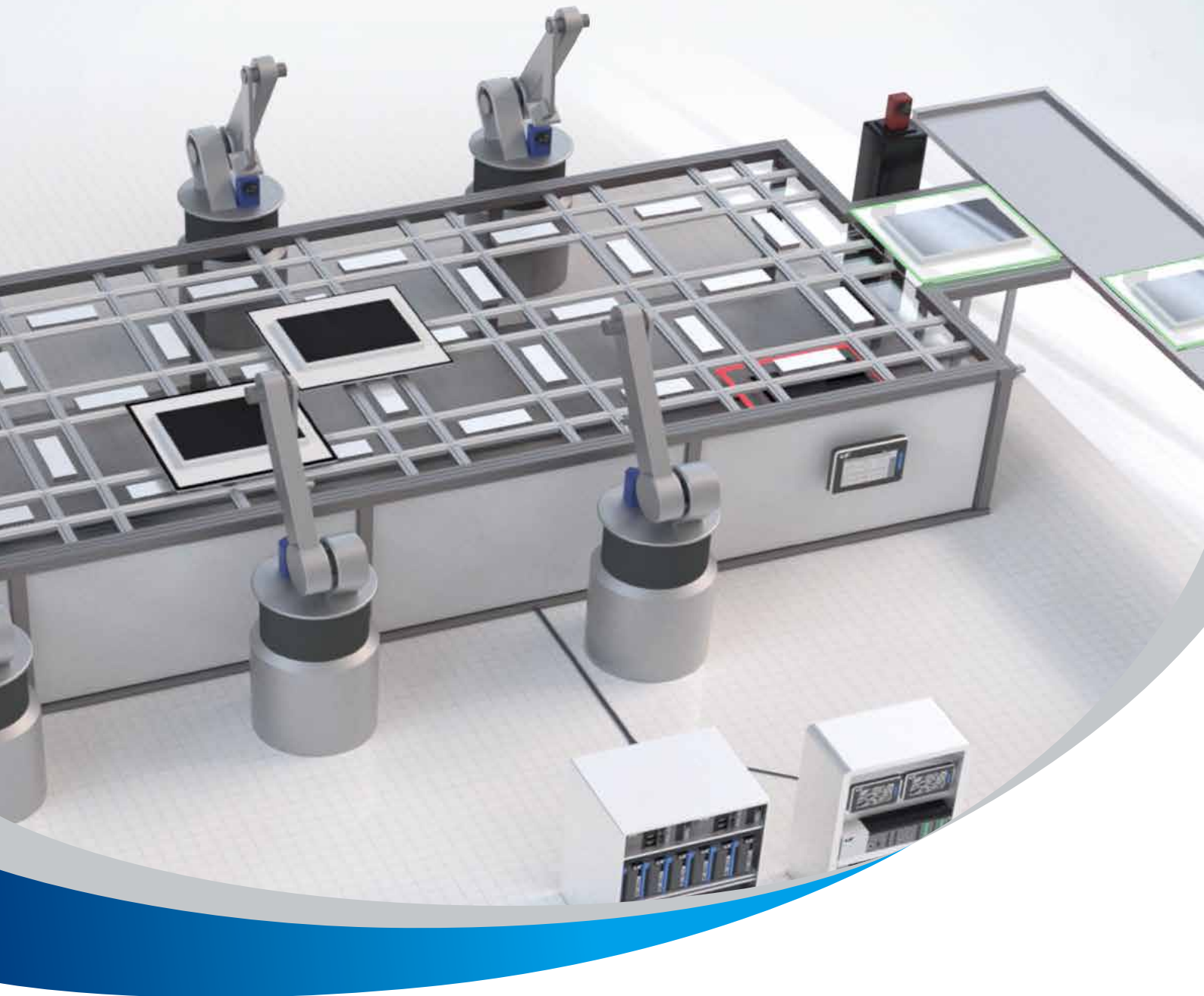


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X-TRAK SOLUTION

Moving Magnet Solution



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- 04 _ Introduction to the X-Trak
- 06 _ System Configuration / Product Specifications
- 08 _ Module Specifications / Model & Type
- 10 _ External Dimensions
- 13 _ Module Cables

X-TRAK SOLUTION

Moving Magnet Solution



Product Features

Reduction of maintenance and service cost



- Streamlined system design
- Fewer components
- Semipermanent product application
- Reduction of start-up time

Application possible to special environments (Clean rooms, vacuum, high temperature etc.)



- No particle generation
- No electric devices in mover

Increased precision and speed



- Resolution: 1 μ m
- Speed: 5 m/s (Actual speed varies by system)
- Acceleration: ~5G (Actual acceleration varies by system)
- Real-time tracking through Mover ID

Flexible configuration possible



- Movers weighing between few kilograms and few tons conveyable
- Diverse module / magnet types available
- Expansion and branching of tracks freely possible



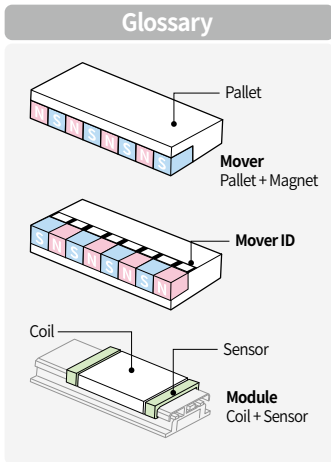
Product Applications

The X-Trak can be applied to diverse work environments, including but not limited to: FPD manufacture and inspection, semiconductor production and inspection, Pick & Place, medical facilities, large printing facilities, and mobile phone manufacture.



