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20 Years' Innovation
for a Century of Automation
2003 - 2023

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INOVANCE

20 Years' Innovation for a Century of Automation
2003 - 2023

Inoprec

Direct Drive Motor Stages and Drives

Fast · Saving · Accurate · Stable · Simple
Outstanding Performance

FORWARD, ALWAYS PROGRESSING

20

20 Years' Innovation
for a Century of Automation

2003
/
2023

67 offices in China

400 authorized distributors

1020 service centers

6 inventory centers

2500+ sales and service staff

About Us

Shenzhen Inovance Technology Co., Ltd. (stock code: SZ.300124) was founded in 2003 and has a current stock market value of about RMB 160 billion. Inovance is the key force in developing industrial automation and drive technologies in China and a provider of optical-mechatronics-hydraulic-pneumatic integrated solutions covering drive, control, motor, and precision machineries.

Inovance achieved an annual revenue of RMB 17.943 billion and an operating profit of RMB 3.573 billon in 2021, which grew by 56% and 70% respectively on a YoY basis. Headquartered in Shenzhen, Inovance has established multiple production bases in Suzhou, Changzhou, Yueyang, and Nanjing, as well as subsidiaries, resident offices, and service centers in over 20 countries and regions worldwide. As of 2021, Inovance has obtained 2,186 patents and software copyrights. Through continuous investment in R&D, Inovance has enhanced its technical strength in such fields as motor and drive control, industrial control software, electric drive assembly for new energy vehicles, digitalization, and industrial robots.

Inovance is dedicated to the development of core technologies in motor drive and control, power electronics, and industrial Internet communication, with business covering industrial automation, elevator electrical accessories, new energy vehicles, industrial robots, and rail transit. Inovance aims to provide integrated solutions and industry-tailored products based on various industry needs, creating continuous values for customers.

The core technologies of Inovance not only covers the information layer, control layer, drive layer, execution layer, and perception layer, but also covers such fields as industrial automation, elevator, new energy vehicle, and trail transit, including :

① high performance vector control technology, servo control technology, and high-power IGCT drive technology in the drive layer;

② small - to large-scale PLC technology, CNC control technology, robot control technology, and high-speed bus technology in the control layer;

③ high-performance servo motor technology, high-efficiency motor technology, high-speed motor and magnetic levitation bearing technology, high-precision encoder design and process technology, precision transmission machine design and process technology, and image recognition technology in the execution layer;

④ industrial Internet, edge computing, industrial AI technology in the information layer; and

⑤ process technologies in industries including new energy vehicle, elevator, air conditioner, air compressor, 3C manufacturing, lithium battery, silicon, crane, injection molding machine, textile, metal product, printing, and packaging.

Inovance has been listed into "CCTV Top 10 Socially Responsible Corporate in Top 50 Listed Companies in China" in 2017, "National Enterprise Technology Center" in 2021, "First Batch of Postdoctoral Workstation in Shenzhen", "Top 100 Innovative Enterprises in Jiangsu", "First Batch of Key R&D Projects in Intelligent Robot in China", and "New Energy Vehicle Power Assembly Engineering Center in Jiangsu".

LMC Linear Motor Stages

Ultra-long life for low maintenance cost

- DDL drive, featuring contactless mechanical power transmission, minimal frictional loss, maintenance-free, safe, and reliable operation, and long service life

One-key tuning for easy use

- All-in-one integration, greatly simplifying design work for customers
- SV680-GINT+ELOI optical encoder, supporting one-key tuning and easy application

High bearing capacity and wide application

- Zero gear clearance between motor and load; high-rigidity guideway support; high structural rigidity and high bearing capacity
- 51 N to 1235 N continuous force range, applicable to most working conditions

Improved productivity

- Up to 3·g to 5·g acceleration and 3 m/s to 5 m/s velocity, greatly improving equipment productivity

Small size for compact equipment layout

- Independent and concurrent operation of multiple rotors on one linear motor stage
- Force density 20% higher than the industry average

Enhanced machining precision

- ±2 μm positioning repeatability achieved through the matching optical scale feedback, effectively improving the machining precision

High 20% Performance

Leading the industry with appr. 20% higher force density

- New DDL technology
- New electromagnetics solution
- DDL structure specifically designed for linear motor stages
- Force fluctuations and operating noise lower than the industry average

Easy 90% One-key tuning

Saving over 90% commissioning time

- All-in-one integration, greatly simplifying design work for customers
- SV680-GINT+ELOI optical encoder, supporting one-key tuning
- Wear-free and maintenance-free operation

Wide 80% Application

Supporting over 80% linear motor stage application scenarios

- Rated force: 51 N to 1235 N, peak force: 99 N to 2717 N
- Acceleration: up to 3·g to 5·g, velocity: 3 m/s to 5 m/s
- Positioning repeatability: ±2 μm, achieved through the matching optical scale feedback
- Bearing capacity: up to 200 kg
- CE and UL certification, meeting the requirements of global customers

Reliable 4 Safety

Continuously improving safety features for safe production

- Standard built-in dynamic braking function to shut down the system quickly for safety
- Standard Safe Torque Off (STO) function
- Fully-enclosed front protection to prevent foreign objects from falling in
- Standard side protective plate to protect the scale from scratching

Naming Rules for Standard Linear Motor Stages

LM	C	1	-	F	1	2	-	0500	DXX	X	-	6	003	1	N	1	0	-	INT
①	②	③		④	⑤	⑥		⑦	⑧	⑨		⑩	⑪	⑫	⑬	⑭	⑮		⑯

① Product family
LM: Linear motor stage

② Product type
C: Compact

③ Product version
1: First generation
2: Second generation (upcomping)

④ Flange size
E: 88 mm, F: 118 mm
G: 168 mm, H: 188 mm
K: 228 mm

⑤ Number of rotors
1: 1
2: 2

⑥ Color
2: Black

⑦ Stroke
0500: indicates 500 mm effective stroke for single-rotor models, or 500 mm maximum center-to-center distance between the outermost rotors for multi-rotor models

⑧ Motor code
See the motor code table on page 30.

⑨ Motor connection
1: Y1 5: Y5
2: Y2 6: Y6
3: Y3
4: Y4

⑩ Feedback
2: 0.5μm optical scale
3: 1 μm optical scale
6: Inovance communication-type magnetic scale

⑪ Cable length
003: 0.3 m

⑫ Hall sensor
9: w/o Hall sensor; no drive specified
A: w/ Hall sensor; no drive specified
F: w/o Hall sensor; matching SV680-GINT-N drive (220 V input)
G: w/o Hall sensor; matching SV680-GINT-P drive (220 V input)
H: w/ Hall sensor; matching SV680-GINT-N drive (220 V input)
K: w/ Hall sensor; matching SV680-GINT-P drive (220 V input)

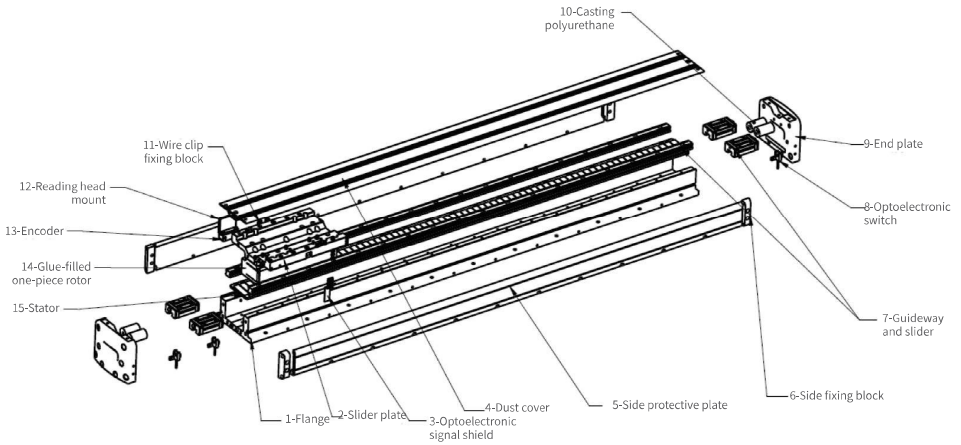
⑬ Optoelectronic switch
Q: No photoelectric switch
N: NPN type
P: PNP type

⑭ Guideway brand
1: THK
2: HIWIN

⑮ Drag chain, side protective plate, and centralized oiling system
0: w/o drag chain, w/o side protective plate, w/o centralized oiling system
2: w/o drag chain, w/ side protective plate, w/o centralized oiling system

⑯ -INT
Global

Standard Linear Motor Stage Structure



LMC Linear Motor Stage Specifications

Flange Size No.	Series	Continuous Force (N)	Peak Force (N)	Positioning Repeatability (μm/m) (Optical Scale)	Bearing Capacity (kg)	Max Vel (m/s)[1]	Max Length (mm)[2]	Moving Mass (kg)[3]
LMC88 series	LMC88-100	51	99	±2	Approx. 15	1.2	1500	1
	LMC88-130	96	187	±2	Approx. 15	1.2	1500	1.4
	LMC88-185	141	275	±2	Approx. 15	1.2	1500	1.9
	LMC88-240	186	363	±2	Approx. 15	1.2	1500	2.5
LMC118 series	LMC118-130	170	374	±2	10 to 50	4.5	6000	2.8
	LMC118-185	250	550	±2	10 to 50	4.5	6000	3.7
	LMC118-240	345	759	±2	10 to 50	4.5	6000	4.6
	LMC118-355	490	1078	±2	10 to 50	4.5	6000	6.7
LMC168 series	LMC168-130	330	726	±2	30 to 70	4.5	5000	4.4
	LMC168-185	495	1089	±2	30 to 70	4.5	5000	6.6
	LMC168-240	660	1452	±2	30 to 70	4.5	5000	8.2
LMC188 series	LMC188-240	660	1452	±2	50 to 150	4	5000	9.6
	LMC188-355	990	2178	±2	50 to 150	4	5000	13.5
LMC228 series	LMC228-240	1000	2200	±2	70 to 200	3	5000	14
	LMC228-290	1235	2717	±2	70 to 200	3	5000	17.4

Notes: [1] The bearing capacity varies slightly with speed and load. For special installation methods, please consult the manufacturer.

[2] For standard stroke, please consult the manufacturer.

[3] Moving mass includes the slider plate, rotor, and slider and their screws.

[4] The guideway needs to be maintained every 100 km or every 3 months the motor stage runs.

[5] Customers may specify needs for special customized functions, including the centralized oiling, foreign matter prevention, and oil dripping prevention.

Table of Rotor Models

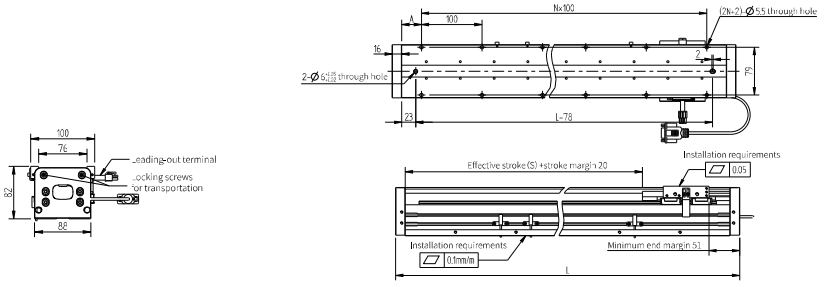
LM88 Series		LMC118 Series		LMC168 Series		LMC188 Series		LMC228 Series	
Internal Motor Model	Motor Code	Internal Motor Model	Motor Code	Internal Motor Model	Motor Code	Internal Motor Model	Motor Code	Internal Motor Model	Motor Code
LMC88-100Y1	D111	LMC118-130Y1	D221	LMC168-130Y2	D322	LMC188-240Y2	D442	LMC228-240Y4	D544
LMC88-130Y1	D121	LMC118-185Y1	D231	LMC168-185Y3	D333	LMC188-240Y4	D444		
LMC88-185Y1	D131	LMC118-185Y3	D233	LMC168-240Y2	D342	LMC188-355Y3	D463	LMC228-290Y5	D555
LMC88-240Y1	D141	LMC118-240Y2	D242	LMC168-240Y4	D344	LMC188-355Y6	D466		
		LMC118-355Y3	D263						

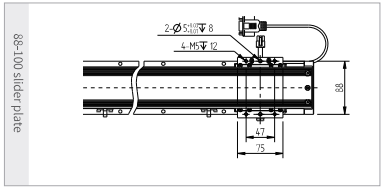
LMC Linear Motor Stage Specifications - LMC88

