CHIEFTEK PRECISION CO., LTD.

LM series

Linear Motor

LM-05-P51-EN

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Selection Application Table

Parameter Glossary

Lp (mm) Coil Assembly Length

The length of the aluminum base of the coil assembly. The cable bending radius is not counted toward this length. A linear motor's effective stroke is usually the total Magnetic way length minus the coil length and cable bending radius.

Pm (Kg) Coil Assembly Weight

Includes main body weight and cable length of 400mm. This mass needs to be factored into the motor load.

Ic (Apk)Continuous Current

The peak line current level that will bring the motor coil to 110℃ given even cycling between the three phases. Assumes ambient air condition of one atmosphere at 25℃. Actual achievablelc is dependent on motor motion profile, component connection and surrounding environments. E.g.Ic capacity under vacuum is significantly less than under nominal air pressure, forcer under continuous motion versus stationary or large versus small forcer fixture contact surface area.

Unit conversion：

Apeak = $\sqrt{2}$ x Arms

Line current(Y) = $\sqrt{3}$ x Phase current(Y)

-------Y connection

Line current (Δ) = $\sqrt{3}$ x Phase current(Δ)

------Δconnection

Sm (Kg/m) Magnetic way Weight

Nominal weight of the Magnetic way per meter length

Ip (Apk) Peak Current

Instantaneous maximum current that can be passed into the motor coil. To prevent irreversible damage, duration should be less than1 second and a duty cycle of under 4%.

Fp (N) Peak Force

Instantaneous maximum force that can be produced by the motor. To prevent irreversible damage, duration should be less than1 second and a duty cycle of under 4%.

Fc (N) Continuous Force

The continuous force that will bring the motor coil to 110℃ given even cycling between the three phases

Ke (V_{l-l}/m/s) Back EMF constant

The peak line-to-line Back EMF produced per one meter/second in velocity by the motor.

Maximum voltage required by a motor in motion is:

Volt = (Ke x Vmax) + (Imax x R)

It is recommended that the driver's maximum deliverable voltage is at least 1.3 times greater than the maximum voltage to ensure that there is enough control over the motor.

Unit conversion：

Vpeak = $\sqrt{2}$ x Vrms

Line voltage(Y) = $\sqrt{3}$ x Phase voltage(Y)

------- Y connection

Line voltage(Δ) = $\sqrt{3}$ x Phase voltage(Δ)

-------Δconnection

Kf (N/Apk) Force Constant

The thrust force produced by the motor per unit amp of current. The cpc catalog values are Peak values

Ipeak = $\sqrt{2}$ x Irms

τ_e (ms) Time Constant

Time needed to reach 63% of target current level. It is a function of inductance and resistance. Generally, Ironless linear motors have a smaller time constant than Ironed linear motors, thus have a faster response.

Kw (N/$\sqrt{W}$) Motor Constant

A measure of motor efficiency, a higher Motor constant indicates that for the same power input, greater force is produced.

τ_p (mm) Pole Pitch

The distance between identical magnetic poles within the Stator, i.e. S-S or N-N, This is equivalent to the commutation cycle length.

R (Ω) Resistance

Motor coil three phase Line-to-Line resistance. Connecting the coils in parallel reduces the constant and Inductance but proportionally increases the amount of current required to achieve the same level of thrust. For copper coils there is a 0.393% increase in resistance for every 1℃ rise in temperature.

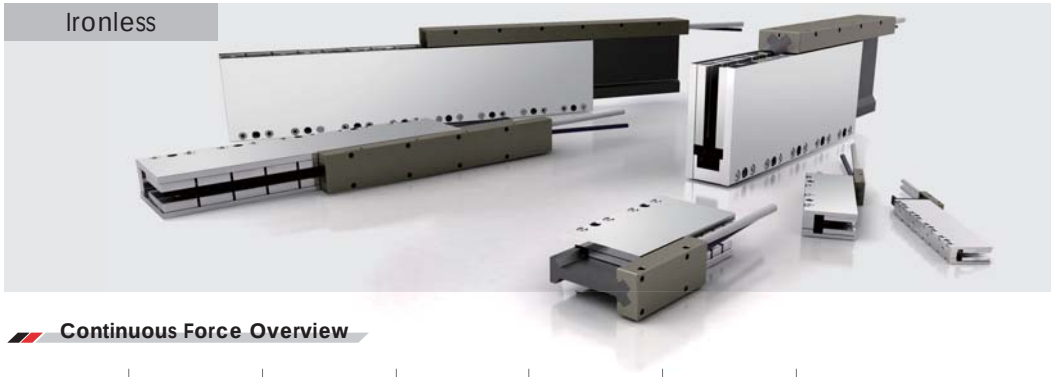
L (mH) Inductance

Motor three phase Line-to-Line inductance. The lower inductance represent the motor's electrical loop response is faster.

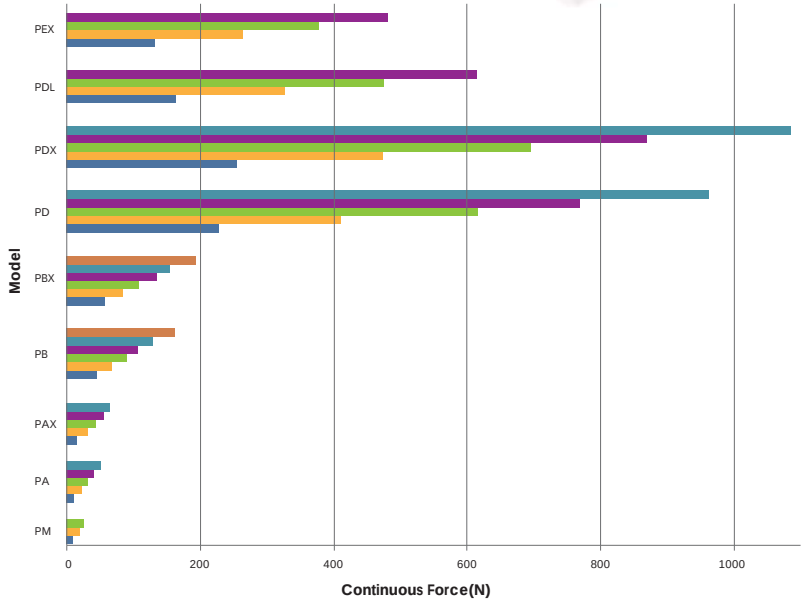
Rth (℃/W) Thermal Resistance

Heat rise of the coil per unit watt of power input. Generally, the smaller the thermal resistance the better the heat dissipation structure.

Ironless



Continuous Force Overview



Ordering Information

Coil Assembly

LM PA 1 W1 N NC 400

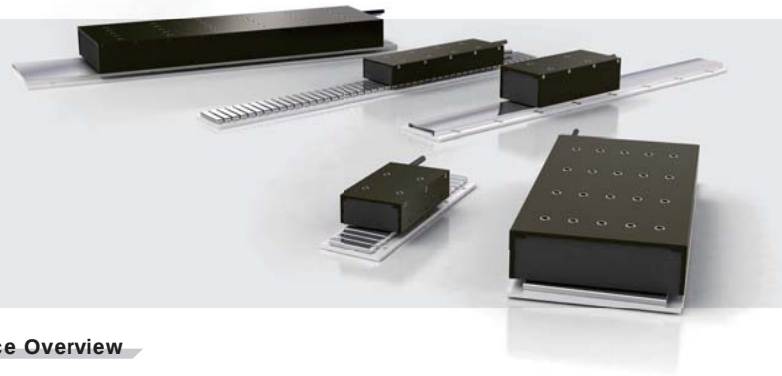
- **Cable Length** in mm (400mm Standard)
- **Cooling** NC - no cooling AC - air cooling
- **Halls** N - no hall sensor H - with hall sensor
- **Winding Type** W1-winding 1 W3-winding 3 W2-winding 2 W4-winding 4
- **Coil assembly count**
  - PM Type : 2.4.6
  - PA Type : 1.2.3.4.5
  - PA-X Type : 1.2.3.4.5
  - PB Type : 2.3.4.5.6.8
  - PB-X Type : 2.3.4.5.6.8
  - PD Type : 2.4.6.8.10
  - PD-X Type : 2.4.6.8.10
  - PDL Type : 2.4.6.8
  - PE-X Type : 2.4.6.8
- **Coil Assembly** PM series PA series PA-X series PB series PE-X series PB-X series PD series PD-X series PDL series
- **Linear Motor**

Magnetic Way

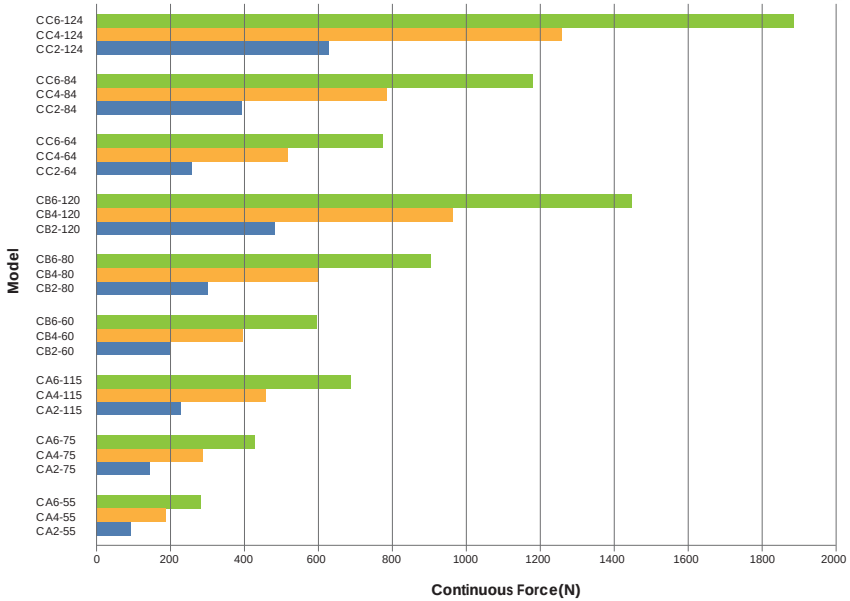
LM SA 0

- **Magnetic Way Length**
  - 0 - 120mm
  - 1 - 300mm
  - 2 - 480mm
- **Magnetic Way**
  - SM series
  - SA series SA-X series
  - SB series SB-X series
  - SD series SD-X series
  - SDL series SE-X series
- **Linear Motor**

Ironcore



Continuous Force Overview



Ordering Information

Coil Assembly

LM CA 2 75 S H NC 400

- **Cable Length** in mm (400mm Standard)
- **Cooling** NC - no cooling WC - water cooling
- **Halls** N - no hall sensor H - with hall sensor
- **Winding Type** S,SP,P,D
- **Assembly width** CC-64,84,124 、 CA-55,75,115 、 CB-60,80,120
- **Winding Quantity** 2 - 2 coils、4 - 4 coils、6 - 6 coils
- **Coil Assembly** CA series 、CB series 、CC series
- **Linear Motor**

Magnetic Way

LM MA 0 75 N

- **Magnet Protection** 1. N - None 2. S - Stainless Steel 3. E - Epoxy
- **Assembly width** CC-64,84,124 CA-55,75,115 CB-60,80,120
- **Magnetic Way Length**
  - 0-MA : 120 MB : 120 MC : 114
  - 1-MA : 360 MB : 300 MC : 304
  - 2-MA : 480 MB : 480 MC : 456
- **Magnetic Way** MA series 、MB series 、MC series
- **Linear Motor**

cpc also provides servo drives, optical linear scales and magnetic linear scale, for more details please contact cpc.

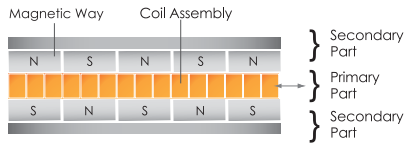
Ironless Linear Motor Series
PAT.

Ironless Linear Motors

Construction & Features

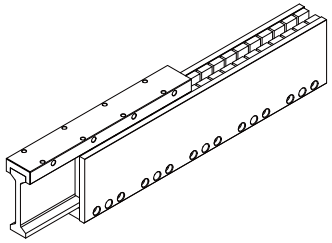
Provides fast acceleration with zero cogging for high velocities, super-smooth motion and superior position control.

Construction



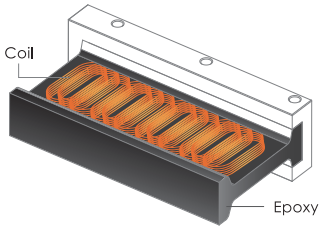
- cpc linear motors are composed of two pieces: a Coil Assembly (forcer) and a stationary Magnetic Way (Stator).
- The Coil Assembly is an ironless design, with the coils placed in a precisely molded resin shell.
- The Magnetic Way consists of two parallel steel plates with embedded rare-earth magnets facing each other. The two plates are joined at one end to create space for the Coil Assemblies to run.

Ironless advantages

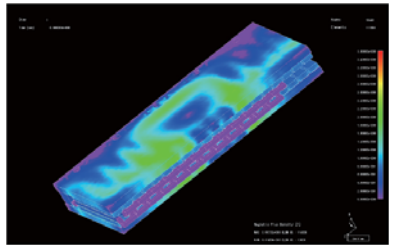


- **Magnetic Forces Contained**
  Magnetic Way consists of a balanced dual-magnet track, so there are no magnetic forces to deal with during assembly.
- **No Cogging**
  Ironless Coil Assembly results in zero cogging and super-smooth motion.
- **Low Weight Forcer**
  Absence of iron results in higher acceleration and deceleration rates as well as a higher mechanical bandwidth.
- **Wide Air Gap**
  Large air gap allows easy installation and alignment.

cpc Features

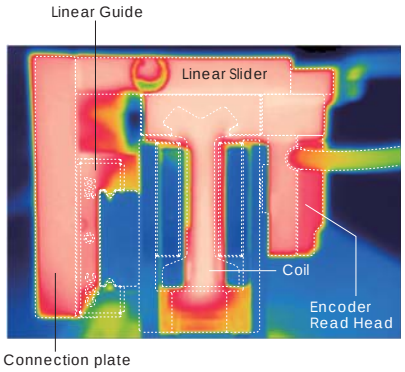


- cpc linear Motors are designed with overlapping coils to provide very high force density.
- cpc uses a vacuum-molding process to eliminate air bubbles from the finished epoxy mold. This results in a strengthened epoxy product with an enhanced lifetime.
- cpc linear motors are designed to have great dielectric strength, resulting in highly stable systems.
- cpc linear motors are very efficient at dissipating waste heat, allowing handling of larger currents for increased power.
- cpc For motor parameters, force constant refers to the amount of force produced per one ampere of current, while motor constant is the force produced per Watt and is representative of the motor's efficiency. As such the motor constant is a better metric at evaluating motor performance. cpc's linear motors have been designed with the aid of advanced simulation software. As a result, for a given dimension cpc's motor has a higher motor constant.



Linear Motor Thermal Analysis

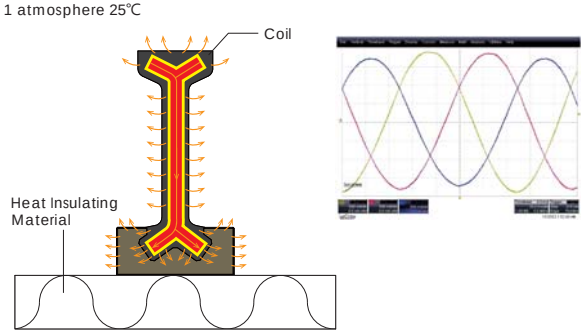
In a linear motor system, the slider, linear guide and base are all paths of heat dissipation for the coil. This also includes the natural air flow over the motor while it is in motion. The thermograph image on the right shows the overall linear motor system temperature distribution after reaching thermal equilibrium. It is obvious that the heat from the coil is dissipated through everything it is in contact with. To ease estimation of required heat sinking capacity, the cpc catalog provides separate continuous current values. One value assumes the motor is without a heat sink and second is with a heat sink of nominal size. Both conditions assume even three phase current distribution.



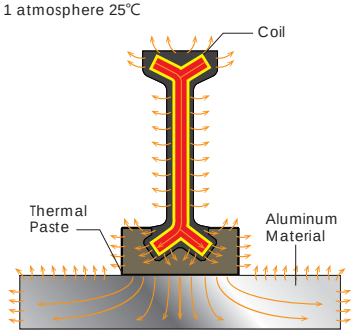
Stationary Measurements

The figure blow shows the method the test setup from which the “without heat sink”continuous current value is derived. The coil is placed on thermally insulating material with ambient air at 25℃ and 1 atmosphere of air pressure . Evenly cycled three phase current is injected into the coils and the level of current is increased until the coil reach 110℃ under thermal equilibrium.

The figure blow shows the method the test setup from which the “with heat sink”continuous current value is derived. The coil is placed on an aluminum plate with ambient air at 25℃ and 1 atmosphere of air pressure . Thermal conductive paste is applied between the interface of the coil and aluminum plate. Evenly cycled three phase current is injected into the coil and the level of current is increased until the coils reach 110℃ under thermal equilibrium.



“Without Heat Sink” Measurement Setup



“With Heat Sink” Measurement Setup

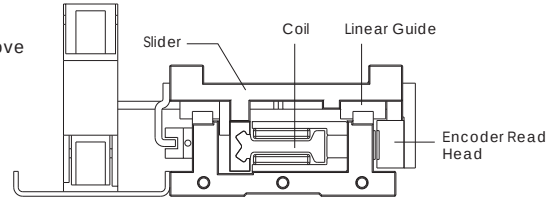
Dynamic System Measurement

Motion profile: Point to Point continuous move

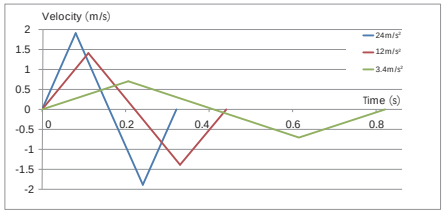
Travel: 150mm

Continuous Current：3.4A

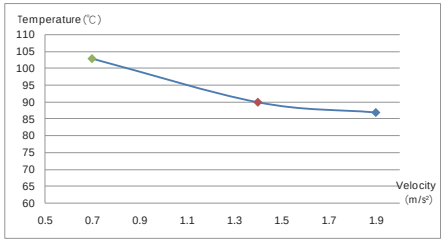
Slider Material: Aluminum (130x125x8mm)



The measurement result shows that, while the same amount of heat is produced. A fast moving motor coil is under a stronger air flow and reached a lower thermal equilibrium temperature.



Motion profile under different acceleration that utilizes has same continuous current.



Equilibrium temperature reached under varying maximum velocity for the same continuouscurrent.

Suggestion

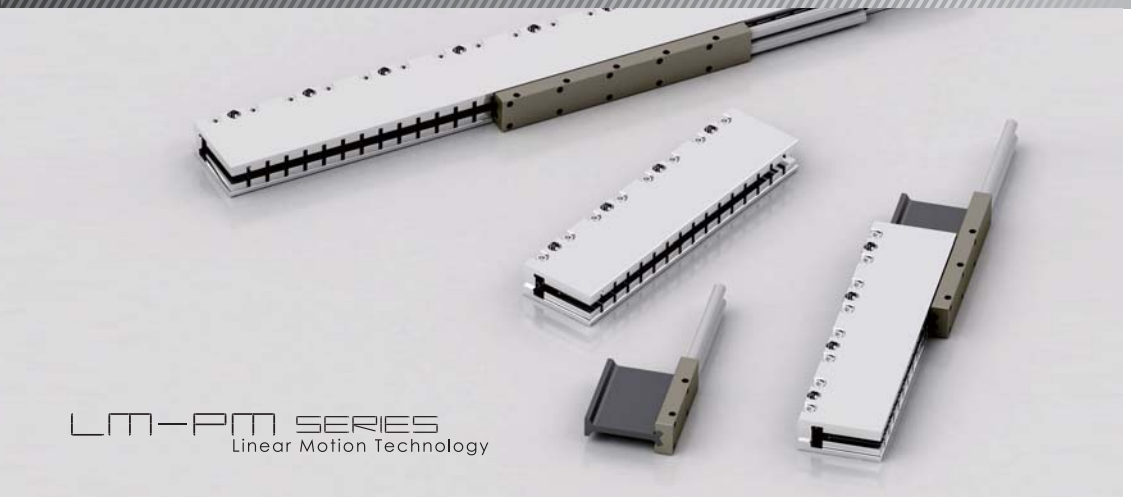
Unlike conventional rotary motors, linear motors are mechanically open systems due to the way external components are connected. Hence the continuous force the motor can achieve is highly dependent on heat dissipation structure, air convection under motion and other external factors. For example, ambient air pressure has the following relation with elevation above sea level:

P_h= 760 - (h/12.5)

P_h：Atmospheric pressure(torr)

h：Elevation above sea level (m)

As atmospheric pressure and thus density decrease with elevation, the convection cooling effect is reduced. As a general guide, the achievable continuous force under vacuum is 50% of that under one atmosphere. cpc suggests that for most application purposes, the “with heat sink” value is used as the main metric in motor sizing selection. Should the “without heat sink”value be used instead it would easily lead to over design.



