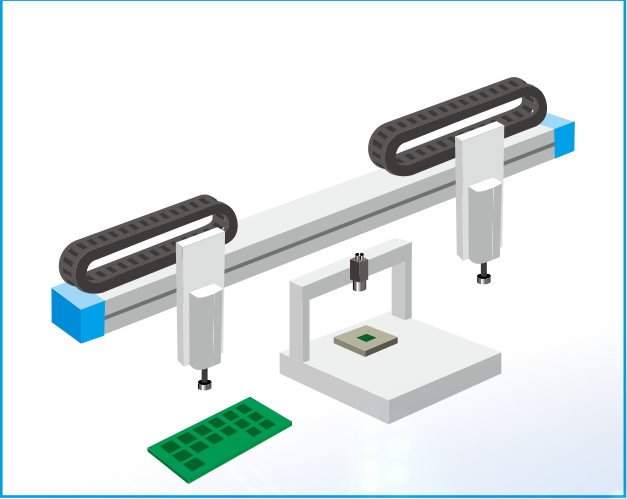
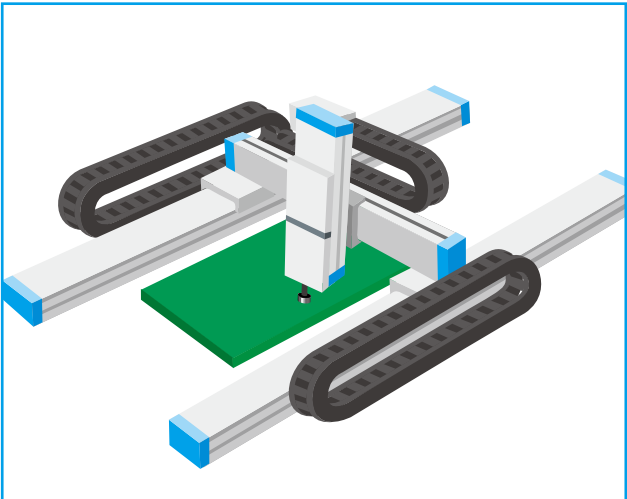
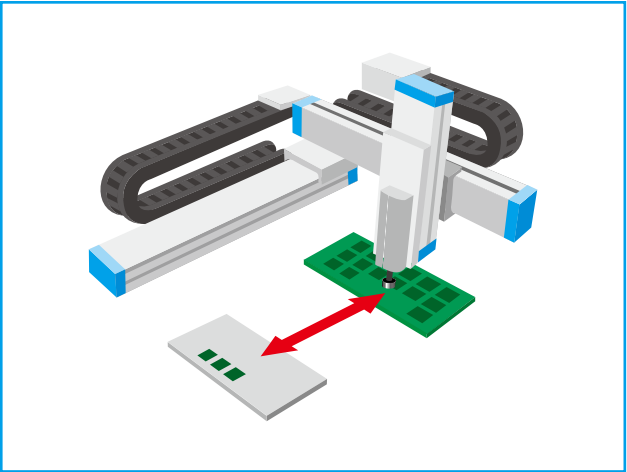
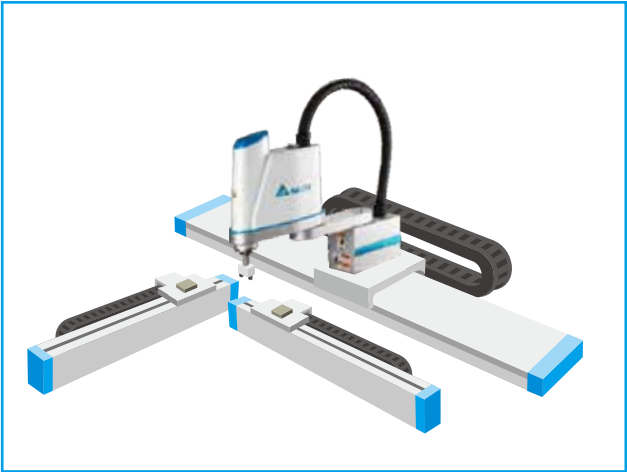
Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLES A	NUMBER OF MOUNTING HOLES B
TL 240	239.5	8.50	4	4
TL 300	299.5	10.50	5	5
TL 360	359.5	12.50	6	6
TL 480	479.5	16.80	8	8

Motor Coil

MOTOR MODEL	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLES C (TOP MOUNT)
ECM-LU542	1.30	1.39	4
ECM-LU543	1.95	2.08	6
ECM-LU544	2.56	2.74	8
ECM-LU546	3.90	4.16	12
ECM-LU548	5.17	5.52	16
ECM-LU54A	6.46	6.90	20
ECM-LU54C	7.96	8.48	24

Applications



LU
LA-S
ECM-L-S
ECM-L-U
ECM-L-U
ECM-L-S-P
ECM-L-F
ECM-D-D
ECM-L-CVC

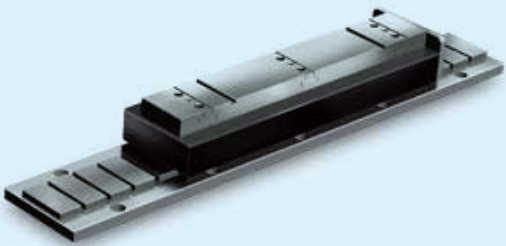


HIGH FORCE

heavy load capacity motion with minimal cogging

ECM-LF Series

IRONCORE LINEAR MOTOR



Heavy Duty Motors For Hi-Speed Point-To-Point Applications

ECM-LF Ironcore motors offer an affordable high force solution to demanding linear applications with minimal cogging effect that is associated with traditional iron core linear motors.

Our Ironcore design provides for optimal dissipation of heat and is thus capable of extremely high forces (>9000N). These motor coils are manufactured with high flex cables and optional external hall effect attachments widely used in multiple general automation applications.

Modular Flat Magnet tracks are available in different length increments to complete this product selection and allow for easy assembly of unrestricted effective strokes by butting tracks of different lengths together.

- High force / thrust
- Maintenance free
- High stiffness
- Compact size
- Minimal cogging

Application

- Material Transfer/Pick And Place
 - Laser Cutting
 - Extruders
 - Machine Tools
- Large Format Printing
 - Textile Printing
 - Digital Printing

MOTOR MODEL	Peak Force (N)	Continuous Force AC (N)	Compatible Magnet Track Length (mm)
ECM-LF542	542	108	64-320
ECM-LF54H2	943	189	
ECM-LF742	893	179	
ECM-LF74H2	1515	303	
ECM-LFA42	1393	279	
ECM-LF54H2	2307	461	

Ordering Information

Coil Assembly

ECM-L F 54 2 S 2 N N D B S
1 2 3 4 5 6 7 8 9 10

	ECM-L	Product Series	ECM-L Linear Motor Series (Delta-PBA)			
1	F	Linear Motor Type	F: Flat Iron core			
2	22	Motor Spec.	Width of Motor (mm)			
			Codes	54	74	A4 (104)
				54H	74H	A4H (104)
3	1	Coil Assembly Specification	2			
4	S	Wiring Method	S: Serial ; P: Parallel			
5	2	Input Voltage	2: 220V			
6	N	Temperature Sensor Specification	C = PT 100 Sensor (Standard) M: Thermostat			
7	N	Cooling Type	N: Standard A: Air Cooling (Customized) W: Water Cooling (Customized)			
8	1	Cable Length	D: 0.5 m (Standard) ; 1 = 1 m ; 3 =3 m ; 5 = 5 m			
9	N	Connector Type	B = 9 Pin D-SUB Male (For Hall Sensor)			
10	S	Special Order	S = Delta-PBA Standard Product			