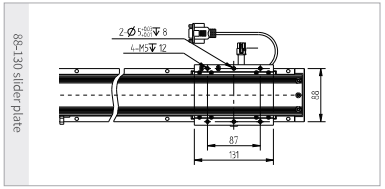
Linear Motor Stage Specifications

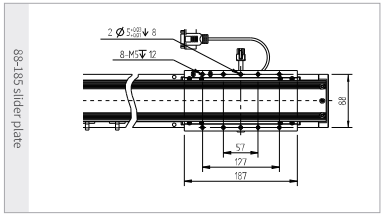
Motor Model	LMC88-100			Weight	LMC88-130			Weight	LMC88-185			Weight	LMC88-240			Weight
Stroke (mm)	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg
200	397	32.5	3	5.3	453	10.5	4	6.3	509	38.5	4	7.3	565	16.5	5	8.5
300	497	32.5	4	6.4	553	10.5	5	7.3	609	38.5	5	8.3	665	16.5	6	9.4
400	597	32.5	5	7.4	653	10.5	6	8.3	709	38.5	6	9.4	765	16.5	7	10.5
500	697	32.5	6	8.4	753	10.5	7	9.4	809	38.5	7	10.4	865	16.5	8	11.6
600	797	32.5	7	9.5	853	10.5	8	10.4	909	38.5	8	11.4	965	16.5	9	12.6
700	897	32.5	8	10.4	953	10.5	9	11.3	1009	38.5	9	12.4	1065	16.5	10	13.5
800	997	32.5	9	11.4	1053	10.5	10	12.4	1109	38.5	10	13.4	1165	16.5	11	14.6
900	1097	32.5	10	12.5	1153	10.5	11	13.5	1209	38.5	11	14.4	1265	16.5	12	15.6
1000	1197	32.5	11	13.5	1253	10.5	12	14.4	1309	38.5	12	15.5	1365	16.5	13	16.6
1100	1297	32.5	12	14.6	1353	10.5	13	15.5	1409	38.5	13	16.6	1465	16.5	14	17.7
1200	1397	32.5	13	15.5	1453	10.5	14	16.5	1509	38.5	14	17.5	1565	16.5	15	18.6
1300	1497	32.5	14	16.5	1553	10.5	15	17.5	1609	38.5	15	18.5	1665	16.5	16	19.7

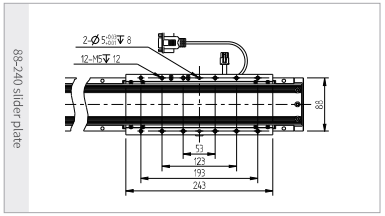
LMC88 - Outline Dimensions









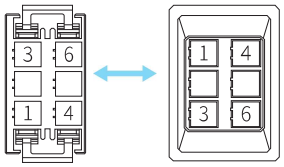


Power Adapter Cables, Encoder Adapter Cables, and Connector Assignment

Motor Power Cable Wiring					
6-pin socket	1	2	4	5	
Wire color	Red	White	Black	Yellow	Shield
Assignment	U	V	W	PE	
Remarks	/	/	/	Soldered to the shield	

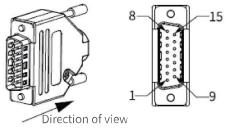
RSF		
Pin	Color	Assignment
7, 8	Pink	5V
2, 9	Gray	0V
14	Black	A+
6	Brown	A–
13	Red	B+
5	Orange	B–
12	Blue	Z+
10	Green	S1
11	Yellow	S2
4	Purple	Z–
15, housing	/	Shield

Inovance Communication-Type Magnetic Scale		
Pin	Color	Assignment
5	Purple	PS+
10	Blue	PS–
6	Brown	Z+
7	Orange	Z–
8	Red	+5V
9	Black	GND
Housing	/	Shield

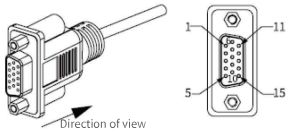


Cable plug terminal

Adapter cable terminal



DB15 male (two-row, adapter needed): for pulse type only



DB15 female (three-row, adapter needed): for communication type only

LMC88 Power Cable Selection							
Motor Type	Drive	Item	Cable Length (m)				
			3	5	8	10	12
LMC88 series： LMC88-100Y1 LMC88-130Y1 LMC88-185Y1 LMC88-240Y1	SV680-GINT	Model	S6-L-M160-3.0-TTS-2-INT	S6-L-M160-5.0-TTS-2-INT	S6-L-M160-8.0-TTS-2-INT	S6-L-M160-10.0-TTS-2-INT	S6-L-M160-12.0-TTS-2-INT
		Code	1504QJ54	1504QJ55	1504QJ56	1504QJ57	1504QK17

Matching Encoder Cables

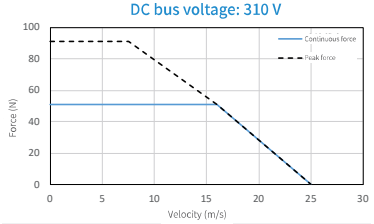
LMC Linear Motor Stage - Encoder Cables (for SV680-GINT Drives)						
		Encoder Cable Length (m)				
Reading Head Type	Item	3	5	8	10	12
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/o Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2	S6-L-P23A-5.0-TTS-2	S6-L-P23A-8.0-TTS-2	S6-L-P23A-10.0-TTS-2	S6-L-P23A-12.0-TTS-2
	Code	1504C044	1504C045	1504C046	1504C047	1504C048
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/ Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2-H	S6-L-P23A-5.0-TTS-2-H	S6-L-P23A-8.0-TTS-2-H	S6-L-P23A-10.0-TTS-2-H	S6-L-P23A-12.0-TTS-2-H
	Code	1504CJ86	1504CJ87	1504CJ88	1504CJ89	1504CJ90
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/o Hall sensor)	Model	S6-L-P24D-3.0-TTS-2	S6-L-P24D-5.0-TTS-2	S6-L-P24D-8.0-TTS-2	S6-L-P24D-10.0-TTS-2	S6-L-P24D-12.0-TTS-2
	Code	1504C283	1504C284	1504C285	1504C286	1504C287
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/ Hall sensor)	Model	S6-L-P24D-3.0-TTS-2-H	S6-L-P24D-5.0-TTS-2-H	S6-L-P24D-8.0-TTS-2-H	S6-L-P24D-10.0-TTS-2-H	S6-L-P24D-12.0-TTS-2-H
	Code	1504CJ81	1504CJ82	1504CJ83	1504CJ84	1504CJ85

Motor Technical Parameters

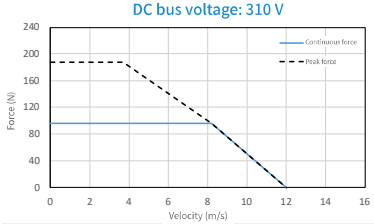
Item	Sign	Unit	LMC88-100 Y1	LMC88-130 Y1	LMC88-185 Y1	LMC88-240 Y1
Rated Performance						
Continuous force @Tmax	Fc	N	51	96	141	186
Peak force	Fp	N	99	187	275	363
Motor constant @25°C	Km	N/sqrt (W)	12.2	15.8	22.4	21.6
Max coil temp	Tmax	°C	120	120	120	120
Max cont. power diss	Pc	W	23	48.5	71.5	97.1
Electrical Specifications						
Winding topology			Y1	Y1	Y1	Y1
Continuous current @Tmax	Ic	Arms	3.6	3.6	3.6	3.6
Peak current	Ip	Arms	10.8	10.8	10.8	10.8
P-P resistance @25°C ±10%	RL-L	Ohms	1	2	2.9	3.9
P-P inductance±20%	LL-L	mH	11.7	23.8	35.6	47.7
P-P back EMF @25°C ±10%	KeL-L	V/m/s	11.7	23.5	35.2	47.1
Force constant @25°C ±10%	Kf	N/Arms	14.2	26.7	39.2	51.7
Electrical cycle time	Te	ms	11.7	11.9	12.3	12.3
Max bus voltage	Vbus	VDC	310			
Mechanical Specifications						
Rotor mass	Mc	kg	0.6	0.8	1.1	1.5
Magnetic stator mass	Mw	kg/m	1.5			
Magnetic pole pair pitch	Dp	mm	28			
Magnetic attraction	Fa	kN	0.1	0.3	0.5	0.7
Magnetic stator type	MALD1-40-112N，MALD1-40-168N，MALD1-40-336N					

Motor Force-Velocity Characteristic Curves

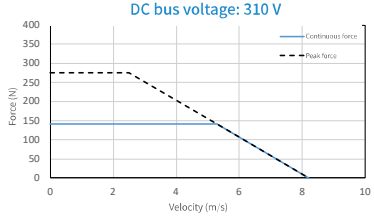
Force-Velocity curve: LMC88-100Y1
DC bus voltage: 310 V



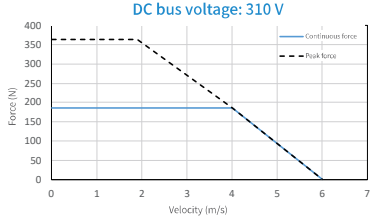
Force-Velocity curve: LMC88-130Y1
DC bus voltage: 310 V



Force-Velocity curve: LMC88-185Y1
DC bus voltage: 310 V



Force-Velocity curve: LMC88-240Y1
DC bus voltage: 310 V

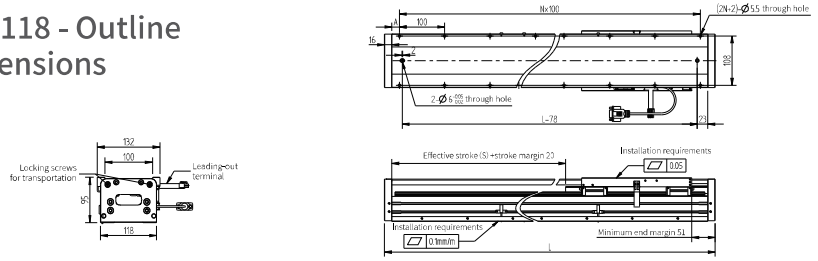


LMC Linear Motor Stage Specifications - LMC118

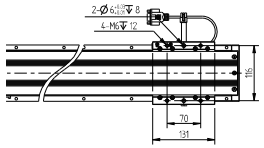
Linear Motor Stage Specifications

Motor Model	LMC118-130			Weight	LMC118-185			Weight	LMC118-240			Weight	LMC118-355			Weight
Stroke (mm)	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg
200	453	10.5	4	10	509	38.5	4	11.7	565	16.5	5	13.5	677	22.5	6	17.3
300	553	10.5	5	11.4	609	38.5	5	13.2	665	16.5	6	14.9	777	22.5	7	18.5
400	653	10.5	6	12.8	709	38.5	6	14.6	765	16.5	7	16.4	877	22.5	8	20
500	753	10.5	7	14.3	809	38.5	7	16	865	16.5	8	17.8	977	22.5	9	21.5
600	853	10.5	8	15.6	909	38.5	8	17.3	965	16.5	9	19.2	1077	22.5	10	22.8
700	953	10.5	9	17	1009	38.5	19	18.8	1065	16.5	10	20.5	1177	22.5	11	24.3
800	1053	10.5	10	18.4	1109	38.5	10	20.2	1165	16.5	11	22	1277	22.5	12	25.6
900	1153	10.5	11	19.9	1209	38.5	11	21.6	1265	16.5	12	23.4	1377	22.5	13	26.9
1000	1253	10.5	12	21.2	1309	38.5	12	22.9	1365	16.5	13	24.8	1477	22.5	14	28.4
1100	1353	10.5	13	22.6	1409	38.5	13	24.3	1465	16.5	14	26.1	1577	22.5	15	29.9
1200	1453	10.5	14	24	1509	38.5	14	25.8	1565	16.5	15	27.5	1677	22.5	16	31.1
1300	1553	10.5	15	25.5	1609	38.5	15	27.2	1665	16.5	16	29	1777	22.5	17	32.6
1400	1653	10.5	16	26.9	1709	38.5	16	28.6	1765	16.5	17	30.4	1877	22.5	18	34.1
1500	1753	10.5	17	28.2	1809	38.5	17	29.9	1865	16.5	18	31.8	1977	22.5	19	35.4
1600	1853	10.5	18	29.6	1909	38.5	18	31.4	1965	16.5	19	33.1	2077	22.5	20	36.9
1700	1953	10.5	19	31	2009	38.5	19	32.8	2065	16.5	20	34.6	2177	22.5	21	38.2
1800	2053	10.5	20	32.5	2109	38.5	20	34.2	2165	16.5	21	36	2277	22.5	22	39.6
1900	2153	10.5	21	33.9	2209	38.5	21	35.7	2265	16.5	22	37.4	2377	22.5	23	41
2000	2253	10.5	22	35.2	2309	38.5	22	37	2365	16.5	23	38.9	2477	22.5	24	42.5