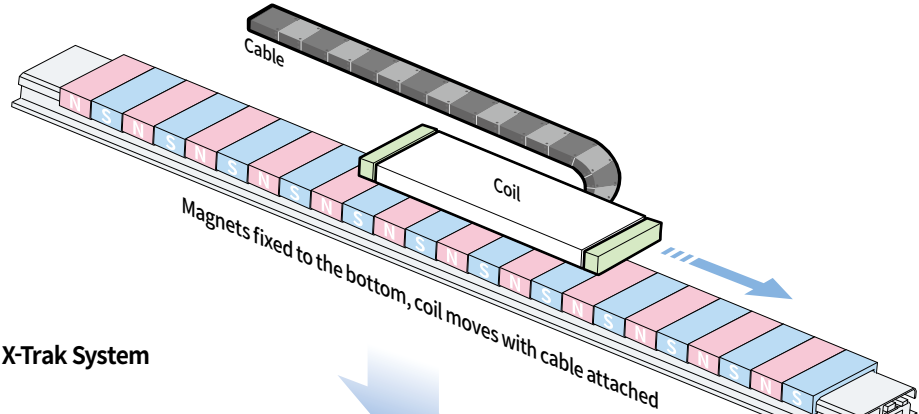
How the X-Trak Works

Glossary

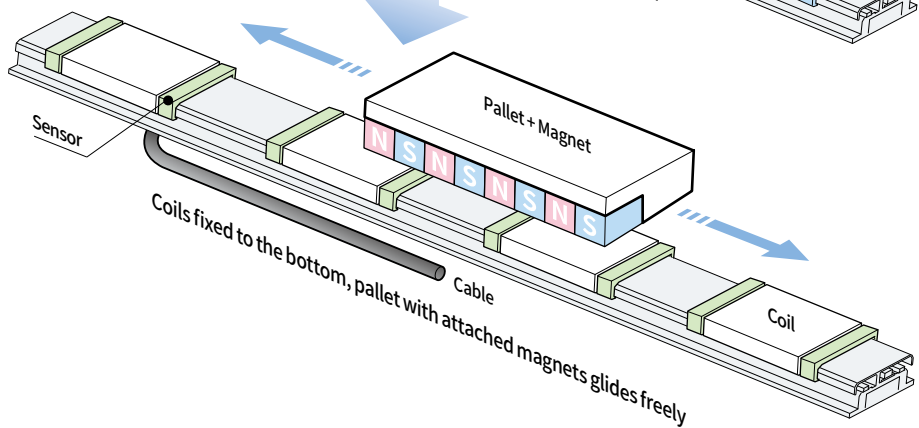


- Pallet
- Mover
Pallet + Magnet
- Mover ID
- Coil
- Sensor
- Module
Coil + Sensor

Conventional Linear Motor System



X-Trak System



Key Specifications

The X-Trak can be used for most purposes thanks to the streamlined system design with minimal numbers of components and cables, and a diverse product line up to 15kW.

Power Range	100W - 15kW commercial power (220 / 380 VAC)
Weight Capacity	1kg ~ Tons (actual capacity may increase or decrease by motor thrust)
Speed	5m/s maximum (Actual speed varies by motor output or guiding system)
Acceleration	~5G (Actual acceleration varies by motor output or guiding system)
Resolution	±1µm
Service Environment	Special environments (vacuum and high temperature) as well as common environments Supports third-party motors

Minimal Number of Parts

- Consisting of only drives and sensors with no MUX / network converters, the numbers of parts and cables, as well as cable lengths are minimized.

Easy Starting-Point Operation

- Supports Inc and Semi-Abs
- Home sensor reduces return time

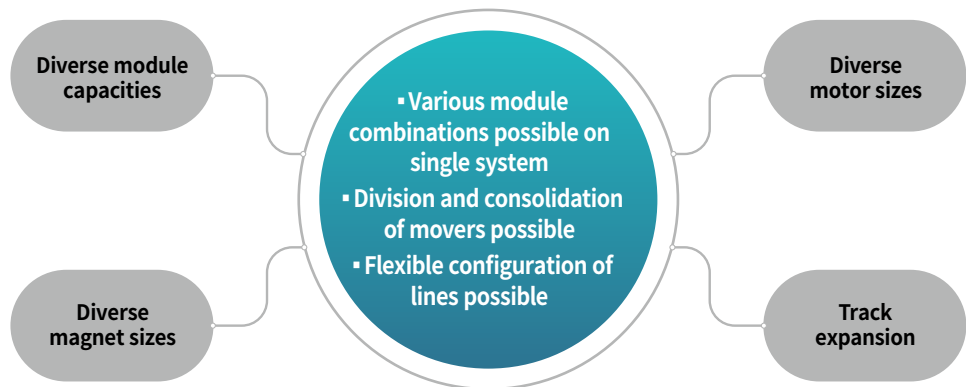
Features and Performance

- One-stop solutions available for drive / motor product line
- Automatic mover ID recognition