LM-PM Coil Assembly Model

Coil Assembly Model	LM-PM2			LM-PM4			LM-PM6		
Winding code	W1	W2	W3	W1	W2	W3	W1	W2	W3
Performance[4]									
Peak Force with heat sink(N)[1][2]	37.0			74.0			102.1		
Peak Force without heat sink(N)[2][3]	26.6			53.3			71.0		
Continuous Force with heat sink(N)[1][2]	9.2			18.5			25.5		
Continuous Force without heat sink(N)[2][3]	6.7			13.3			17.8		
Peak power(W)[1][2]	230.0			460.0			584.0		
Continuous power(W)[1][2]	14.4			28.8			36.5		
Mechanical									
Coil assembly length(mm)	40			70			100		
Coil assembly weight(kg)[2]	0.04			0.07			0.10		
Magnetic way weight(kg/m)[2]	2.0			2.0			2.0		
Pole pitch(mm)	15			15			15		
Electrical[4]									
Continuous Current with heat sink(A_{pk})[1][2]	2.5	5	10	2.5	5	10	2.3	4.6	9.2
Continuous Current without heat sink(A_{pk})[2][3]	1.8	3.6	7.2	1.8	3.6	7.2	1.6	3.2	6.4
Peak Current with heat sink(A_{pk})[1][2]	10	20	40	10	20	40	9.2	18.4	36.8
Peak Current without heat sink(A_{pk})[2][3]	7.2	14.4	28.8	7.2	14.4	28.8	6.4	12.8	25.6
Force Constant(N/A_{pk})[2]	3.7	1.8	0.9	7.4	3.7	1.8	11.1	5.5	2.8
Back EMF Constant($V_{pk(l-l)}$ / m/s)[2]	4.3	2.2	1.1	8.6	4.3	2.2	12.9	6.5	3.2
Resistant(Ohms)[2]	2.3	0.6	0.1	4.6	1.2	0.3	6.9	1.7	0.4
Inductance(mH)[2]	0.09	0.02	0.01	0.18	0.04	0.01	0.3	0.07	0.02
Time Constant(ms)[2]	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Thermal Resistant with heat sink(°C/W)[1][2]	4.6			2.3			1.8		
Thermal Resistant without heat sink(°C/W)[2][3]	8.8			4.4			3.8		
Heat Sink(mm)	300x200x12			300x200x12			300x200x12		
Motor Constant(N/√W)[2]	2.4			3.4			4.2		
Ph-PE dielectric strength[2]	≥5KV(AC)			≥5KV(AC)			≥5KV(AC)		
Ph-PE insulation resistance[2]	≥1KV(DC)			≥1KV(DC)			≥1KV(DC)		

(1) The value applies to static sinusoidal drive, specific heat sink and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

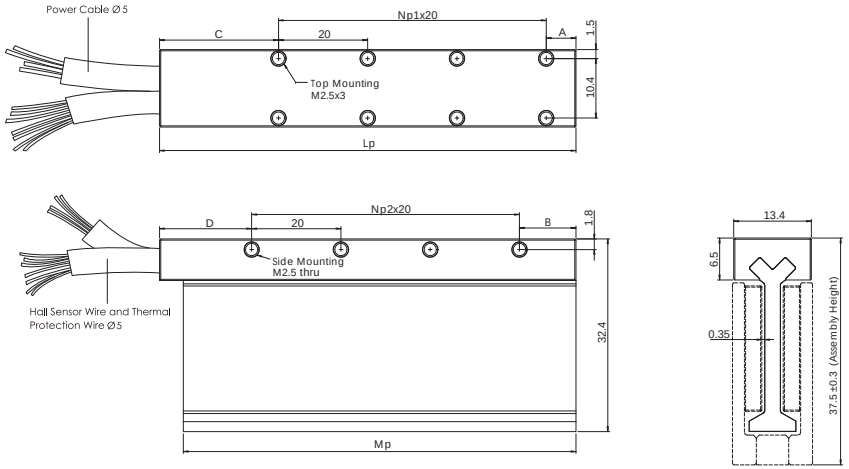
LM-PM Coil Assembly

	Np1	Np2	Lp	Mp	A	B	C	D
LM-PM2	1	1	40	35	3	6.5	17	13.5
LM-PM4	2	2	70	65	13	16.5	17	13.5
LM-PM6	4	4	100	95	3	6.5	17	13.5

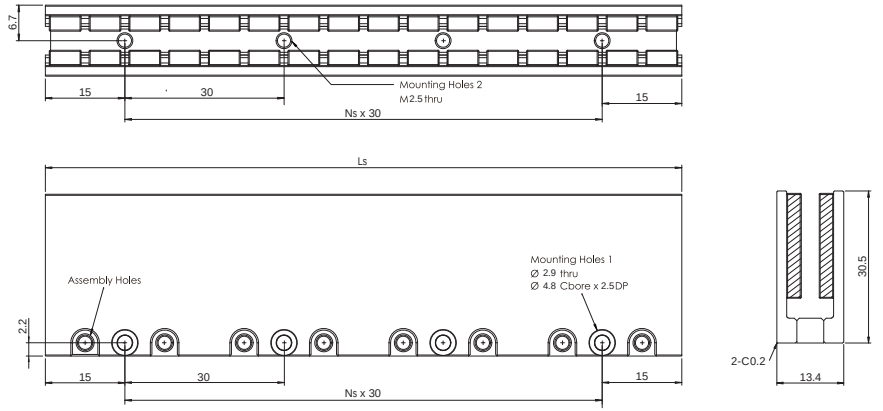
LM-SM Magnetic Way

	Ns	Ls
LM-SM0	3	120
LM-SM1	9	300
LM-SM2	15	480

LM-PM Coil Assembly

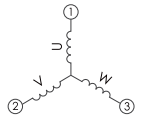


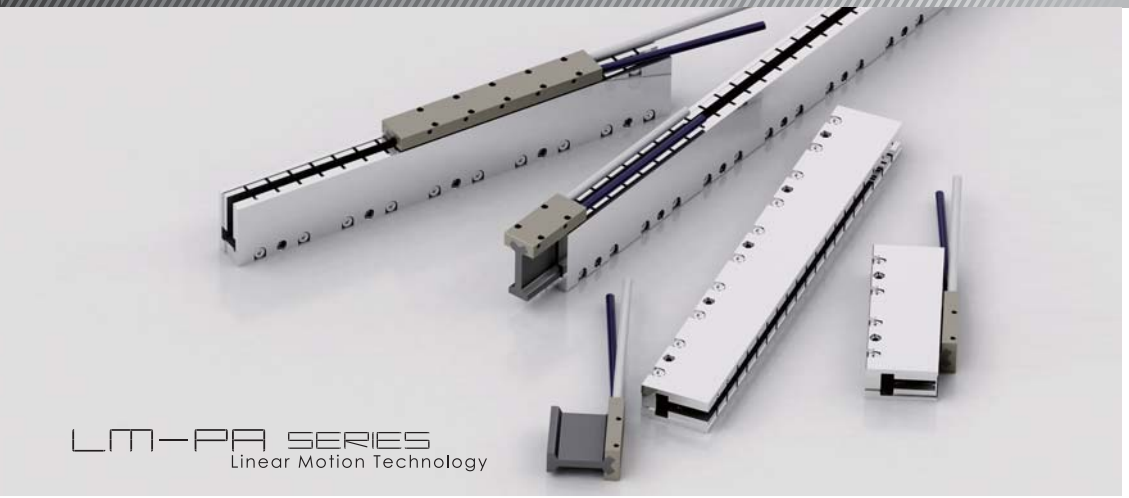
LM-SM Magnetic Way



OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White	U phase	0.25mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow	V phase	0.25mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown	W phase	0.25mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	0.25mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			





LM-PA Coil Assembly Model

Coil Assembly Model	LM-PA1	LM-PA2		LM-PA3		LM-PA4			LM-PA5	
Winding code	W1	W1	W2	W1	W2	W1	W2	W3	W1	W2
Performance[4]										
Peak Force with heat sink(N)[1][2]	47.7	90.4		128.1		160.7			200.9	
Peak Force without heat sink(N)[2][3]	30.1	60.3		90.4		110.5			138.1	
Continuous Force with heat sink(N)[1][2]	11.9	22.6		32		40.2			50.2	
Continuous Force without heat sink(N)[2][3]	7.5	15.1		22.6		27.6			34.5	
Peak power(W)[1][2]	421.6	756.9		1012.7		1196			1495	
Continuous power(W)[1][2]	26.4	47.3		63.3		74.8			93.4	
Mechanical										
Coil assembly length(mm)	50	80		110		140			170	
Coil assembly weight(kg)[2]	0.08	0.12		0.16		0.20			0.24	
Magnetic way weight(kg/m)[2]	4.4	4.4		4.4		4.4			4.4	
Pole pitch(mm)	30	30		30		30			30	
Electrical[4]										
Continuous Current with heat sink(A_{pk})[1][2]	1.9	1.8	3.6	1.7	3.4	1.6	3.2	6.4	1.6	3.2
Continuous Current without heat sink(A_{pk})[2][3]	1.2	1.2	2.4	1.2	2.4	1.1	2.2	4.4	1.1	2.2
Peak Current with heat sink(A_{pk})[1][2]	7.6	7.2	14.4	6.8	13.6	6.4	12.8	25.6	6.4	12.8
Peak Current without heat sink(A_{pk})[2][3]	4.8	4.8	9.6	4.8	9.6	4.4	8.8	17.6	4.4	8.8
Force Constant(N/A_{pk})[2]	6.3	12.6	6.3	18.8	9.4	25.1	12.6	6.3	31.4	15.7
Back EMF Constant($V_{pk(l-l)}$ / m/s)[2]	7.3	14.6	7.3	21.9	11	29.2	14.6	7.3	36.5	18.3
Resistant(Ohms)[2]	7.3	14.6	3.7	21.9	5.5	29.2	7.3	1.8	36.5	9.1
Inductance(mH)[2]	1.25	2.5	0.63	3.75	0.94	5	1.25	0.13	6.25	1.56
Time Constant(ms)[2]	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Thermal Resistant with heat sink(°C/W)[1][2]	2.7	1.6		1.3		1			0.7	
Thermal Resistant without heat sink(°C/W)[2][3]	6.8	3.9		2.7		2.2			1.7	
Heat Sink(mm)	250x250x25	250x250x25		250x250x25		250x250x25			250x250x25	
Motor Constant(N/√W)[2]	2.3	3.3		4.0		4.6			5.2	
Ph-PE dielectric strength[2]	≥ 5KV(AC)	≥ 5KV(AC)		≥ 5KV(AC)		≥ 5KV(AC)			≥ 5KV(AC)	
Ph-PE insulation resistance[2]	≥ 1KV(DC)	≥ 1KV(DC)		≥ 1KV(DC)		≥ 1KV(DC)			≥ 1KV(DC)	

(1) The value applies to static sinusoidal drive, specific heat sink and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

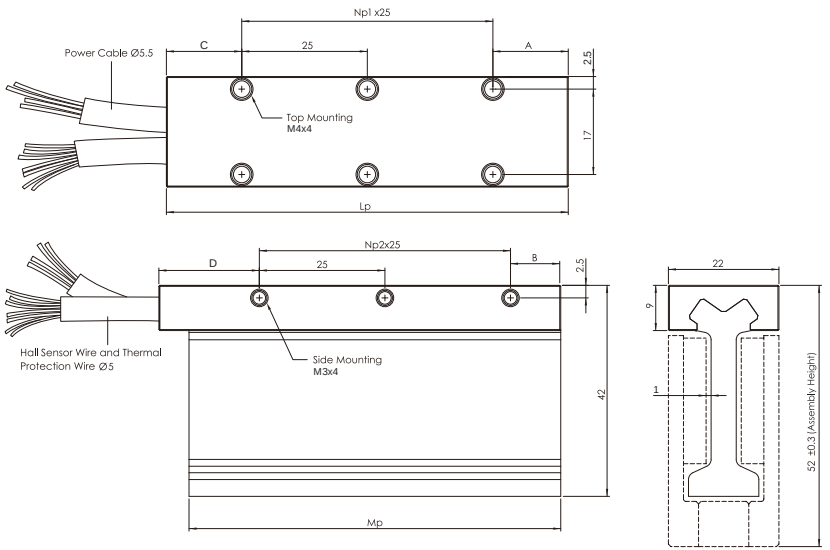
LM-PA Coil Assembly

	Np1	Np2	Lp	Mp	A	B	C	D
LM-PA1	1	1	50	44	10	5	15	20
LM-PA2	2	2	80	74	15	10	15	20
LM-PA3	3	3	110	104	20	15	15	20
LM-PA4	4	4	140	134	25	20	15	20
LM-PA5	6	5	170	164	5	25	15	20

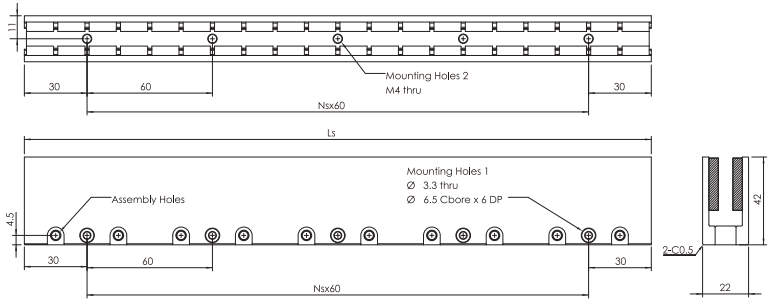
LM-SA Magnetic Way

	Ns	Ls
LM-SA0	1	120
LM-SA1	4	300
LM-SA2	7	480

LM-PA Coil Assembly

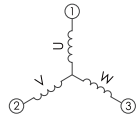


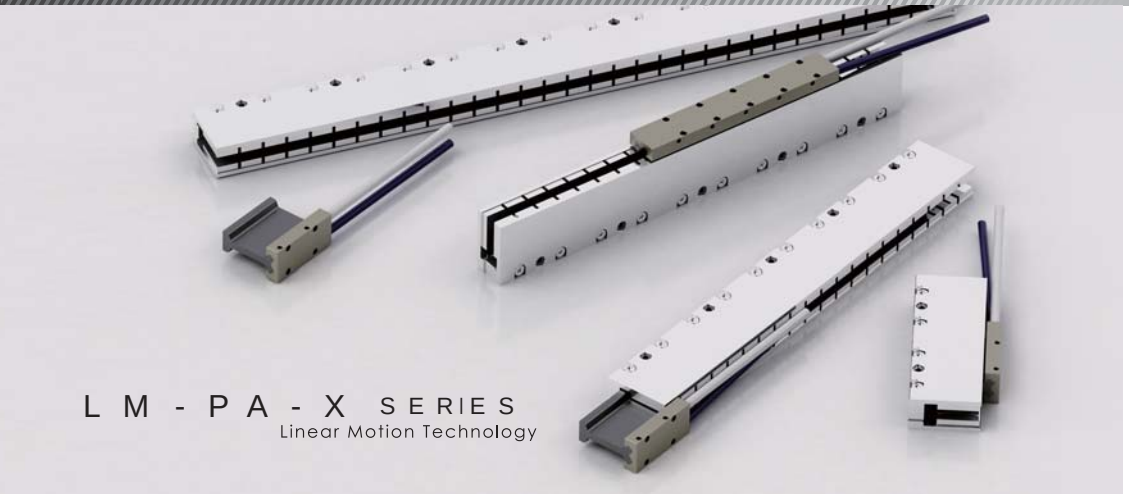
LM-SA Magnetic Way



OUTPUT CABLE (Cable standard length 400mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White	U phase	0.25mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow	V phase	0.25mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown	W phase	0.25mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	0.25mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			





LM-PA-X Coil Assembly Model

Coil Assembly Model	LM-PA-X1	LM-PA-X2		LM-PA-X3		LM-PA-X4			LM-PA-X5	
Winding code	W1	W1	W2	W1	W2	W1	W2	W3	W1	W2
Performance[4]										
Peak Force with heat sink(N)[1][2]	65.4	123.8		175.4		220.2			258	
Peak Force without heat sink(N)[2][3]	44.7	82.6		113.5		151.4			189.2	
Continuous Force with heat sink(N)[1][2]	16.3	31		43.9		55			64.5	
Continuous Force without heat sink(N)[2][3]	11.2	20.6		28.4		37.8			47.3	
Peak power(W)[1][2]	491	881.3		1179.1		1392.6			1537.2	
Continuous power(W)[1][2]	30.7	55.1		73.7		87			96.1	
Mechanical										
Coil assembly length(mm)	50	80		110		140			170	
Coil assembly weight(kg)[2]	0.08	0.13		0.18		0.23			0.28	
Magnetic way weight(kg/m)[2]	4.4	4.4		4.4		4.4			4.4	
Pole pitch(mm)	30	30		30		30			30	
Electrical[4]										
Continuous Current with heat sink(A_{pk})[1][2]	1.9	1.8	3.6	1.7	3.4	1.6	3.2	6.4	1.5	3
Continuous Current without heat sink(A_{pk})[2][3]	1.3	1.2	2.4	1.1	2.2	1.1	2.2	4.4	1.1	2.2
Peak Current with heat sink(A_{pk})[1][2]	7.6	7.2	14.4	6.8	13.6	6.4	12.8	25.6	6	12
Peak Current without heat sink(A_{pk})[2][3]	5.2	4.8	9.6	4.4	8.8	4.4	8.8	17.6	4.4	8.8
Force Constant(N/A_{pk})[2]	8.6	17.2	8.6	25.8	12.9	34.4	17.2	8.6	43	21.5
Back EMF Constant($V_{pk(l-l)}$ / m/s)[2]	10	20	10	30	15	40	20	10	50	25
Resistant(Ohms)[2]	8.5	17	4.3	25.5	6.4	34	8.5	2.1	42.7	10.7
Inductance(mH)[2]	1.65	3.3	0.83	4.95	1.24	6.6	1.65	0.41	8.27	2.07
Time Constant(ms)[2]	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Thermal Resistant with heat sink(°C/W)[1][2]	2.5	1.5		1.1		0.9			0.7	
Thermal Resistant without heat sink(°C/W)[2][3]	4.9	3.5		2.7		2			1.6	
Heat Sink(mm)	250x250x25	250x250x25		250x250x25		250x250x25			250x250x25	
Motor Constant(N/√W)[2]	2.9	4.2		5.1		5.9			6.6	
Ph-PE dielectric strength[2]	≥5KV(AC)	≥5KV(AC)		≥5KV(AC)		≥5KV(AC)			≥5KV(AC)	
Ph-PE insulation resistance[2]	≥1KV(DC)	≥1KV(DC)		≥1KV(DC)		≥1KV(DC)			≥1KV(DC)	

(1) The value applies to static sinusoidal drive, specific heat sink and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

