

Basic specifications of linear conveyor module

Model	LCM100-4M / 3M / 2MT
Drive method	Moving magnet type, Linear motor with flat core
Repeat positioning accuracy	+/-0.015 mm (single slider) ^{Note 1} / width 0.1 mm (mutual difference among all sliders) ^{Note 2}
Scale	Electromagnetic type / resolution 5 µm
Max. speed	3000 mm/sec
Max. acceleration	2 G
Max. payload	15 kg ^{Note 3} ^{Note 4}
Rated thrust	48 N
Total module length	640 mm (4M) / 480 mm (3M) / 400 mm (for 2MT circulation)
Max. number of combined modules	16 (total length: 10240 mm)
Max. number of sliders	16 (when 16 modules are combined)
Min. pitch between sliders	420 mm
Mutual height difference between sliders	0.08 mm
Max. external size of body cross-section	W 136.5 mm × H 155 mm (including slider)
Bearing method	1 guide rail / 2 blocks (with retainer)
Module weight	12.5 kg (4M) / 9.4 kg (3M) / 7.6 kg (2MT)
Slider weight	2.4 kg / 3.4 kg (when the belt module is used.)
Cable length	3 m / 5 m
Controller	LCC140

Note 1. Repeated positioning accuracy when positioning in the same direction (pulsating).

Note 2. Positioning accuracy in the pulsating when using the position correction function with the RFID.

Note 3. Weight per single slider.

Note 4. When used together with the belt module, the max. payload becomes 14 kg since the parts dedicated to the belt are attached to the slider.

Basic specifications of belt module

Model	LCM100-4B / 3B
Drive method	Belt back surface pressing force drive
Bearing method	1 guide rail / 2 blocks (with retainer)
Max. speed	560 mm/sec
Max. payload	14 kg
Module length	640 mm (4B) / 480 mm (3B)
Max. number of sliders	1 slider / 1 module
Main unit maximum cross-section outside dimensions	W 173.8 mm × H 155 mm (including slider)
Cable length	None
Controller	Dedicated driver (Included)
Power supply	DC 24 V 5A
Communication I/F	Dedicated input/output 16 points
Module weight	11.2 kg (4B) / 8.8 kg (3B)

Feel the action.

You Tube Yamaha Robot Official Channel

Animated video for your better understanding

LCM 100 Promotion Video

<https://www.youtube.com/watch?v=QLx1Rxuqpm8>



Check out the actual move in the video.

Yamaha PAS Speedometer Assembly Line

https://www.youtube.com/watch?v=1_-wU6R-JXg



The slider insertion/ejection function in use

Examples of using the traverser for transport

<https://www.youtube.com/watch?v=uQlebbGyK08>



● Specifications and appearance are subject to change without prior notice.

201902-DE



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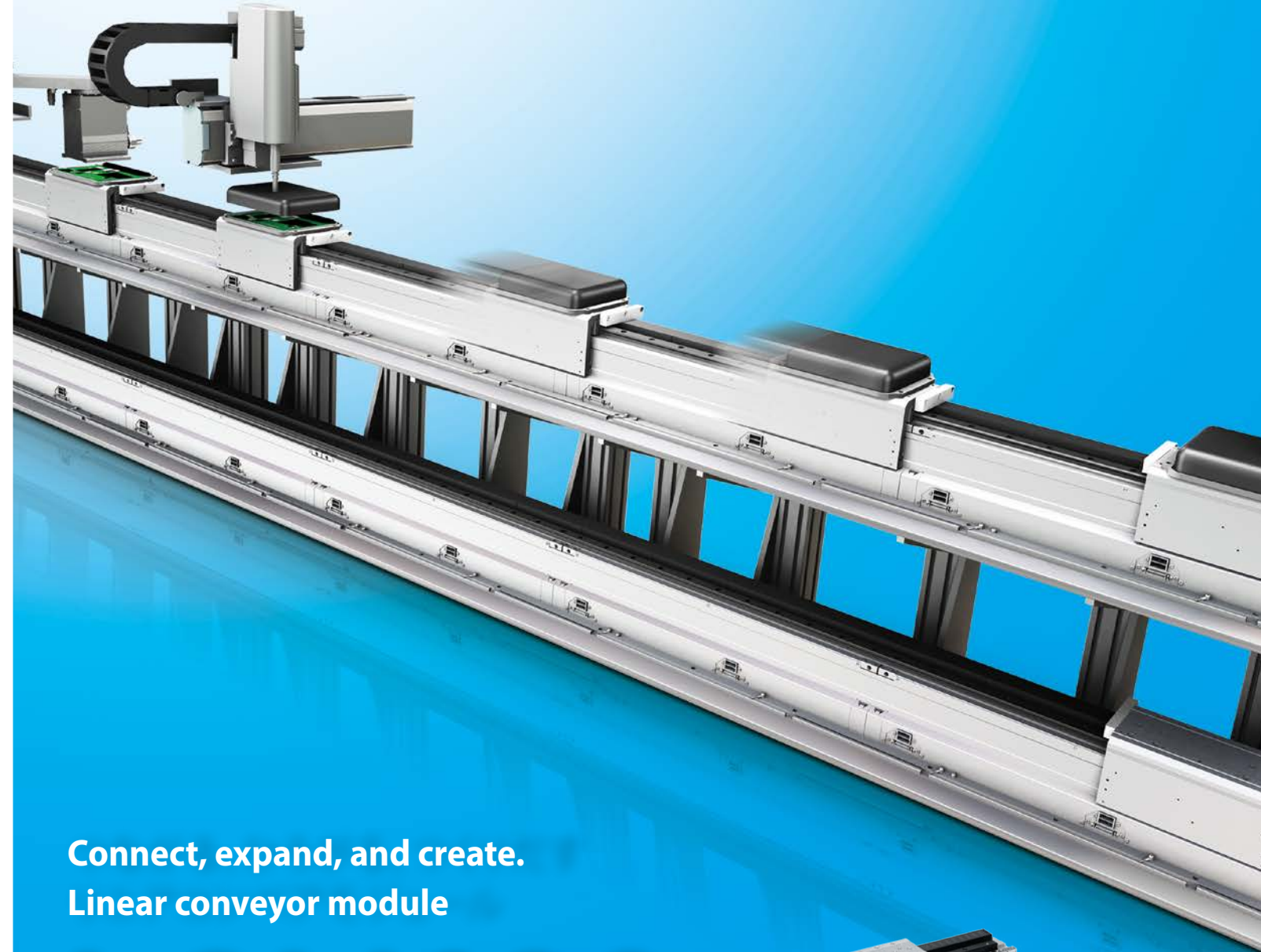
URL <https://global.yamaha-motor.com/business/robot/>
E-mail robotn@yamaha-motor.co.jp