Reduction of Maintenance and Service Cost

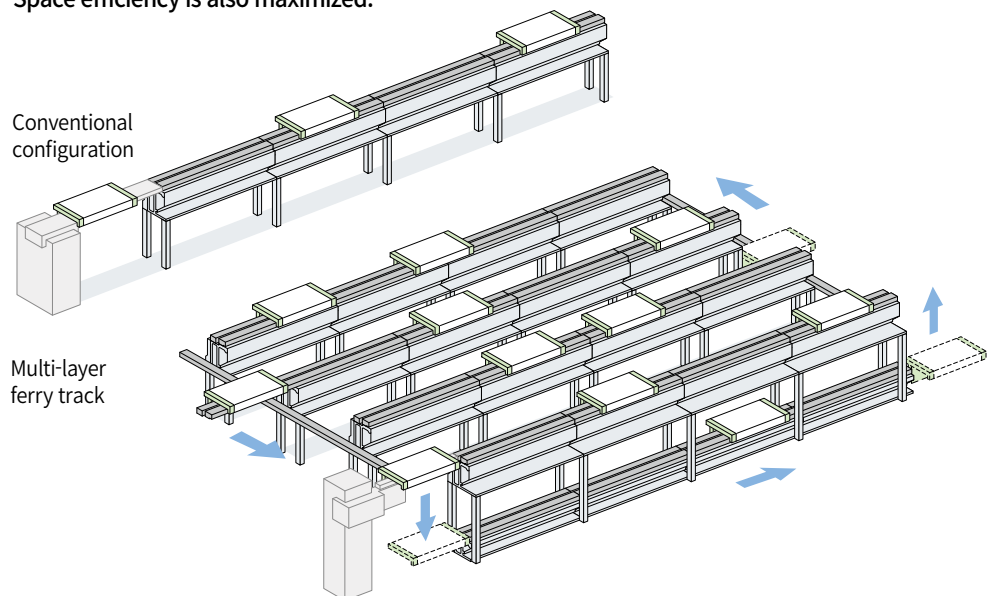
Conventional Conveyor Systems	X-Trak System
Contact required for carrier movement	Contactless conveyor system
Sudden speed changes may induce shock	Zero shock induced
Periodical replacement of rollers required	Semipermanent mechanism; No replacement required
Risk of particle formation and slip occurrence	No particle & No slip
Location and speed of multiple movers not individually controllable	Location and speed of multiple movers individually controllable
Mover meanders when moving	Linear guides minimize meandering

Flexible Configuration



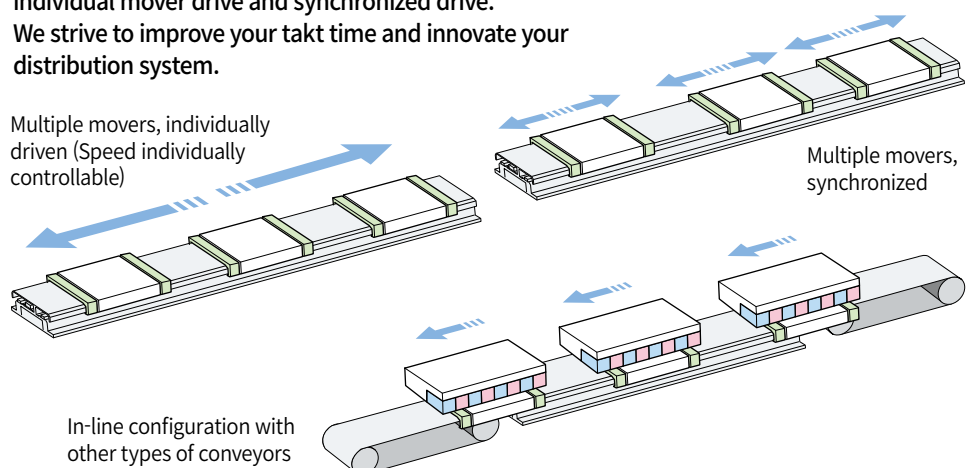
Design Freedom and Space Efficiency

You can freely design your system according to your needs. Space efficiency is also maximized.