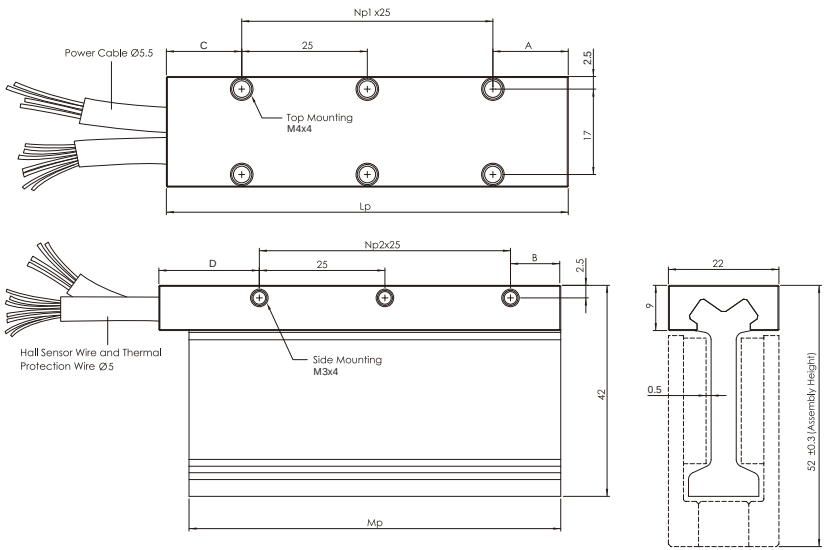
LM-PA-X Coil Assembly

	Np1	Np2	Lp	Mp	A	B	C	D
LM-PA-X1	1	1	50	44	10	5	15	20
LM-PA-X2	2	2	80	74	15	10	15	20
LM-PA-X3	3	3	110	104	20	15	15	20
LM-PA-X4	4	4	140	134	25	20	15	20
LM-PA-X5	6	5	170	164	5	25	15	20

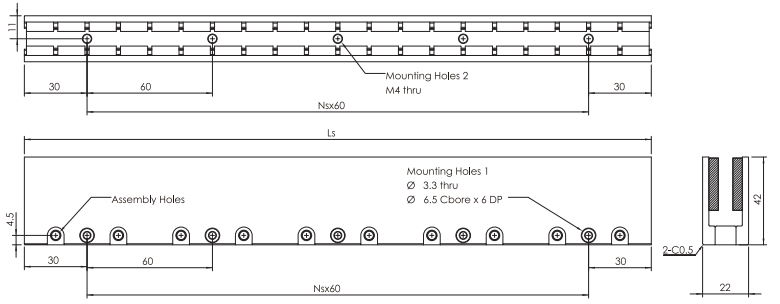
LM-SA-X Magnetic Way

	Ns	Ls
LM-SA-X0	1	120
LM-SA-X1	4	300
LM-SA-X2	7	480

LM-PA-X Coil Assembly

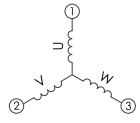


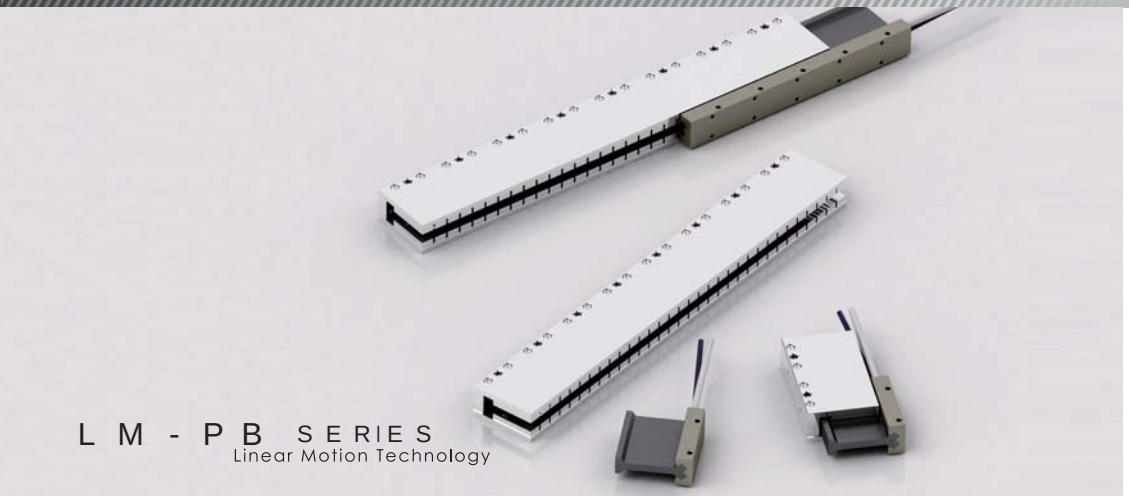
LM-SA-X Magnetic Way



OUTPUT CABLE (Cable standard length 400mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White	U phase	0.25mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow	V phase	0.25mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown	W phase	0.25mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	0.25mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			





LM-PB Coil Assembly Model

Coil Assembly Model	LM-PB2		LM-PB3		LM-PB4			LM-PB5		LM-PB6		LM-PB8			
Winding code	W1	W2	W1	W2	W1	W2	W3	W1	W2	W1	W2	W1	W2	W3	W4
Performance[4]															
Peak Force with heat sink(N)[1][2]	180.3		270.4		360.5			428.1		513.7		648.9			
Peak Force without heat sink(N)[2][3]	118.3		166.4		207.1			240.4		288.4		468.5			
Continuous Force with heat sink(N)[1][2]	45.1		67.6		90.1			107		128.4		162.2			
Continuous Force without heat sink(N)[2][3]	29.6		41.6		51.8			60.1		72.1		117.1			
Peak power(W)[1][2]	960		1440		1920			2166		2599.2		3110.4			
Continuous power(W)[1][2]	60		90		120			135.4		162.5		194.4			
Mechanical															
Coil assembly length(mm)	80		110		140			170		200		260			
Coil assembly weight(kg)[2]	0.31		0.43		0.54			0.66		0.78		0.9			
Magnetic way weight(kg/m)[2]	11.8		11.8		11.8			11.8		11.8		11.8			
Electrical cycle length(mm)	30		30		30			30		30		30			
Electrical[4]															
Continuous Current with heat sink(A_{pk})[1][2]	2	4	2	4	2	4	8	1.9	3.8	1.9	3.8	1.8	3.6	7.2	14.4
Continuous Current without heat sink(A_{pk})[2][3]	1.6	3.2	1.5	3	1.4	2.8	5.6	1.3	2.6	1.3	2.6	1.3	2.6	5.2	10.4
Peak Current with heat sink(A_{pk})[1][2]	8	16	8	16	8	16	32	7.6	15.2	7.6	15.2	7.2	14.4	28.8	57.6
Peak Current without heat sink(A_{pk})[2][3]	6.4	12.8	6	12	5.6	11.2	22.4	5.2	10.4	5.2	10.4	5.2	10.4	20.8	41.6
Force Constant(N/A_{pk})[2]	22.5	11.3	33.8	16.9	45.1	22.5	11.3	56.3	28.2	67.6	33.8	90.1	45.1	22.5	11.3
Back EMF Constant($V_{pk(l-l)}$ / m/s)[2]	26.2	13.1	39.3	19.7	52.4	26.2	13.1	65.5	32.8	78.6	39.3	104.8	52.4	26.2	13.1
Resistant(Ohms)[2]	15	3.8	22.5	5.6	30	7.5	1.9	37.5	9.4	45	11.3	60	15	3.8	0.9
Inductance(mH)[2]	3.5	0.88	5.25	1.31	7	1.75	0.44	8.75	2.19	10.5	2.63	14	3.5	0.88	0.22
Time Constant(ms)[2]	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Thermal Resistant with heat sink(°C/W)[1][2]	1.3		0.9		0.8			0.6		0.5		0.5			
Thermal Resistant without heat sink(°C/W)[2][3]	2.1		1.7		1.5			1.3		1.1		0.8			
Heat Sink(mm)	250x250x25		250x250x25		250x250x25			250x250x25		250x250x25		250x250x25			
Motor Constant(N/√W)[2]	5.8		7.1		8.2			9.2		10.1		11.6			
Ph-PE dielectric strength[2]	≥ 5KV(AC)		≥ 5KV(AC)		≥ 5KV(AC)			≥ 5KV(AC)		≥ 5KV(AC)		≥ 5KV(AC)			
Ph-PE insulation resistance[2]	≥ 1KV(DC)		≥ 1KV(DC)		≥ 1KV(DC)			≥ 1KV(DC)		≥ 1KV(DC)		≥ 1KV(DC)			

(1) The value applies to static sinusoidal drive, specific heat sink and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

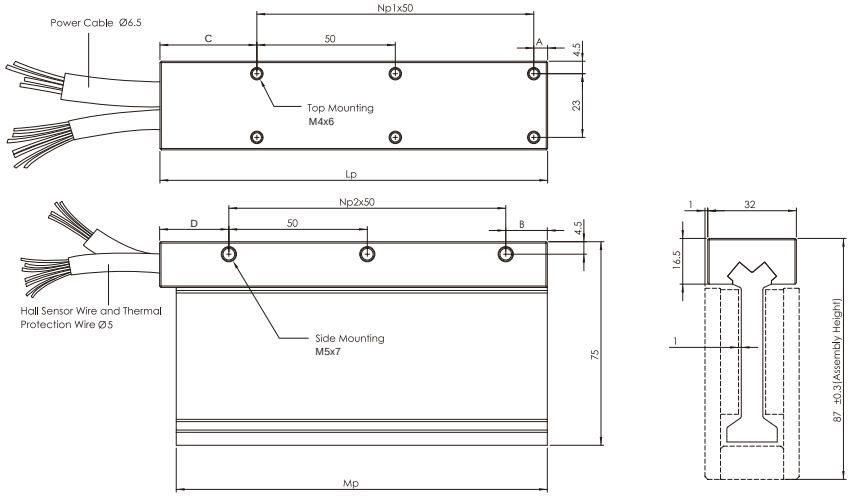
LM-PB Coil Assembly

	Np1	Np2	Lp	Mp	A	B	C	D
LM-PB2	1	1	80	74	5	10	25	20
LM-PB3	1	1	110	104	25	35	35	25
LM-PB4	2	2	140	134	5	15	35	25
LM-PB5	2	2	170	164	35	45	35	25
LM-PB6	3	3	200	194	15	25	35	25
LM-PB8	4	4	260	254	25	35	35	25

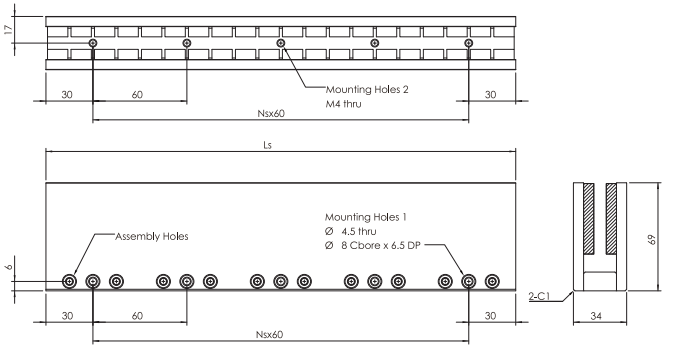
LM-SB Magnetic Way

	Ns	Ls
LM-SB0	1	120
LM-SB1	4	300
LM-SB2	7	480

LM-PB Coil Assembly

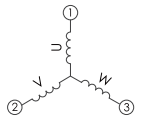


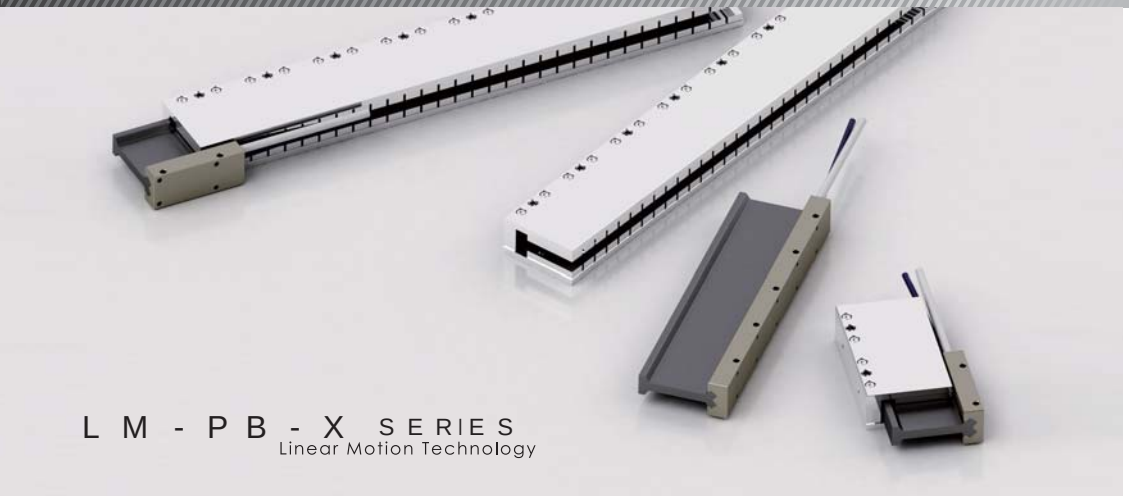
LM-SB Magnetic Way



OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White	U phase	0.5 mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow	V phase	0.5 mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown	W phase	0.5 mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	0.5 mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			





L M - P B - X SERIES
Linear Motion Technology

LM-PB-X Coil Assembly Model

Coil Assembly Model	LM-PB-X2		LM-PB-X3		LM-PB-X4			LM-PB-X5		LM-PB-X6		LM-PB-X8			
Winding code	W1	W2	W1	W2	W1	W2	W3	W1	W2	W1	W2	W1	W2	W3	W4
Performance[4]															
Peak Force with heat sink(N)[1][2]	227		340.6		431.4			539.2		613		771.9			
Peak Force without heat sink(N)[2][3]	170.3		238.4		295.2			368.9		442.7		590.3			
Continuous Force with heat sink(N)[1][2]	56.8		85.1		107.8			134.8		153.3		193			
Continuous Force without heat sink(N)[2][3]	42.6		59.6		73.8			92.2		110.7		147.6			
Peak power(W)[1][2]	1056		1584		1906.1			2382.6		2566.1		3051.8			
Continuous power(W)[1][2]	66		99		119.1			148.9		160.4		190.7			
Mechanical															
Coil assembly length(mm)	80		110		140			170		200		260			
Coil assembly weight(kg)[2]	0.33		0.44		0.55			0.72		0.9		1.09			
Magnetic way weight(kg/m)[2]	12.2		12.2		12.2			12.2		12.2		12.2			
Electrical cycle length(mm)	30		30		30			30		30		30			
Electrical[4]															
Continuous Current with heat sink(A_{pk})[1][2]	2	4	2	4	1.9	3.8	7.6	1.9	3.8	1.8	3.6	1.7	3.4	6.8	13.6
Continuous Current without heat sink(A_{pk})[2][3]	1.5	3	1.4	2.8	1.3	2.6	5.2	1.3	2.6	1.3	2.6	1.3	2.6	5.2	10.4
Peak Current with heat sink(A_{pk})[1][2]	8	16	8	16	7.6	15.2	30.4	7.6	15.2	7.2	14.4	6.8	13.6	27.7	54.4
Peak Current without heat sink(A_{pk})[2][3]	6	12	5.6	11.2	5.2	10.4	20.8	5.2	10.4	5.2	10.4	5.2	10.4	20.8	41.6
Force Constant(N/A_{pk})[2]	28.4	14.2	42.6	21.3	56.8	28.4	14.2	71	35.5	85.1	42.6	113.5	56.8	28.4	14.2
Back EMF Constant($V_{pk(l-l)}$ / m/s)[2]	33	16.5	49.5	24.8	66	33	16.5	82.5	41.3	99	49.5	132	66	33	16.5
Resistant(Ohms)[2]	16.5	4.1	24.8	6.2	33	8.3	2.1	41.3	10.3	49.5	12.4	66	16.5	4.1	1
Inductance(mH)[2]	5.74	1.44	8.61	2.15	11.48	2.87	0.72	14.35	3.59	17.22	4.31	22.96	5.74	1.44	0.36
Time Constant(ms)[2]	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Thermal Resistant with heat sink(°C/W)[1][2]	1.1		0.8		0.7			0.6		0.5		0.4			
Thermal Resistant without heat sink(°C/W)[2][3]	1.9		1.6		1.4			1.2		1		0.7			
Heat Sink(mm)	250x250x25		250x250x25		250x250x25			250x250x25		250x250x25		250x250x25			
Motor Constant(N/√W)[2]	7		8.6		9.9			11		12.1		14			
Ph-PE dielectric strength[2]	≥ 5KV(AC)		≥ 5KV(AC)		≥ 5KV(AC)			≥ 5KV(AC)		≥ 5KV(AC)		≥ 5KV(AC)			
Ph-PE insulation resistance[2]	≥ 1KV(DC)		≥ 1KV(DC)		≥ 1KV(DC)			≥ 1KV(DC)		≥ 1KV(DC)		≥ 1KV(DC)			

(1) The value applies to static sinusoidal drive, specific heat sink and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

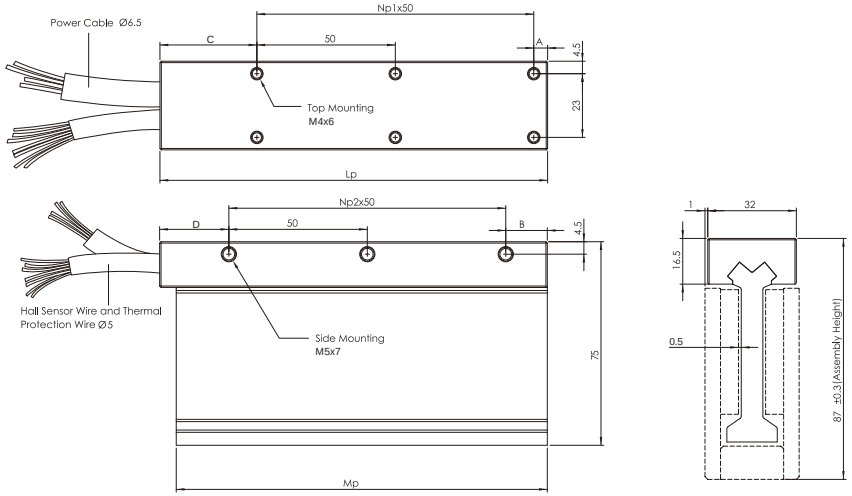
LM-PB-X Coil Assembly

	Np1	Np2	Lp	Mp	A	B	C	D
LM-PB-X2	1	1	80	74	5	10	25	20
LM-PB-X3	1	1	110	104	25	35	35	25
LM-PB-X4	2	2	140	134	5	15	35	25
LM-PB-X5	2	2	170	164	35	45	35	25
LM-PB-X6	3	3	200	194	15	25	35	25
LM-PB-X8	4	4	260	254	25	35	35	25

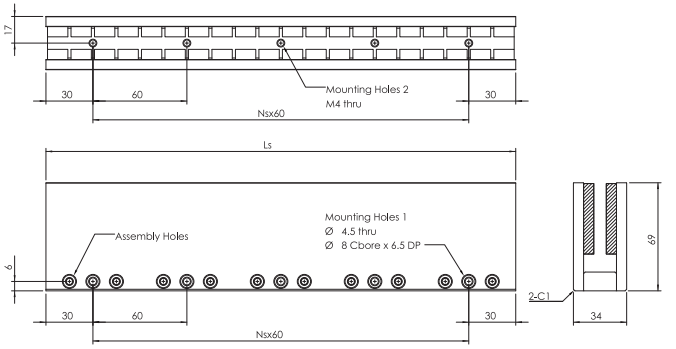
LM-SB-X Magnetic Way

	Ns	Ls
LM-SB-X0	1	120
LM-SB-X1	4	300
LM-SB-X2	7	480

LM-PB-X Coil Assembly

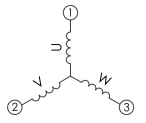


LM-SB-X Magnetic Way



OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White	U phase	0.5 mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow	V phase	0.5 mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown	W phase	0.5 mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	0.5 mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			