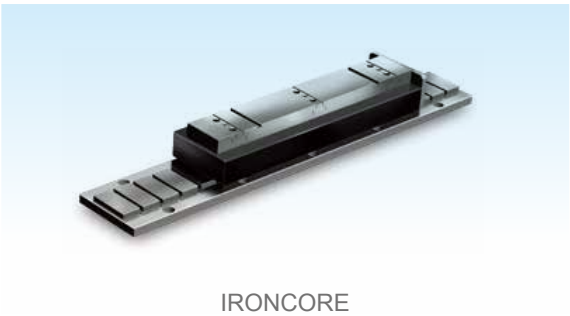
Magnet Track

ECM-L FM 54 064
1 2 3

1	ECM-L	Product Series	ECM-L Linear Motor Series (Delta-PBA)			
	FM	Linear Motor Type	F: Flat type Iron core			
2	22	Motor Spec.	Width of Motor (mm)			
			Codes	54	74	A4 (104)
3	120	Magnetic Way Length				
			Codes	064 = 64 mm	128 = 128 mm	
				192 = 192 mm	320 = 320 mm	

ECM-LF Series

- Peak force to 1393N, Continuous force to 279N
- Hall Sensor

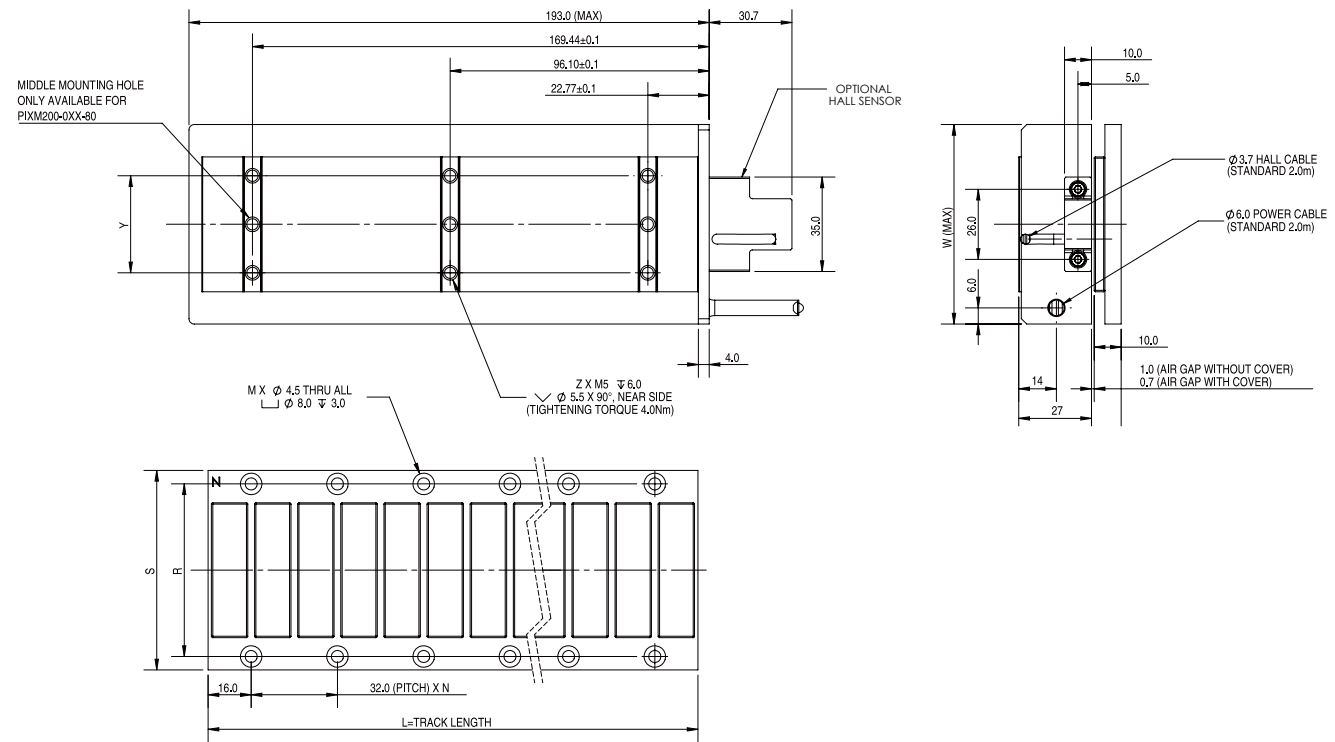


SPECIFICATIONS		ECM-LF54		ECM-LF74		ECM-LFA4	
Connection Type	N	S	P	S	P	S	P
Peak Force	N	542		893		1393	
Continuous Force @ 120 °C*	N	108		179		279	
Continuous Stall Force @ 120 °C*	N	77		126		197	
Peak Power @ 120 °C	W	1823		2323		2932	
Continuous Power @ 120 °C*	W	73		93		117	
Peak Current	A ^{pk}	30.4	60.8	29.3	58.7	27.9	55.7
Continuous Current @ 120 °C*	A ^{pk}	6.1	12.2	5.9	11.7	5.6	11.1
Continuous Stall Current @ 120 °C*	Arms	4.30	8.60	4.15	8.30	3.94	7.88
Force Constant	N/Apk	17.8	8 ⁹	30.4	15.2	50.0	25.0
Back EMF Constant	Vpk/m/s	20.5	10.3	35	17.5	57.5	28.8
Coil Resistance L-L @ 25 °C	ohm	1.9	0.5	2.6	0.7	3.6	0.9
Coil Resistance L-L @ 120 °C*	ohm	2.6	0.7	3.6	0.9	5.0	1.3
Inductance L-L @ 1kHz	mH	4.8	1.2	7.0	1.8	10.5	2.6
Motor Constant @ 25 °C*	N/ √ W	14.9		21.8		30.3	
Motor Constant @ 120 °C*	N/ √ W	12.7		18.5		25.7	
Max. Terminal Voltage	VDC			600			
Thermal Resistance @ 120 °C*	°C/W	1.3		1.02		0.81	
Max. Coil Temperature	°C			120			
Coil Weight	kg	1.3		2.0		3.1	
Attractive Force	N	1560		2600		4160	
Electrical Cycle Length	mm			32			

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25 °C, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%.
4. Peak force and current - 4% duty ratio and 1 second duration.

Dimensions

ECM-LF Series

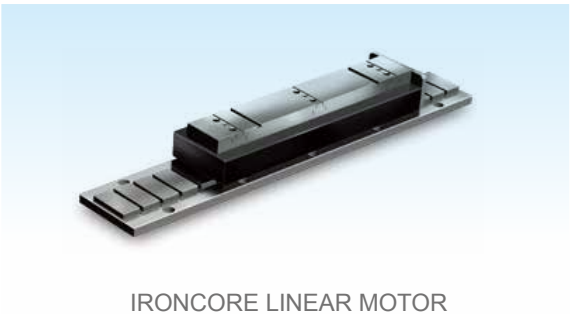


MOTOR MODEL	W (mm)	Y (mm)	NUMBER OF MOUNTING HOLES Z	COMPATIBLE TRACK
ECM-LF542	54	16	4	ECM-LFM54XXX
ECM-LF742	74	36	4	ECM-LFM74XXX
ECM-LFA42	104	66	6	ECM-LFMA4XXX

MAGNET TRACK		L (mm)	S (mm)	R (mm)	N	M	WEIGHT (g)	MOTOR MODEL
ECM-LFM54	M064	64	54	44	1	4	207.6	ECM-LF54H
	M128	128			3	8	415.2	
	M192	192			5	12	622.8	
	M320	320			9	20	1038	
ECM-LFM74	M064	64	74	64	1	4	300.3	ECM-LF74H
	M128	128			3	8	600.6	
	M192	192			5	12	901	
	M320	320			9	20	1501.6	
ECM-LFMA4	M064	64	104	94	1	4	439.4	ECM-LFA4H
	M128	128			3	8	878.8	
	M192	192			5	12	1318.2	
	M320	320			9	20	2197	