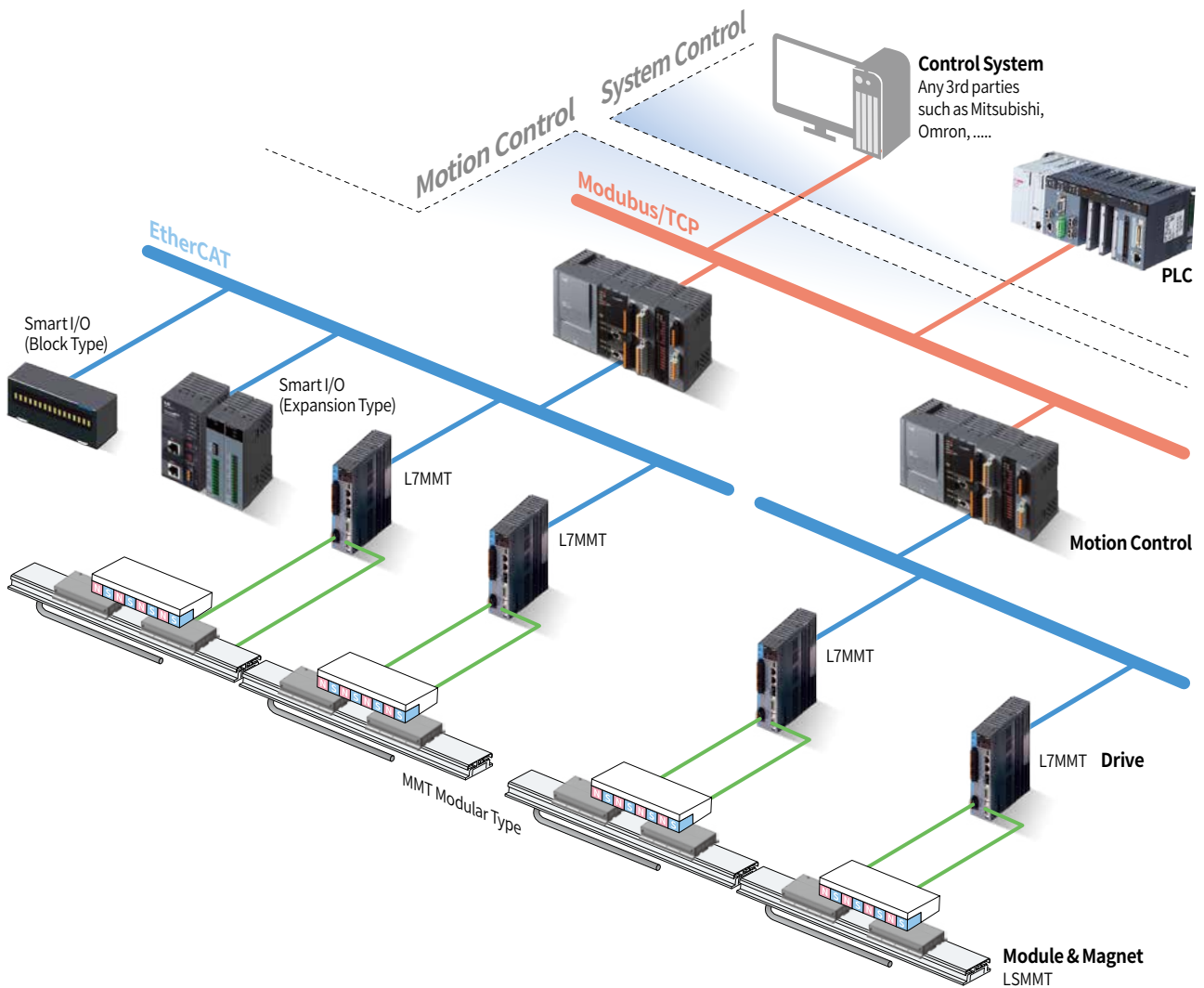
Various Control Possible

You can control the system in various ways, including individual mover drive and synchronized drive. We strive to improve your takt time and innovate your distribution system.



Block Diagram of the X-Trak System

The X-Trak is an all-in-one system consisting of motion controllers, servo drives, I/O and linear motors/sensors.



Medium/Large Scale Modular PLC Solution



XGK

- Best-in-class CPU performance (8.5 ns / Step)
- Controls up to 32,768 I/O
- Diverse product line including Professional, Standard and Economy models
- Intelligent software (XG5000) with integrated programming environment
- System solution based on open network
 - RAPIenet+(Ethernet, Ethernet/IP, RAPIenet integrated), Profibus-DP, DeviceNet

XGI

- Basic CPU performance specifications same as XGK
- IEC 61131-3 Standard programming language: Supports LD, SFC and ST (Structured Text)
- Compatible with GLOFA-GM user programming language (supports autoconverting)
- Shares system component with XGK (modules, base etc.)

Motion Controller LSMMT-E32A/C



Stand-Alone Motion Controller

Classification	Item	Data
Processing Speed	Standard	6.25ns (with ordinary contacts and coils)
	MOVE	5ns (with WORD type)
	Arithmetic	30ns (with WORD type)
Program Memory	No. of Modules Supported	Up to 256
	Capacity	10MB (Motion control) and 10MB (NC Control) total
Control Slaves	Slave	64 Slaves
Communication Type		EtherCAT (CoE: CANopen over EtherCAT, FoE: File Access over EtherCAT)
Communication Cycle		0.5ms, 1ms, 2ms and 4ms (Same as main task cycle)
Supported Servo Drives		Servo drives with EtherCAT CoE support
Ethernet	Communication Speed	Auto / 10Mbps / 100Mbps
	Communication Port	1 Port
	Communication Distance	Up to 100m between nodes

Servo Drive L7MMT



L7MMT	001U	002U	004U	008U	010U	020U	035U	050U	075U	150U
Capacity [kW]	0.1	0.2	0.4	0.75	1.0	2.0	3.5	5.0	7.5	15.0
Main Power Input	3Phase AC200[V] ~ 230[V], 50 ~ 60[Hz]									
Control Power Input	1Phase AC200[V] ~ 230[V], 50 ~ 60[Hz]									
Rated Current Output	1.4	1.7	3.0	5.2	6.75	13.5	16.7	32.0	39.4	76.0
Maximum Current Output	4.2	5.1	9.0	15.6	20.25	40.5	50.1	90.9	98.5	190.0
Control Performance	Speed control of 1:5000									
Communication Specifications	EtherCAT communication: Synchronization through FoE / EoE / CoE and DC (Distributed Clock), minimum DC cycle 250[μs] Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Cyclic Synchronous Position Mode									
Input / Output	Digital input : 8ch, Digital Output : 4ch, Analog input : 1ch, Analog Output : 2ch									
Safety Features	STO (STO1, STO2 input and EDM output)									