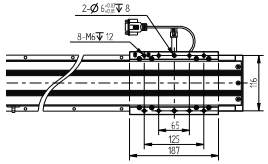
LMC118 - Outline Dimensions



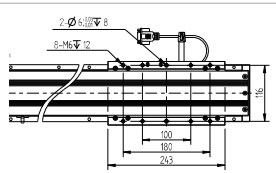
118-130 slider plate



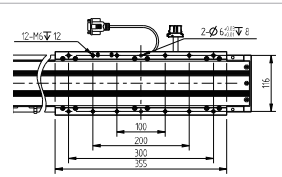
118-185 slider plate



118-240 slider plate



118-355 slider plate

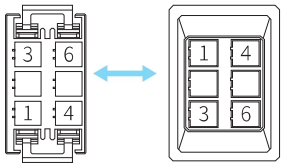


Power Adapter Cables, Encoder Adapter Cables, and Connector Assignment

Motor Power Cable Wiring					
6-pin socket	1	2	4	5	
Wire color	Red	White	Black	Yellow	Shield
Assignment	U	V	W	PE	
Remarks	/	/	/	Soldered to the shield	

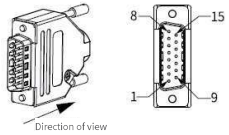
RSF		
Pin	Color	Assignment
7, 8	Pink	5V
2, 9	Gray	0V
14	Black	A+
6	Brown	A–
13	Red	B+
5	Orange	B–
12	Blue	Z+
10	Green	S1
11	Yellow	S2
4	Purple	Z–
15, housing	/	Shield

Inovance Communication-Type Magnetic Scale		
Pin	Color	Assignment
5	Purple	PS+
10	Blue	PS–
6	Brown	Z+
7	Orange	Z–
8	Red	+5V
9	Black	GND
Housing	/	Shield

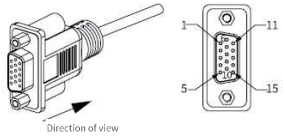


Cable plug terminal

Adapter cable terminal



DB15 male (two-row, adapter needed): for pulse type only



DB15 female (three-row, adapter needed): for communication type only

LMC118 Power Cable Selection							
Motor Type	Drive	Item	Cable Length (m)				
			3	5	8	10	12
LMC118 series： LMC118-130Y1 LMC118-185Y1 LMC118-240Y2	SV680-GINT	Model	S6-L-M160-3.0-TTS-2-INT	S6-L-M160-5.0-TTS-2-INT	S6-L-M160-8.0-TTS-2-INT	S6-L-M160-10.0-TTS-2-INT	S6-L-M160-12.0-TTS-2-INT
		Code	1504QJ54	1504QJ55	1504QJ56	1504QJ57	1504QK17
LMC118-185Y3 LMC118-240Y4	SV680-GINT	Model	S6-L-M150-3.0-TTS-2-INT	S6-L-M150-5.0-TTS-2-INT	S6-L-M150-8.0-TTS-2-INT	S6-L-M150-10.0-TTS-2-INT	S6-L-M150-12.0-TTS-2-INT
		Code	1504QJ60	1504QJ61	1504QJ62	1504QJ63	1504QJ64

Matching Encoder Cables

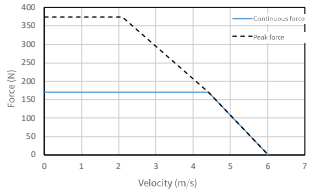
LMC Linear Motor Stage - Encoder Cables (for SV680-GINT Drives)						
		Encoder Cable Length (m)				
Reading Head Type	Item	3	5	8	10	12
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/o Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2	S6-L-P23A-5.0-TTS-2	S6-L-P23A-8.0-TTS-2	S6-L-P23A-10.0-TTS-2	S6-L-P23A-12.0-TTS-2
	Code	1504C044	1504C045	1504C046	1504C047	1504C048
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/ Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2-H	S6-L-P23A-5.0-TTS-2-H	S6-L-P23A-8.0-TTS-2-H	S6-L-P23A-10.0-TTS-2-H	S6-L-P23A-12.0-TTS-2-H
	Code	1504CJ86	1504CJ87	1504CJ88	1504CJ89	1504CJ90
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/o Hall sensor)	Model	S6-L-P24D-3.0-TTS-2	S6-L-P24D-5.0-TTS-2	S6-L-P24D-8.0-TTS-2	S6-L-P24D-10.0-TTS-2	S6-L-P24D-12.0-TTS-2
	Code	1504C283	1504C284	1504C285	1504C286	1504C287
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/ Hall sensor)	Model	S6-L-P24D-3.0-TTS-2-H	S6-L-P24D-5.0-TTS-2-H	S6-L-P24D-8.0-TTS-2-H	S6-L-P24D-10.0-TTS-2-H	S6-L-P24D-12.0-TTS-2-H
	Code	1504CJ81	1504CJ82	1504CJ83	1504CJ84	1504CJ85

Motor Technical Parameters

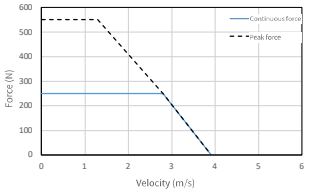
Item	Sign	Unit	LMC118-130 Y1	LMC118-185 Y1	LMC118-185 Y3	LMC118-240 Y2	LMC118-355 Y3
Rated Performance							
Continuous force @Tmax	Fc	N	170	250	250	345	490
Peak force	Fp	N	374	550	550	759	1078
Motor constant @25°C	Km	N/sqrt (W)	25.5	30.8	30.8	37.2	42.8
Max coil temp	Tmax	°C	120	120	120	120	120
Max cont. power diss	Pc	W	58.5	90.9	90.9	113.1	172.6
Electrical Specifications							
Winding topology	-	-	Y1	Y1	Y3	Y2	Y3
Continuous current @Tmax	Ic	Arms	3.2	3.2	9.6	6.4	9.6
Peak current	Ip	Arms	9.6	9.6	28.8	19.2	28.8
P-P resistance @25°C ±10%	RL-L	Ohms	2.9	4.4	0.5	1.4	1
P-P inductance±20%	LL-L	mH	36.6	53.1	5.9	17.9	12.5
P-P back EMF @25°C ±10%	KeL-L	V/m/s	47.1	70.6	23.6	47.1	47.2
Force constant @25°C ±10%	Kf	N/Arms	53.1	78.1	26	53.9	51
Electrical cycle time	Te	ms	12.6	12	11.8	12.8	12.5
Max bus voltage	Vbus	VDC	310				
Mechanical Specifications							
Rotor mass	Mc	kg	1.6	2.3		2.9	4.1
Magnetic stator mass	Mw	kg/m	2.5				
Magnetic pole pair pitch	Dp	mm	28				
Magnetic attraction	Fa	kN	0.8	1.1		1.5	2.3
Magnetic stator type	MALD1-60-112N, MALD1-60-168N, and MALD1-60-336N						

Motor Force-Velocity Characteristic Curves

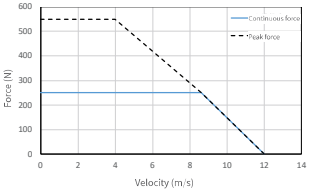
Force-Velocity curve: LMC118-130Y1
DC bus voltage: 310 V



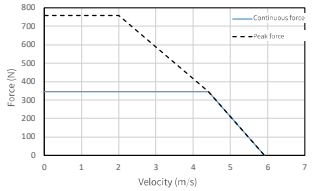
Force-Velocity curve: LMC118-185Y1
DC bus voltage: 310 V



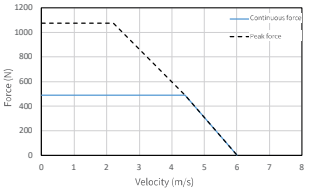
Force-Velocity curve: LMC118-185Y3
DC bus voltage: 310 V



Force-Velocity curve: LMC118-240Y2
DC bus voltage: 310 V



Force-Velocity curve: LMC118-355Y3
DC bus voltage: 310 V

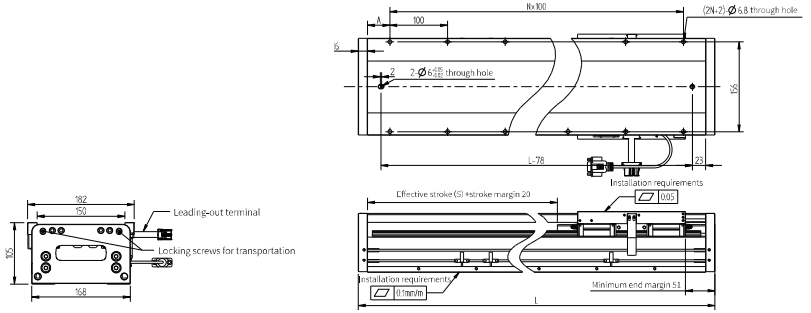


LMC Linear Motor Stage Specifications - LMC168

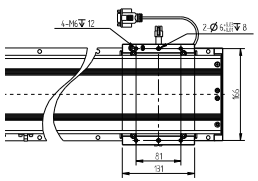
Linear Motor Stage Specifications

Motor Model	LMC168-130			Weight	LMC168-185			Weight	LMC168-240			Weight
Stroke (mm)	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg
300	553	10.5	5	18.6	609	38.5	5	21.4	665	16.5	6	24.8
400	653	10.5	6	20.9	709	38.5	6	23.9	765	16.5	7	27.3
500	753	10.5	7	23.3	809	38.5	7	26.3	865	16.5	8	29.7
600	853	10.5	8	25.8	909	38.5	8	28.5	965	16.5	9	32
700	953	10.5	9	27.7	1009	38.5	9	30.7	1065	16.5	10	34.1
800	1053	10.5	10	30.1	1109	38.5	10	33.2	1165	16.5	11	36.6
900	1153	10.5	11	32.6	1209	38.5	11	35.4	1265	16.5	12	38.8
1000	1253	10.5	12	34.8	1309	38.5	12	37.8	1365	16.5	13	41.2
1100	1353	10.5	13	37.3	1409	38.5	13	40.3	1465	16.5	14	43.7
1200	1453	10.5	14	39.4	1509	38.5	14	42.2	1565	16.5	15	45.6
1300	1553	10.5	15	41.6	1609	38.5	15	44.6	1665	16.5	16	48.1
1400	1653	10.5	16	44.1	1709	38.5	16	47.1	1765	16.5	17	50.5
1500	1753	10.5	17	46.5	1809	38.5	17	49.3	1865	16.5	18	52.7
1600	1853	10.5	18	48.4	1909	38.5	18	51.5	1965	16.5	19	54.9
1700	1953	10.5	19	50.9	2009	38.5	19	53.9	2065	16.5	20	57.3
1800	2053	10.5	20	53.4	2109	38.5	20	56.1	2165	16.5	21	59.5
1900	2153	10.5	21	55.6	2209	38.5	21	58.6	2265	16.5	22	62
2000	2253	10.5	22	58	2309	38.5	22	61.1	2365	16.5	23	64.5

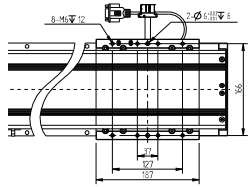
LMC168 - Outline Dimensions



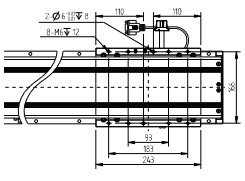
168-130 slider plate



168-185 slider plate



168-240 slider plate

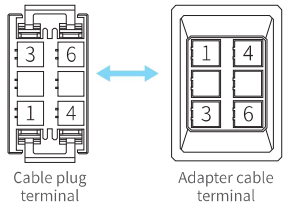


Power Adapter Cables, Encoder Adapter Cables, and Connector Assignment

Motor Power Cable Wiring					
6-pin socket	1	2	4	5	
Wire color	Red	White	Black	Yellow	Shield
Assignment	U	V	W	PE	
Remarks	/	/	/	Soldered to the shield	