ECM-LF Series

- Peak force to 2307N, Continuous force to 461N
- Hall Sensor (Optional)

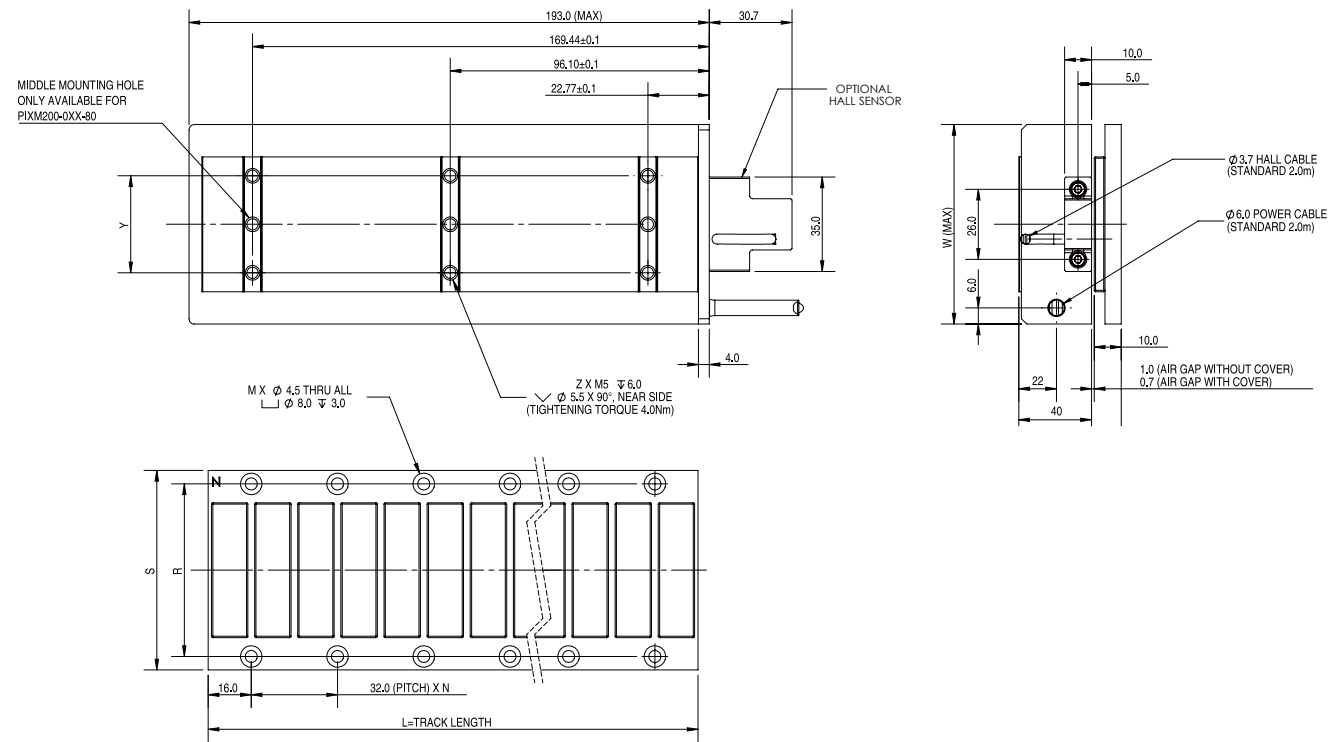


SPECIFICATIONS		ECM-LF54H		ECM-LF74H		ECM-LFA4H	
Connection Type	N	S	P	S	P	S	P
Peak Force	N	943		1515		2307	
Continuous Force @ 120 °C*	N	189		303		461	
Continuous Stall Force @ 120 °C*	N	133		214		326	
Peak Power @ 120 °C	W	2144		2662		3457	
Continuous Power @ 120 °C*	W	86		106		138	
Peak Current	A ^{pk}	21.9	43.8	20.5	41.0	19.8	39.6
Continuous Current @ 120 °C*	A ^{pk}	4.4	8.8	4.1	8.2	4.0	7.9
Continuous Stall Current @ 120 °C*	Arms	3.10	6.20	2.90	5.80	2.80	5.60
Force Constant	N/A ^{pk}	43.0	21.5	73.9	37.0	116.5	58.3
Back EMF Constant	V ^{pk} /m/s	49.5	24.8	85.0	42.5	134.0	67.0
Coil Resistance L-L @ 25 °C	ohm	4.3	1.1	6.1	1.5	8.5	2.1
Coil Resistance L-L @ 120 °C*	ohm	6.0	1.5	8.4	2.1	11.8	2.9
Inductance L-L @ 1kHz	mH	40.0	10.0	60.0	15.0	87.0	21.8
Motor Constant @ 25 °C*	N/√W	24.0		34.6		46.1	
Motor Constant @ 120 °C*	N/√W	20.4		29.4		39.2	
Max. Terminal Voltage	V _{DC}			600			
Thermal Resistance @ 120 °C*	°C/W	1.11		0.89		0.69	
Max. Coil Temperature	°C			120			
Coil Weight	kg	2.1		3.1		4.6	
Attractive Force	N	1560		2600		4160	
Electrical Cycle Length	mm			32			

Notes:
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25 °C, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%.
4. Peak force and current - 4% duty ratio and 1 second duration.

Dimensions

ECM-LF Series



MOTOR MODEL	W (mm)	Y (mm)	NUMBER OF MOUNTING HOLES Z	COMPATIBLE TRACK
ECM-LF54H	54	16	4	ECM-LFM54XXX
ECM-LF74H	74	36	4	ECM-LFM74XXX
ECM-LFA4H	104	66	6	ECM-LFMA4XXX

MAGNET TRACK		L (mm)	S (mm)	R (mm)	N	M	WEIGHT (g)	MOTOR MODEL
ECM-LFM54	M064	64	54	44	1	4	207.6	ECM-LF54H
	M128	128			3	8	415.2	
	M192	192			5	12	622.8	
	M320	320			9	20	1038	
ECM-LFM74	M064	64	74	64	1	4	300.3	ECM-LF74H
	M128	128			3	8	600.6	
	M192	192			5	12	901	
	M320	320			9	20	1501.6	
ECM-LFMA4	M064	64	104	94	1	4	439.4	ECM-LFA4H
	M128	128			3	8	878.8	
	M192	192			5	12	1318.2	
	M320	320			9	20	2197	

Explanation of Parameters

Technical Terms

■ Back EMF Constant

The induced voltage in motor coils under a permanent magnetic field is defined as the back EMF voltage, and is proportional to the angular speed of the motor. The proportionality constant, referred to as back EMF constant is defined as the ratio of back EMF to motor rotational speed (rpm) or linear speed (m/s). Thus, back EMF constant is a measure of how many volts per rpm the motor may generate if it is driven as a generator.

■ Torque Constant and Thrust Constant

Kt is called torque constant (N-m/A) which is defined as the electromagnetic torque or thrust (in N-m) generated by a motor to the motor input current (in A). The thrust constant times the rated current gives the rated thrust.

■ Continuous Current

The continuous current is the rated current, sometimes described as operational current, which is the value of amperes intended to flow through the motor.

■ Maximum Current

The maximum current is defined as the motor output current when the motor reaches the maximum thrust or the maximum torque. It works under the temperature when the permanent magnet is not eliminating a remnant magnetic field yet. The maximum current is related to the coils. The initial temperature of coils will affect the output time of the maximum current.

■ Rated Torque and Rated Thrust

Rated torque or thrust is the maximum torque or thrust that the motor can safely apply continuously to the load at any speed within the rated speed range of the motor.