EtherCAT-Based Smart I/O (Expansion type)

- Expansion-type EtherCAT I/O communication adapter
- Supports 15 digital I/O modules: TR (SINK/SOURCE) and Relay
- Supports 14 special I/O modules: LoadCell, HSC, Temperature, Analog etc.
- Up to 8 modules per adapter node
- Supports DC5V output (3.0A)



EtherCAT-Based Smart I/O (Block type)



- Block-type EtherCAT network I/O
- Six-model configuration (3 analog models and 3 digital)
 - Digital: 16 IN/16 OUT, 32IN, 32 TR OUT (APS-EC-D232/DT32K/TR32K)
 - Analog: 4 Voltages / 4 Currents, 8 Voltages and 8 Currents I/O (APS-EC-AH1S/AH2S/AH3S)
- Uses both NPN / PNP input
- Individual status LED per I/O, fast I/O processing of 100 Mbps
- Vibration- and shock-resistance complies with IEC 61131-2 standard
- Up to 100m between nodes
- Operational voltage: DC 240V (20.4 - 28.8, ripple under 5%), 30mA
- Rated Current: 5mA input, 0.5A/connection, 3A/COM
- Response Time: Under 1ms
- Common Type: 16 connections/COM
- Terminal Block: (M3X6 screw type)
- Analog voltage range: 0~5[V], 1~5[V], 0~10[V], -10~+10[V]
- Analog current range: -5~+5[V], 0~20[mA], 4~20[mA]

Module Specifications

Classification		Unit	LSMMT-M040					LSMMT-M060			
Module	Air Gap ^{Note 1)}	[mm]	1.0	2.0	3.0	4.0	5.0	1.0	2.0	3.0	4.0
	Continuous Thrust	[N]	35.6	28.0	22.1	17.8	14.0	57.3	44.8	35.6	29.1
	Maximum Thrust	[N]	152.5	120.1	94.7	76.2	60.1	286.4	224.1	177.9	145.5
	Magnetic Attractive Force	[N]	256.4	201.0	157.9	129.4	103.2	482.0	378.1	297.2	242.6
	Continuous Drive Current ^{Note 2)}	[Arms]	2.66					2.28			
	Maximum Current	[Arms]	11.4					11.4			
	Magnetic Pole Pair Pitch	[mm]									
	Length	[mm]	167					227			
	Width	[mm]	113					113			
	Height	[mm]	41					41			
Air Gap Guide Height ^{Note 2)}	[mm]	42.0	43.0	44.0	45.0	46.0	42.0	43.0	44.0	45.0	
Magnet Plate	Series	LSMG-C072-□□□									
Weight	[Kg]	1.29					2.12				

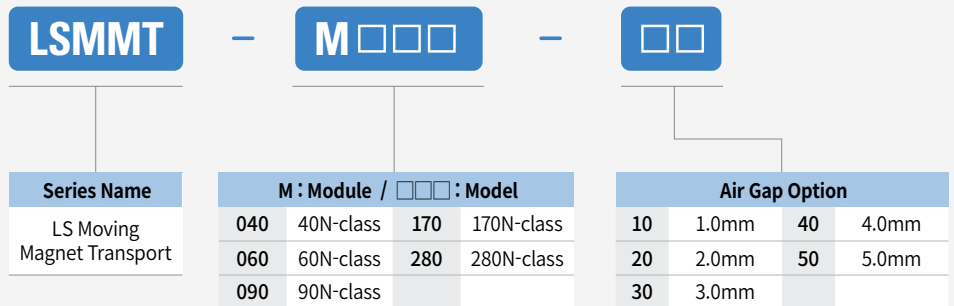
^{Note 1)} "Air Gap" refers to the gap between module surface and magnet plate surface (Tolerance: -1.0 mm to +1.0 mm)

^{Note 2)} Current required to continuously drive moving magnet modules at 40°C

^{Note 3)} Air gap deduced by measuring distance between module floor and magnet plate surface; measurement at module surface not possible due to cover plate tolerance