LM-PD Coil Assembly Model

Coil Assembly Model	LM-PD2		LM-PD4			LM-PD6			LM-PD8			LM-PD10		
Winding code	W1	W2	W1	W2	W3	W1	W2	W3	W1	W2	W3	W1	W2	W3
Performance[4]														
Peak Force with heat sink(N)[1][2]	908.7		1642.7			2464			3075.6			3844.5		
Peak Force without heat sink(N)[2][3]	699		1258.2			1887.3			2376.6			2796		
Continuous Force with heat sink(N)[1][2]	227.2		410.7			616			768.9			961.1		
Continuous Force without heat sink(N)[2][3]	174.8		314.6			471.8			594.2			699		
Peak power(W)[1][2]	2812.2		4594.7			6892.1			8053.8			10067.2		
Continuous power(W)[1][2]	175.8		287.2			430.8			503.4			629.2		
Mechanical														
Coil assembly length(mm)	146		266			386			506			626		
Coil assembly weight(kg)[2]	1.3		2.5			3.7			4.9			6.1		
Magnetic way weight(kg/m)[2]	29.8		29.8			29.8			29.8			29.8		
Electrical cycle length(mm)	60		60			60			60			60		
Electrical[4]														
Continuous Current with heat sink(A_{pk})[1][2]	2.6	5.2	2.4	4.7	9.4	2.4	4.7	14.4	2.2	4.4	8.8	2.2	4.4	11.0
Continuous Current without heat sink(A_{pk})[2][3]	2	4	1.8	3.6	7.2	1.8	3.6	10.8	1.7	3.4	6.8	1.6	3.2	8.0
Peak Current with heat sink(A_{pk})[1][2]	10.4	20.8	9.4	18.8	37.6	9.4	18.8	56.4	8.8	17.6	35.2	8.8	17.6	44.0
Peak Current without heat sink(A_{pk})[2][3]	8	16	7.2	14.4	28.8	7.2	14.4	43.2	6.8	13.6	27.2	6.4	12.8	32.0
Force Constant(N/A_{pk})[2]	87.4	43.7	174.8	87.4	43.7	262.1	131.1	43.7	349.5	174.8	87.4	436.9	218.4	87.4
Back EMF Constant($V_{pk(l-l)}$ / m/s)[2]	101.6	50.8	203.2	101.6	50.8	304.8	152.4	50.8	406.4	203.2	101.6	508	254	101.6
Resistant(Ohms)[2]	26	6.5	52	13	3.3	78	19.5	2.2	104	26	6.5	130	32.5	5.3
Inductance(mH)[2]	26.4	6.6	52	13.2	3.3	79	19.8	2.2	105.6	26.4	6.6	132	33	5.3
Time Constant(ms)[2]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Thermal Resistant with heat sink(°C/W)[1][2]	0.4		0.3			0.2			0.2			0.1		
Thermal Resistant without heat sink(°C/W)[2][3]	0.7		0.5			0.3			0.3			0.2		
Heat Sink(mm)	800x900x12		800x900x12			800x900x12			800x900x12			800x900x12		
Motor Constant(N/√W)[2]	17.1		24.2			29.7			34.3			38.3		
Ph-PE dielectric strength[2]	≥ 5KV(AC)		≥ 5KV(AC)			≥ 5KV(AC)			≥ 5KV(AC)			≥ 5KV(AC)		
Ph-PE insulation resistance[2]	≥ 1KV(DC)		≥ 1KV(DC)			≥ 1KV(DC)			≥ 1KV(DC)			≥ 1KV(DC)		

(1) The value applies to static sinusoidal drive, specific heat sink and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

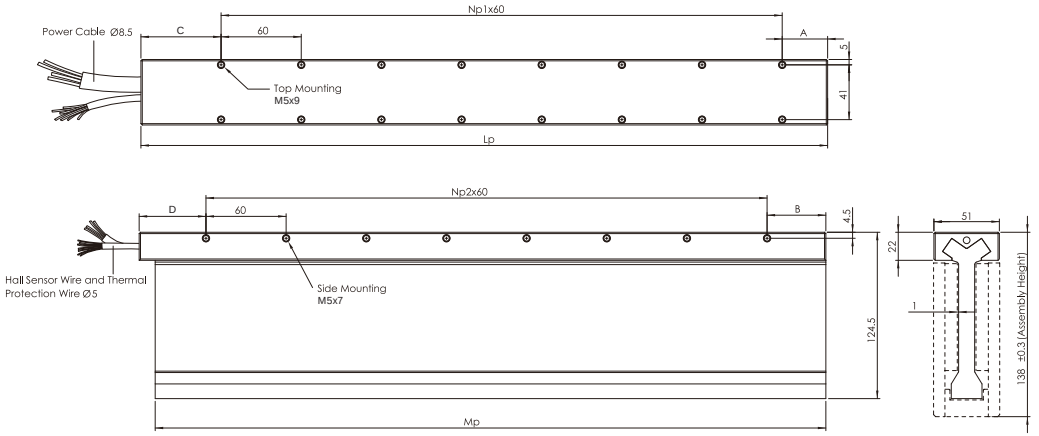
LM-PD Coil Assembly

	Np1	Np2	Lp	Mp	A	B	C	D
LM-PD2	1	1	146	143	26	36	60	50
LM-PD4	3	3	266	263	26	36	60	50
LM-PD6	5	5	386	383	26	36	60	50
LM-PD8	7	7	506	503	26	36	60	50
LM-PD10	9	9	626	623	26	36	60	50

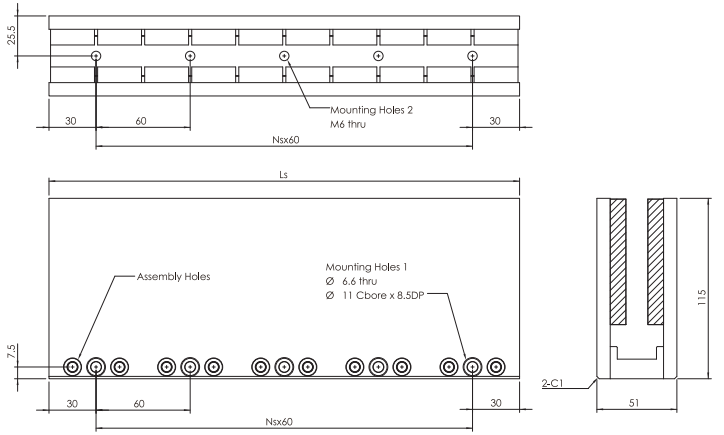
LM-SD Magnetic Way

	Ns	Ls
LM-SD0	1	120
LM-SD1	4	300
LM-SD2	7	480

LM-PD Coil Assembly

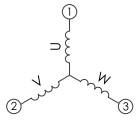


LM-SD Magnetic Way



OUTPUT CABLE (Cable standard length 400mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow (2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			



LM-PD-X Coil Assembly Model

Coil Assembly Model	LM-PD-X2		LM-PD-X4			LM-PD-X6			LM-PD-X8			LM-PD-X10		
Winding code	W1	W2	W1	W2	W3	W1	W2	W3	W1	W2	W3	W1	W2	W3
Performance[4]														
Peak Force with heat sink(N)[1][2]	1025		1892.3			2779.3			3469.2			4336.5		
Peak Force without heat sink(N)[2][3]	709.6		1419.2			2069.7			2680.7			3153.8		
Continuous Force with heat sink(N)[1][2]	256.2		473.1			694.8			867.3			1084.1		
Continuous Force without heat sink(N)[2][3]	177.4		354.8			517.4			670.2			788.4		
Peak power(W)[1][2]	3028.5		5161			7422.2			8673.3			10841.6		
Continuous power(W)[1][2]	189.3		322.6			463.9			542.1			677.6		
Mechanical														
Coil assembly length(mm)	146		266			386			506			626		
Coil assembly weight(kg)[2]	1.3		2.8			4.3			5.8			7.3		
Magnetic way weight(kg/m)[2]	29.8		29.8			29.8			29.8			29.8		
Electrical cycle length(mm)	60		60			60			60			60		
Electrical[4]														
Continuous Current with heat sink(A_{pk})[1][2]	2.6	5.2	2.4	4.7	9.6	2.4	4.7	14.4	2.2	4.4	8.8	2.2	4.4	11.0
Continuous Current without heat sink(A_{pk})[2][3]	1.8	3.6	1.8	3.6	7.2	1.8	3.5	10.8	1.7	3.4	6.8	1.6	3.2	8.0
Peak Current with heat sink(A_{pk})[1][2]	10.4	20.8	9.6	19.2	38.4	9.4	18.8	56.4	8.8	17.6	35.2	8.8	17.6	44.0
Peak Current without heat sink(A_{pk})[2][3]	7.2	14.4	7.2	14.4	28.8	7	14	42	6.8	13.6	27.2	6.4	12.8	32.0
Force Constant(N/A_{pk})[2]	98.6	49.3	197.1	98.6	49.3	295.7	147.8	49.3	394.2	197.1	98.6	492.8	246.4	98.6
Back EMF Constant($V_{pk(l-l)}$ / m/s)[2]	114.6	57.3	229.2	114.6	57.3	343.8	171.9	57.3	458.4	229.2	114.6	573	286.5	114.6
Resistant(Ohms)[2]	28	7	56	14	3.5	84	21	2.3	112	28	7	140	35	5.6
Inductance(mH)[2]	30.32	7.58	60.64	15.16	3.79	90.96	22.74	2.53	121.28	30.32	7.58	151.6	37.9	6.06
Time Constant(ms)[2]	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Thermal Resistant with heat sink(°C/W)[1][2]	0.4		0.3			0.2			0.2			0.1		
Thermal Resistant without heat sink(°C/W)[2][3]	0.8		0.4			0.3			0.2			0.2		
Heat Sink(mm)	800x900x12		800x900x12			800x900x12			800x900x12			800x900x12		
Motor Constant(N/√W)[2]	18.6		26.3			32.3			37.3			41.6		
Ph-PE dielectric strength[2]	≥ 5KV(AC)		≥ 5KV(AC)			≥ 5KV(AC)			≥ 5KV(AC)			≥ 5KV(AC)		
Ph-PE insulation resistance[2]	≥ 1KV(DC)		≥ 1KV(DC)			≥ 1KV(DC)			≥ 1KV(DC)			≥ 1KV(DC)		

(1) The value applies to static sinusoidal drive, specific heat sink and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

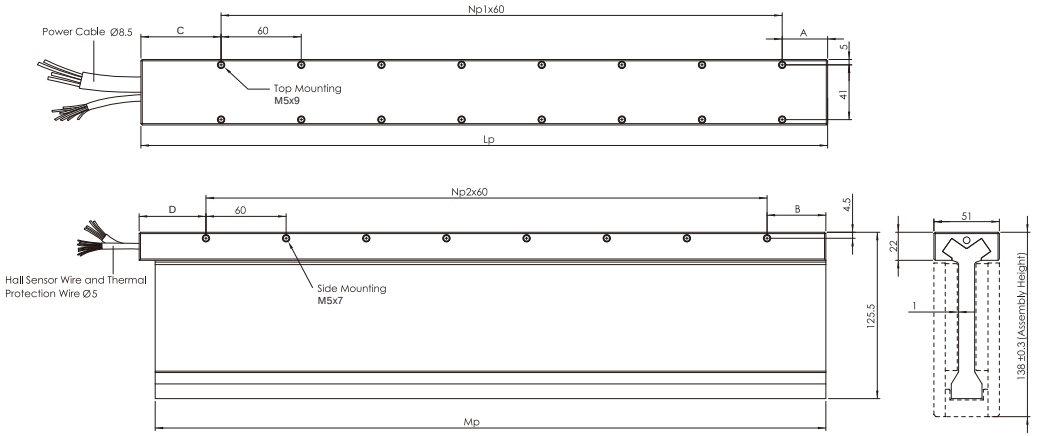
LM-PD-X Coil Assembly

	Np1	Np2	Lp	Mp	A	B	C	D
LM-PD-X2	1	1	146	143	26	36	60	50
LM-PD-X4	3	3	266	263	26	36	60	50
LM-PD-X6	5	5	386	383	26	36	60	50
LM-PD-X8	7	7	506	503	26	36	60	50
LM-PD-X10	9	9	626	623	26	36	60	50

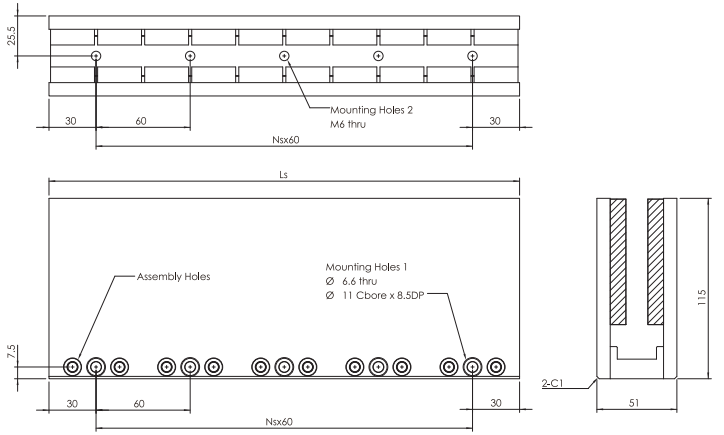
LM-SD-X Magnetic Way

	Ns	Ls
LM-SD-X0	1	120
LM-SD-X1	4	300
LM-SD-X2	7	480

LM-PD-X Coil Assembly

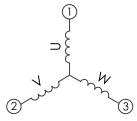


LM-SD-X Magnetic Way



OUTPUT CABLE (Cable standard length 400mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow (2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			



LM-PDL Coil Assembly Model

Coil Assembly Model	LM-PDL2			LM-PDL4			LM-PDL6			LM-PDL8		
Winding code	W1	W2	W3	W1	W2	W3	W1	W2	W3	W1	W2	W3
Performance[4]												
Peak Force with heat sink(N)[1][2]	657.2			1305.3			1900.3			2457.0		
Peak Force without heat sink(N)[2][3]	502.2			998.2			1382.1			1842.7		
Continuous Force with heat sink(N)[1][2]	164.4			326.3			475.1			614.2		
Continuous Force without heat sink(N)[2][3]	125.7			249.5			345.5			460.7		
Peak power(W)[1][2]	1294.7			2589.4			3659.0			4587.5		
Continuous power(W)[1][2]	80.9			161.8			228.7			286.7		
Mechanical												
Coil assembly length(mm)	148.0			268.0			388.0			508.0		
Coil assembly weight(kg)[2]	1.6			2.6			3.6			4.6		
Magnetic way weight(kg/m)[2]	25.1			25.1			25.1			25.1		
Electrical cycle length(mm)	60.0			60.0			60.0			60.0		
Electrical[4]												
Continuous Current with heat sink(A_{pk})[1][2]	1.7	3.4	6.8	1.7	3.4	6.8	1.7	3.3	10.2	1.6	3.3	6.6
Continuous Current without heat sink(A_{pk})[2][3]	1.3	2.6	5.2	1.3	2.6	5.2	1.2	2.4	7.2	1.2	2.4	4.8
Peak Current with heat sink(A_{pk})[1][2]	6.8	13.6	27.2	6.8	13.6	27.2	6.6	13.2	39.6	6.4	12.8	25.6
Peak Current without heat sink(A_{pk})[2][3]	5.2	10.4	20.8	5.2	10.4	20.8	4.8	9.6	28.8	4.8	9.6	19.2
Force Constant(N/A_{pk})[2]	96.7	48.4	24.2	192.0	96.0	48.0	287.9	144.0	48.0	383.9	192.0	96.0
Back EMF Constant($V_{pk(l-l)}$ / m/s)[2]	111.6	57.3	28.7	223.2	111.6	55.8	334.8	167.4	55.8	446.4	223.2	111.6
Resistant(Ohms)[2]	28	7.0	1.8	56.0	14.0	3.5	84.0	21.0	2.3	112.0	28.0	7.0
Inductance(mH)[2]	30.32	7.58	1.9	60.64	15.16	3.79	90.96	22.74	2.50	121.28	30.32	7.58
Time Constant(ms)[2]	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Thermal Resistant with heat sink(°C/W)[1][2]	1			0.5			0.4			0.3		
Thermal Resistant without heat sink(°C/W)[2][3]	1.6			0.8			0.7			0.5		
Heat Sink(mm)	800x900x12			800x900x12			800x900x12			800x900x12		
Motor Constant(N/√W)[2]	18.3			25.7			31.4			36.3		
Ph-PE dielectric strength[2]	≥ 5KV(AC)			≥ 5KV(AC)			≥ 5KV(AC)			≥ 5KV(AC)		
Ph-PE insulation resistance[2]	≥ 1KV(DC)			≥ 1KV(DC)			≥ 1KV(DC)			≥ 1KV(DC)		

(1) The value applies to static sinusoidal drive, specific heat sink and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

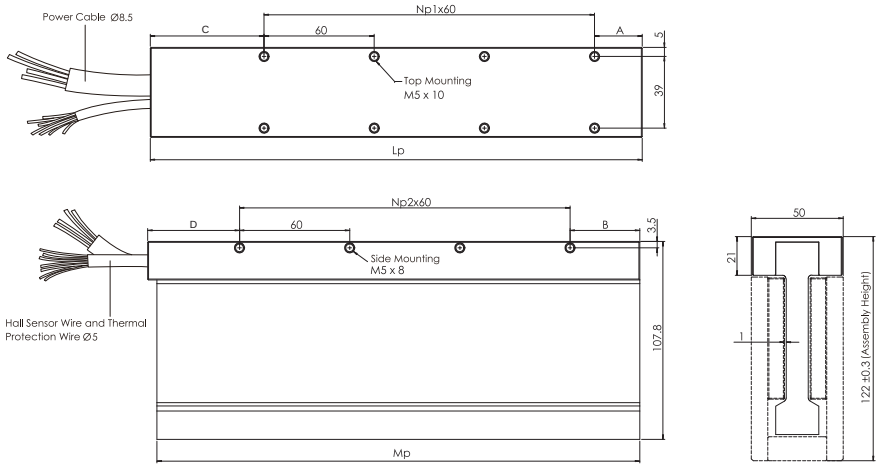
LM-PDL Coil Assembly

	Np1	Np2	Lp	Mp	A	B	C	D
LM-PDL2	1	1	148	143	26	38	62	50
LM-PDL4	3	3	268	263	26	38	62	50
LM-PDL6	5	5	388	383	26	38	62	50
LM-PDL8	7	7	508	503	26	38	62	50