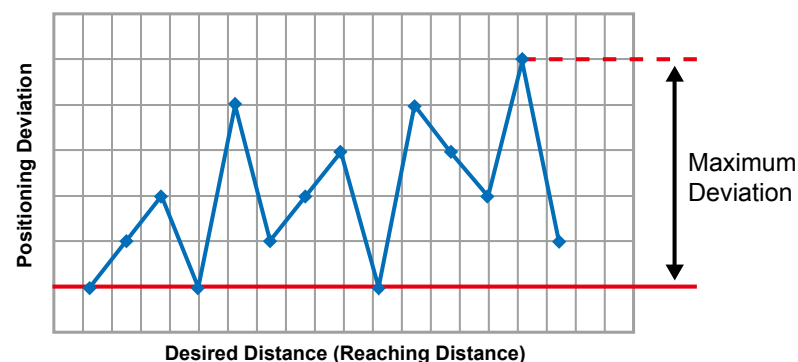
■ Maximum Torque and Maximum Thrust

At maximum current, the maximum torque or maximum thrust generated by the motor is generally used as the limit for instant motor acceleration and deceleration.

■ Positioning Accuracy

Definition of Positioning Accuracy of the LU Series:

The maximum deviation between the actual distance and the desired distance (reaching distance) when moving from the original position and approached from the same direction.



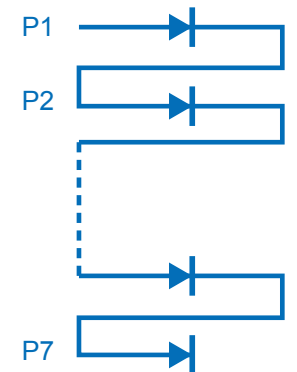
Explanation of Parameters

Technical Terms

■ Positioning Repeatability

Definition of Positioning Repeatability of the LU Series:

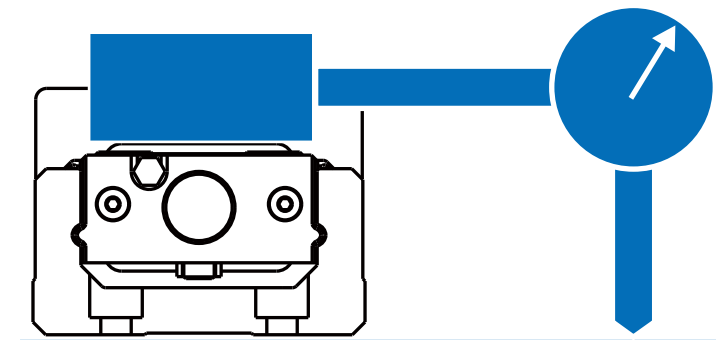
Choose a desired position. Repeat to the desired position approaching that position from a constant direction seven times. Measure the maximum positioning deviation. The positioning repeatability specifies the half of maximum positioning deviation with plus-minus sign ($\pm$) in the overall travel length.



■ Running Parallelism

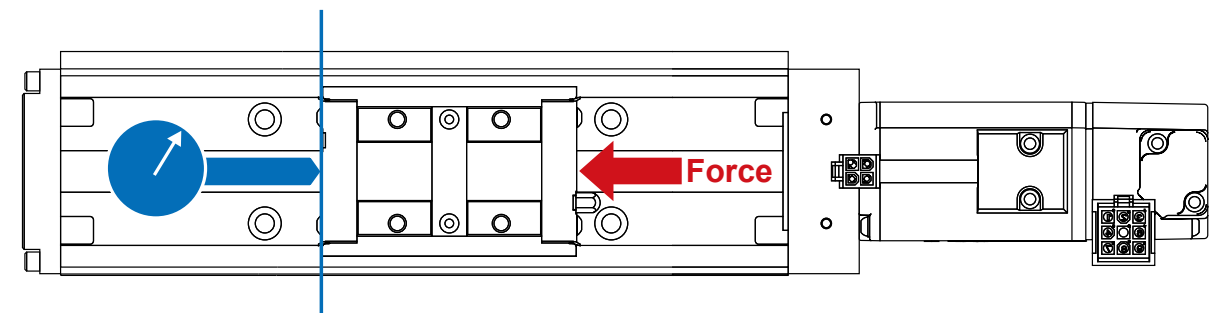
Definition of Running Parallelism of the LU Series:

Position a gauge at the center of the datum surface of the blocks. The running parallelism is measured and defined as the maximum deviation of parallelism between the datum surface of the blocks and the surface of the linear stage when the blocks are moving over the overall travel length.

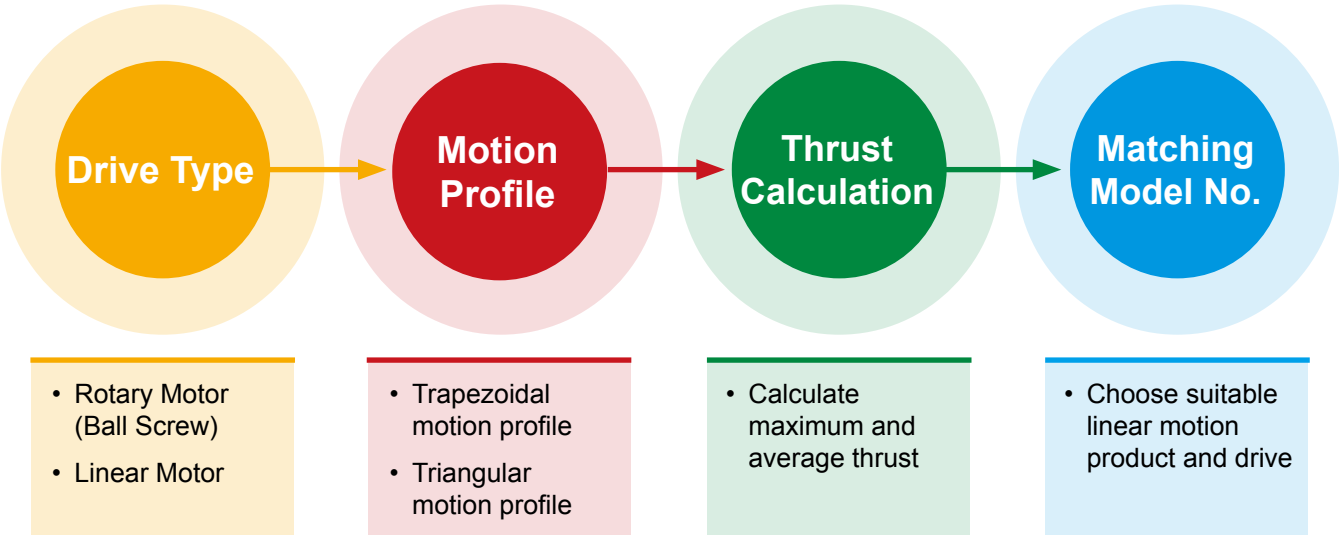


■ Backlash

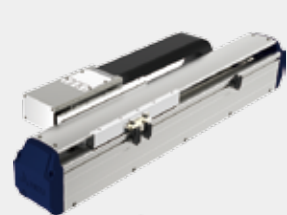
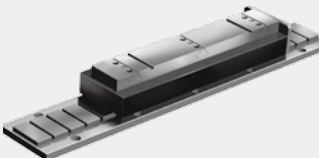
After traveling a certain distance, stop the movement of the blocks and use the stop position as the reference datum. The backlash is defined as the deviation value in positioning caused by the reversal of travel direction after applying a force to the block from the same direction and releasing it.