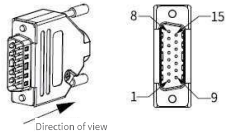
RSF		
Pin	Color	Assignment
7, 8	Pink	5V
2, 9	Gray	0V
14	Black	A+
6	Brown	A–
13	Red	B+
5	Orange	B–
12	Blue	Z+
10	Green	S1
11	Yellow	S2
4	Purple	Z–
15, housing	/	Shield

Inovance Communication-Type Magnetic Scale		
Pin	Color	Assignment
5	Purple	PS+
10	Blue	PS–
6	Brown	Z+
7	Orange	Z–
8	Red	+5V
9	Black	GND
Housing	/	Shield

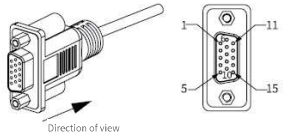


Cable plug terminal

Adapter cable terminal



DB15 male (two-row, adapter needed): for pulse type only



DB15 female (three-row, adapter needed): for communication type only

LMC168 Power Cable Selection							
Motor Type	Drive	Item	Cable Length (m)				
			3	5	8	10	12
LMC168 series： LMC168-130Y2 LMC168-240Y2	SV680-GINT	Model	S6-L-M160-3.0-TTS-2-INT	S6-L-M160-5.0-TTS-2-INT	S6-L-M160-8.0-TTS-2-INT	S6-L-M160-10.0-TTS-2-INT	S6-L-M160-12.0-TTS-2-INT
		Code	1504QJ54	1504QJ55	1504QJ56	1504QJ57	1504QK17
LMC168-185Y3 LMC168-240Y4	SV680-GINT	Model	S6-L-M150-3.0-TTS-2-INT	S6-L-M150-5.0-TTS-2-INT	S6-L-M150-8.0-TTS-2-INT	S6-L-M150-10.0-TTS-2-INT	S6-L-M150-12.0-TTS-2-INT
		Code	1504QJ60	1504QJ61	1504QJ62	1504QJ63	1504QJ64

Matching Encoder Cables

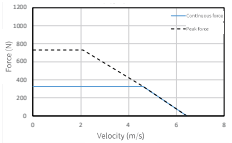
LMC Linear Motor Stage - Encoder Cables (for SV680-GINT Drives)						
		Encoder Cable Length (m)				
Reading Head Type	Item	3	5	8	10	12
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/o Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2	S6-L-P23A-5.0-TTS-2	S6-L-P23A-8.0-TTS-2	S6-L-P23A-10.0-TTS-2	S6-L-P23A-12.0-TTS-2
	Code	1504C044	1504C045	1504C046	1504C047	1504C048
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/ Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2-H	S6-L-P23A-5.0-TTS-2-H	S6-L-P23A-8.0-TTS-2-H	S6-L-P23A-10.0-TTS-2-H	S6-L-P23A-12.0-TTS-2-H
	Code	1504CJ86	1504CJ87	1504CJ88	1504CJ89	1504CJ90
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/o Hall sensor)	Model	S6-L-P24D-3.0-TTS-2	S6-L-P24D-5.0-TTS-2	S6-L-P24D-8.0-TTS-2	S6-L-P24D-10.0-TTS-2	S6-L-P24D-12.0-TTS-2
	Code	1504C283	1504C284	1504C285	1504C286	1504C287
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/ Hall sensor)	Model	S6-L-P24D-3.0-TTS-2-H	S6-L-P24D-5.0-TTS-2-H	S6-L-P24D-8.0-TTS-2-H	S6-L-P24D-10.0-TTS-2-H	S6-L-P24D-12.0-TTS-2-H
	Code	1504CJ81	1504CJ82	1504CJ83	1504CJ84	1504CJ85

Motor Technical Parameters

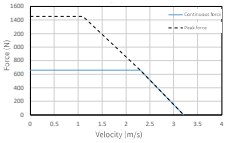
Item	Sign	Unit	LMC168-130 Y2	LMC168-185 Y3	LMC168-240 Y2	LMC168-240 Y4
Rated Performance						
Continuous force @Tmax	Fc	N	330	495	660	619
Peak force	Fp	N	726	1089	1452	1210
Motor constant @25°C	Km	N/sqrt (W)	39.3	48.4	55.5	55.5
Max coil temp	Tmax	°C	120	120	120	120
Max cont. power diss	Pc	W	92.9	145.4	193.8	170.3
Electrical Specifications						
Winding topology			Y2	Y3	Y2	Y4
Continuous current @Tmax	Ic	Arms	6.4	9.6	6.4	12
Peak current	Ip	Arms	19.2	28.8	19.2	32
P-P resistance @25°C ±10%	RL-L	Ohms	1.2	0.8	2.4	0.6
P-P inductance±20%	LL-L	mH	15.7	10.4	32.1	7.9
P-P back EMF @25°C ±10%	KeL-L	V/m/s	44.6	44.5	89.1	44.5
Force constant @25°C ±10%	Kf	N/Arms	51.6	51.6	103.1	51.6
Electrical cycle time	Te	ms	13.1	13	13.3	13.2
Max bus voltage	Vbus	VDC	540			
Mechanical Specifications						
Rotor mass	Mc	kg	3	4.3	5.5	
Magnetic stator mass	Mw	kg/m	5.7			
Magnetic pole pair pitch	Dp	mm	28			
Magnetic attraction	Fa	kN	1.4	2.1	2.8	
Magnetic stator type	MALD1-95-112N, MALD1-95-168N, and MALD1-95-336N					

Motor Force-Velocity Characteristic Curves

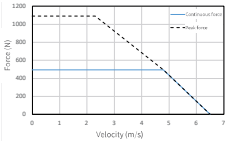
Force-Velocity curve: LMC168-130Y2
DC bus voltage: 310 V



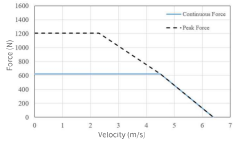
Force-Velocity curve: LMC168-240Y2
DC bus voltage: 310 V



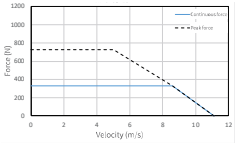
Force-Velocity curve: LMC168-185Y3
DC bus voltage: 310 V



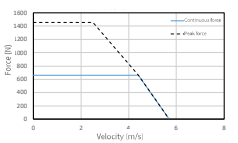
Force-Velocity curve: LMC168-240Y4
DC bus voltage: 310 V



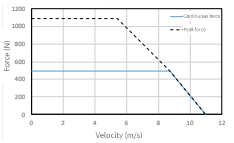
Force-Velocity curve: LMC168-130Y2
DC bus voltage: 540 V



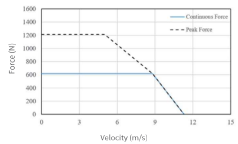
Force-Velocity curve: LMC168-240Y2
DC bus voltage: 540 V



Force-Velocity curve: LMC168-185Y3
DC bus voltage: 540 V



Force-Velocity curve: LMC168-240Y4
DC bus voltage: 540 V



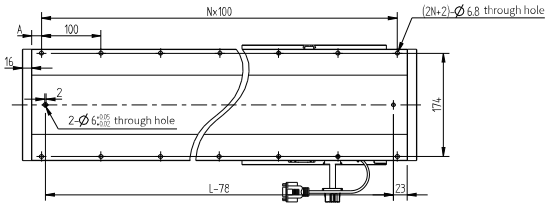
Note: The 220 V drive is used for the 310 V DC bus voltage, whereas the 380 V drive is used for the 540 V DC bus voltage.

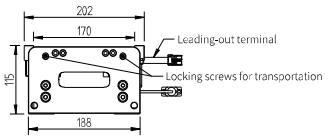
LMC Linear Motor Stage Specifications - LMC188

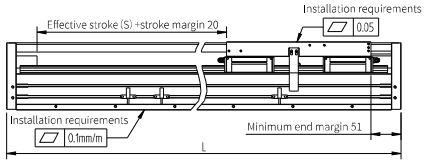
Linear Motor Stage Specifications

Motor Model	LMC188-240			Weight	LMC188-355			Weight
Stroke (mm)	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg
500	865	16.5	8	34.1	977	22.5	9	41.6
600	965	16.5	9	31.3	1077	22.5	10	44.1
700	1065	16.5	10	34.1	1177	22.5	11	46.6
800	1165	16.5	11	36.6	1277	22.5	12	49.5
900	1265	16.5	12	39.1	1377	22.5	13	52
1000	1365	16.5	13	42	1477	22.5	14	54.8
1100	1465	16.5	14	44.5	1577	22.5	15	57.6
1200	1565	16.5	15	47.3	1677	22.5	16	59.8
1300	1665	16.5	16	50.1	1777	22.5	17	62.6
1400	1765	16.5	17	52.3	1877	22.5	18	65.5
1500	1865	16.5	18	55.2	1977	22.5	19	68
1600	1965	16.5	19	58	2077	22.5	20	70.5
1700	2065	16.5	20	60.5	2177	22.5	21	73.3
1800	2165	16.5	21	63	2277	22.5	22	75.8
1900	2265	16.5	22	65.8	2377	22.5	23	78.7
2000	2365	16.5	23	68.4	2477	22.5	24	81.5
2100	2465	16.5	24	71.2	2577	22.5	25	83.7
2200	2565	16.5	25	74	2677	22.5	26	86.5
2300	2665	16.5	26	76.2	2777	22.5	27	89.4
2400	2765	16.5	27	79	2877	22.5	28	91.9
2500	2865	16.5	28	81.9	2977	22.5	29	94.7

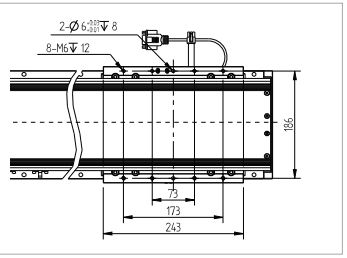
LMC188 - Outline Dimensions



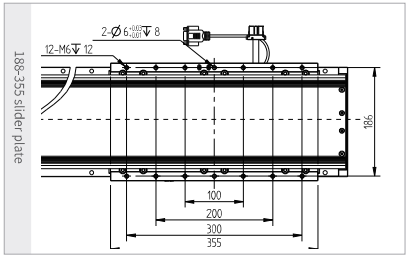




188-240 slider plate



188-355 slider plate

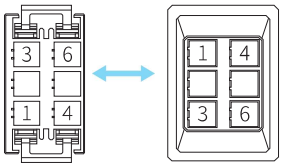


Power Adapter Cables, Encoder Adapter Cables, and Connector Assignment

Motor Power Cable Wiring					
6-pin socket	1	2	4	5	
Wire color	Red	White	Black	Yellow/yellow-green	Shield
Assignment	U	V	W	PE	
Remarks	/	/	/	Soldered to the shield	

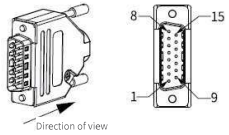
RSF		
Pin	Color	Assignment
7, 8	Pink	5V
2, 9	Gray	0V
14	Black	A+
6	Brown	A–
13	Red	B+
5	Orange	B–
12	Blue	Z+
10	Green	S1
11	Yellow	S2
4	Purple	Z–
15, housing	/	Shield

Inovance Communication-Type Magnetic Scale		
Pin	Color	Assignment
5	Purple	PS+
10	Blue	PS–
6	Brown	Z+
7	Orange	Z–
8	Red	+5V
9	Black	GND
Housing	/	Shield

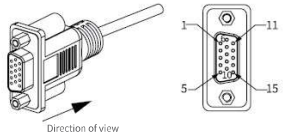


Cable plug terminal

Adapter cable terminal



DB15 male (two-row, adapter needed): for pulse type only



DB15 female (three-row, adapter needed): for communication type only

LMC188 Power Cable Selection							
Motor Type	Drive	Item	Cable Length (m)				
			3	5	8	10	12
LMC188 series：LMC188-240Y2	SV680-GINT	Model	S6-L-M160-3.0-TTS-2-INT	S6-L-M160-5.0-TTS-2-INT	S6-L-M160-8.0-TTS-2-INT	S6-L-M160-10.0-TTS-2-INT	S6-L-M160-12.0-TTS-2-INT
		Code	1504QJ54	1504QJ55	1504QJ56	1504QJ57	1504QK17
LMC188-355Y3 LMC188-240Y4	SV680-GINT	Model	S6-L-M150-3.0-TTS-2-INT	S6-L-M150-5.0-TTS-2-INT	S6-L-M150-8.0-TTS-2-INT	S6-L-M150-10.0-TTS-2-INT	S6-L-M150-12.0-TTS-2-INT
		Code	1504QJ60	1504QJ61	1504QJ62	1504QJ63	1504QJ64
LMC188-355Y6	SV680-GINT	Model	S6-L-M040-3.0-TTS-2-INT	S6-L-M040-5.0-TTS-2-INT	S6-L-M040-8.0-TTS-2-INT	S6-L-M040-10.0-TTS-2-INT	S6-L-M040-12.0-TTS-2-INT
		Code	1504QJ67	1504QJ68	1504QJ69	1504QJ70	1504QJ71