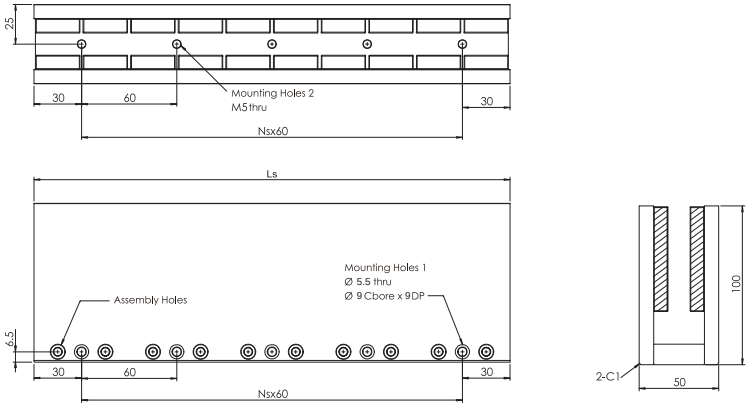
LM-SDL Magnetic Way

	Ns	Ls
LM-SDL0	1	120
LM-SDL1	4	300
LM-SDL2	7	480

LM-PDL Coil Assembly

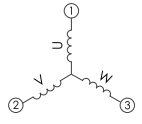


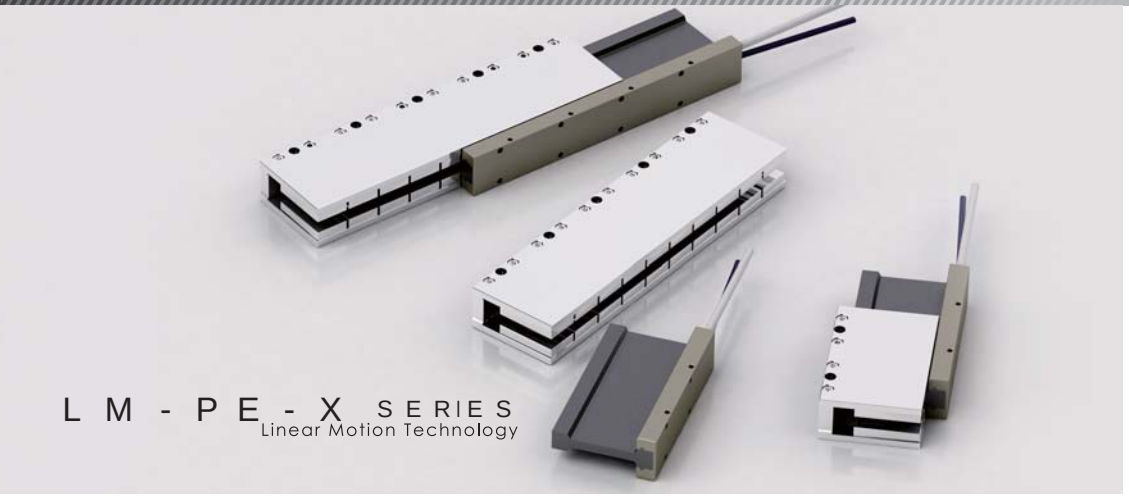
LM-SDL Magnetic Way



OUTPUT CABLE (Cable standard length 400mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow (2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			





LM-PE-X Coil Assembly Model

Coil Assembly Model	LM-PE-X2			LM-PE-X4			LM-PE-X6			LM-PE-X8		
Winding code	W1	W2	W3	W1	W2	W3	W1	W2	W3	W1	W2	W3
Performance[4]												
Peak Force with heat sink(N)[1][2]	526.7			1053.4			1511.4			1923.6		
Peak Force without heat sink(N)[2][3]	389.3			778.6			1099.2			1465.6		
Continuous Force with heat sink(N)[1][2]	131.7			263.4			377.9			480.9		
Continuous Force without heat sink(N)[2][3]	97.3			194.7			274.8			366.4		
Peak power(W)[1][2]	1269.6			2539.2			3484.8			4233.6		
Continuous power(W)[1][2]	79.4			158.7			217.8			264.6		
Mechanical												
Coil assembly length(mm)	148.0			268.0			388.0			508.0		
Coil assembly weight(kg)[2]	0.9			1.5			2.1			2.7		
Magnetic way weight(kg/m)[2]	15.0			15.0			15.0			15		
Electrical cycle length(mm)	60.0			60.0			60.0			60.0		
Electrical[4]												
Continuous Current with heat sink(A_{pk})[1][2]	2.3	4.6	9.2	2.3	4.6	9.2	2.2	4.4	13.2	2.1	4.2	8.4
Continuous Current without heat sink(A_{pk})[2][3]	1.7	3.4	6.8	1.7	3.4	6.8	1.6	3.2	9.6	1.6	2.4	4.8
Peak Current with heat sink(A_{pk})[1][2]	9.2	18.4	36.8	9.2	18.4	36.8	8.8	17.6	52.8	8.4	16.8	33.6
Peak Current without heat sink(A_{pk})[2][3]	6.8	13.6	27.2	6.8	13.6	27.2	6.4	12.8	38.4	6.4	12.8	25.6
Force Constant(N/A_{pk})[2]	57.3	28.6	14.3	114.5	57.3	28.6	171.8	85.9	28.6	229.0	114.5	57.3
Back EMF Constant($V_{pk(l-l)}$ / m/s)[2]	66.1	33.1	16.5	132.2	66.1	33.1	198.3	99.2	33.1	264.4	132.2	66.1
Resistant(Ohms)[2]	15	3.8	0.9	30.0	7.5	1.9	45.0	11.3	1.3	60.0	15.0	3.8
Inductance(mH)[2]	12.89	3.22	0.81	25.78	6.45	1.61	38.67	9.67	1.07	51.56	12.89	3.22
Time Constant(ms)[2]	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Thermal Resistant with heat sink(°C/W)[1][2]	1			0.5			0.4			0.3		
Thermal Resistant without heat sink(°C/W)[2][3]	1.6			0.9			0.7			0.5		
Heat Sink(mm)	250x500x25			250x500x25			250x500x25			250x500x25		
Motor Constant(N/√W)[2]	14.8			20.9			25.6			29.6		
Ph-PE dielectric strength[2]	≥ 5KV(AC)			≥ 5KV(AC)			≥ 5KV(AC)			≥ 5KV(AC)		
Ph-PE insulation resistance[2]	≥ 1KV(DC)			≥ 1KV(DC)			≥ 1KV(DC)			≥ 1KV(DC)		

(1) The value applies to static sinusoidal drive, specific heat sink and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

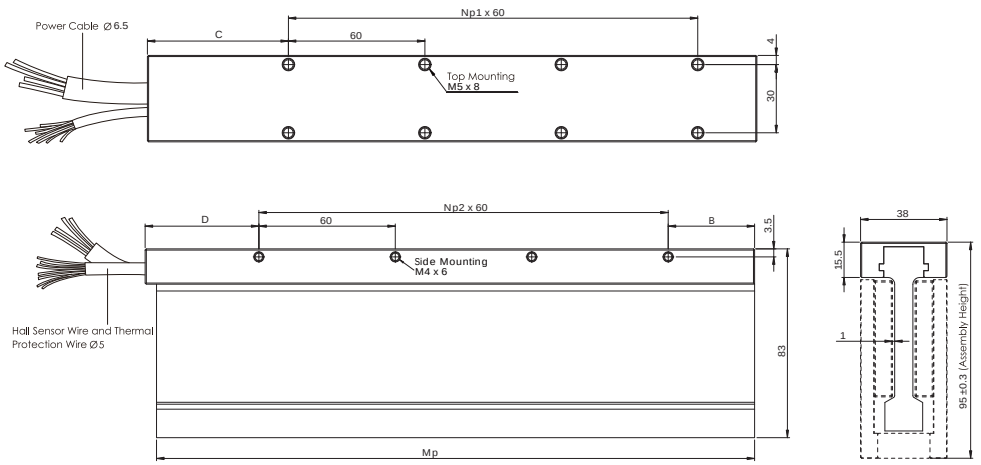
LM-PE-X Coil Assembly

	Np1	Np2	Lp	Mp	A	B	C	D
LM-PE-X2	1	1	148	143	26	38	62	50
LM-PE-X4	3	3	268	263	26	38	62	50
LM-PE-X6	5	5	388	383	26	38	62	50
LM-PE-X8	7	7	508	503	26	38	62	50

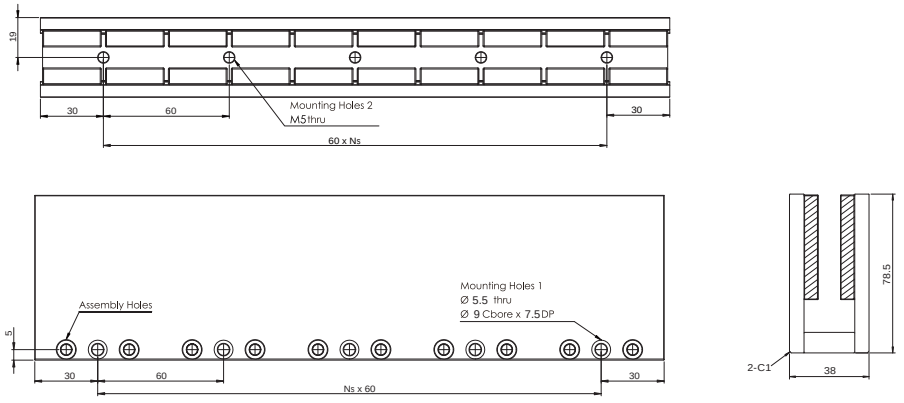
LM-SE-X Magnetic Way

	Ns	Ls
LM-SE-X0	1	120
LM-SE-X1	4	300
LM-SE-X2	7	480

LM-PE-X Coil Assembly

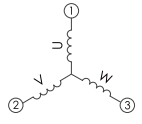


LM-SE-X Magnetic Way



OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White	U phase	0.5 mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow	V phase	0.5 mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown	W phase	0.5 mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	0.5 mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			



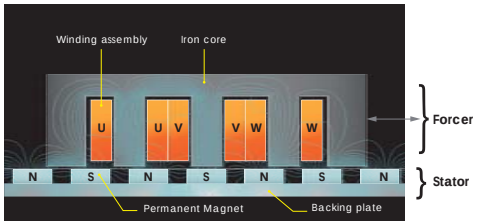
Ironcore Linear Motor Series

Ironcore Linear Motor

Construction & Features

Iron core linear motors are suitable for use in high acceleration, high velocity and high load point to point linear motion applications.

Structure



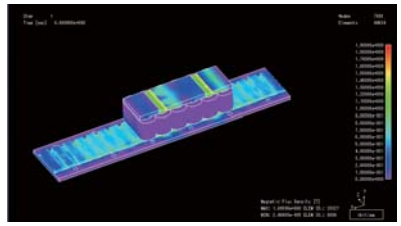
- cpc linear motors are composed of two parts: The stator and the forcer.
- Forcer is made by combining coil windings with an iron core encapsulated by epoxy inside an aluminum outer shell.
- Stator is composed of arrays of permanent magnets on a ferromagnetic backing plate. The magnets are arranged in a N-S pole pattern, forming a closed magnetic field loop with the forcer iron core.

Advantages

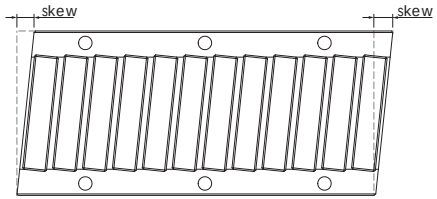
- **High Force Density**
  Due to stronger magnetic coupling between the iron core and the stator magnets. Iron core linear motors have relatively higher force output than ironless linear motors.
- **High Heat Dissipation**
  The iron core provides a dissipation path for the heat produced by the coils during operation, reducing the coil-to-ambient thermal resistance compared with ironless linear motors.
- **Easy assembly**
  For iron core linear motors the forcer and stator are directly facing and is easier to assemble.

cpc Features

- cpc For motor parameters, force constant refers to the amount of force produced per one ampere of current, while motor constant is the force produced per Watt and is representative of the motor's efficiency. As such the motor constant is a better metric at evaluating motor performance. cpc's linear motors have been designed with the aid of advanced simulation software. As a result, for a given dimension cpc's motor has a higher motor constant.



- **Low Cogging Force**
  Cogging force originates from the magnetic pull on the iron core during transitions across magnetic poles on the stator. By skewing the magnets the transition zone characteristics can be refined. Using advanced software analysis **cpc** arrived at a design with low cogging force



- **Heat Dissipative Case**
  In a **cpc** iron core motor the outer casing is made of aluminum, increasing heat dissipation area and lowering thermal resistance.
- **Integrated Hall Sensor and Temperature Switch**
  cpc's motor forcer fully utilizes its internal volume, integrating hall sensors and an over temperature detection switch for the user, without having to buy or install as optional extras.

Applications

1. Automated storage
2. Pick & Place
3. Industrial Automation
4. Semiconductors
5. Medical equipment
6. PCB industry
7. Printing industry

LM-CA-55 Coil Assembly Model

Coil Assembly Model	LM-CA2-55			LM-CA4-55			LM-CA6-55		
Winding code	S	P	D	SP	P	D	SP	P	D
Performance[4]									
Peak Force(N)[2][3]	242.1			484.2			726.3		
Continuous Force with heat sink(N)[1][2]	94.2			188.3			282.5		
Continuous Force without heat sink(N)[2][3]	53.8			107.6			161.4		
Peak Force in linear range(N)	174.9			349.7			524.6		
Attraction Force(N)	350.0			700.0			1050		
Peak power(W)[2]	540			1080			1620		
Continuous power(W)[1][2]	66.2			132.3			198.5		
Mechanical									
Coil assembly length(mm)	97			177			257		
Coil assembly weight(kg)[2]	0.6			1.1			1.6		
Magnetic way weight(kg/m)[2]	2.6			2.6			2.6		
Pole pitch(mm)	20			20			20		
Electrical[4]									
Continuous Current with heat sink(A_{pk})[1][2]	1.8	3.5	7.0	3.5	7.0	14.4	3.5	10.5	21.0
Continuous Current without heat sink(A_{pk})[2][3]	1.0	2.0	4.0	2.0	4.0	8.0	2.0	6.0	12.0
Peak Current [2][3]	5.0	10.0	20.0	10.0	20.0	40.0	10.0	30.0	60.0
Peak Current in linear range(N)	3.3	6.5	13.2	6.6	13.2	20.0	6.6	19.8	40.0
Force Constant(N/A_{pk})[2]	53.8	26.9	13.5	53.8	26.9	13.5	80.7	26.9	13.5
Back EMF Constant(V/m/s)[2]	67.4	33.7	16.9	67.4	33.7	16.9	101.1	33.7	16.9
Resistant(Ohms)[2]	21.6	5.4	1.4	10.8	2.7	0.7	16.2	1.8	0.5
Inductance(mH)[2]	100.00	25.00	3.92	50.00	12.50	1.96	75.00	8.30	1.40
Time Constant(ms)[2]	4.6	4.6	2.8	4.6	4.6	2.8	4.6	4.6	2.8
Thermal Resistant with heat sink(°C/W)[1][2]	1.1			0.6			0.4		
Thermal Resistant without heat sink(°C/W)[2][3]	3.4			1.7			1.1		
Motor Constant(N/√W)[2]	11.6			16.4			20.1		

(1) The value applies to static sinusoidal drive, specific heat sink (a 25mm aluminum heat sink whose area equals 11x the coil mounting area) and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

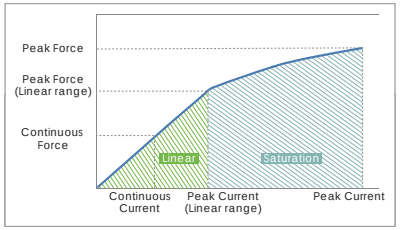
LM-CA-55 Coil Assembly

	Np1	Lp
LM-CA2-55	1	97
LM-CA4-55	3	177
LM-CA6-55	5	257

LM-MA-55 Magnetic Way

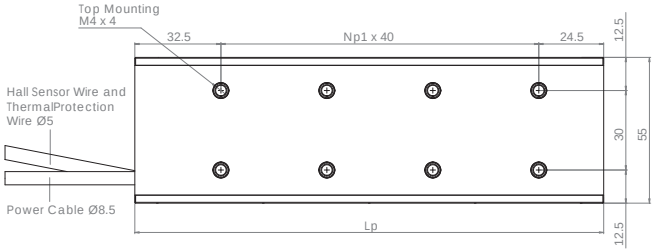
	Ns	Lт	Ls	Ls1
LM-MA0-55	2	126	120	110
LM-MA1-55	8	366	360	350
LM-MA2-55	11	486	480	470

Current VS Force.

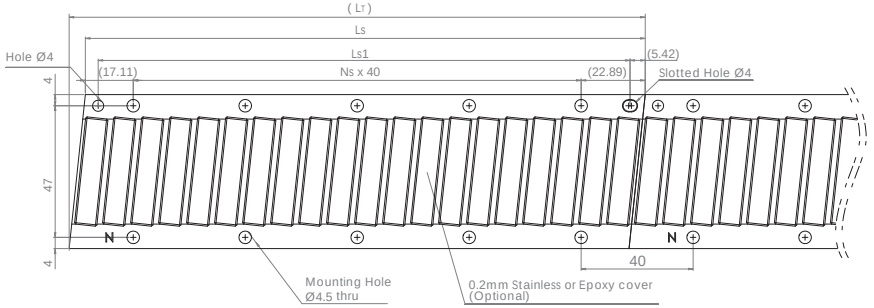


When the motor its operating in its linear regin, its thrust output is directly proportional to input current and the force constant is fixed.
When operating in the saturation regin,output thrust is not linearly proportional due to magnetic saturation,resulting in less thrust increase than expected.

LM-CA-55 Coil Assembly

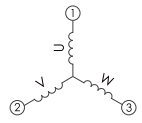


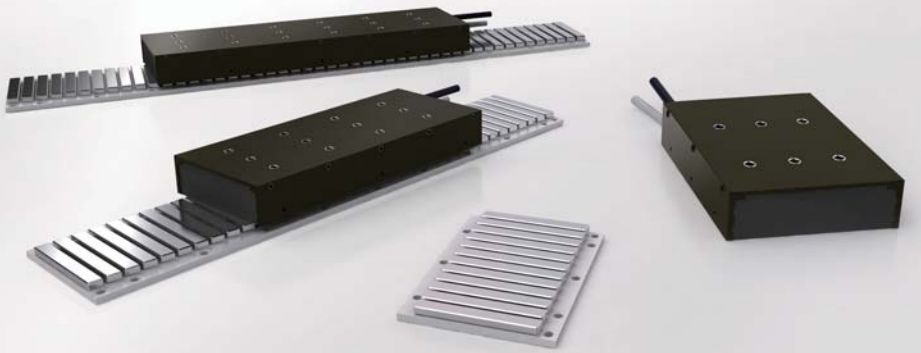
LM-MA-55 Magnetic Way



OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow(2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			





L M - C A - 7 5 series
Linear Motion Technology

LM-CA-75 Coil Assembly Model

Coil Assembly Model	LM-CA2-75			LM-CA4-75			LM-CA6-75	
Winding code	S	P	D	SP	P	D	P	D
Performance[4]								
Peak Force(N)[2][3]	368.0			736.0			1104.0	
Continuous Force with heat sink(N)[1][2]	143.1			286.2			429.3	
Continuous Force without heat sink(N)[2][3]	81.8			163.6			245.3	
Peak Force in linear range(N)	265.8			531.5			797.3	
Attraction Force(N)	505			1009			1514	
Peak power(W)[2]	740			1480			2220	
Continuous power(W)[1][2]	90.7			181.3			272.0	
Mechanical								
Coil assembly length(mm)	97			177			257	
Coil assembly weight(kg)[2]	0.8			1.5			2.2	
Magnetic way weight(kg/m)[2]	3.5			3.5			3.5	
Pole pitch(mm)	20			20			20	
Electrical[4]								
Continuous Current with heat sink(A_{pk})[1][2]	1.8	3.5	7.0	3.5	7.0	14.0	10.5	21.0
Continuous Current without heat sink(A_{pk})[2][3]	1.0	2.0	4.0	2.0	4.0	8.0	6.0	12.0
Peak Current [2][3]	5.0	10.0	20.0	10.0	20.0	40.0	30.0	60.0
Peak Current in linear range(N)	3.3	6.5	13.2	6.6	13.2	20.0	19.8	39.6
Force Constant(N/A_{pk})[2]	81.8	40.9	20.4	81.8	40.9	20.4	40.9	20.4
Back EMF Constant(V/m/s)[2]	102.4	51.2	25.6	102.4	51.2	25.6	51.2	25.6
Resistant(Ohms)[2]	29.6	7.4	1.9	14.8	3.7	0.9	2.5	0.6
Inductance(mH)[2]	137.03	34.26	5.70	68.52	17.13	2.70	11.40	1.80
Time Constant(ms)[2]	4.6	4.6	3.0	4.6	4.6	3.0	4.6	3.0
Thermal Resistant with heat sink(°C/W)[1][2]	0.8			0.4			0.3	
Thermal Resistant without heat sink(°C/W)[2][3]	2.5			1.2			0.8	
Motor Constant(N/√W)[2]	15.0			21.3			26.0	

(1) The value applies to static sinusoidal drive, specific heat sink (a 25mm aluminum heat sink whose area equals 11x the coil mounting area) and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

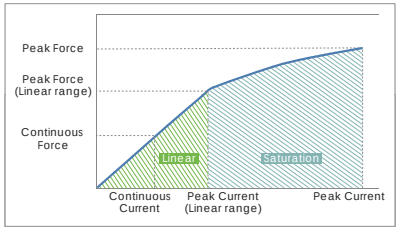
LM-CA-75 Coil Assembly

	Np1	Lp
LM-CA2-75	1	97
LM-CA4-75	3	177
LM-CA6-75	5	257

LM-MA-75 Magnetic Way

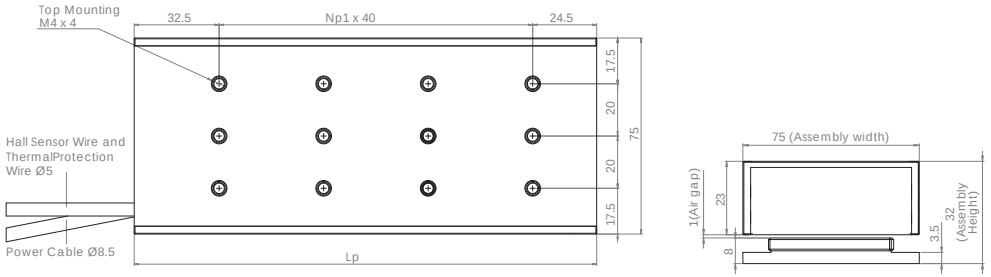
	Ns	LT	Ls	Ls1
LM-MA0-75	2	126	120	110
LM-MA1-75	8	366	360	350
LM-MA2-75	11	486	480	470

Current VS Force.