Feel the action.

From "flow" to "move"

Efficient transfer processes for increased profitability



Connect, expand, and create.

Linear conveyor module

LCM100



Improved tact time

Increased throughput

Excellent maintainability

Reduced transport line space

Flexible line configurations

Shorter start-up time

Lower running costs

Long service life

From "flow" to "move"

Linear Conveyor Module LCM100

Constructing high-speed throughput lines.

Linear Conveyor Module

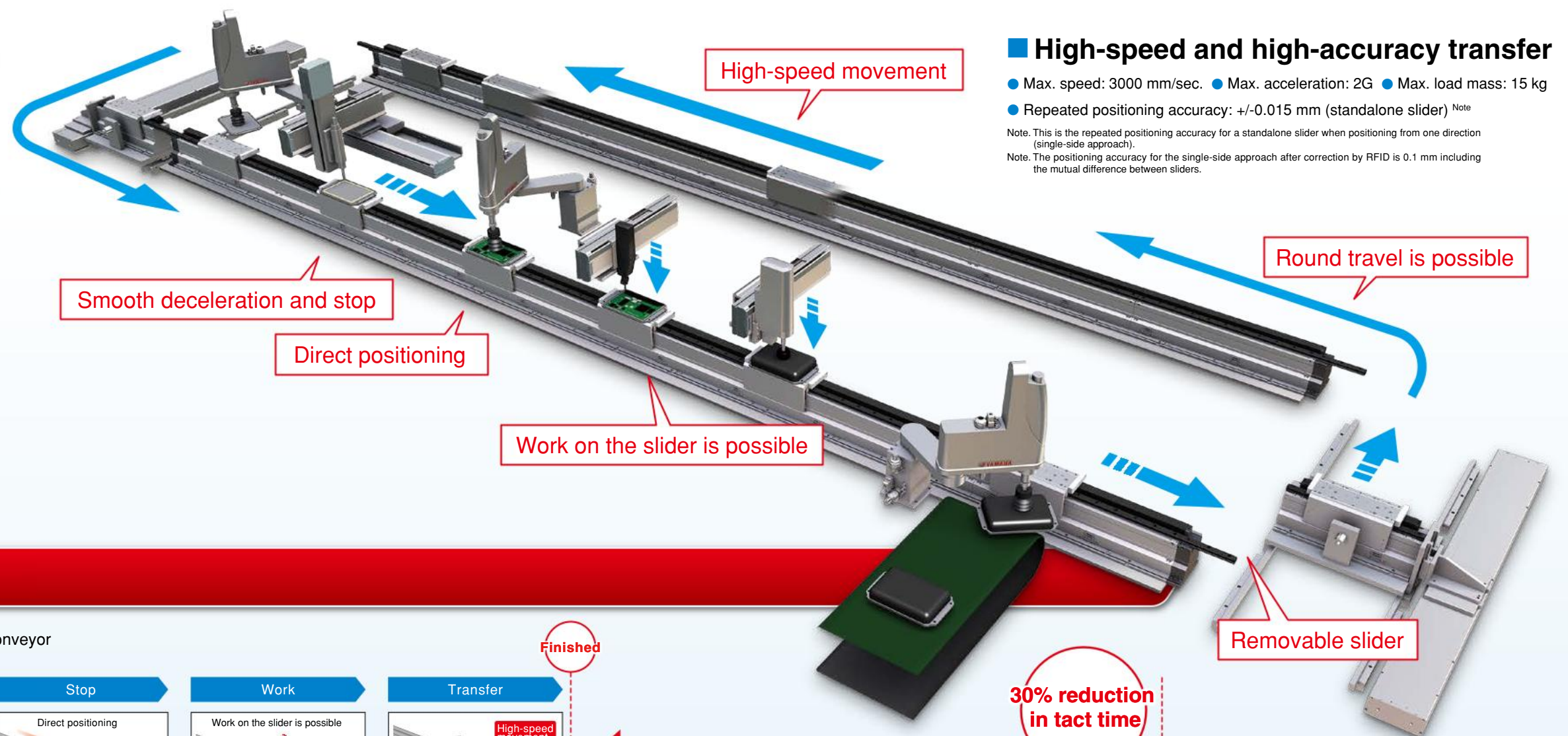
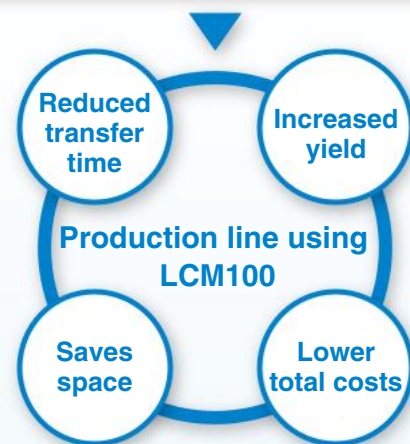
LCM100