Choosing a Delta linear motion product



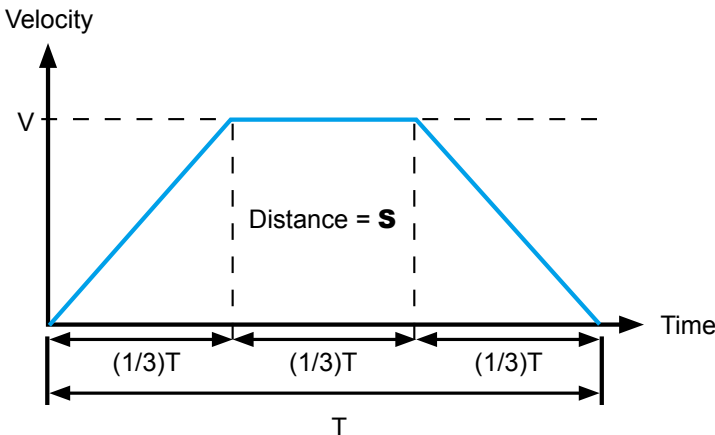
Drive Type

Delta's Linear Motion Products	
Rotary Motor (Ball Screw)	Linear Motor
	
	
	
	
	
	

Motion Curve

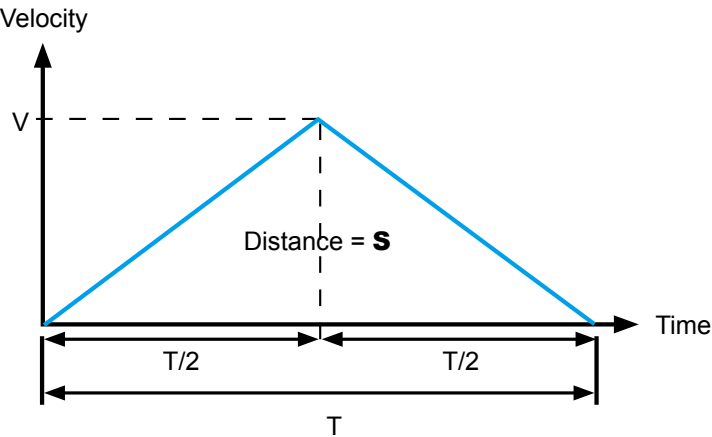
Based on motion profile information, you can calculate: 1. Moving speed; 2. Moving time; 3. Moving distance (you can do the calculation just based on two of the above data types.)

Trapezoidal Motion Profile



Known	Stroke S (m)	Velocity V (m/sec)	Acceleration A (m/sec²)	Acceleration A (m/sec²)
Obtained	Time T (sec)	Time T (sec)	Time T (sec)	Velocity V (m/sec)
Stroke S (m)		$S = (\frac{2}{3}) \times V \times T$	$S = (1/4.5) \times A \times T^2$	$S = 2 \times (V^2 / A)$
Velocity V (m/s)	$V = 1.5 \times (S / T)$		$V = (A \times T) / 3$	$V = \sqrt{(A \times S) / 2}$
Acceleration A (m/sec²)	$A = 4.5 \times (S / T^2)$	$A = 3 \times (V / T)$		$A = 2 \times (V^2 / S)$

Triangular Motion Profile



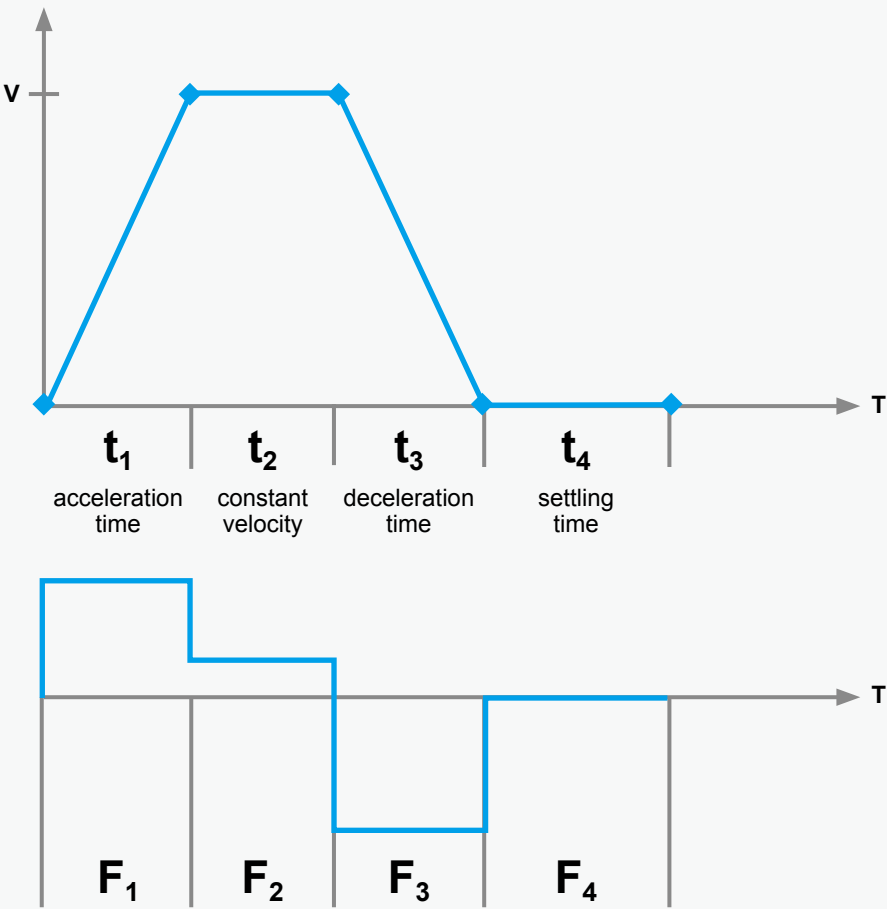
Known	Stroke S (m)	Velocity V (m/sec)	Acceleration A (m/sec²)	Acceleration A (m/sec²)
Obtained	Time T (sec)	Time T (sec)	Time T (sec)	Velocity V (m/sec)
Stroke S (m)		$S = (1/2) \times V \times T$	$S = (1/4) \times A \times T^2$	$S = V^2 / A$
Velocity V (m/s)	$V = 2 \times (S / T)$		$V = (A \times T) / 2$	$V = \sqrt{A \times S}$
Acceleration A (m/sec²)	$A = 4 \times (S / T^2)$	$A = 2 \times (V / T)$		$A = V^2 / S$

Thrust Calculation

Formula

Formula	
Required thrust for acceleration section	$F_1 = F_2 + m \times a$
Required thrust for constant velocity section	$F_2 = \mu \times m \times g$
Required thrust for deceleration section	$F_3 = m \times a - F_2$
RMS Thrust (rms)	$F_{rms} = \sqrt{\left(\frac{F_1^2 \times t_1 + F_2^2 \times t_2 + F_3^2 \times t_3 + F_4^2 \times t_4}{t_1 + t_2 + t_3 + t_4}\right)}$

μ : coefficient of sliding friction (e.g coefficient of friction of bearings, linear guideways)
 m : moving mass and external payload
 g : 9.81 m/s²
 a : acceleration m/s²



Sample Calculation 1 (Ball Screw Driven)

Calculation process 1

1 Take LU-22111300AP0S for example,
Motion profile and requirement:

Total mass m	30Kg
Total move distance S	300mm
Max. linear velocity V	300 mm/s
$t_1=t_3$	0.2 sec
$t_2=t_4$	0.8 sec
$t_1 + t_2 + t_3 + t_4 = t$	2 sec
Coefficient of sliding friction μ	0.01
Acceleration of gravity g	9.8 m/s ²
Ball screw lead L	0.01 m
Torque at driven load T₀	0.12 N-m
Motor inertia I_m	0.37 x 10 ⁻⁵ kg-m ²
Inertia due to screw I_s	0.55 x 10 ⁻⁵ kg-m ²
Motor rated torque	0.32 N-m
Screw efficiency η	0.9

2 Calculate the required torque for constant velocity section:

$$T_0 = T_0 + \mu mg \times \left(\frac{L}{2\pi \times 0.9}\right) = 0.12 + 0.01 \times 30 \times 9.8 \times \left(\frac{0.01}{2\pi \times 0.9}\right) \square 0.13 \text{ N-m}$$