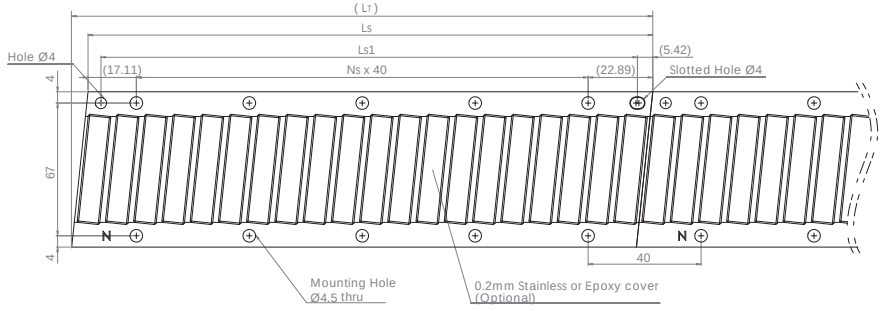


When the motor its operating in its linear regin, its thrust output is directly proportional to input current and the force constant is fixed.
When operating in the saturation regin,output thrust is not linearly proportional due to magnetic saturation,resulting in less thrust increase than expected.

LM-CA-75 Coil Assembly

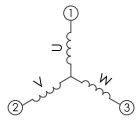


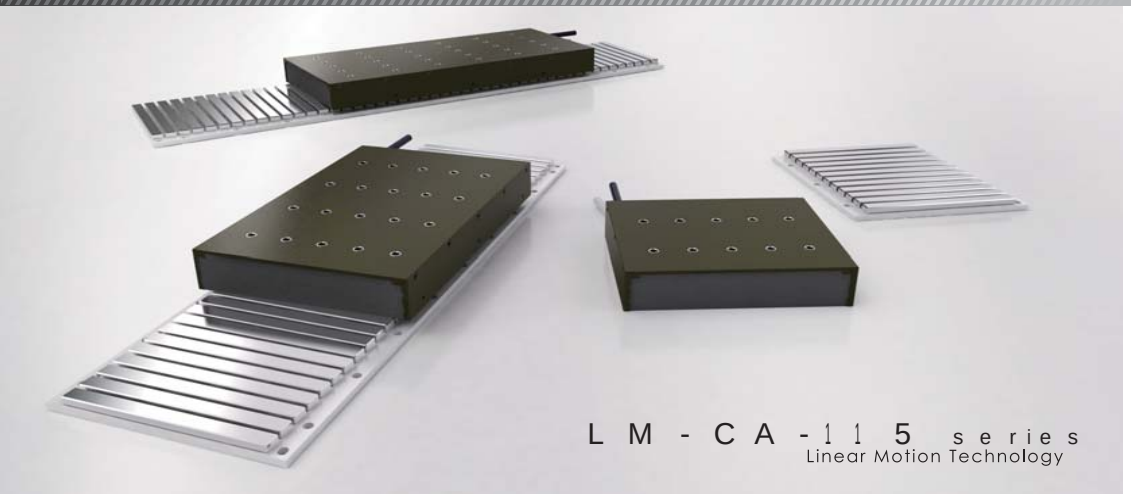
LM-MA-75 Magnetic Way



OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow(2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	HallIC + 5V	0.14 mm²			
			White	GND	0.14 mm²			





LM-CA-115 Coil Assembly Model

Coil Assembly Model	LM-CA2-115		LM-CA4-115		LM-CA6-115	
Winding code	P	D	P	D	P	D
Performance[4]						
Peak Force(N)[2][3]	588.8		1177.6		1766.4	
Continuous Force with heat sink(N)[1][2]	229.0		457.9		686.9	
Continuous Force without heat sink(N)[2][3]	130.8		261.7		392.5	
Peak Force in linear range(N)	454.5		909.0		1363.5	
Attraction Force(N)	896		1792		2688	
Peak power(W)[2]	1020		2040		3060	
Continuous power(W)[1][2]	124.9		249.9		374.8	
Mechanical						
Coil assembly length(mm)	97		177		257	
Coil assembly weight(kg)[2]	1.5		2.8		4.1	
Magnetic way weight(kg/m)[2]	6.7		6.7		6.7	
Pole pitch(mm)	20		20		20	
Electrical[4]						
Continuous Current with heat sink(A_{pk})[1][2]	3.3	6.7	6.7	13.3	10.0	20.0
Continuous Current without heat sink(A_{pk})[2][3]	1.9	3.8	3.8	7.6	5.7	11.4
Peak Current [2][3]	9.5	19.0	19.0	38.0	28.5	57.0
Peak Current in linear range(N)	6.6	13.2	13.2	26.4	16.5	39.6
Force Constant(N/A_{pk})[2]	68.9	34.4	68.9	34.4	68.9	34.4
Back EMF Constant(V/m/s)[2]	86.3	43.1	86.3	43.1	86.3	43.1
Resistant(Ohms)[2]	11.3	2.8	5.65	1.41	3.8	0.9
Inductance(mH)[2]	52.31	8.68	26.16	4.37	17.40	2.79
Time Constant(ms)[2]	4.6	3.1	4.6	3.1	4.6	3.1
Thermal Resistant with heat sink(°C/W)[1][2]	0.6		0.3		0.2	
Thermal Resistant without heat sink(°C/W)[2][3]	1.8		0.9		0.6	
Motor Constant(N/√W)[2]	20.5		29.0		35.5	

(1) The value applies to static sinusoidal drive, specific heat sink (a 25mm aluminum heat sink whose area equals 11x the coil mounting area) and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

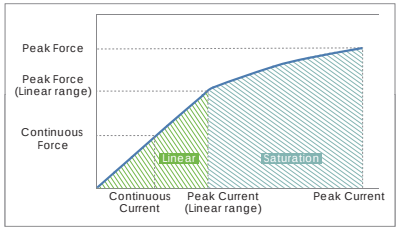
LM-CA-115 Coil Assembly

	Np1	Lp
LM-CA2-115	1	97
LM-CA4-115	3	177
LM-CA6-115	5	257

LM-MA-115 Magnetic Way

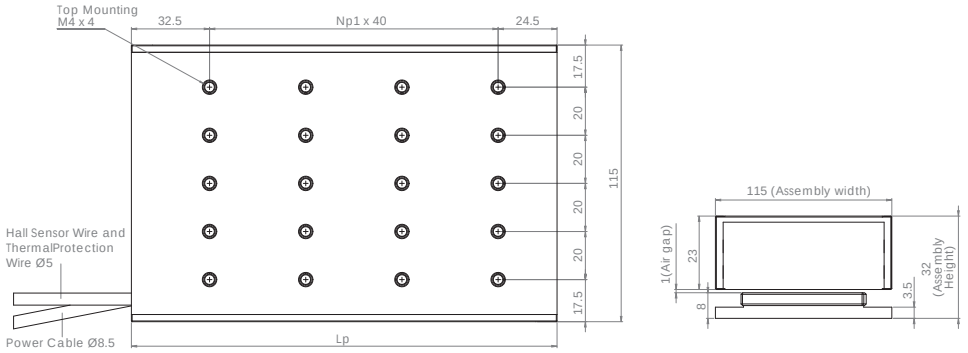
	Ns	LT	Ls	Ls1
LM-MA0-115	2	126	120	110
LM-MA1-115	8	366	360	350
LM-MA2-115	11	486	480	470

Current VS Force.

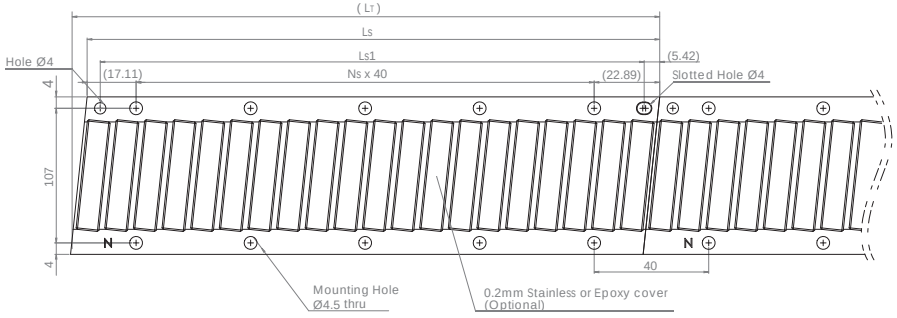


When the motor its operating in its linear regin, its thrust output is directly proportional to input current and the force constant is fixed.
When operating in the saturation regin,output thrust is not linearly proportional due to magnetic saturation,resulting in less thrust increase than expected.

LM-CA-115 Coil Assembly

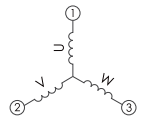


LM-MA-115 Magnetic Way



OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow(2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	HallIC + 5V	0.14 mm²			
			White	GND	0.14 mm²			



LM-CB-60 Coil Assembly Model

Coil Assembly Model	LM-CB2-60			LM-CB4-60			LM-CB6-60	
Winding code	S	P	D	SP	P	D	P	D
Performance[4]								
Peak Force(N)[2][3]	563			1117.4			1680.3	
Continuous Force with heat sink(N)[1][2]	198.2			396.5			594.7	
Continuous Force without heat sink(N)[2][3]	132.2			264.3			396.5	
Peak Force in linear range(N)	283.2			566.4			849.6	
Attraction Force(N)	630			1260			1890	
Peak power(W)[2]	862			1698			2560	
Continuous power(W)[1][2]	84.7			169.3			254.0	
Mechanical								
Coil assembly length(mm)	130			250			370	
Coil assembly weight(kg)[2]	1.6			3.1			4.6	
Magnetic way weight(kg/m)[2]	3.0			3.0			3.0	
Pole pitch(mm)	30			30			30	
Electrical[4]								
Continuous Current with heat sink(A_{pk})[1][2]	2.1	4.2	8.4	4.2	8.4	16.8	12.6	25.2
Continuous Current without heat sink(A_{pk})[2][3]	1.4	2.8	5.6	2.8	5.6	11.2	8.4	16.8
Peak Current [2][3]	6.7	13.4	26.8	13.3	26.6	53.2	40.0	80.0
Peak Current in linear range(N)	3.0	6.0	12.0	6.0	12.0	24.0	18.0	36.0
Force Constant(N/A_{pk})[2]	94.4	47.2	23.6	94.4	47.2	23.6	47.2	23.6
Back EMF Constant(V/m/s)[2]	104.0	52.0	26.0	104.0	52.0	26.0	52.0	26.0
Resistant(Ohms)[2]	19.2	4.8	1.2	9.6	2.4	0.6	1.6	0.4
Inductance(mH)[2]	200.00	50.00	10.32	100.00	25.00	5.16	16.70	3.44
Time Constant(ms)[2]	10.4	10.4	8.6	10.4	10.4	8.6	10.4	8.6
Thermal Resistant with heat sink(°C/W)[1][2]	0.9			0.4			0.3	
Thermal Resistant without heat sink(°C/W)[2][3]	1.9			1.0			0.6	
Motor Constant(N/√W)[2]	21.5			30.5			37.3	

(1) The value applies to static sinusoidal drive, specific heat sink (a 25mm aluminum heat sink whose area equals 8x the coil mounting area) and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

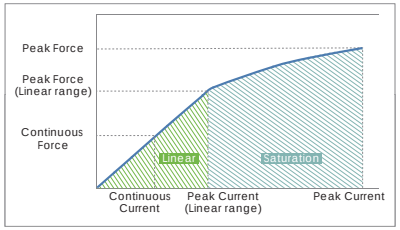
LM-CB-60 Coil Assembly

	Np1	Lp
LM-CB2-60	1	130
LM-CB4-60	3	250
LM-CB6-60	5	370

LM-MB-60 Magnetic Way

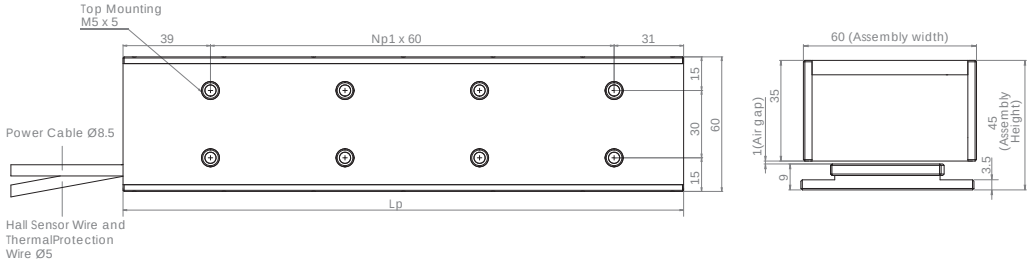
	Ns	Ls
LM-MB0-60	1	120
LM-MB1-60	4	300
LM-MB2-60	7	480

Current VS Force.

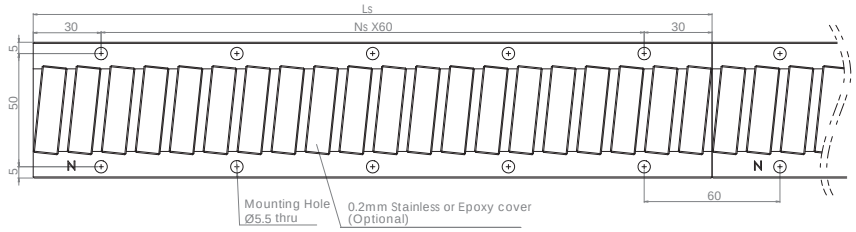


When the motor its operating in its linear regin, its thrust output is directly proportional to input current and the force constant is fixed.
When operating in the saturation regin,output thrust is not linearly proportional due to magnetic saturation,resulting in less thrust increase than expected.

LM-CB-60 Coil Assembly

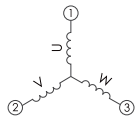


LM-MB-60 Magnetic Way

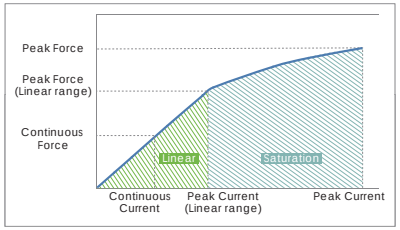


OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow (2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	HallIC + 5V	0.14 mm²			
			White	GND	0.14 mm²			

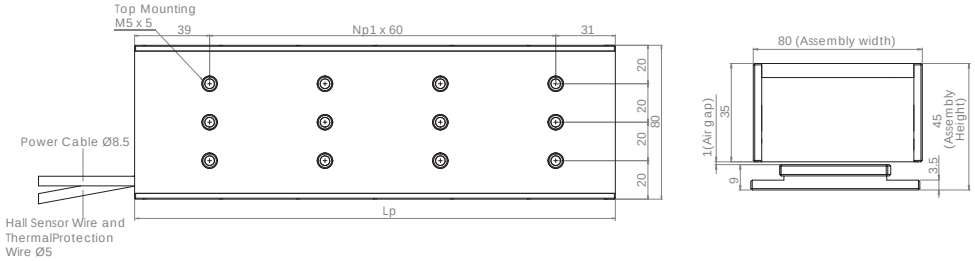


Current VS Force.

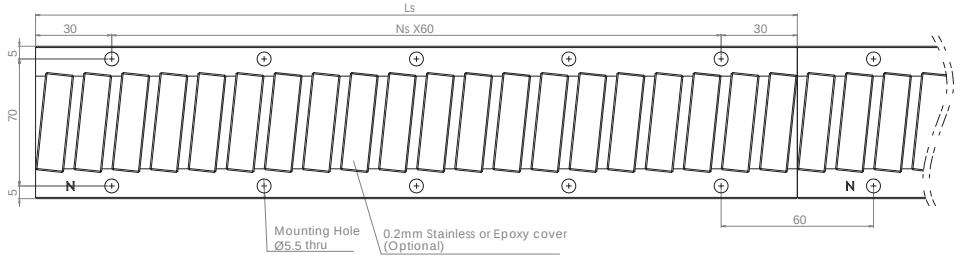


When the motor its operating in its linear regin, its thrust output is directly proportional to input current and the force constant is fixed.
When operating in the saturation regin,output thrust is not linearly proportional due to magnetic saturation,resulting in less thrust increase than expected.