- | | | | |
|------------------------------|-----------------------|---------------------------|------------------------------|
| Improved tact time | Increased throughput | Excellent maintainability | Reduced transport line space |
| Flexible line configurations | Shorter start-up time | Lower running costs | Long service life |

In a conventional production line:

- Tact time was close to the limit
- Unit changes were cumbersome
- No work could be performed on the conveyor, so the equipment became larger
- Time was wasted from having to perform operations based on the longest work when conducting a combination of works with different cycles such as screw fastening, sealing, and joining

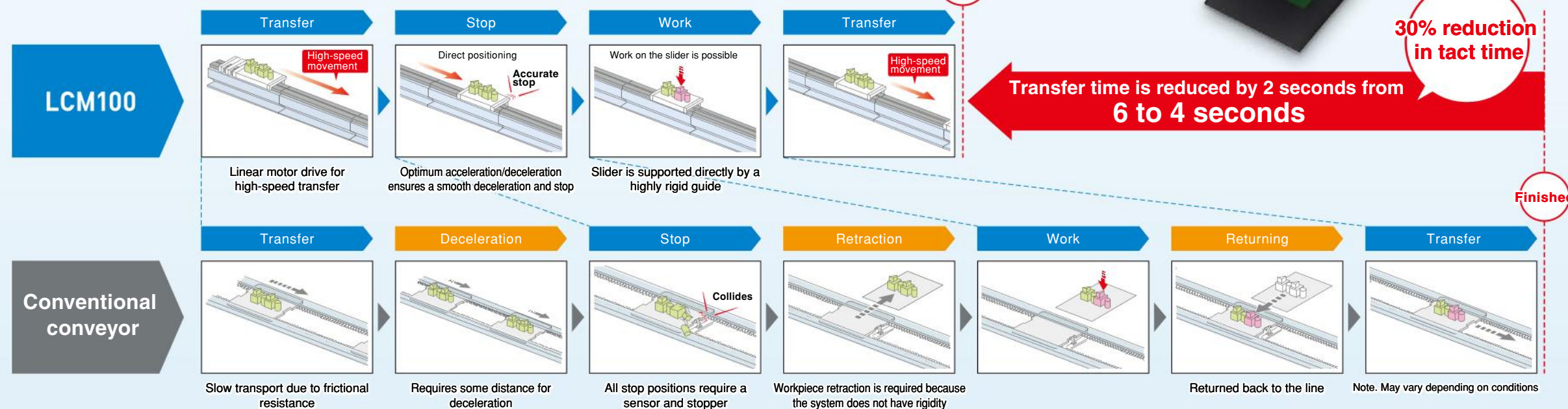


High-speed and high-accuracy transfer

- Max. speed: 3000 mm/sec. ● Max. acceleration: 2G ● Max. load mass: 15 kg
 - Repeated positioning accuracy: ± 0.015 mm (standalone slider) Note
- Note. This is the repeated positioning accuracy for a standalone slider when positioning from one direction (single-side approach).
- Note. The positioning accuracy for the single-side approach after correction by RFID is 0.1 mm including the mutual difference between sliders.

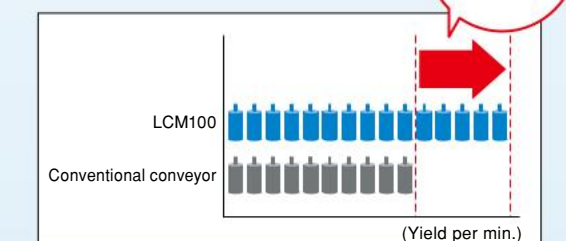
Reduced transfer time

- Comparison between LCM100 and a conventional conveyor



Increased yield

Increased by approx. 50%



Note. May vary depending on conditions

A modular structure that allows the connection of modules

The length of the transfer line can be adjusted freely by adding modules.