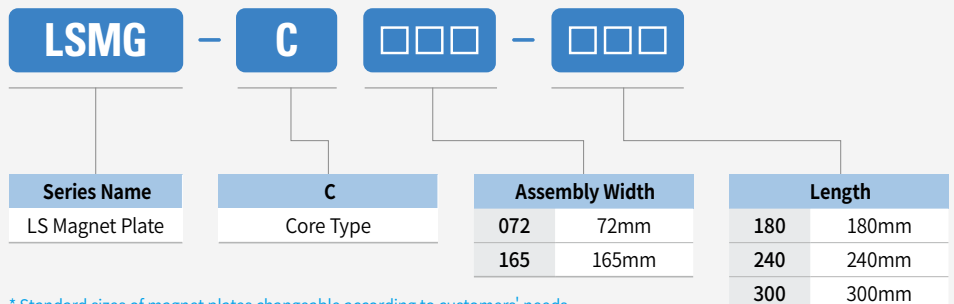
Magnet Model & Type

Magnet Modules



※ Continuous thrust at 1mm air gap

Magnet Plates

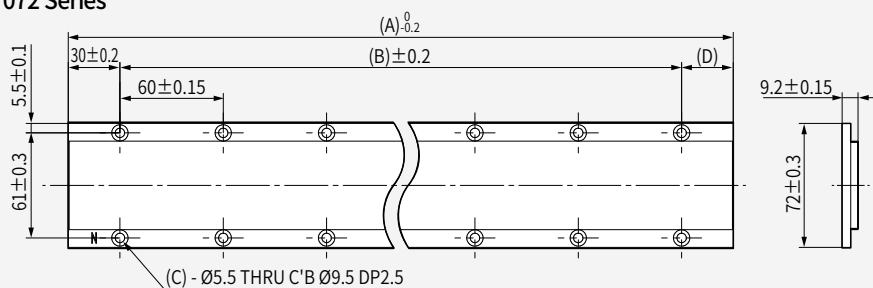


* Standard sizes of magnet plates changeable according to customers' needs

LSMMT-M090						LSMMT-M170					LSMMT-M280				
5.0	1.0	2.0	3.0	4.0	5.0	1.0	2.0	3.0	4.0	5.0	1.0	2.0	3.0	4.0	5.0
27.0	95.9	75.1	59.7	48.5	53.9	173.2	137.3	114.0	96.9	118.6	281.4	251.1	215.8	192.0	168.2
115.5	575.2	450.5	358.1	291.1	231.0	1039.0	823.6	683.8	581.6	508.4	1463.5	1305.9	1122.2	998.4	874.6
194.8	964.0	756.1	594.4	485.1	389.6	825.1	547.6	377.4	273.8	210.2	1354.6	1072.3	817.9	676.8	583.7
1.9						2.55					2.56				
11.4						15.3					13.3				
30.0											60.0				
347						407					425				
113						113					195				
41						59.5					63.5				
46.0	42.0	43.0	44.0	45.0	46.0	60.5	61.5	62.5	63.5	64.5	64.5	65.5	66.5	67.5	68.5
LSMG-C072-□□□										LSMG-C165-□□□					
3.75						7.24					11.48				

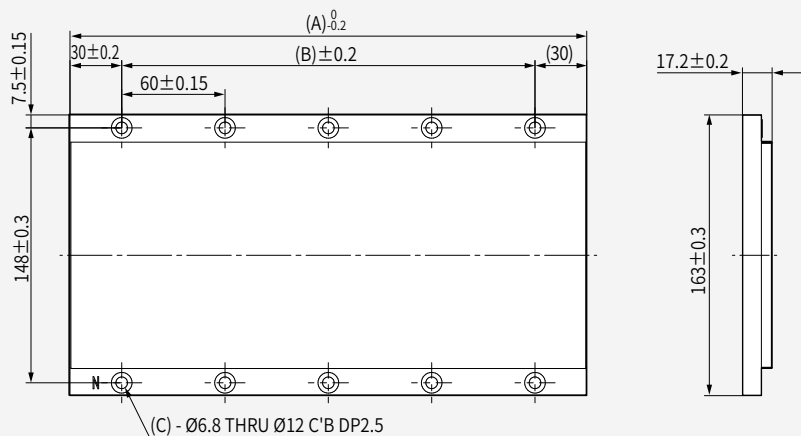
Outside View of Magnetic Plates

072 Series



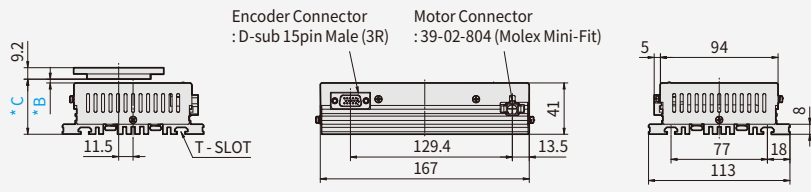
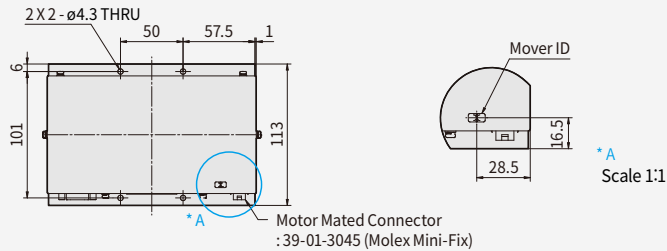
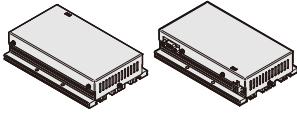
Model	A	B	C	D	Weight
180	180	120(2X60)	6	30	0.75 kg
240	240	180(3X60)	8	30	1 kg
300	300	240(4X60)	10	30	1.25 kg