3 Calculate the acceleration section torque **T** (max. torque)

$$\text{Load inertia } I_L = m \times \left(\frac{L}{2\pi}\right)^2 = 30 \times \left(\frac{0.01}{2\pi}\right)^2 \doteq 7.6 \times 10^{-5} \text{ kg-m}^2$$

$$\text{Max. rotational speed } N = V \times 60/L = 1800 \text{ min}^{-1}$$

$$\text{Angular acceleration } \omega = \frac{2\pi \times N}{60 \times t} = \frac{2\pi \times 1800}{60 \times 0.2} \square 942$$

$$T_a = (I_m + I_s + I_L) \times \omega = (0.37 + 0.55 + 7.6) \times 10^{-5} \times 942 \square 0.08 \text{ N-m}$$

$$T_a + T_s = 0.08 + 0.13 \square 0.21 \text{ N-m}$$

Calculation process 2	
4	Calculate RMS torque $T_{rms} = \sqrt{\frac{T^2 \times t_1 + (T - 2 \times T_s)^2 \times t_3 + T_s^2 \times t_2}{t}} \square 0.11 \text{ N-m}$
5	Check whether the RMS torque is less than the motor rated torque $T_{rms} \square 0.11 < \text{motor rated torque } 0.32 \text{ N-m} \rightarrow \text{OK}$ Check whether the maximum torque T is less than the motor rated torque Generally, the safety factor is considered in the calculation of maximum torque Safety factor k: general safety factor is 1.2~1.3 $T \times k = 0.21 \times 1.3 = 0.27 \text{ N-m}$ The maximum torque 0.27 N-m < motor rated torque 0.32 N-m $\rightarrow \text{OK}$
6	The size of linear stage is subject to re-evaluation if the required torque is more than the motor rated torque. A linear stage with larger motor power should be selected.

LU Series Specifications		Ball Screw Moment of Inertia	Motor Inertia	Motor Power
Model no.	Rail Length (mm)	$\times 10^{-4} \text{ kg.m}^2$	$\times 10^{-4} \text{ kg.m}^2$	W
LU-26	150	0.0060	0.0206	50
	200	0.0076		
	250	0.0092	0.037	100
	300	0.0108		
LU-33	150	0.0310	0.037	100
	200	0.0390		
	300	0.0550		
	400	0.0710		
	500	0.0869		
	600	0.1029		
LU-46	340	0.1557	0.277	400
	440	0.1947		
	540	0.2337		
	640	0.2727		
	740	0.3117		
	940	0.3898		

Sample Calculation 2 (Linear Motor Driven)

Calculation process 1	
1	Given motion profile: Applied in pick-and-place machines (horizontal movement) Total mass m : 10 Kg Total move distance S : 300 mm $t_1 = t_2 = t_3 = t_4 = 0.1 \text{ sec}$ $T = t_1 + t_2 + t_3 = 0.3$ μ : Coefficient of sliding friction = 0.005 g : 9.81 m/s ²
2	Calculate the maximum thrust: $S = 0.3 \text{ m} = (2/3) \times V \times T = (2/3) \times V \times 0.3 \Rightarrow V = 1.5 \text{ m/s}$ $a = V/t_1 = 1.5/0.1 = 15 \text{ m/s}^2$ Required thrust for acceleration section = $F_1 = F_2 + m \times a = 0.49 + 10 \times 15 = 150.49 \text{ N}$ Required thrust for constant velocity section = $F_2 = \mu \times m \times g = 0.005 \times 10 \times 9.81 = 0.49 \text{ N}$ Required thrust for deceleration section = $F_3 = m \times a - F_2 = 10 \times 15 - 0.49 = 149.51 \text{ N}$ Required thrust for settling section = $F_4 = 0 \text{ N}$ $\Rightarrow F_{\max} = F_1 = 150.49$
3	Calculate the RMS thrust: $F_{rms} = \sqrt{\frac{F_1^2 \times t_1 + F_2^2 \times t_2 + F_3^2 \times t_3 + F_4^2 \times t_4}{t_1 + t_2 + t_3 + t_4}} = 106 \text{ N}$
4	Safety factor: general safety factor is 1.2~1.3 $F_{\max} = 150.49 \times \text{Safety factor} = 150.49 \times 1.2 = 180.59 \text{ N}$ $F_{rms} = 106 \times \text{Safety factor} = 106 \times 1.2 = 127.2 \text{ N}$
5	Refer to LA-S thrust range, rated thrust > $F_{\max} \square F_{rms}$ Suggested linear stage model: LA-SB Refer to LA-S Series and Servo Drive Selection Table: 750 W

Linear Stage Request Form

Date:

Company:

Product required

Specification

Industry of the company

Equipment application

Max. velocity

(m/s)

Max. acceleration and deceleration

(m/s²)

Stroke

(mm)

Load

(kg)

Repeatability

(μm)

±

Multiple rotors in single axis

☐ Yes (pcs/axis)

☐ No

Vertical application

☐ Yes

☐ No

Stage mounting direction

☐ horizontal

☐ lateral

☐ upside down

Total amount required

Drive voltage

Request for external electricity regeneration
(to be confirmed with electrical control personnel)

☐ Yes

☐ No

Speed Curve:

Velocity (m/s)

Vmax: _____

T1: _____

T2: _____

T3: _____

T4: _____

acceleration time

constant velocity

deceleration time

settling time

Time (sec)

Special requirements and notes (e.g. high temperature or clean room operation and more)

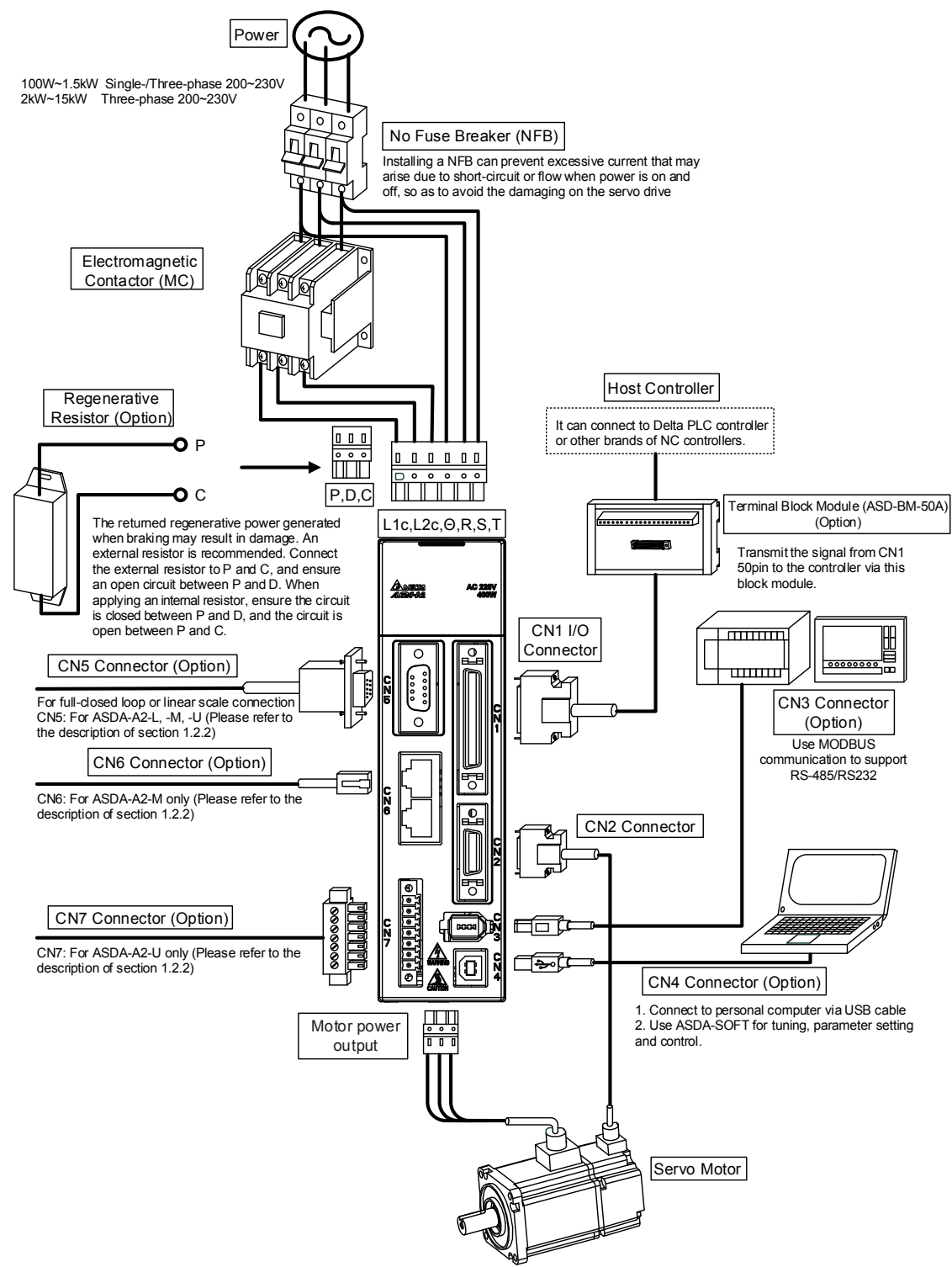
Servo Drive ASDA-A2 Specifications
(Ball Screw Driven)