Linear Conveyor Module

LCM100



Improved tact time

Increased throughput

Excellent maintainability

Reduced transport line space

Flexible line configurations

Shorter start-up time

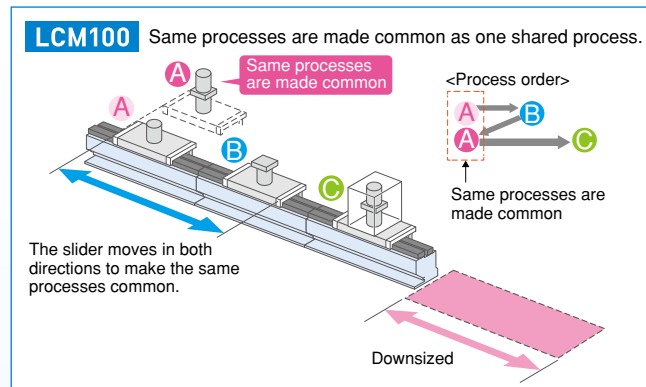
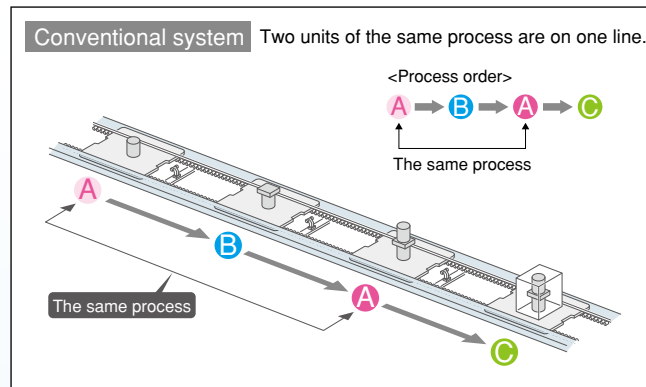
Lower running costs

Long service life

Save equipment space.

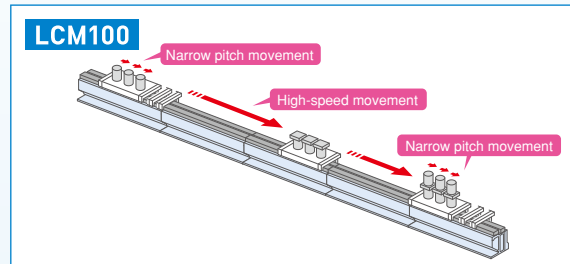
- Since the movement direction can be changed, the same processes are made common. This makes the equipment compact and results in cost reduction.
- Forward and backward movement at a high speed can be set freely.
- Flexible actions such as moving only some sliders backward is possible.

Numerical values are used for setting transfer distance and stop positions



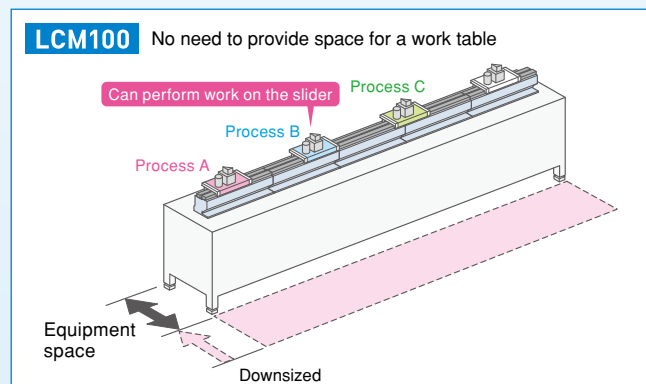
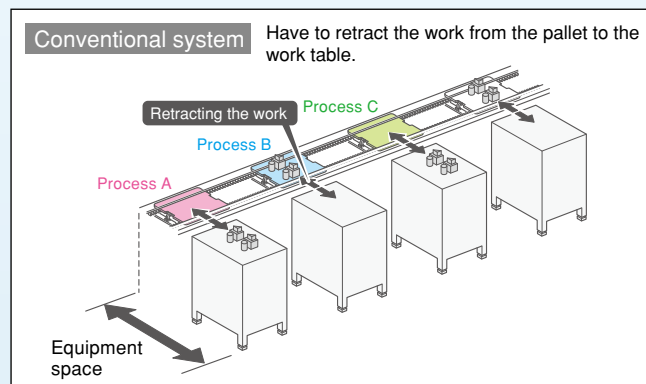
Can be moved efficiently between processes with different tacts

- Narrow pitch movement is possible.
- Movement time can be reduced by combining the use of different movements, such as using pitch-feed for the same processes in short-time processes while transferring three workpieces at the same time at a high speed in long-time processes.



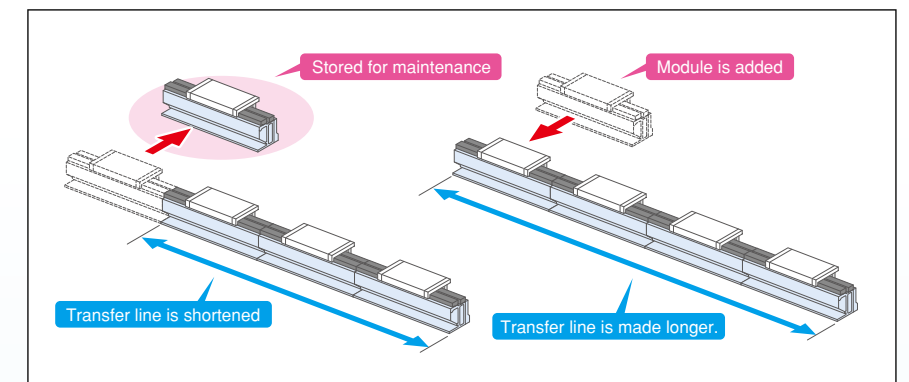
Workpieces do not need to be retracted

- As the work moves down, you can assemble and process them on the transfer line.
- Eliminates having to retract the work from the pallet to the work table.
- Reduces costs.