165 Series



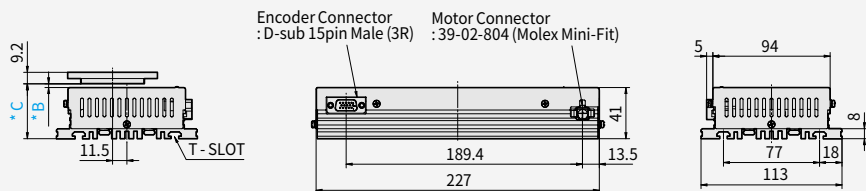
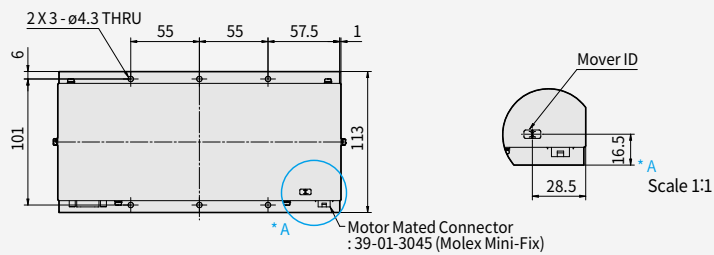
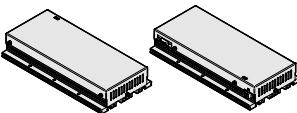
Model	A	B	C	D	Weight
180	180	120(2X60)	6	30	3.4 kg
240	240	180(3X60)	8	30	4.5 kg
300	300	240(4X60)	10	30	4.6 kg

LSMMT-M040



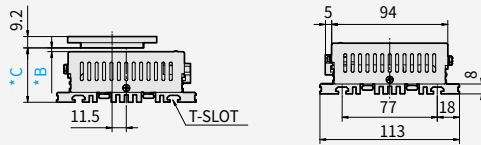
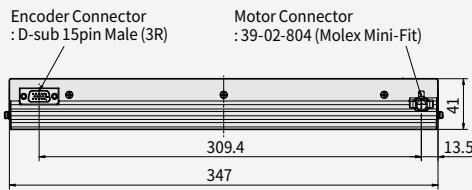
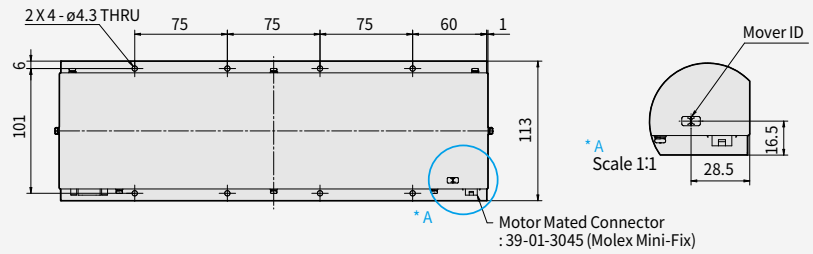
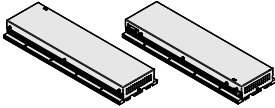
* B : Air gap between module surface and magnet surface
 * C : Installation dimension for module placement; air gap included

LSMMT-M060



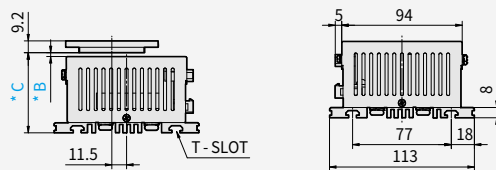
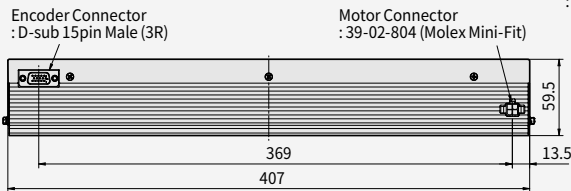
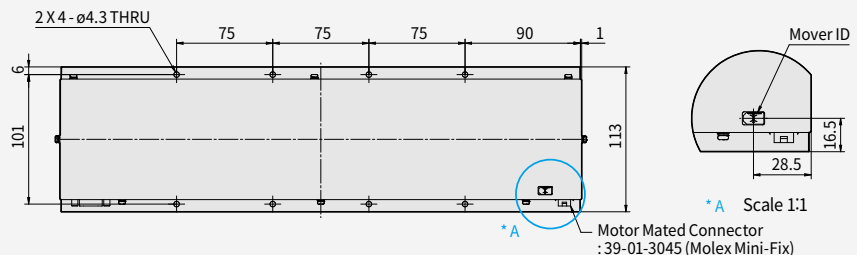
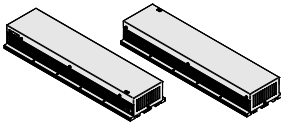
* B : Air gap between module surface and magnet surface
 * C : Installation dimension for module placement; air gap included

LSMMT-M090



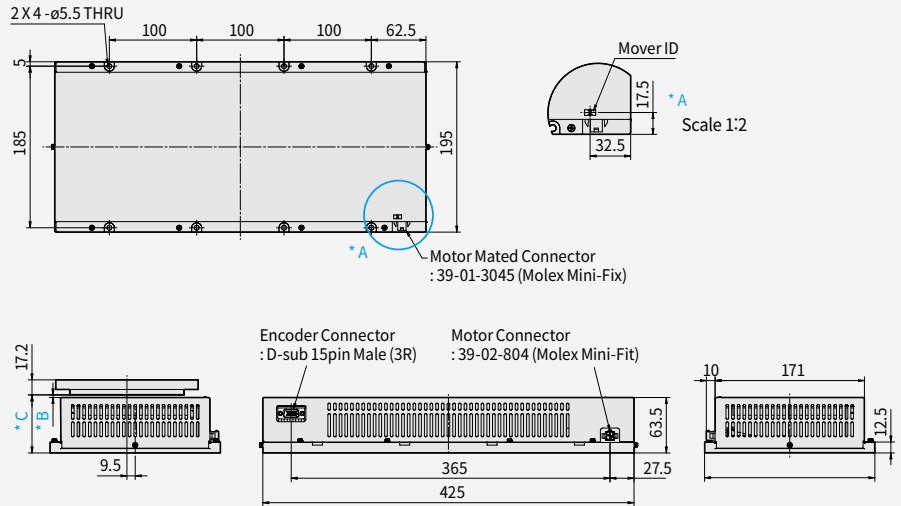
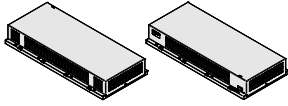
* B : Air gap between module surface and magnet surface
 * C : Installation dimension for module placement; air gap included