ASDA-A2 Series			100 W	200 W	400 W	750 W
			01	02	04	07
Power supply	Phase / Voltage		Three-phase / Single-phase 220 V _{AC}			
	Permissible Voltage Range		1-phase / 3-phase 200 ~ 230 V _{AC} , -15% ~ 10%			
	Input Current (3PH) (Units: Arms)		0.39	1.11	1.86	3.66
	Input Current (1PH) (Units: Arms)		0.69	1.92	3.22	6.78
	Continuous Output Current (Units: Arms)		0.9	1.55	2.6	5.1
Cooling System			Natural Air Circulation			Fan Cooling
Encoder Resolution / Feedback Resolution			Incremental encoder: 20-bit (1280000 p/rev); Absolute encoder: 17-bit			
Control of Main Circuit			SVPWM (Space Vector Pulse Width Modulation) Control			
Tuning Modes			Auto / Manual			
Regenerative Resistor			None		Built-in	
Position Control Mode	Max. Input Pulse Frequency (Only for Non-DMCNET mode)		Max. 500 Kpps / 4 Mpps (Line driver), Max. 200 Kpps (Open collector)			
	Pulse Type (Only for Non-DMCNET mode)		Pulse + Direction, A phase + B phase, CCW pulse + CW pulse			
	Command Source		External pulse train (PT mode) (Only for Non-DMCNET mode) / Internal parameters (PR mode)			
	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<25600)			
	Torque Limit Operation		Set by parameters			
	Feed Forward Compensation		Set by parameters			
	Speed Control Mode	Analog Input Command (Only for Non-DMCNET mode)	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 (Only for Non-DMCNET mode) / Internal parameters				
Smoothing Strategy		Low-pass and S-curve filter				
Torque Limit Operation		Set by parameters or via analog input (Only for Non-DMCNET mode)				
Frequency Response Characteristic		Maximum 1 kHz				
Speed Accuracy ^{*2} (At rated rotation speed)		0.01% or less at 0 to 100% load fluctuation				
		0.01% or less at ±10% power fluctuation				
Torque Control Mode	Analog Input Command (Only for Non-DMCNET mode)	Voltage Range	0 ~ ±10 V _{DC}			
		Input Resistance	10KΩ			
		Time Constant	2.2 μs			
	Command Source		External analog signal (Only for Non-DMCNET mode) / Internal parameters			
	Smoothing Strategy		Low-pass filter			
	Speed Limit Operation		Set by parameters or via analog input (Only for Non-DMCNET mode)			
	Analog Monitor Output		Monitor signal can set by parameters (Output voltage range: ±8 V)			
Digital Inputs / Outputs	Inputs		Servo on, Reset, Gain switching, Pulse clear, Zero speed CLAMP, Command input reverse control, Command triggered, Speed/ Torque limit enabled, Position command selection, Motor stop, Speed position selection, Position / Speed mode switching, Speed / Torque mode switching, Torque / Position mode switching, PT / PR command switching, Emergency stop, Forward / Reverse inhibit limit, Reference "Home" sensor, Forward / Reverse operation torque limit, Move to "Home", Electronic Cam (E-Cam), Forward / Reverse JOG input, Event trigger PR command, Electronic gear ratio (Numerator) selection and Pulse inhibit input			
	Outputs		Encoder signal output (A, B, Z Line Driver and 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, Position command overflow, Forward / Reverse software limit, Internal position command completed, Capture operation completed output., Motion control completed output., Master position of E-Cam (Electronic Cam)			
Protective Functions			Overcurrent, Undervoltage, Motor overheated, Regeneration error, Overload, Overspeed, Abnormal pulse control command, Excessive deviation, Encoder error, Adjustment error, Emergency stop activated, Reverse/ Forward limit switch error, Position excessive deviation of full-close control loop, Serial communication error, Input power phase loss, Serial communication time out, short circuit protection of U, V, W, and CN1, CN2, CN3 terminals			
Communication Interface			RS-232 / RS-485 / CANopen / USB / DMCNET			
Environment	Installation Site		Indoor location (free from direct sunlight), no corrosive liquid and gas (far away from oil mist, flammable gas, dust)			
	Altitude		Altitude 1000 m or lower above sea level			
	Atmospheric Pressure		86 kPa ~ 106 kPa			
	Operating Temperature		0°C ~ 55°C (If operating temperature is above 45°C, forced cooling will be required)			
	Storage Temperature		-20°C ~ 65°C (-4°F to 149°F)			
	Humidity		0 ~ 90% RH (non-condensing)			
	Vibration		9.80665m/s ² (1G) less than 20 Hz, 5.88 m/s ² (0.6G) 20 to 50 Hz			
	IP Rating		IP20			
	Power System		TN System ^{*3}			
Certifications			IEC/EN 61800-5-1, UL 508C, C-tick			
			CE cUL US LISTED			

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.