LM-CB-80 Coil Assembly



LM-MB-80 Magnetic Way



LM-CB-80 Coil Assembly Model

Coil Assembly Model	LM-CB2-80		LM-CB4-80		LM-CB6-80	
Winding code	P	D	P	D	P	D
Performance[4]						
Peak Force(N)[2][3]	848.7		1697.4		2552.5	
Continuous Force with heat sink(N)[1][2]	301.3		602.6		904.0	
Continuous Force without heat sink(N)[2][3]	200.9		401.8		602.6	
Peak Force in linear range(N)	430.5		860.9		1291.4	
Attraction Force(N)	958		1915		2873	
Peak power(W)[2]	1167		2335		3520	
Continuous power(W)[1][2]	116.4		232.8		349.3	
Mechanical						
Coil assembly length(mm)	130		250		370	
Coil assembly weight(kg)[2]	2.4		4.7		6.9	
Magnetic way weight(kg/m)[2]	4.6		4.6		4.6	
Pole pitch(mm)	30		30		30	
Electrical[4]						
Continuous Current with heat sink(A_{pk})[1][2]	4.2	8.4	8.4	16.8	12.6	25.2
Continuous Current without heat sink(A_{pk})[2][3]	2.8	5.6	5.6	11.2	8.4	16.8
Peak Current [2][3]	13.3	26.6	26.6	53.3	40.0	80.0
Peak Current in linear range(N)	6.0	12.0	12.0	24.0	18.0	36.0
Force Constant(N/A_{pk})[2]	71.7	35.9	71.7	35.9	71.7	35.9
Back EMF Constant(V/m/s)[2]	79.0	39.5	79.0	39.5	79.0	39.5
Resistant(Ohms)[2]	6.6	1.7	3.3	0.8	2.2	0.6
Inductance(mH)[2]	68.75	14.28	34.38	6.72	22.92	5.04
Time Constant(ms)[2]	10.4	8.4	10.4	8.4	10.4	8.4
Thermal Resistant with heat sink(°C/W)[1][2]	0.6		0.3		0.2	
Thermal Resistant without heat sink(°C/W)[2][3]	1.4		0.7		0.5	
Motor Constant(N/√W)[2]	27.9		39.5		48.4	

(1) The value applies to static sinusoidal drive, specific heat sink (a 25mm aluminum heat sink whose area equals 8x the coil mounting area) and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

LM-CB-80 Coil Assembly

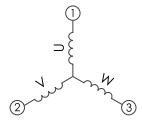
	Np1	Lp
LM-CB2-80	1	130
LM-CB4-80	3	250
LM-CB6-80	5	370

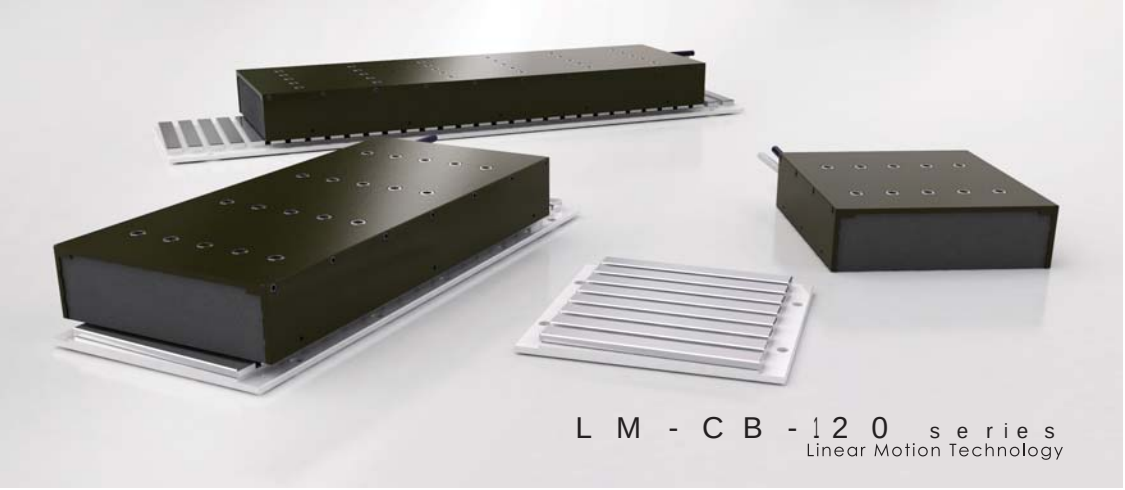
LM-MB-80 Magnetic Way

	Ns	Ls
LM-MB0-80	1	120
LM-MB1-80	4	300
LM-MB2-80	7	480

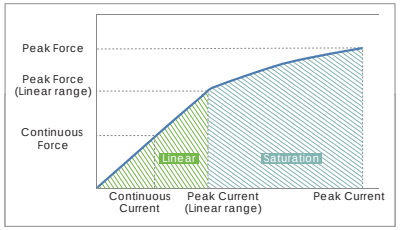
OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow(2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	HallIC + 5V	0.14 mm²			
			White	GND	0.14 mm²			





Current VS Force.



When the motor its operating in its linear regin, its thrust output is directly proportional to input current and the force constant is fixed.
When operating in the saturation regin,output thrust is not linearly proportional due to magnetic saturation,resulting in less thrust increase than expected.

LM-CB-120 Coil Assembly Model

Coil Assembly Model	LM-CB2-120		LM-CB4-120		LM-CB6-120	
Winding code	P	D	P	D	P	D
Performance[4]						
Peak Force(N)[2][3]	1376.2		2709.3		4096.2	
Continuous Force with heat sink(N)[1][2]	482.1		964.2		1446.4	
Continuous Force without heat sink(N)[2][3]	321.4		642.8		964.2	
Peak Force in linear range(N)	725.0		1450.0		2175.0	
Attraction Force(N)	1613		3226		4839	
Peak power(W)[2]	1622		3143		4790	
Continuous power(W)[1][2]	157.6		315.2		472.8	
Mechanical						
Coil assembly length(mm)	130		250		370	
Coil assembly weight(kg)[2]	4.0		7.8		11.5	
Magnetic way weight(kg/m)[2]	7.7		7.7		7.7	
Pole pitch(mm)	30		30		30	
Electrical[4]						
Continuous Current with heat sink(A_{pk})[1][2]	4.0	8.0	8.0	16.0	12.0	23.9
Continuous Current without heat sink(A_{pk})[2][3]	2.7	5.3	5.3	10.6	8.0	16.0
Peak Current[2][3]	12.8	25.2	25.2	50.4	38.1	76.2
Peak Current in linear range(N)	6.0	12.0	12.0	24.0	18.0	36.0
Force Constant(N/A_{pk})[2]	120.8	60.4	120.8	60.4	120.8	60.4
Back EMF Constant(V/m/s)[2]	133.1	66.6	133.1	66.6	133.1	66.6
Resistant(Ohms)[2]	9.90	2.50	4.95	1.24	3.3	0.8
Inductance(mH)[2]	103.13	22.00	51.56	10.91	34.40	7.04
Time Constant(ms)[2]	10.4	8.8	10.4	8.8	10.4	8.8
Thermal Resistant with heat sink(°C/W)[1][2]	0.5		0.2		0.2	
Thermal Resistant without heat sink(°C/W)[2][3]	1.0		0.5		0.3	
Motor Constant(N/√W)[2]	38.4		54.3		66.5	

(1) The value applies to static sinusoidal drive, specific heat sink (a 25mm aluminum heat sink whose area equals 8x the coil mounting area) and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

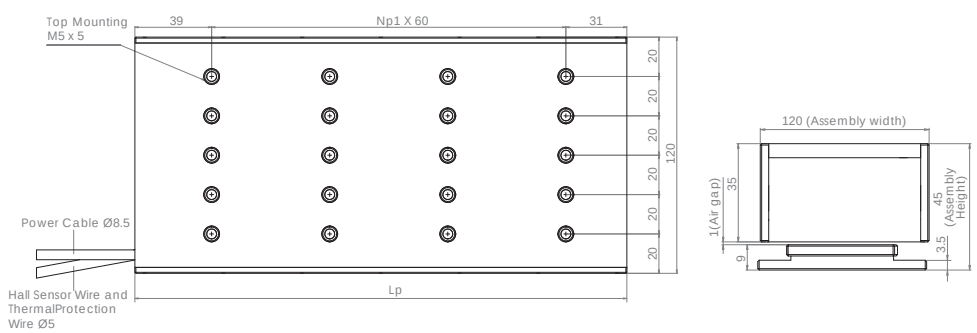
LM-CB-120 Coil Assembly

	Np1	Lp
LM-CB2-120	1	130
LM-CB4-120	3	250
LM-CB6-120	5	370

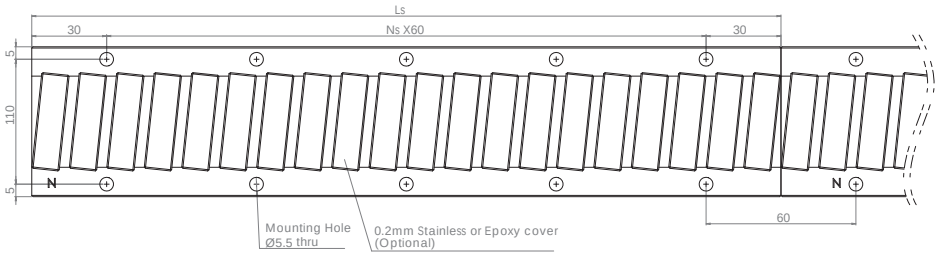
LM-MB-120 Magnetic Way

	Ns	Ls
LM-MB0-120	1	120
LM-MB1-120	4	300
LM-MB2-120	7	480

LM-CB-120 Coil Assembly

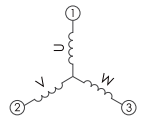


LM-MB-120 Magnetic Way

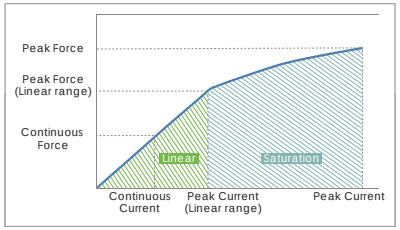


OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow (2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	Hall IC + 5V	0.14 mm²			
			White	GND	0.14 mm²			

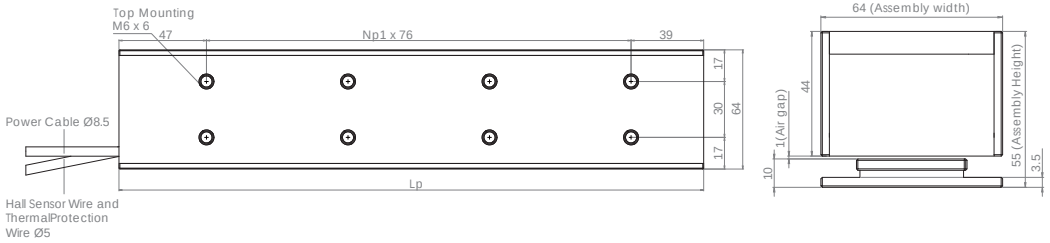


Current VS Force.

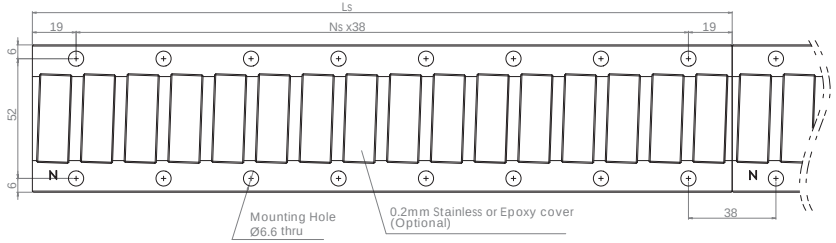


When the motor its operating in its linear regin, its thrust output is directly proportional to input current and the force constant is fixed.
When operating in the saturation regin,output thrust is not linearly proportional due to magnetic saturation,resulting in less thrust increase than expected.

LM-CC-64 Coil Assembly



LM-MC-64 Magnetic Way



LM-CC-64 Coil Assembly Model

Coil Assembly Model	LM-CC2-64		LM-CC4-64		LM-CC6-64	
Winding code	P	D	P	D	P	D
Performance[4]						
Peak Force (N)[2][3]	592		1185		1777	
Continuous Force(N)[1][2]	258.5		517.0		775.4	
Continuous Force without heat sink(N)[2][3]	143.6		287.2		430.8	
Peak Force in linear range(N)	287.2		574.4		861.6	
Attraction Force(N)	590		1180		1770	
Peak power(W)[2]	1755		3510		5265	
Continuous power(W)[1][2]	101.1		202.2		303.3	
Mechanical						
Coil assembly length(mm)	162		314		466	
Coil assembly weight(kg)[2]	2.3		4.5		6.6	
Magnetic way weight(kg/m)[2]	3.6		3.6		3.6	
Pole pitch(mm)	38		38		38	
Electrical[4]						
Continuous Current with heat sink(A_{pk})[1][2]	3.6	7.2	7.2	14.4	10.8	21.6
Continuous Current without heat sink(A_{pk})[2][3]	2.0	4.0	4.0	8.0	6.0	12.0
Peak Current [2][3]	15.0	30.0	30.0	60.0	45.0	90.0
Peak Current in linear range(N)	4.0	8.0	8.0	16.0	12.0	24.0
Force Constant(N/A_{pk})[2]	71.8	35.9	71.8	35.9	71.8	35.9
Back EMF Constant(V/m/s)[2]	87.5	43.8	87.5	43.8	87.5	43.8
Resistant(Ohms)[2]	7.8	2.0	3.9	1.0	2.6	0.7
Inductance(mH)[2]	119.20	24.00	59.60	12.00	39.70	8.40
Time Constant(ms)[2]	15	12	15	12	15	12
Thermal Resistant with heat sink(°C/W)[1][2]	0.7		0.4		0.2	
Thermal Resistant without heat sink(°C/W)[2][3]	2.9		1.4		1.0	
Motor Constant(N/√W)[2]	25.7		36.4		44.5	

(1) The value applies to static sinusoidal drive, specific heat sink (a 25mm aluminum heat sink whose area equals 9x the coil mounting area) and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

LM-CC-64 Coil Assembly

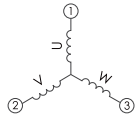
	Np1	Lp
LM-CC2-64	1	162
LM-CC4-64	3	314
LM-CC6-64	5	466

LM-MC-64 Magnetic Way

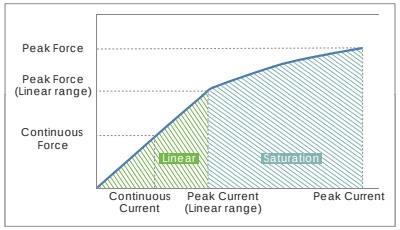
	Ns	Ls
LM-MC0-64	2	114
LM-MC1-64	7	304
LM-MC2-64	11	456

OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow(2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	HallIC + 5V	0.14 mm²			
			White	GND	0.14 mm²			



Current VS Force.



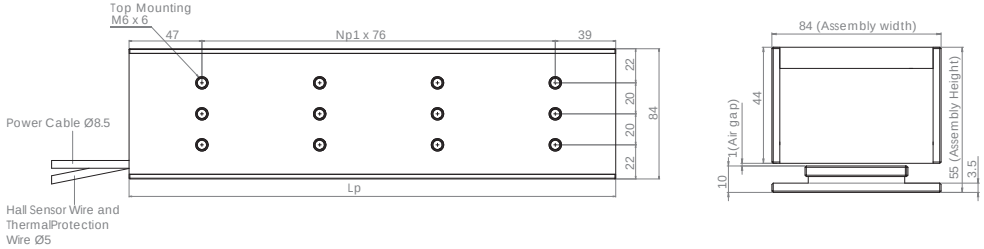
When the motor its operating in its linear regin, its thrust output is directly proportional to input current and the force constant is fixed.
When operating in the saturation regin,output thrust is not linearly proportional due to magnetic saturation,resulting in less thrust increase than expected.

LM-CC-84 Coil Assembly Model

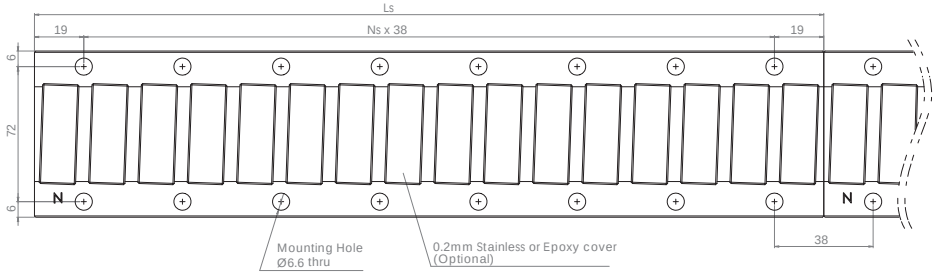
Coil Assembly Model	LM-CC2-84		LM-CC4-84		LM-CC6-84	
Winding code	P	D	P	D	P	D
Performance[4]						
Peak Force(N)[2][3]	900.9		1800		2700	
Continuous Force with heat sink(N)[1][2]	392.9		785.8		1178.7	
Continuous Force without heat sink(N)[2][3]	218.2		436.4		654.6	
Peak Force in linear range(N)	436.5		873.1		1309.6	
Attraction Force(N)	897		1794		2690	
Peak power(W)[2]	2295		4590		6885	
Continuous power(W)[1][2]	132.2		264.4		396.6	
Mechanical						
Coil assembly length(mm)	162		314		466	
Coil assembly weight(kg)[2]	3.5		6.8		10.1	
Magnetic way weight(kg/m)[2]	5.5		5.5		5.5	
Pole pitch(mm)	38		38		38	
Electrical[4]						
Continuous Current with heat sink(A_{pk})[1][2]	3.6	7.2	7.2	14.4	10.8	20.5
Continuous Current without heat sink(A_{pk})[2][3]	2.0	4.0	4.0	8.0	6.0	12.0
Peak Current [2][3]	15.0	30.0	30.0	60.0	45.0	90.0
Peak Current in linear range(N)	4.0	8.0	8.0	16.0	12.0	24.0
Force Constant(N/A_{pk})[2]	109.1	54.6	109.1	54.6	109.1	54.6
Back EMF Constant(V/m/s)[2]	133.0	66.5	133.0	66.5	133.0	66.5
Resistant(Ohms)[2]	10.2	2.6	5.1	1.3	3.4	0.9
Inductance(mH)[2]	155.90	31.20	77.90	15.60	52.00	10.80
Time Constant(ms)[2]	15	12	15	12	15	12
Thermal Resistant with heat sink(°C/W)[1][2]	0.6		0.3		0.2	
Thermal Resistant without heat sink(°C/W)[2][3]	2.2		1.1		0.7	
Motor Constant(N/√W)[2]	34.2		48.3		59.2	

(1) The value applies to static sinusoidal drive, specific heat sink (a 25mm aluminum heat sink whose area equals 9x the coil mounting area) and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

LM-CC-84 Coil Assembly



LM-MC-84 Magnetic Way



LM-CC-84 Coil Assembly

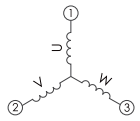
	Np1	Lp
LM-CC2-84	1	162
LM-CC4-84	3	314
LM-CC6-84	5	466

LM-MC-84 Magnetic Way

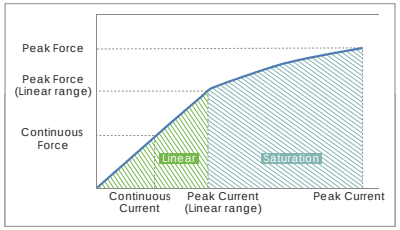
	Ns	Ls
LM-MC0-84	2	114
LM-MC1-84	7	304
LM-MC2-84	11	456

OUTPUT CABLE (All cable standard length 400 mm)

Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow(2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	HallIC + 5V	0.14 mm²			
			White	GND	0.14 mm²			

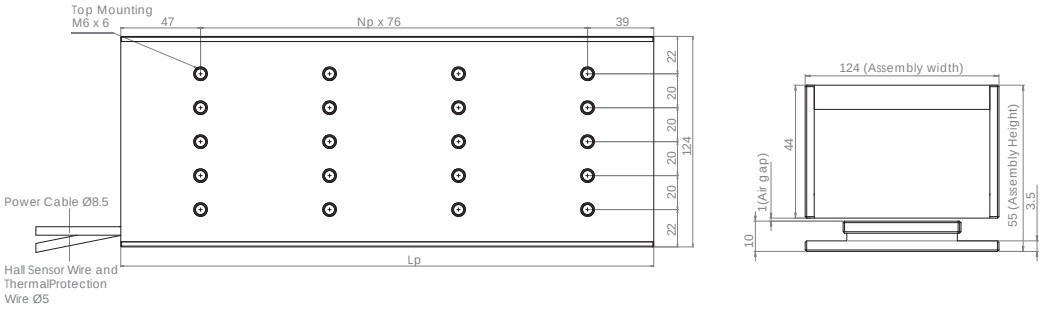


Current VS Force.

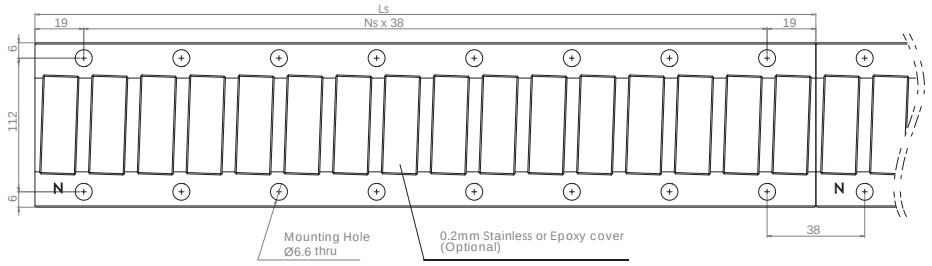


When the motor its operating in its linear regin, its thrust output is directly proportional to input current and the force constant is fixed.
When operating in the saturation regin,output thrust is not linearly proportional due to magnetic saturation,resulting in less thrust increase than expected.