LSMMT-M170



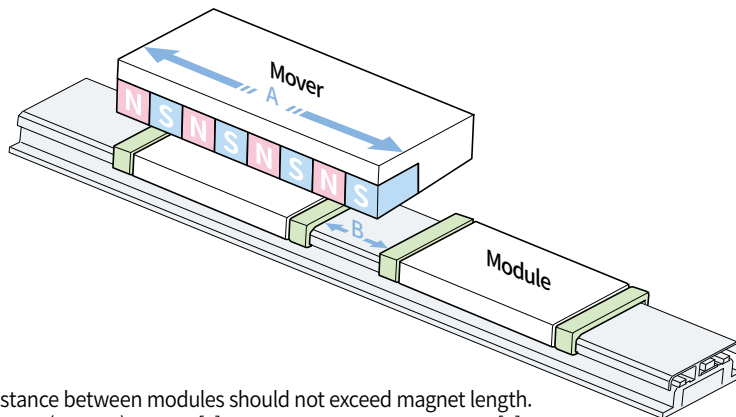
* B : Air gap between module surface and magnet surface
 * C : Installation dimension for module placement; air gap included

LSMMT-M280



* B: Air gap between module surface and magnet surface
 * C: Installation dimension for module placement; air gap included

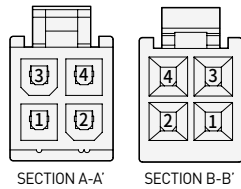
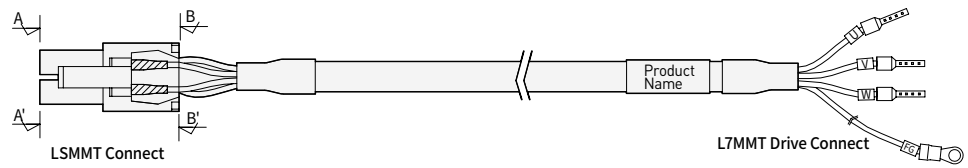
Module Placement Example



- Distance between modules should not exceed magnet length.
 - Mover(Magnet) Length [A] \geq Distance between modules [B]
 - Maximum distance for placement matches magnet length

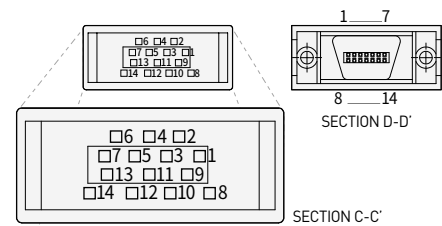
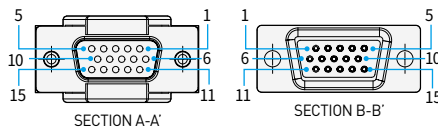
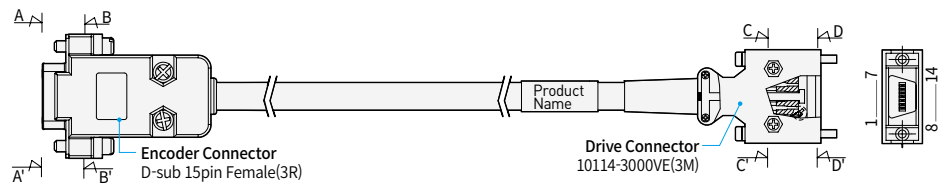
※ Please note that mover cannot be stopped between modules when PLC I/O mode is being used.

Module Power Cables



Type	Signal	Pin No.	Cable Color 1	Cable Color 2
Lead Wire	U	4	Red	Light Blue
	V	3	White	Brown
	W	2	Black	Black
FG	FG	1	Green	Green

Module Encoder Cables



Pin No.	Signal	Pin No.	Signal
1	MA+	9	-
2	MA-	10	+5V
3	SLO+	11	-
4	SLO-	12	Mover ID-
5	-	13	-
6	-	14	-
7	Mover ID+	15	GND
8	-	Plate	Shield

Pin No.	Signal	Pin No.	Signal
1	-	8	-
2	-	9	-
3	MA+	10	-
4	MA-	11	-
5	SLO+	12	Mover ID-
6	SLO-	13	Mover ID+
7	GND	14	+5V
-	-	Plate	Shield

Power Line Wire Circuit	No. of Pair	Cable Comparison	
		Immobile Cable (UL2464)	Mobile Cable (UL758)
		AWG24	AWG25
1 Wire	4	7 [m]	5 [m]
2 Wire	5	11 [m]	10 [m]
3 Wire	6	18 [m]	15 [m]

※ Immobile cable extendable to up to 31m and mobile cable up to 19m when encoder extension cable is used

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* Service will update sequentially in 2022~2023.



Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance. Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.



- According to The WEEE Directive, please do not discard the device with your household waste.



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