A2 Wiring Diagram of Peripheral Devices



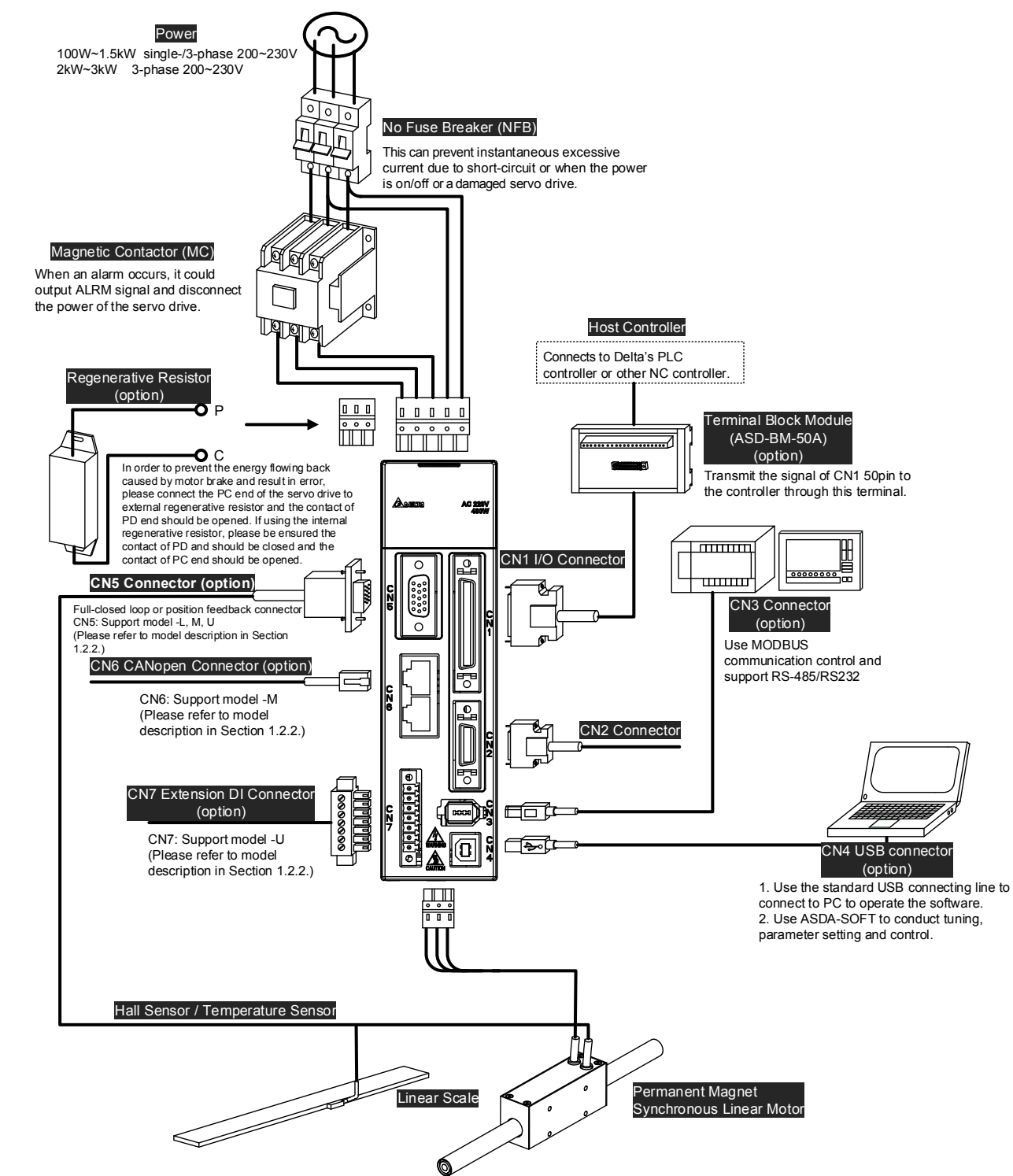
Servo Drive ASDA-A2R Specifications (Linear Motor Driven)

ASDA-A2R Series			100 W	200 W	400 W	750 W
			01	02	04	07
Power Supply	Phase / Voltage		Three-phase / Single-phase 220V _{AC}			
	Permissible Voltage Range		1-phase / 3-phase 200 ~ 230V _{AC} , -15% ~ 10%			
	Input Current(3PH) (Units: Arms)		0.39	1.11	1.86	3.66
	Input Current(1PH) (Units: Arms)		0.69	1.92	3.22	6.78
	Continuous Output Current (Units: Arms)		0.9	1.55	2.6	5.1
	Max. Output Current (Units: Arms)		7.07	10.61	10.61	14.14
Cooling System			Natural Air Circulation			Fan Cooling
Encoder Resolution / Feedback Resolution			20-bit (1280000 p/rev)			
Control of Main Circuit			SVPWM(Space Vector Pulse Width Modulation) Control			
Tuning Modes			Auto / Manual			
Regenerative Resistor			None		Built-in	
Position Control Mode	Max. Input Pulse Frequency (Only for Non-DMCNET mode)		Max. 500Kpps / 4Mpps (Line driver), Max. 200Kpps (Open collector)			
	Pulse Type (Only for Non-DMCNET mode)		Pulse + Direction, A phase + B phase, CCW pulse + CW pulse			
	Command Source		External pulse train (PT mode) (Only for Non-DMCNET mode) / Internal parameters (PR mode)			
	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<25600)			
	Torque Limit Operation		Set by parameters			
	Feed Forward Compensation		Set by parameters			
Speed Control Mode	Analog Input	Voltage Range	0 ~ ±10 V _{DC}			
	Command	Input Resistance	10KΩ			
	(Only for Non-DMCNET mode)	Time Constant	2.2 μs			
	Speed Control Range ^{*1}		1: 5000			
	Command Source		External analog signal (Only for Non-DMCNET mode) / Internal parameters			
	Smoothing Strategy		Low-pass and S-curve filter			
	Torque Limit Operation		Set by parameters or via analog input (Only for Non-DMCNET mode)			
	Frequency Response Characteristic		Maximum 1 kHz			
	Speed Accuracy ^{*2} (At rated rotation speed)		0.01% or less at 0 to 100% load fluctuation 0.01% or less at ±10% power fluctuation 0.01% or less at 0°C to 50°C ambient temperature fluctuation			
Torque Control Mode	Analog Input	Voltage Range	0 ~ ±10 V _{DC}			
	Command	Input Resistance	10KΩ			
	(Only for Non-DMCNET mode)	Time Constant	2.2 μs			
	Command Source		External analog signal (Only for Non-DMCNET mode) / Internal parameters			
	Smoothing Strategy		Low-pass filter			
	Speed Limit Operation		Set by parameters or via analog input (Only for Non-DMCNET mode)			
Analog Monitor Output			Monitor signal can be set by parameters (Output voltage range: ±8V)			
Digital Inputs / Outputs	Inputs		Servo on, Reset, Gain switching, Pulse clear, Zero speed CLAMP, Command input reverse control, Command triggered, Speed/ Torque limit enabled, Position command selection, Motor stop, Speed position selection, Position / Speed mode switching, Speed / Torque mode switching, Torque / Position mode switching, PT / PR command switching, Emergency stop, Forward / Reverse inhibit limit, Reference "Home" sensor, Forward / Reverse operation torque limit, Move to "Home", Electronic Cam (E-Cam), Forward / Reverse JOG input, Event trigger PR command, Electronic gear ratio (Numerator) selection and Pulse inhibit input * Please note that the above digital signals and inputs are available only for Non-DMCNET mode. In DMCNET mode, it is recommended to write digital inputs into the servo drives through DMCNET communication, and the digital inputs should be used for Emergency Stop, Forward / Reverse Inhibit limit and Reference "Home" sensor only.			
	Outputs		Encoder signal output (A, B, Z Line Driver and 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, Position command overflow, Forward / Reverse software limit, Internal position command completed, Capture operation completed output., Motion control completed output., Master position of E-Cam (Electronic Cam)			
Protective Functions			Overcurrent, Undervoltage, Motor overheated, Regeneration error, Overload, Overspeed, Abnormal pulse control command, Excessive deviation, Encoder error, Adjustment error, Emergency stop activated, Reverse/ Forward limit switch error, Position excessive deviation of full-close control loop, Serial communication error, Input power phase loss, Serial communication time out, short circuit protection of U, V, W, and CN1, CN2, CN3 terminals			
Communication Interface			RS-232 / RS-485 / CANopen / USB / DMCNET			
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 ~ 106kPa			
	Operating Temperature		0°C ~ 55°C (If operating temperature is above 45°C, forced cooling will be required)			
	Storage Temperature		-20°C ~ 65°C			
	Humidity		0 ~ 90% RH (non-condensing)			
	Vibration		9.80665 m/s (1G) less than 20 Hz, 5.88 m/s (0.6G) 20 to 50 Hz			
	IP Rating		IP20			
	Power System		TN System ^{*3}			
Certifications			IEC/EN 61800-5-1, UL 508C, C-tick			
			CE cUL US LISTED			

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



A2R Wiring Diagram of Peripheral Devices





Smarter. Greener. Together.

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