Matching Encoder Cables

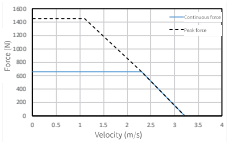
LMC Linear Motor Stage - Encoder Cables (for SV680-GINT Drives)						
		Encoder Cable Length (m)				
Reading Head Type	Item	3	5	8	10	12
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/o Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2	S6-L-P23A-5.0-TTS-2	S6-L-P23A-8.0-TTS-2	S6-L-P23A-10.0-TTS-2	S6-L-P23A-12.0-TTS-2
	Code	1504C044	1504C045	1504C046	1504C047	1504C048
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/ Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2-H	S6-L-P23A-5.0-TTS-2-H	S6-L-P23A-8.0-TTS-2-H	S6-L-P23A-10.0-TTS-2-H	S6-L-P23A-12.0-TTS-2-H
	Code	1504CJ86	1504CJ87	1504CJ88	1504CJ89	1504CJ90
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/o Hall sensor)	Model	S6-L-P24D-3.0-TTS-2	S6-L-P24D-5.0-TTS-2	S6-L-P24D-8.0-TTS-2	S6-L-P24D-10.0-TTS-2	S6-L-P24D-12.0-TTS-2
	Code	1504C283	1504C284	1504C285	1504C286	1504C287
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/ Hall sensor)	Model	S6-L-P24D-3.0-TTS-2-H	S6-L-P24D-5.0-TTS-2-H	S6-L-P24D-8.0-TTS-2-H	S6-L-P24D-10.0-TTS-2-H	S6-L-P24D-12.0-TTS-2-H
	Code	1504CJ81	1504CJ82	1504CJ83	1504CJ84	1504CJ85

Motor Technical Parameters

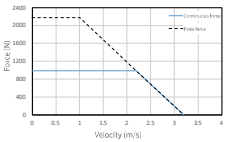
Item	Sign	Unit	LMC188-240 Y2	LMC188-240 Y4	LMC188-355 Y3	LMC188-355 Y6
Rated Performance						
Continuous force @Tmax	Fc	N	660	619	990	990
Peak force	Fp	N	1452	1210	2178	2080
Motor constant @25°C	Km	N/sqrt (W)	55.5	55.5	68.8	68.8
Max coil temp	Tmax	°C	120	120	120	120
Max cont. power diss	Pc	W	193.8	170.3	272.6	272.6
Electrical Specifications						
Winding topology			Y2	Y4	Y3	Y6
Continuous current @Tmax	Ic	Arms	6.4	12	9.6	19.2
Peak current	Ip	Arms	19.2	32	28.8	55
P-P resistance @25°C ±10%	RL-L	Ohms	2.4	0.6	1.6	0.4
P-P inductance±20%	LL-L	mH	32.1	7.9	21.5	5.4
P-P back EMF @25°C ±10%	KeL-L	V/m/s	89.1	44.5	89.1	44.5
Force constant @25°C ±10%	Kf	N/Arms	103.1	51.6	103.1	51.6
Electrical cycle time	Te	ms	13.3	13.2	13.4	13.5
Max bus voltage	Vbus	VDC	540			
Mechanical Specifications						
Rotor mass	Mc	kg	5.5		8	
Magnetic stator mass	Mw	kg/m	5.7			
Magnetic pole pair pitch	Dp	mm	28			
Magnetic attraction	Fa	kN	2.8		4.2	
Magnetic stator type	MALD1-95-112N, MALD1-95-168N, and MALD1-95-336N					

Motor Force-Velocity Characteristic Curves

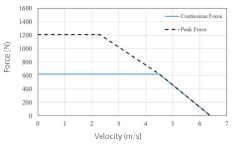
Force-Velocity curve: LMC188-240Y2
DC bus voltage: 310 V



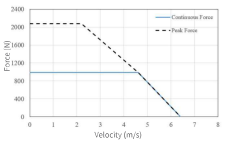
Force-Velocity curve: LMC188-355Y3
DC bus voltage: 310 V



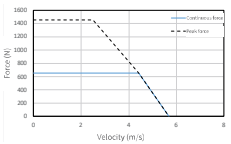
Force-Velocity curve: LMC188-240Y4
DC bus voltage: 310 V



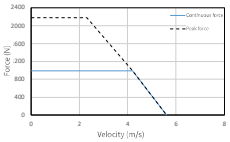
Force-Velocity curve: LMC188-355Y6
DC bus voltage: 310 V



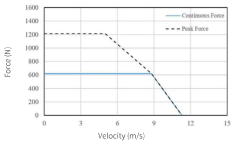
Force-Velocity curve: LMC188-240Y2
DC bus voltage: 540 V



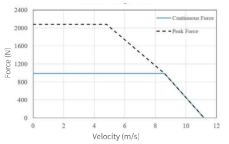
Force-Velocity curve: LMC188-355Y3
DC bus voltage: 540 V



Force-Velocity curve: LMC188-240Y4
DC bus voltage: 540 V



Force-Velocity curve: LMC188-355Y6
DC bus voltage: 540 V



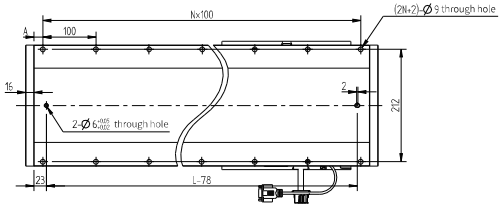
Note: The 220 V drive is used for the 310 V DC bus voltage, whereas the 380 V drive is used for the 540 V DC bus voltage.

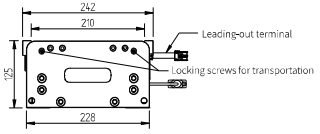
LMC Linear Motor Stage Specifications - LMC228

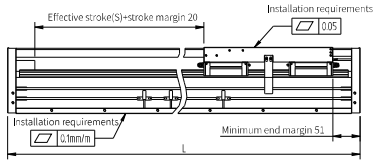
Linear Motor Stage Specifications

Motor Model	LMC228-240			Weight	LMC228-290			Weight
Stroke (mm)	L (mm)	A (mm)	N	kg	L (mm)	A (mm)	N	kg
500	865	16.5	8	49.2	921	44.5	8	54.5
600	965	16.5	9	52.3	1021	44.5	9	57.7
700	1065	16.5	10	55.4	1121	44.5	10	60.8
800	1165	16.5	11	58.9	1221	44.5	11	64.3
900	1265	16.5	12	62.1	1321	44.5	12	67.4
1000	1365	16.5	13	65.6	1421	44.5	13	70.9
1100	1465	16.5	14	69.1	1521	44.5	14	74.4
1200	1565	16.5	15	71.8	1621	44.5	15	77.2
1300	1665	16.5	16	75.3	1721	44.5	16	80.7
1400	1765	16.5	17	78.8	1821	44.5	17	84.2
1500	1865	16.5	18	81.9	1921	44.5	18	87.3
1600	1965	16.5	19	85	2021	44.5	19	90.4
1700	2065	16.5	20	88.5	2121	44.5	20	93.9
1800	2165	16.5	21	91.7	2221	44.5	21	97
1900	2265	16.5	22	95.2	2321	44.5	22	100.5
2000	2365	16.5	23	98.7	2421	44.5	23	104
2100	2465	16.5	24	101.4	2521	44.5	24	106.8
2200	2565	16.5	25	104.9	2621	44.5	25	110.3
2300	2665	16.5	26	108.4	2721	44.5	26	113.8
2400	2765	16.5	27	111.6	2821	44.5	27	117.3
2500	2865	16.5	28	115.1	2921	44.5	28	120.8

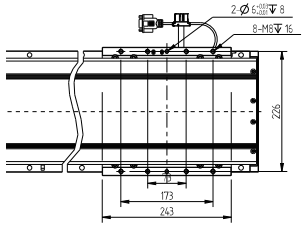
LMC228 - Outline Dimensions



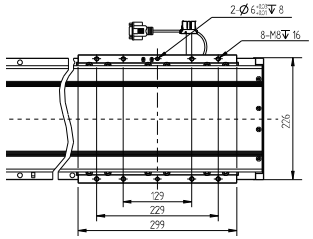




228-240 slider plate



228-290 slider plate

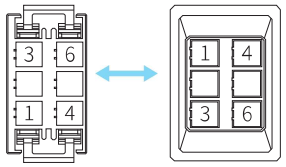


Power Adapter Cables, Encoder Adapter Cables, and Connector Assignment

Motor Power Cable Wiring					
6-pin socket	1	2	4	5	
Wire color	Red	White	Black	Yellow/yellow-green	Shield
Assignment	U	V	W	PE	
Remarks	/	/	/	Soldered to the shield	

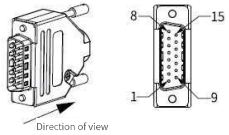
RSF		
Pin	Color	Assignment
7, 8	Pink	5V
2, 9	Gray	0V
14	Black	A+
6	Brown	A–
13	Red	B+
5	Orange	B–
12	Blue	Z+
10	Green	S1
11	Yellow	S2
4	Purple	Z–
15, housing	/	Shield

Inovance Communication-Type Magnetic Scale		
Pin	Color	Assignment
5	Purple	PS+
10	Blue	PS–
6	Brown	Z+
7	Orange	Z–
8	Red	+5V
9	Black	GND
Housing	/	Shield

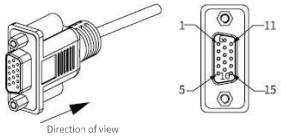


Cable plug terminal

Adapter cable terminal



DB15 male (two-row, adapter needed): for pulse type only



DB15 female (three-row, adapter needed): for communication type only

LMC228 Power Cable Selection							
Motor Type	Drive	Item	Cable Length (m)				
			3	5	8	10	12
LMC228 series: LMC228-240Y4	SV680-GINT	Model	S6-L-M150-3.0-TTS-2-INT	S6-L-M150-5.0-TTS-2-INT	S6-L-M150-8.0-TTS-2-INT	S6-L-M150-10.0-TTS-2-INT	S6-L-M150-12.0-TTS-2-INT
		Code	1504QJ60	1504QJ61	1504QJ62	1504QJ63	1504QJ64
LMC228-290Y5	SV680-GINT	Model	S6-L-M040-3.0-TTS-2-INT	S6-L-M040-5.0-TTS-2-INT	S6-L-M040-8.0-TTS-2-INT	S6-L-M040-10.0-TTS-2-INT	S6-L-M040-12.0-TTS-2-INT
		Code	1504QJ67	1504QJ68	1504QJ69	1504QJ70	1504QJ71

Matching Encoder Cables

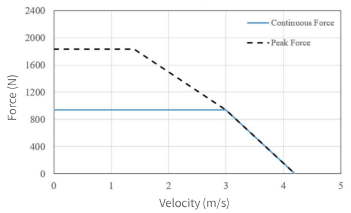
LMC Linear Motor Stage - Encoder Cables (for SV680-GINT Drives)						
		Encoder Cable Length (m)				
Reading Head Type	Item	3	5	8	10	12
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/o Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2	S6-L-P23A-5.0-TTS-2	S6-L-P23A-8.0-TTS-2	S6-L-P23A-10.0-TTS-2	S6-L-P23A-12.0-TTS-2
	Code	1504C044	1504C045	1504C046	1504C047	1504C048
RSF-MS15 series & Inovance pulse-type optical encoder (DB15 two-row connector) (w/ Hall sensor, w/o limit switch)	Model	S6-L-P23A-3.0-TTS-2-H	S6-L-P23A-5.0-TTS-2-H	S6-L-P23A-8.0-TTS-2-H	S6-L-P23A-10.0-TTS-2-H	S6-L-P23A-12.0-TTS-2-H
	Code	1504CJ86	1504CJ87	1504CJ88	1504CJ89	1504CJ90
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/o Hall sensor)	Model	S6-L-P24D-3.0-TTS-2	S6-L-P24D-5.0-TTS-2	S6-L-P24D-8.0-TTS-2	S6-L-P24D-10.0-TTS-2	S6-L-P24D-12.0-TTS-2
	Code	1504C283	1504C284	1504C285	1504C286	1504C287
Inovance communication-type ELMI magnetic scale/ELOI optical scale (w/ Hall sensor)	Model	S6-L-P24D-3.0-TTS-2-H	S6-L-P24D-5.0-TTS-2-H	S6-L-P24D-8.0-TTS-2-H	S6-L-P24D-10.0-TTS-2-H	S6-L-P24D-12.0-TTS-2-H
	Code	1504CJ81	1504CJ82	1504CJ83	1504CJ84	1504CJ85