LM-CC-124 Coil Assembly



LM-MC-124 Magnetic Way



LM-CC-124 Coil Assembly Model

Coil Assembly Model	LM-CC2-124		LM-CC4-124		LM-CC6-124	
Winding code	P	D	P	D	P	D
Performance[4]						
Peak Force(N)[2][3]	1446		2881		4327	
Continuous Force with heat sink(N)[1][2]	628.6		1257.2		1885.9	
Continuous Force without heat sink(N)[2][3]	349.2		698.4		1047.7	
Peak Force in linear range(N)	735.2		1470.5		2205.7	
Attraction Force(N)	1510		3021		4531	
Peak power(W)[2]	3067		6092		9159	
Continuous power(W)[1][2]	175.4		350.9		526.3	
Mechanical						
Coil assembly length(mm)	162		314		466	
Coil assembly weight(kg)[2]	5.9		11.4		16.9	
Magnetic way weight(kg/m)[2]	9.2		9.2		9.2	
Pole pitch(mm)	38		38		38	
Electrical[4]						
Continuous Current with heat sink(A_{pk})[1][2]	3.4	6.8	6.8	13.7	10.3	20.5
Continuous Current without heat sink(A_{pk})[2][3]	1.9	3.8	3.8	7.6	5.7	11.4
Peak Current [2][3]	14.3	28.5	28.5	57.0	42.8	85.5
Peak Current in linear range(N)	4.0	8.0	8.0	16.0	12.0	24.0
Force Constant(N/A_{pk})[2]	183.8	91.9	183.8	91.9	183.8	91.9
Back EMF Constant(V/m/s)[2]	224.0	112.0	224.0	112.0	224.0	112.0
Resistant(Ohms)[2]	15	3.8	7.5	1.9	5.0	1.3
Inductance(mH)[2]	229.20	46.36	114.60	28.18	76.40	15.86
Time Constant(ms)[2]	15	12.2	15	12.2	15	12.2
Thermal Resistant with heat sink(°C/W)[1][2]	0.4		0.2		0.1	
Thermal Resistant without heat sink(°C/W)[2][3]	1.7		0.8		0.6	
Motor Constant(N/√W)[2]	47.5		67.1		82.2	

(1) The value applies to static sinusoidal drive, specific heat sink (a 25mm aluminum heat sink whose area equals 9x the coil mounting area) and temperature from 25°C up to 110°C. The actual performance is dependent to heat sink configuration, system cooling condition and ambient temperature.
(2) The tolerance of all performance and electrical specification is ±10%
(3) The value applies to static sinusoidal drive and temperature from 25°C up to 110°C, without heat sink.
(4) Above "withoutheatsink" figure assumes a working condition of 1atm, 25°Cambient temperature, with the linear motor stationary and not in contact with any other objects, thus relying only on free air convection for cooling. As all heat conductive objects in direct contact with the linear motor, including slide plate, linear guide and base etc.can be considered as a kind of heat sink, the "with heat sink" figure should be taken as the primaryreference in actual application design.

LM-CC-124 Coil Assembly

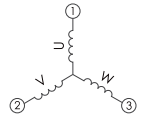
	Np1	Lp
LM-CC2-124	1	162
LM-CC4-124	3	314
LM-CC6-124	5	466

LM-MC-124 Magnetic Way

	Ns	Ls
LM-MC0-124	2	114
LM-MC1-124	7	304
LM-MC2-124	11	456

OUTPUT CABLE (All cable standard length 400 mm)

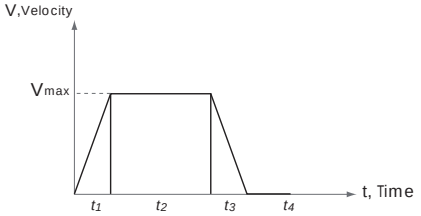
Motor Wire Table			Hall Sensor Wire Table and Thermal Protection Wire Table					
Pin Number	Function	Cross section	Color	Function	Cable Dia.	Color	Function	Cable Dia.
White (1)	U phase	1.5mm²	Pink	Hall A U phase	0.14 mm²	Brown	Thermal sensor	0.14 mm²
Yellow (2)	V phase	1.5mm²	Yellow	Hall B V phase	0.14 mm²	Blue		
Brown (3)	W phase	1.5mm²	Green	Hall C W phase	0.14 mm²			
Green	PE	1.5mm²	Grey	HallIC + 5V	0.14 mm²			
			White	GND	0.14 mm²			



Sizing Example

Condition 1: Motion profile containing cruising section

Driver maximum output voltage：300 VDC
Driver continuous output current：2A
Driver peak output current：5A
Max. velocity：Vmax = 2 [m/s]
Load mass：m=5 [kg]
Acceleration：a = 10 [m/s2]
Accelerating time：t_1 = 0.2 [s]
Cruising time：t_2 = 3 [s]
Decelerating time：t_3 = 0.2 [s]
Dwell time：t_4 = 2 [s]
Friction Force：f = 5 [N]



Symbol	Parameter	Metric	Imperial
t_1	Accelerating time	s	s
t_2	Cruising time	s	s
t_3	Decelerating time	s	s
t_4	Dwell time	s	s
Vmax	Max. velocity	m/S	in/S

Step1: Thrust force calculation

F1 = ma + f = 5 x 10 +5 = 55 [N]

F2 = f = 5 [N]

F3 = ma – f = 5 x 10 - 5 = 45 [N]

F4 = 0 [N]

$$Frms = \sqrt{\frac{F1^2 \times t_1 + F2^2 \times t_2 + F3^2 \times t_3 + F4^2 \times t_4}{t_1 + t_2 + t_3 + t_4}}$$

$$= \sqrt{\frac{55^2 \times 0.2 + 5^2 \times 3 + 45^2 \times 0.2 + 0}{0.2 + 3 + 0.2 + 2}} = 14.2 \text{ [N]}$$

Fmax = F1 = 55 [N]

Safety factor = 1.5

Motor required peak force needs to be greater than
Fmax x 1.5 = 55 x 1.5 = 82.5 [N]
Motor required continuous force needs to be greater than
Frms x 1.5 = 14.2 x 1.5 = 21.3 [N]
Hence choose LM-PA-X2
(Peak Force= 123.8[N], Continuous force = 31[N])

Step2: Wiring selection

If W1 model is chosen

Irms = Frms / Kf = 21.3 / 17.2 = 1.24 [A]

Imax = Fmax / kf = 82.5 / 17.2 = 4.8 [A]

Required voltage = Vmax x Ke + Imax x R

= 2 x 20 + 4.8 x 17 = 121.6 [V]

Take safety factor = 1.3

Required supply voltage 121.6 x 1.3 = 158.1 [V]

Driver：

Continuous output current 2A > 1.24A

Peak output current 5A > 4.8A

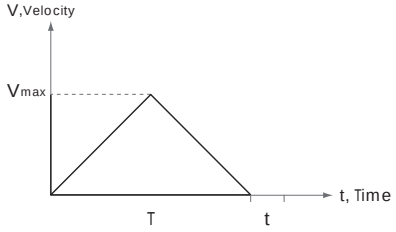
Max. output voltage 300 V > 158.1V

W1 model matches requirements.

LM-PA-X2-W1 will be applicable.

Condition 2 : Motion Profile without cruising velocity section

Driver maximum output voltage：80VDC
Driver continuous output current：2A
Driver peak output current：4A
Load mass：5 [kg]
Moving Time：T = 1 [s]
Stroke：S = 1[m]
Friction Force：f = 5 [N]



Symbol	Parameter	Metric	Imperial
t	Stop time	s	s
T	Moving time	s	s
Vmax	Max. velocity	m/s	in/s
a	Acceleration	m/s²	in/s²
s	Stroke	m	in

Step1: Thrust force calculation

a =4S/T²= 4 x 1/1 = 4 m/s²

F1 = ma + f = 5 x 4 +5 = 25 [N]

F2 = ma – f = 5 x 4–5 =15 [N]

F3 = 0[N]

$$Frms = \sqrt{\frac{F1^2 \times t_1 + F2^2 \times t_2 + F3^2 \times t_3}{t_1 + t_2 + t_3}}$$

$$Frms = \sqrt{\frac{25^2 \times 0.5 + 15^2 \times 0.5 + 0}{0.5 + 0.5 + 0.2}} = 18.8 \text{ [N]}$$

Fmax = F1 = 25 [N]

Safety factor = 1.5

Motor required peak force needs to be greater than
Fmax x 1.5 = 25 x 1.5 =37.5 [N]
Motor required peak force needs to be greater than
Frms x 1.5 = 18.8 x 1.5 = 28.2 [N]
Hence choose LM-PA-X4
(Peak Force= 151.4[N]，Continuous force = 37.8[N])

Step2: Wiring selection

If W1 model is chosen

Irms = Frms / Kf = 18.8 / 34.4 = 0.55 [A]

Imax = Fmax/ Kf = 25 / 34.4 = 0.73 [A]

Vmax = T/2 x a =1/2 x 4 = 2 [m/s]

Required voltage = Vmax x Ke + Imax x R

= 2 x 40 + 0.73 x 34 = 104.8 [V]

Take safety factor =1.3

Required supply voltage 104.8 x 1.3 = 136.2 [V]

Driver：

Continuous output current 2A > 0.55A

Peak output current 4A > 0.73A

Max. output voltage 80V < 136.2V

Max. velocity cannot be reached with W1.

If W2 model is chosen

Irms = Frms / Kf = 18.8/17.2 = 1.1 [A]

Imax = Fmax / Kf = 25/17.2 = 1.45 [A]

Required voltage = Vmax. x Ke + Imax x R

= 2 x 20+ 1.45 x 8.5 = 52.3 [V]

Take safety factor = 1.3

Required supply voltage 52.3 x 1.3 = 68 [V]

Driver：

Continuous output current 2A > 1.1A

Peak output current 4A > 1.45A

Max. output voltage 80V > 68V

W2 model matches requirements.

LM-PA-X4-W2 will be applicable.

Note: For other calculation constraints or special requirements please contact cpc.

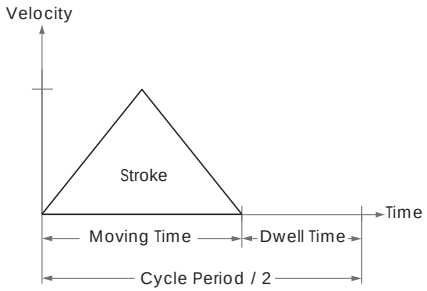
Sizing Form

Customer Name /	Filling Date (DD/MM/YEAR) /
Contact Person /	Telephone /
E-mail /	Fax /

1. Point-to-Point Motion without constant velocity section

Property: Specific travel distance in specific time
Application: Pick and place, carriage etc.

a. Known Motion Condition	
(1) Load Mass	kg
(2) Effective Stroke	m
(3) Moving Time	s
(4) Dwell Time	s



b. Driver Condition	
(1) Max. Output Voltage	V
(2) Continuous Current	A
(3) Peak Current	A

c. Encoder	
(1) ☐ Analog ☐ Digital	
(2) Resolution	μm

d. Working Environment
(1) ☐ Room Temperature
(2) ☐ Constant Temperature _____℃
(3) ☐ Vacuum _____ Torr
(4) ☐ Clean Room _____ Level

e. Motion Precision	
(1) Positioning Accuracy	μm
(2) Repetitive Accuracy	μm

f. Motion Direction
(1) ☐ Horizontal
(2) ☐ Vertical
(3) ☐ Tilt_____ Degrees

g. Installation Method
(1) ☐ Lying Flat
(2) ☐ Vertically standing
(3) ☐ Wall Mount

h. Space Restrictions
(1) ☐ None
(2) ☐ Yes _____mm x_____mm x_____mm

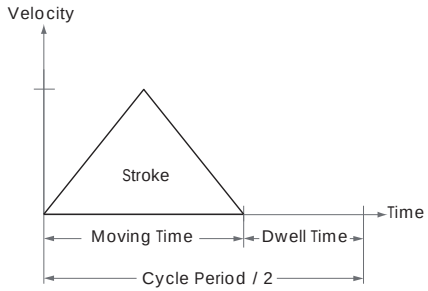
Sizing Form

Customer Name /	Filling Date (DD/MM/YEAR) /
Contact Person /	Telephone /
E-mail /	Fax /

2. Point-to-Point Motion without constant velocity section

Property: Specific travel distance in specific time
Application: Pick and place, carriage etc.

a. Known Motion Condition	
(1) Load Mass	kg
(2) Effective Stroke	m
(3) Frequency	Hz
(4) Dwell Time	s



b. Driver Condition	
(1) Max. Output Voltage	V
(2) Continuous Current	A
(3) Peak Current	A

c. Encoder	
(1) ☐ Analog ☐ Digital	
(2) Resolution	μm

d. Working Environment
(1) ☐ Room Temperature
(2) ☐ Constant Temperature _____℃
(3) ☐ Vacuum _____ Torr
(4) ☐ Clean Room _____ Level

e. Motion Precision	
(1) Positioning Accuracy	μm
(2) Repetitive Accuracy	μm

f. Motion Direction
(1) ☐ Horizontal
(2) ☐ Vertical
(3) ☐ Tilt_____ Degrees

g. Installation Method
(1) ☐ Lying Flat
(2) ☐ Vertically standing
(3) ☐ Wall Mount

h. Space Restrictions
(1) ☐ None
(2) ☐ Yes _____mm x_____mm x_____mm

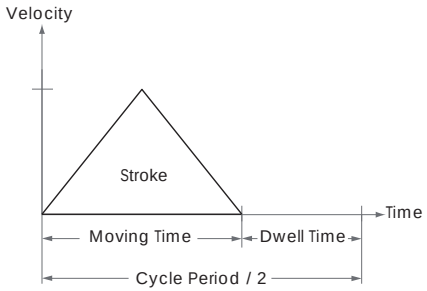
Sizing Form

Customer Name /	Filling Date (DD/MM/YEAR) /
Contact Person /	Telephone /
E-mail /	Fax /

3. Point-to-Point Motion without constant velocity section

Property: Specific travel distance in specific time
Application: Pick and place, carriage etc.

a. Known Motion Condition	
(1) Load Mass	kg
(2) Effective Stroke	m
(3) Acceleration	m/s²
(4) Dwell Time	s



b. Driver Condition	
(1) Max. Output Voltage	V
(2) Continuous Current	A
(3) Peak Current	A

c. Encoder	
(1) ☐ Analog ☐ Digital	
(2) Resolution	μm

f. Motion Direction
(1) ☐ Horizontal
(2) ☐ Vertical
(3) ☐ Tilt_____ Degrees

d. Working Environment
(1) ☐ Room Temperature
(2) ☐ Constant Temperature _____℃
(3) ☐ Vacuum _____ Torr
(4) ☐ Clean Room _____ Level

g. Installation Method
(1) ☐ Lying Flat
(2) ☐ Vertically standing
(3) ☐ Wall Mount

e. Motion Precision	
(1) Positioning Accuracy	μm
(2) Repetitive Accuracy	μm

h. Space Restrictions
(1) ☐ None
(2) ☐ Yes _____mm x_____mm x_____mm

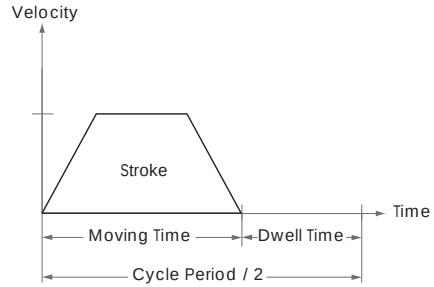
Sizing Form

Customer Name /	Filling Date (DD/MM/YEAR) /
Contact Person /	Telephone /
E-mail /	Fax /

4. Point-to-Point Motion with constant velocity section

Property: Work performed under constant velocity
Application: Scanning, inspection, cutting etc.

a. Motion Condition	
(1) Load Mass	kg
(2) Effective Stroke	m
(3) Moving Time	s
(4) Dwell Time	s
(5) Acceleration	m/s²



b. Driver Condition	
(1) Max. Output Voltage	V
(2) Continuous Current	A
(3) Peak Current	A

c. Encoder	
(1) ☐ Analog ☐ Digital	
(2) Resolution	μm

f. Motion Direction
(1) ☐ Horizontal
(2) ☐ Vertical
(3) ☐ Tilt_____ Degrees

d. Working Environment
(1) ☐ Room Temperature
(2) ☐ Constant Temperature _____℃
(3) ☐ Vacuum _____ Torr
(4) ☐ Clean Room _____ Level

g. Installation Method
(1) ☐ Lying Flat
(2) ☐ Vertically standing
(3) ☐ Wall Mount

e. Motion Precision	
(1) Positioning Accuracy	μm
(2) Repetitive Accuracy	μm

h. Space Restrictions
(1) ☐ None
(2) ☐ Yes _____mm x_____mm x_____mm

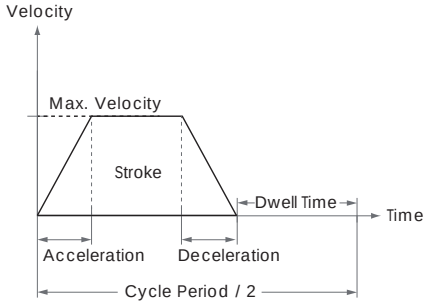
Sizing Form

Customer Name /	Filling Date (DD/MM/YEAR) /
Contact Person /	Telephone /
E-mail /	Fax /

5. Point-to-Point Motion with constant velocity section

Property: Work performed under constant velocity
Application: Scanning, inspection, cutting etc.

a. Motion Condition	
(1) Load Mass	kg
(2) Effective Stroke	m
(3) Max. Velocity	m/s
(4) Acceleration Time	s
(5) Dwell Time	s



b. Driver Condition	
(1) Max. Output Voltage	V
(2) Continuous Current	A
(3) Peak Current	A

c. Encoder	
(1) ☐ Analog ☐ Digital	
(2) Resolution	μm

f. Motion Direction
(1) ☐ Horizontal
(2) ☐ Vertical
(3) ☐ Tilt_____ Degrees

d. Working Environment
(1) ☐ Room Temperature
(2) ☐ Constant Temperature _____℃
(3) ☐ Vacuum _____ Torr
(4) ☐ Clean Room _____ Level

g. Installation Method
(1) ☐ Lying Flat
(2) ☐ Vertically standing
(3) ☐ Wall Mount

e. Motion Precision	
(1) Positioning Accuracy	μm
(2) Repetitive Accuracy	μm

h. Space Restrictions
(1) ☐ None
(2) ☐ Yes _____mm x_____mm x_____mm

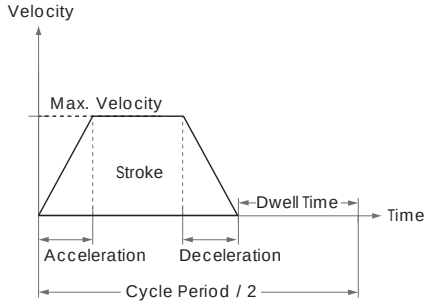
Sizing Form

Customer Name /	Filling Date (DD/MM/YEAR) /
Contact Person /	Telephone /
E-mail /	Fax /

6. Point-to-Point Motion with constant velocity section

Property: Work performed under constant velocity
Application: Scanning, inspection, cutting etc.

a. Motion Condition	
(1) Load Mass	kg
(2) Effective Stroke	m
(3) Moving Time	s
(4) Acceleration	m/s²
(5) Dwell Time	s



b. Driver Condition	
(1) Max. Output Voltage	V
(2) Continuous Current	A
(3) Peak Current	A

c. Encoder	
(1) ☐ Analog ☐ Digital	
(2) Resolution	μm

f. Motion Direction
(1) ☐ Horizontal
(2) ☐ Vertical
(3) ☐ Tilt_____ Degrees

d. Working Environment
(1) ☐ Room Temperature
(2) ☐ Constant Temperature _____℃
(3) ☐ Vacuum _____ Torr
(4) ☐ Clean Room _____ Level

g. Installation Method
(1) ☐ Lying Flat
(2) ☐ Vertically standing
(3) ☐ Wall Mount

e. Motion Precision	
(1) Positioning Accuracy	μm
(2) Repetitive Accuracy	μm

h. Space Restrictions
(1) ☐ None
(2) ☐ Yes _____mm x_____mm x_____mm