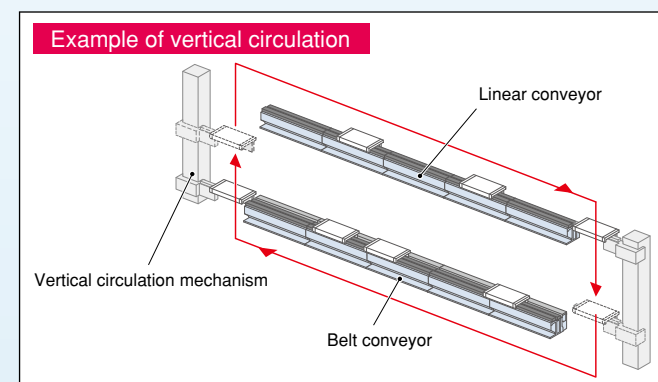
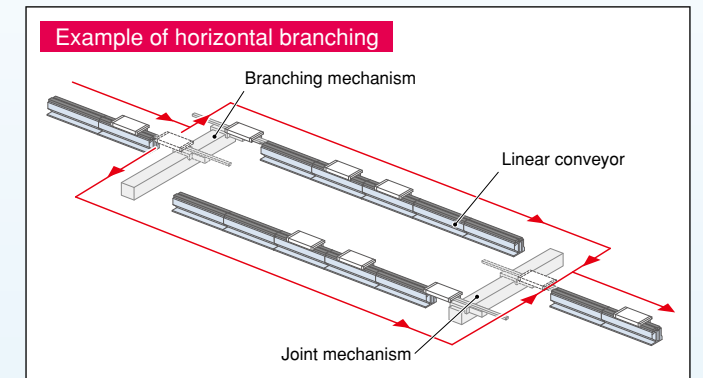
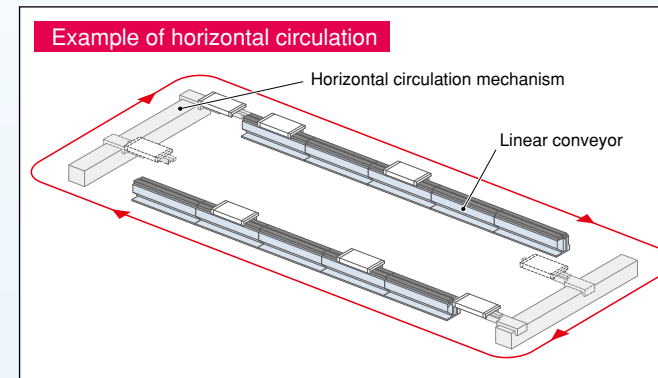
Significant reduction of start-up time

- Just connect modules for easy construction of a transfer line.
- Lifting cylinders, sensors, stoppers, and other complex parts are not necessary.
- Operations can be performed by using only the LCC140 Controller.
- Economical as excess modules can be used for other lines or stored for maintenance.



Construct branching lines, joint lines, and other lines in flexible configurations.

- Layout examples by combining modules with circulation mechanisms



Note. The customer needs to prepare the return unit and the circulation mechanism.
Note. Modules convenient for the circulation are configured.