Motor Technical Parameters

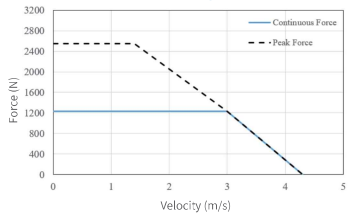
Item	Sign	Unit	LMC228-240 Y4	LMC228-290 Y5
Rated Performance				
Continuous force @Tmax	Fc	N	938	1235
Peak force	Fp	N	1833	2547
Motor constant @25°C	Km	N/sqrt (W)	71.3	81.4
Max coil temp	Tmax	°C	120	120
Max cont. power diss	Pc	W	227.1	302.8
Electrical Specifications				
Winding topology			Y4	Y5
Continuous current @Tmax	Ic	Arms	12	16
Peak current	Ip	Arms	32	45
P-P resistance @25°C ±10%	RL-L	Ohms	0.9	0.7
P-P inductance±20%	LL-L	mH	11.4	9.1
P-P back EMF @25°C ±10%	KeL-L	V/m/s	68.1	68.1
Force constant @25°C ±10%	Kf	N/Arms	78.1	77.2
Electrical cycle time	Te	ms	12.7	13
Max bus voltage	Vbus	VDC	540	
Mechanical Specifications				
Rotor mass	Mc	kg	8.4	10.2
Magnetic stator mass	Mw	kg/m	8	
Magnetic pole pair pitch	Dp	mm	28	
Magnetic attraction	Fa	kN	4.3	5.4
Magnetic stator type	MALD1-135-112N, MALD1-135-168N, and MALD1-135-336N			

Motor Force-Velocity Characteristic Curves

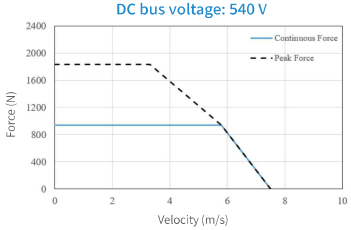
Force-Velocity curve: LMC228-240Y4
DC bus voltage: 310 V



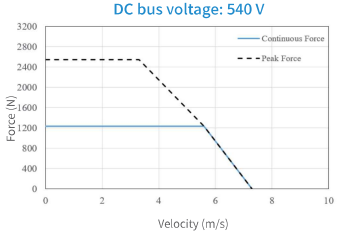
Force-Velocity curve: LMC228-290Y5
DC bus voltage: 310 V



Force-Velocity curve: LMC228-240Y4
DC bus voltage: 540 V



Force-Velocity curve: LMC228-290Y5
DC bus voltage: 540 V



Note: The 220 V drive is used for the 310 V DC bus voltage, whereas the 380 V drive is used for the 540 V DC bus voltage.

MP Precision Torque Motors

Motor Naming Rules

M P 1 - 112 F 10A B - U3 1 3 X - INT
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

① Product family
M: Motor

② Series code
P: Precision torque motor

③ Product version
1: First generation
2: Second generation (upcomping)

④ Frame code
112: 112 mm diameter
175: 175 mm diameter

⑤ Basic structure
S: Standard, cylindrical mounting flange
F: Flange, rectangular mounting flange

⑥ Maximum output torque
Consists of one letter and two digits (N·m)
A: x 1
B: x 10
C: x 100
D: x 1000
E: x 10000
For example, 12A indicates 12 N·m. 45A indicates 45N·m.

⑦ Voltage class
A: 110 V
B: 220 V

⑧ Encoder type
Consists of one digit and one letter
U3: 23-bit single-turn absolute encoder

⑨ Mounting accuracy
1: Mechanical deviation less than 5 μm axially and radially
2: Mechanical deviation less than 10 μm axially and radially
3: Mechanical deviation less than 30 μm axially and radially

⑩ Connector type
3: 0.3 m direct lead wire from cable gland

⑪ Cooling method
X: Natural cooling
F: Air cooling
L: Liquid cooling

⑫ -INT
Global

Motor Technical Parameters

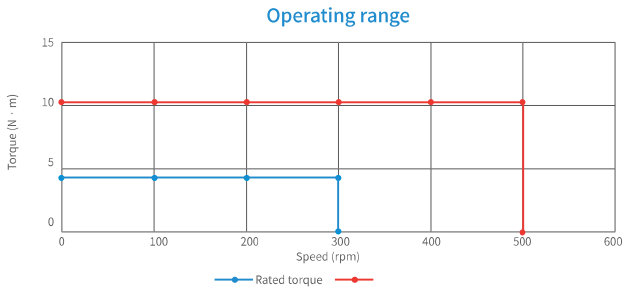
Motor Model	MP1-112F10AB-U313X-INT	MP1-175S11BB-U333X-INT
Continuous operating torque (N·m)	4.2	36
Maximum torque (N·m)	10.5	108
Continuous operating speed (rpm)	300	350
Maximum speed (rpm)	500	500
Motor resolution (pulse)	8388608	8388608
Positioning repeatability (arcsec)	±1.2	±2
Absolute positioning accuracy (arcsec)	±18	±20
Torque constant (N·m/Arms)	2.00	3.91
Line back EMF (Vrms/rpm)	0.139	0.270
P-P resistance (Ω)	12.48	1.28
P-P inductance (mH)	21.82	22.74
Continuous current (Arms)	2.1	9.2
Peak current (Arms)	5.3	27.6
Number of poles	28	16
Moment of inertia (10^{-4}kgm^2)	13.96	76.45
Axial load (pressure) (N)	1100	3000
Axial load (tension) (N)	360	1000
Torque load (N·m)	6.1	58
Load surface mounting accuracy (μm)	5	30
Weight (kg)	2.55	15.95

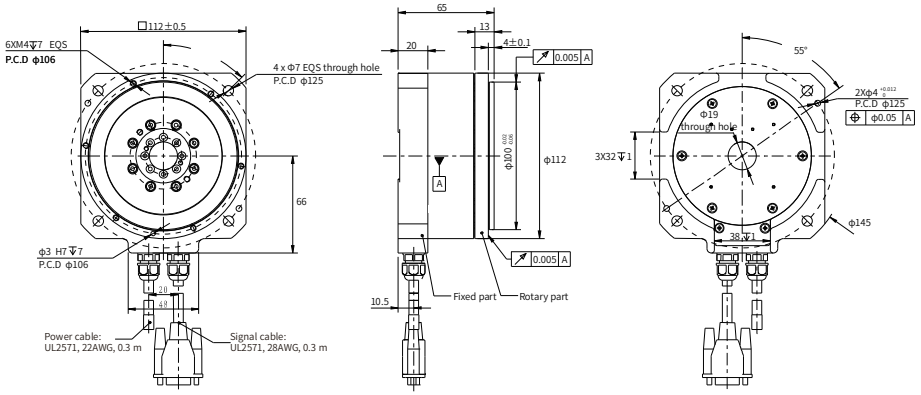
Precision Torque Motors

112 Precision Torque Motor Performance Parameters

Motor Model	MP1-112F10AB-U313X-INT
Continuous operating torque (N·m)	4.2
Maximum torque (N·m)	10.5
Continuous operating speed (rpm)	300
Maximum speed (rpm)	500
Motor resolution (pulse)	8388608
Positioning repeatability (arcsec)	±1.2
Absolute positioning accuracy (arcsec)	±18
Torque constant (N·m/Arms)	2.00
Line back EMF (Vrms/rpm)	0.139
P-P resistance (Ω)	12.48
P-P inductance (mH)	21.82
Continuous current (Arms)	2.1
Peak current (Arms)	5.3
Number of poles	28
Moment of inertia (10^{-4}kgm^2)	13.96
Axial load (pressure) (N)	1100
Axial load (tension) (N)	360
Torque load (N·m)	6.1
Load surface mounting accuracy (μm)	5
Weight (kg)	2.55

Motor Operating Range Characteristic Curve





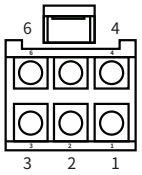
Drive and DDR Encoder Adapter Models

Motor Model	Applicable Drive	Item	3 m Extension Cable	5 m Extension Cable	10 m Extension Cable
MP1-112FF10AB-U313X-INT	SV680NS2R8I-GINT SV680PS2R8I-GINT	Power cable model	S6-L-M110-3.0-T-INT	S6-L-M110-5.0-T-INT	S6-L-M110-10.0-T-INT
		Power cable code	1504QJ74	1504QJ75	1504QJ77
		Encoder cable model	S6-L-PD-3.0-TTS	S6-L-PD-5.0-TTS	S6-L-PD-10.0-TTS
		Encoder cable code	1504D691	1504D692	1504D694

Note: The encoder adapter is a standard accessory and does not need to be purchased separately.

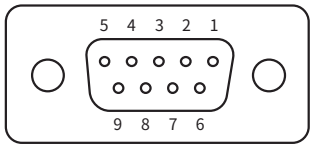
Terminal Pins and Assignment

Motor power cable connector



Pin	Phase	Wire color
1	U	White
2	V	Black
4	W	Red
5	P/E	Yellow/green
6	Shield	Black

Motor signal cable DB9 connector



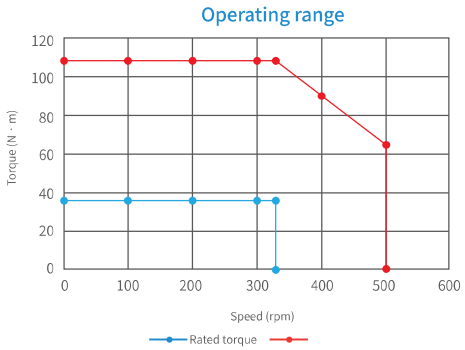
No.	Assignment	No.	Assignment
1	PS+	6	-
2	PS–	7	+5
3	-	8	GND
4	-	9	-
5	-		

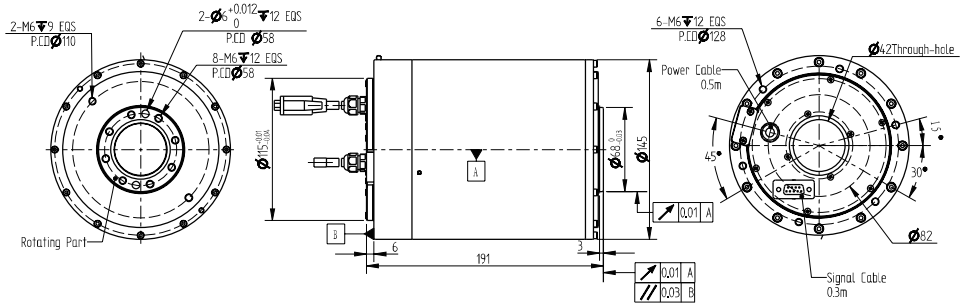
Precision Torque Motors

140 Precision Torque Motor Performance Parameters

Motor Model	MP1-140S10BB-U323X-INT	MP1-140S10BB-U323X-CD-INT
Continuous operating torque (N·m)	108	108
Maximum torque (N·m)	36	36
Continuous operating speed (rpm)	500	500
Maximum speed (rpm)	330	330
Motor resolution (pulse)	8,388,608	8,388,608
Positioning repeatability (arcsec)	±2	±2
Absolute positioning accuracy (arcsec)	±20	±4 (compensated)
Torque constant (N·m/Arms)	3.75	3.75
Line back EMF (Vrms/rpm)	0.256	0.256
P-P resistance (Ω)	7.33	7.33
P-P inductance (mH)	9.8	9.8
Continuous current (Arms)	9.6	9.6
Peak current (Arms)	28.8	28.8
Number of poles	20	20
Moment of inertia (10^{-4}kgm^2)	33.8	33.8
Axial load (pressure) (N)	3200	3200
Axial load (tension) (N)	1050	1050
Torque load (N·m)	108	108
Load surface mounting accuracy (μm)	10	10
Weight (kg)	12.8	12.8

Motor Operating Range Characteristic Curve





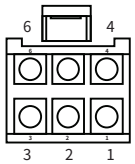
Drive and DDR Encoder Adapter Models

Motor Model	Applicable Drive	Item	3 m Extension Cable	5 m Extension Cable	10 m Extension Cable
MP1-140S10BB-U323X-INT	SV680NS012I-GINT SV680PS012I-GINT	Power cable model	S6-L-M110-3.0-T-INT	S6-L-M110-5.0-T-INT	S6-L-M110-10.0-T-INT
		Power cable code	1504QJ74	1504QJ75	1504QJ77
		Encoder cable model	S6-L-PD-3.0-TTS	S6-L-PD-5.0-TTS	S6-L-PD-10.0-TTS
		Encoder cable code	1504D691	1504D692	1504D694

Note: The encoder adapter is a standard accessory and does not need to be purchased separately.