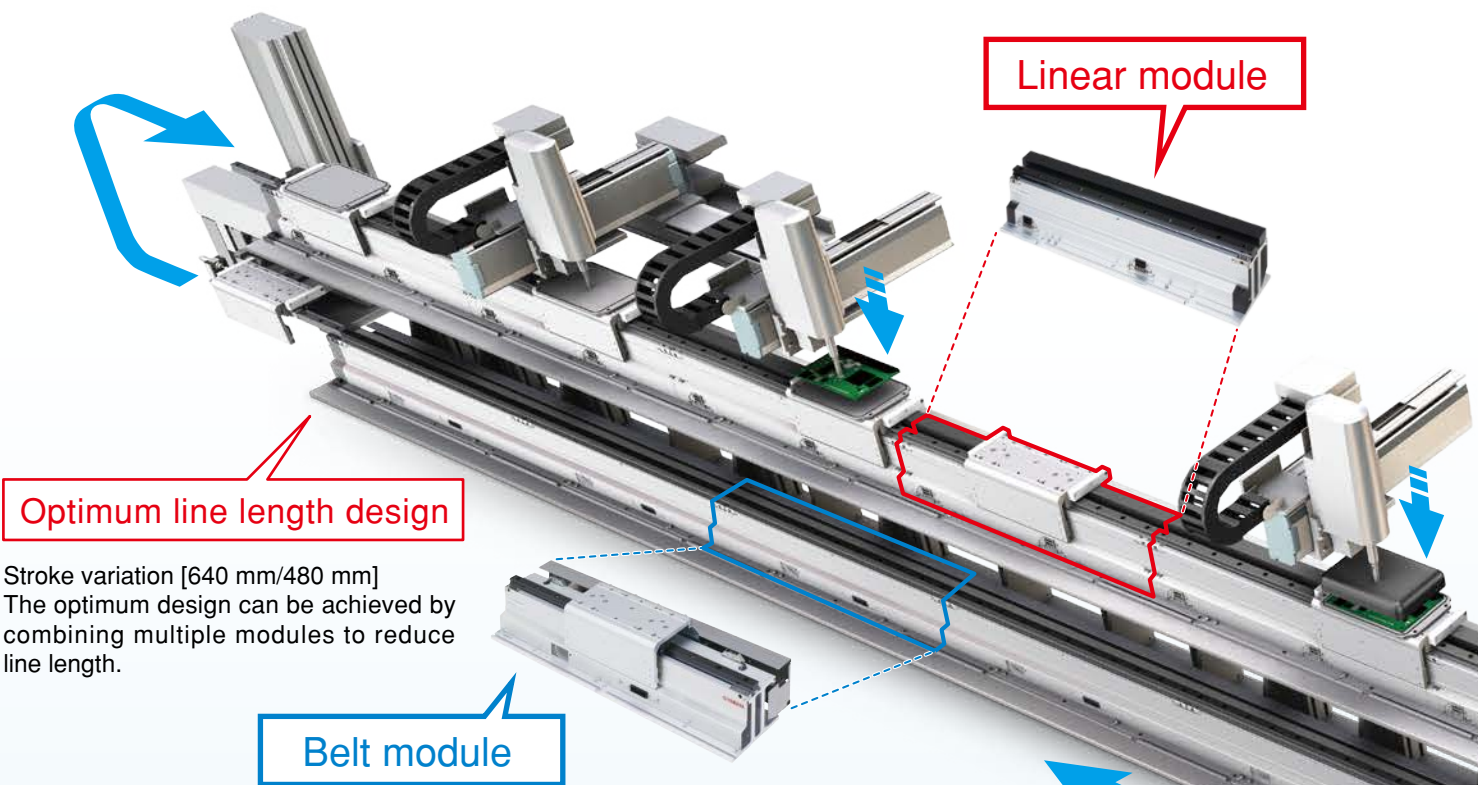
An expanding, next-generation transport system

Flexible set-up of the slider's acceleration/deceleration, forward/backward movement, positioning, and other actions.
The variety of possible line structures has been greatly expanded to supersede conventional models.

Linear Conveyor Module LCM100



- Improved tact time
- Increased throughput
- Excellent maintainability
- Reduced transport line space
- Flexible line configurations
- Shorter start-up time
- Lower running costs
- Long service life



Optimum line length design

Stroke variation [640 mm/480 mm]
The optimum design can be achieved by combining multiple modules to reduce line length.

Belt module

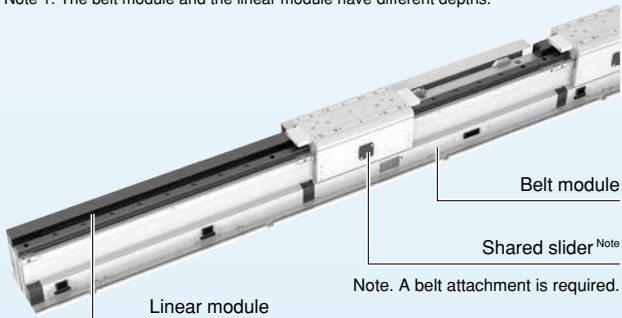
■ Belt modules can be selected to your needs

Genuine new Yamaha belt modules are included in the lineup.

- Low price Using modules only for return processes and interprocess transfer will help reduce the facility cost.
- Easy control without controllers and no need to create robot programs

Pin Number	Signal	Role
A1	+24V	Power connection
A2	GND	DC24V (+/-10%)
A3		
A4	Optional sensor L	Detection output
A5	Optional sensor C	Detection output
A6	Optional sensor R	Detection output
A7	ALARM output	Alarm output
A8	SPEED output	Speed output
B1	ALARM-RESET input	Alarm reset input ON [L]: reset. OFF [H]: normal.
B2	INV.VR/EXT input	Speed setting device switching input ON [L]: internal. OFF [H]: External.
B3	CW/CCW	Rotation switching input ON [L]: CW. OFF [H]: CCW
B4	RUN/BRAKE	Brake input ON [L]: run. OFF [H]: momentary stop.
B5	START/STOP	Start/stop input ON [L]: start. OFF [H]: stop.
B6	VRL	- side Speed setting current power
B7	VRM	+ side DC 0 - 5V 1mA or higher
B8	VRH	(When a dedicated speed setting device used)

- Greatly decreased design and production labor
The guide connections, connection height, and stroke length are completely compatible between belt and linear modules. Reduced design and production labor will help speed up the start-up time. Note 1

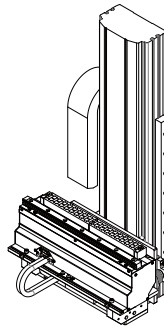


■ Easier to design and implement

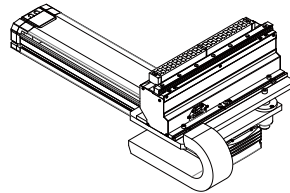
- LCM100-2MT, a module for circulation, is available to insert or eject a slider into or out of a line.
- Also can be used for a return mechanism.

We welcome consultations on proposals for customized design, design drawing presentation, etc., to create return units best fitting your request.
For details, contact our sales representatives.