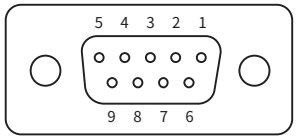
Terminal Pins and Assignment

Motor power cable connector



Pin	Phase	Wire color
1	U	White
2	V	Black
4	W	Red
5	P/E	Yellow/green
6	Shield	Black

Motor signal cable DB9 connector



No.	Assignment	No.	Assignment
1	PS+	6	-
2	PS-	7	+5
3	-	8	GND
4	-	9	-
5	-		

Precision Torque Motors

Motor Naming Rules

ISM T 1 - 160 F 12A B - A1 3 3 X - INT

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

① Inovance product type ISM: General-purpose servo motor	⑤ Basic structure F: Flange, rectangular mounting flange	⑦ Voltage B: 220 V	⑩ Connector type 3: 0.3 m direct lead wire from cable gland
② Series code T: Precision torque motor	⑥ Maximum output torque Two digits x Letter = Torque (N·m) A: x 1 B: x 10 C: x 100 D: x 1000 E: x 10000 For example, 12A indicates 12 N·m. 45A indicates 45N·m.	⑧ Encoder type A1: Single-turn 23-bit absolute encoder	⑪ Cooling method X: Natural cooling
③ Product version 1: First generation 2: Second generation		⑨ Mounting accuracy 1: Mechanical deviation less than 5 μm axially and radially 3: Mechanical deviation less than 30 μm axially and radially	⑫ -INT Global
④ Frame code 160: 160 mm diameter			

Motor Technical Parameters

Motor Model ISMT1-XXXXXXXX-XXXXX	160F12AB-A113X-INT 160F12AB-A133X-INT	160F45AB-A133X-INT
Continuous operating torque (N·m)	4	15
Maximum torque (N·m)	12	45
Continuous operating speed (rpm)	120	120
Maximum speed (rpm)	240	150
Motor resolution (pulse)	8388608	8388608
Positioning repeatability (arcsec)	±3	±3
Absolute positioning accuracy (arcsec)	±30	±30
Torque constant (N·m/Arms)	12.00	28.66
Line back EMF (Vrms/rpm)	0.208	0.653
P-P resistance (Ω)	32	17
P-P inductance (mH)	60.31	60.7
Continuous current (Arms)	1	1.57
Peak current (Arms)	3	4.72
Number of poles	28	28
Moment of inertia ($10^{-4}kgm^2$)	92	223
Axial load (pressure) (N)	5400	5100
Axial load (tension) (N)	1800	1700
Torque load (N·m)	40	40
Load surface mounting accuracy (μm)	5/10/30	30
Weight (kg)	5.6	14

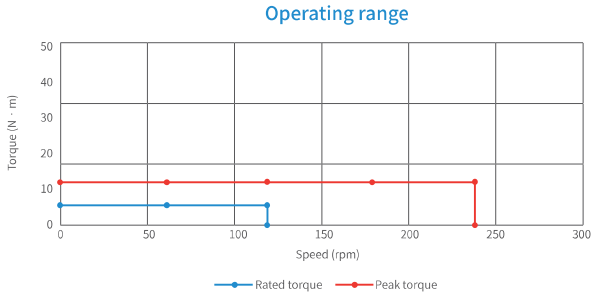
Note: ① The data may vary with drive settings. ② The accuracy is 30 μm by default, and can be as high as 5 μm (optional).

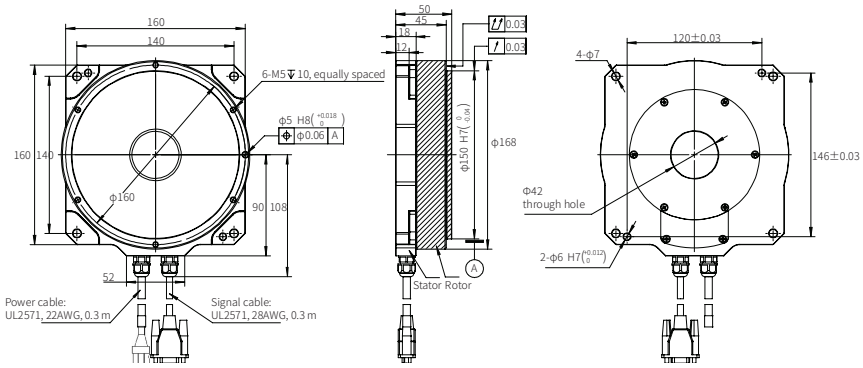
Precision Torque Motors

160 12 N·m Precision Torque Motor Performance Parameters

Motor Model	ISMT1-160F12AB-A113X-INT and ISMT1-160F12AB-A133X-INT
Continuous operating torque (N·m)	4
Maximum torque (N·m)	12
Continuous operating speed (rpm)	120
Maximum speed (rpm)	240
Motor resolution (pulse)	8388608
Positioning repeatability (arcsec)	±3
Absolute positioning accuracy (arcsec)	±30
Torque constant (N·m/Arms)	12.00
Line back EMF (Vrms/rpm)	0.208
P-P resistance (Ω)	32
P-P inductance (mH)	60.31
Continuous current (Arms)	1
Peak current (Arms)	3
Number of poles	28
Moment of inertia ($10^{-4}kgm^2$)	92
Axial load (pressure) (N)	5400
Axial load (tension) (N)	1800
Torque load (N·m)	40
Load surface mounting accuracy (μm)	5/10/30
Weight (kg)	5.6

Motor Operating Range Characteristic Curve





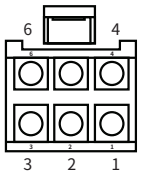
Drive and DDR Encoder Adapter Models

Motor Model	Applicable Drive	Item	3 m Extension Cable	5 m Extension Cable	10 m Extension Cable
ISMT1-160F12AB-A113X ISMT1-160F12AB-A133X ISMT1-160F45AB-A133X	SV680NS2R8I-GINT SV680PS2R8I-GINT	Power cable model	S6-L-M110-3.0-T-INT	S6-L-M110-5.0-T-INT	S6-L-M110-10.0-T-INT
		Power cable code	1504QJ74	1504QJ75	1504QJ77
		Encoder cable model	S6-L-PD-3.0-TTS	S6-L-PD-5.0-TTS	S6-L-PD-10.0-TTS
		Encoder cable code	1504D691	1504D692	1504D694

Note: The encoder adapter is a standard accessory and does not need to be purchased separately.

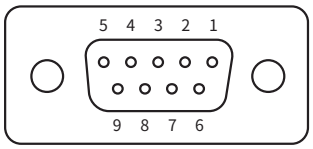
Terminal Pins and Assignment

Motor power cable connector



Pin	Phase	Wire color
1	U	White
2	V	Black
4	W	Red
5	P/E	Yellow/green
6	Shield	Black

Motor signal cable DB9 connector



No.	Assignment	No.	Assignment
1	PS+	6	-
2	PS–	7	+5
3	-	8	GND
4	-	9	-
5	-		

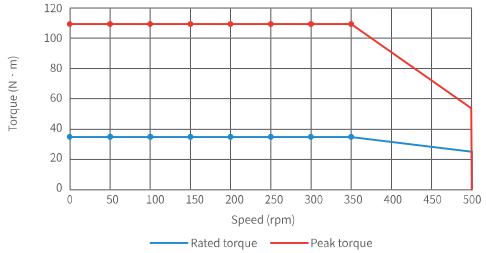
Precision Torque Motors

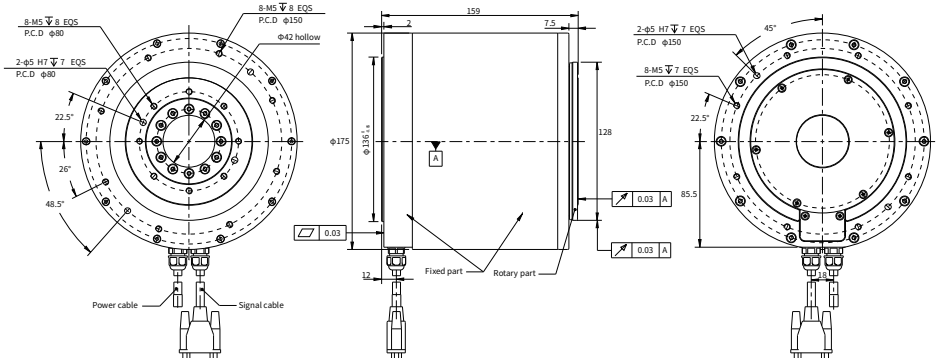
175 Precision Torque Motor Performance Parameters

Motor Model	MP1-175S11BB-U333X-INT
Continuous operating torque (N·m)	36
Maximum torque (N·m)	108
Continuous operating speed (rpm)	350
Maximum speed (rpm)	500
Motor resolution (pulse)	8388608
Positioning repeatability (arcsec)	±2
Absolute positioning accuracy (arcsec)	±20
Torque constant (N·m/Arms)	3.91
Line back EMF (Vrms/rpm)	0.270
P-P resistance (Ω)	1.28
P-P inductance (mH)	22.74
Continuous current (Arms)	9.2
Peak current (Arms)	27.6
Number of poles	16
Moment of inertia (10^{-4}kgm^2)	76.45
Axial load (pressure) (N)	3000
Axial load (tension) (N)	1000
Torque load (N·m)	58
Load surface mounting accuracy (μm)	30
Weight (kg)	15.95

Motor Operating Range Characteristic Curve

Operating range





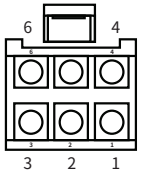
Drive and DDR Encoder Adapter Models

Motor Model	Applicable Drive	Item	3 m Extension Cable	5 m Extension Cable	10 m Extension Cable
MP1-175S11BB-U333X	SV680NS012I-GINT SV680PS012I-GINT	Power cable model	S6-L-M110-3.0-T-INT	S6-L-M110-5.0-T-INT	S6-L-M110-10.0-T-INT
		Power cable code	1504QJ74	1504QJ75	1504QJ77
		Encoder cable model	S6-L-PD-3.0-TTS	S6-L-PD-5.0-TTS	S6-L-PD-10.0-TTS
		Encoder cable code	1504D691	1504D692	1504D694

Note: The encoder adapter is a standard accessory and does not need to be purchased separately.