Example of vertical circulation mechanism



Example of horizontal circulation mechanism



Circulation modules are also available

Belt module proximity sensor

Use the sensor to check the position of the slider. This prevents collisions between sliders and enables smooth action.

A maximum of three proximity sensors can be used (optional).



Model	L (left) : KDJ-M2205-L0
	C (center) : KDJ-M2205-C0
	R (right) : KDJ-M2205-R0

Create a new transfer environment.

Loss-free transport that was not possible with conventional conveyors can be achieved with LCM100.
Reduce losses while increasing profitability.

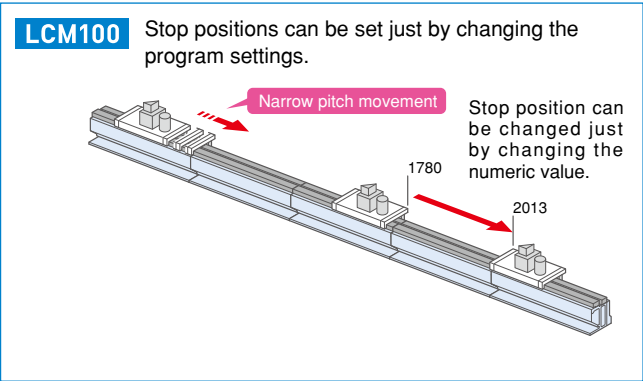
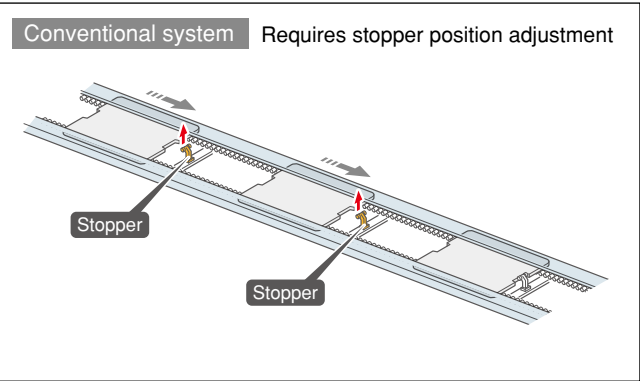
Linear Conveyor Module LCM100



- Improved tact time
- Increased throughput
- Excellent maintainability
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- Flexible line configurations
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- Long service life

Optimal for small batch production of various product types

- No need for mechanical stoppers or sensors. Change layout easily.
- Reconstruction can be finished quickly by just changing the program to set a stop position.
- Frequent unit changes for different models can be handled flexibly.



Quick recovery by replacing the slider when machine trouble occurs

- Parts can be replaced easily.
- Parts can be kept for maintenance as they are standardized.
- Possible to minimize the downtime of a production line.



Easy maintenance

- Motors and scales do not make contact and are free from abrasion.
- As only the rails are sliding parts, dust generation is low.
- There are only a few consumable parts, which mean a long service life.



System configuration diagram (when 3 sliders are connected)

<Linear module>

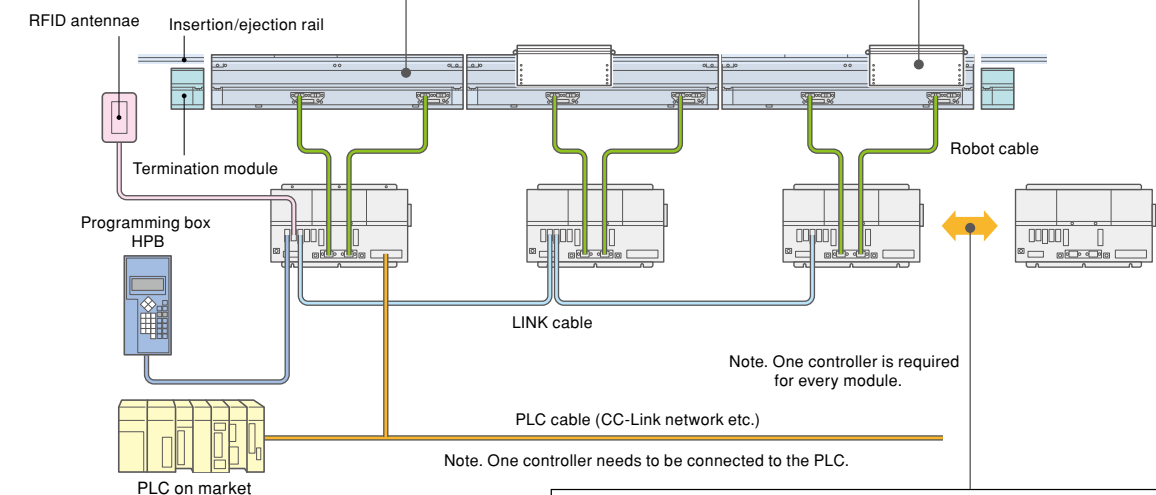
The module is standardized and can also be stored for maintenance.

If a short line is used and modules are in excess, they can be diverted to another line or stored for maintenance.



Standardized slider

The slider is standardized and can be used for any line. It is also possible to share the slider on multiple lines. Production can be restored immediately by replacing a failed slider if trouble occurs.