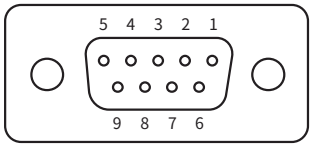
Terminal Pins and Assignment

Motor power cable connector



Pin	Phase	Wire color
1	U	White
2	V	Black
4	W	Red
5	P/E	Yellow/green
6	Shield	Black

Motor signal cable DB9 connector



No.	Assignment	No.	Assignment
1	PS+	6	-
2	PS–	7	+5
3	-	8	GND
4	-	9	-
5	-		

Terminal Assignment of Standard SV680P

STO safety terminal (CN6)

Pin No.	Assignment	Description
1	COM-	STO reference ground
2	24V	Internal 24V power supply
3	STO1	Control input for STO1
4	STO2	Control input for STO2

CN3 & CN4 (comm. terminals)

Pin No.	Assignment	Description	Pin No.	Assignment	Description
1 and 9	CANH	CAN communication port	6 and 14	-	-
2 and 10	CANL		7 and 15	-	-
3 and 11	CGND	CAN communication GND	8 and 16	GND	Grounding
4 and 12	RS485+	RS485 communication port	Enclosure	PE	Shield
5 and 13	RS485-				

Comm. terminal CN5

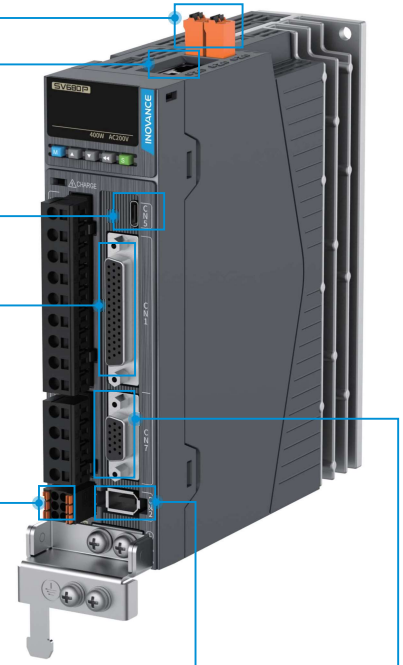
Pin No.	Assignment	Description	Pin No.	Assignment	Description
A1 B1	GND	Ground	A7 B7	DN	Differential data transmission
A4 B4	VBUS	USB power supply	A8 B8	-	-
A5 B5	-	-	A9 B9	VBUS	USB power supply
A6 B6	DP	Differential data transmission	A12 B12	GND	Ground

Control signal terminal CN1

Signal Name		Default Function	Pin No.	Terminal Function
General	DI1	P-OT	9	Positive limit switch
	DI2	N-OT	10	Negative limit switch
	DI3	INHIBIT	34	Position reference inhibited
	DI4	ALM-RST	8	Alarm reset (edge-triggered)
	DI5	S-ON	33	Servo ON
	DI6	-	32	-
	DI7	XintFree	12	Interrupt positioning selection
	DI8	HomeSwitch	30	Home switch
	+24V		17	Internal 24 V power supply; voltage range: 20 V to 30 V; maximum output current: 150 mA
	COM-		14	
	COM+		11	Common terminal of DI terminals
	DO1+	S-RDY+	7	Ready to switch on
	DO1-	S-RDY-	6	
	DO2+	COIN+	5	Positioning completed
	DO2-	COIN-	4	
	DO3+	-	3	-
	DO3-	-	2	
	DO4+	ALM+	1	Fault output
	DO4-	ALM-	26	
	DO5+	HomeAttain+	28	Homing completed
	DO5-	HomeAttain–	27	

Brake and PTC input terminal CN8

Pin No.	Assignment	Description
1	PTC	Motor temperature feedback input
2	COM-	Onboard 24VCOM
3	BK–	Brake+
4	BK-	Brake–
5	24V_BK	External power supply for the brake
6	COM_BK	Brake 24VCOM



Encoder Terminal CN2

Pin No.	Assignment	Description
1	5V	5 V power supply
2	GND	5 V power supply GND
3	PS4+/CLK+	1. PS± signal of second encoder 2. CLK± signal of bus-type encoder
4	PS4-/CLK-	
5	PS3+/DATA+	1. PS± signal of first encoder 2. DATA± signal of bus-type encoder 3. Gantry synchronization signal
6	PS3-/DATA-	
Enclosure	PE	Shield

Encoder terminal CN7

Pin No.	Assign-ment	Description	Pin No.	Assign-ment	Description
1	A+	Encoder pulse phase A ±	9	GND	Power supply reference GND
2	A–		10	PS1-/DATA-	1. PS- signal of first encoder 2. DATA- signal of bus-type encoder 3. Gantry synchronization signal
3	B+	Encoder pulse phase B ±	11	HALL_U+	Hall signal U
4	B–		12	HALL_V+	Hall signal V
5	PS1+/ DATA+	1. PS+ signal of first encoder 2. DATA+ signal of bus-type encoder 3. Gantry synchronization signal	13	HALL_W+	Hall signal W
6	Z+	Encoder pulse phase Z ±	14	PS2+/CLK	1. PS+ signal of second encoder 2. CLK+ signal of bus-type encoder
7	Z-		15	PS2-/CLK-	
8	+5V	Encoder 5 V power supply (load current lower than 200 mA)	Enclosure	PE	Shield

Terminal Assignment of Standard SV680N

STO safety terminal CN6

Pin No.	Assignment	Description
1	COM-	STO reference GND
2	24V	Internal 24 V power supply
3	STO1	Control input of STO1
4	STO2	Control input of STO2

Servo commissioning terminal CN5

Pin No.	Assignment	Description	Pin No.	Assignment	Description
A1 B1	GND	Ground	A7 B7	DN	Differential data transmission
A4 B4	VBUS	USB power supply	A8 B8	-	-
A5 B5	-	-	A9 B9	VBUS	USB power supply
A6 B6	DP	Differential data transmission	A12 B12	GND	Ground

CN3 & CN4 (comm. terminals)

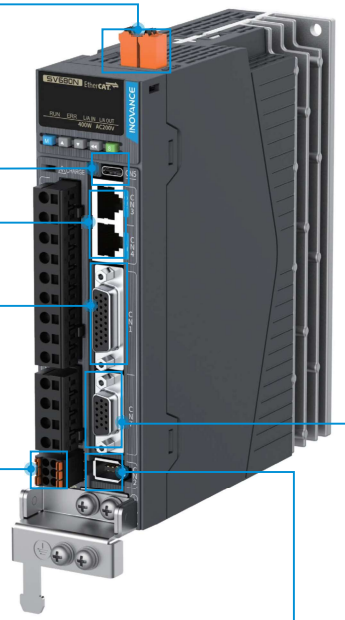
Pin No.	Assignment	Description	Pin No.	Assignment	Description
1	TD+	Transmit data (+)	9	TD+	Transmit data (+)
2	TD-	Transmit data (-)	10	TD-	Transmit data (-)
3	RD+	Receive data (+)	11	RD+	Receive data (+)
4&5	-	-	12&13	-	-
6	RD-	Receive data (-)	14	RD-	Receive data (-)
7&8	-	-	15&16	-	-

CN1 (control terminal)

Signal Name		Default Function	Pin No.	Terminal Function
General	DI1	P-OT	5	Positive limit switch
	DI2	N-OT	24	Negative limit switch
	DI3	HomeSwitch	15	Home switch
	DI4	Emergence Stop	16	Emergency stop
	DI5	TouchProbe1	23	Touch probe 1
	+24V		9	Internal 24 V power supply; voltage range: 20 V to 28 V; maximum output current: 150 mA.
	COM-		6	
	COM+		7	Common terminal of DI terminals
	DO1+	S-RDY+	4	Ready to switch on
	DO1-	S-RDY-	3	
	DO2+	ALM+	2	Fault
	DO2-	ALM-	1	

Brake terminal CN8

Pin No.	Assignment	Description	Pin No.	Assignment	Description
1	PTC	Motor temperature feedback input	4	BK-	Brake–
2	COM-	Onboard 24VCOM	5	24V_BK	External power supply for the brake
3	BK+	Brake+	6	COM_BK	Brake 24VCOM



Encoder Terminal CN2

Pin No.	Assignment	Description
1	5V	5 V power supply
2	GND	5 V power supply GND
3	PS4+/CLK+	1. PS± signal of second encoder
4	PS4-/CLK-	2. CLK± signal of bus-type encoder
5	PS3+/DATA+	1. PS± signal of first encoder
6	PS3-/DATA-	2. DATA± signal of bus-type encoder 3. Gantry synchronization signal
Enclosure	PE	Shield

Encoder terminal CN7

Pin No.	Assign-ment	Description	Pin No.	Assign-ment	Description
1	A+	Encoder pulse phase A ±	9	GND	Power supply reference ground
2	A–		10	PS1-/DATA-	1. PS- signal of first encoder 2. DATA- signal of bus-type encoder 3. Gantry synchronization signal
3	B+	Encoder pulse phase B ±	11	HALL_U+	Hall signal U
4	B–		12	HALL_V+	Hall signal V
5	PS1+/ DATA+	1. PS+ signal of first encoder 2. DATA+ signal of bus type encoder 3. Gantry synchronization signal	13	HALL_W+	Hall signal W
6	Z+	Encoder pulse phase Z ±	14	PS2+/CLK	1. PS+ signal of second encoder 2. CLK+ signal of bus-type encoder
7	Z-		15	PS2-/CLK-	
8	+5V	Encoder 5 V power supply (load current lower than 200 mA)	Enclosure	PE	Shield

Calculations in Selecting DDL Motors

Key Points in Selecting DDL Motors

Determine relevant parameters

Stroke S (m), load M (kg), and reverse force Fr (typically the frictional force in horizontal installation)

Determine velocity profile

Triangular velocity profile or T-curve velocity profile

Determine continuous force and peak force requirements through calculation

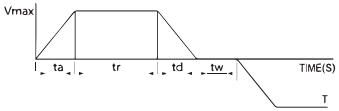
Typically, increase the calculated force values by 30% as safety margin.

Determine motor type

Select a linear motor from the guide that meets the continuous force and peak force requirements.

Determine Velocity Profile

- t_a: Acceleration time (s)
- t_r: Constant-velocity operation time (s)
- t_d: Deceleration time (s)
- t_w: Stopping time (s)
- V_{max}: Maximum velocity (m/s)



Determine Relevant Parameters

- Stroke: S (m)
- Load: M (kg)
- Reverse force: F_r (N, typically the frictional force in horizontal installation)

Determine Force Requirements

For example, in the T-curve velocity profile for horizontal motion, $t_a = t_d$

- Acceleration A_{cc} = Deceleration $D_{ec} = V_{max}/t_a$
- Force at acceleration F_a = Force at deceleration $F_d = M \times A_{cc}$ (The effect of friction is negligible.)
- Continuous force $F_{rms} = \sqrt{\frac{F_a^2 \times t_a + F_r^2 \times t_r + F_d^2 \times t_d}{t_a + t_r + t_d + t_w}}$

Determine Motor Force Specifications

Typically, increase the calculated force values by 30% for safety margin.

- Required peak force $F_p \geqslant F_a \times 130\%$
- Required continuous force $F_c \geqslant F_{rms} \times 130\%$

Select a motor that meets the continuous force and peak force requirements based on the calculation results.

Calculations in Selecting DDR Motors

Key Points in Selecting DDR Motors

Determine relevant parameters

Stroke S (rad), load inertia M (kg x m^2), and reverse torque T_r (typically the frictional torque in horizontal installation)

Determine velocity profile

Triangular velocity profile or T-curve velocity profile

Determine continuous torque and peak torque requirements through calculation

Typically, increase the calculated torque values by 30% as safety margin.

Determine motor type

Select a DD motor from the guide that meets the continuous torque and peak torque requirements.

Determine Torque Requirements

For example, in the T-curve velocity profile for horizontal rotation, $t_a = t_d$

- Acceleration A_{cc} = Deceleration $D_{ec} = V_{max}/t_a$
- Torque at acceleration T_a = Torque at deceleration $T_d = M \times A_{cc}$ (The effect of friction is negligible.)
- Continuous torque $T_{rms} = \sqrt{\frac{T_a^2 \times t_a + T_r^2 \times t_r + T_d^2 \times t_d}{t_a + t_r + t_d + t_w}}$

Determine Motor Torque Specifications

Typically, increase the calculated torque values by 30% for safety margin.

- Required peak torque $T_p \geqslant T_a \times 130\%$
- Required continuous torque $T_c \geqslant T_{rms} \times 130\%$

Select a DD motor that meets the continuous torque and peak torque requirements based on the calculation results.

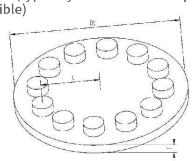
Determine Relevant Parameters

- Stroke: S (rad)
- Load inertia: M (kg x m^2)

If the load is composed of a solid disc with a mass of M_1 (diameter being D_t in meters) and N workpieces with a mass of M_2 each, and each workpiece is located at a distance of L (in meters) from the center of rotation, the load inertia is calculated according to the following formula:

$M = 1/8M_1 \times D_t^2 + N \times M_2 \times L_2$

- Reverse torque: Tr (typically the frictional torque in horizontal installation; negligible)



Determine Velocity Profile

- t_a: Acceleration time (s)
- t_r: Constant-velocity operation time (s)
- t_d: Deceleration time (s)
- t_w: Stopping time (s)
- V_{max}: Maximum velocity (rad/s)