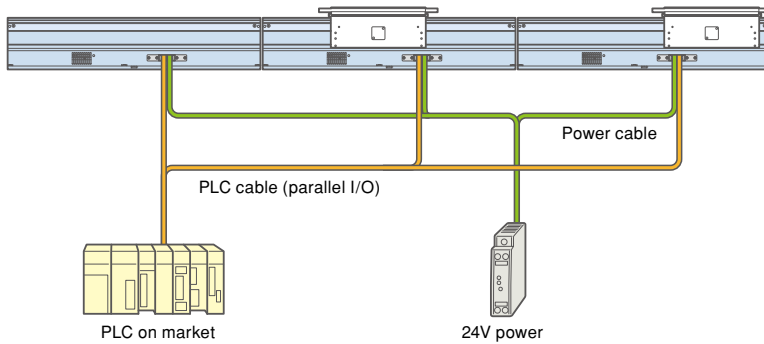


Controller is replaceable

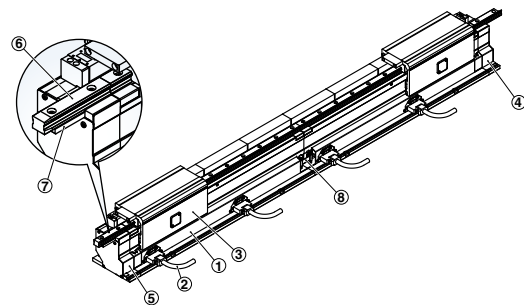
The connected controller and module combinations can be changed as needed. Note that initial setting is required when a combination is changed. Replacing just the controller or the module is also possible.



<Belt module>



This interface allows the customer to supply 24V power and select just the necessary signals to use.^{Note}
Note. The customer will need to prepare the wiring on the user side.



① Module	⑤ Termination module (L side)
② Robot cable	⑥ Insertion/ejection rail
③ Slider	⑦ Module connection block (with fastening bolts)
④ Termination module (R side)	⑧ Module connection cable

LCM100 main body

LCM100 module

Linear module



Linear module

Model	LCM100-4M
	KDJ-M2020-40 (640mm)
	LCM100-3M
	KDJ-M2020-30 (480mm)
	LCM100-2MT (for circulation)
	KDJ-M2022-20 (400mm)

Belt module

Model	LCM100-4B
	KDJ-4K111-40 (640mm)
	LCM100-3B
	KDJ-4K111-30 (480mm)

Robot cable for linear module

Robot cables for the number of modules are required.



Model	For LCM100-4M/3M
	KDJ-M4710-30 (3m×2 pcs.)
	KDJ-M4710-50 (5m×2 pcs.)
	For LCM100-2MT
	KDJ-M4721-30
	(Flexible cable 3m×1 pc.)
	KDJ-M4721-50
	(Flexible cable 5m×1 pc.)

Slider

For linear module



Linear module

Model	KDJ-M2264-00
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Belt module

Model	KDJ-M2264-10
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For belt module



Parts for LCM100

Termination module for linear module (R side)

This part is attached to the right end of the module. One termination module per line is required. ^{Note 1} Additionally, even when using only one module without connections, one termination module is required.

Model	KDJ-M2021-R0
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Termination module for linear module (L side)

This part is attached to the left end of the module. One termination module per line is required. ^{Note 1} Additionally, even when using only one module without connections, one termination module is required.

Model	KDJ-M2021-L0
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Insertion/ejection rail

Tapered rail. Up to two rails per line can be installed.



Model	44mm : KDJ-M6200-00
	(With a dedicated 44mm connection block)
	100mm : KDJ-M2222-10
	160mm : KDJ-M2222-20 ^{Note}
	220mm : KDJ-M2222-30 ^{Note}
	280mm : KDJ-M2222-40 ^{Note}
	340mm : KDJ-M2222-50

Note. Not in stock. We require some lead time for delivery.

Module connection block (with fastening bolts)

This block connects modules. ([Number of modules making up the line ^{Note 1}] - 1) blocks are required. Additionally, when installing insertion/ejection rails, one block per rail is required.



Model	KDJ-M6100-00
	KDJ-M6100-10 ^{Note}

Note. Use this model when installing 100 mm insertion/ejection rails to L side.

Note 1. A state, in which multiple modules are connected, is called "line".

Module connection cable

This cable connects modules. ([Number of modules] - 1) cables per line are required. ^{Note 1}



Model	KDJ-M4811-00
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Parts for LCC140 controller

Power connector + connection lever

One set of parts per LCC140 is required.



Model	KAS-M5382-00
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HPB dummy connector

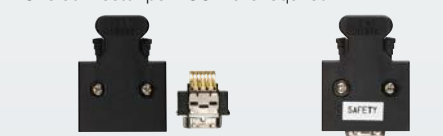
When performing the operation with the programming box HPB removed, connect this dummy connector to the HPB connector. One connector per LCC140 is required.



Model	KDK-M5163-00
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SAFETY connector

One connector per LCC140 is required.



Model	Not wired (plug + shell kit)
	Wired ^{Note}
Model	Not wired : KDK-M5370-10
	Wired ^{Note} : KDK-M5370-00

Note. The wired connector is that the wiring for the emergency stop cancel was performed inside the connector. Select this model when performing the operation check or debugging with single linear conveyor.

Parts for line configuration

LINK cable

([Number of modules] - 1) cables per line are required.



Model	1m : KDK-M5361-10
	3m : KDK-M5361-30
	5m : KDK-M5361-50

Terminator connector

When connecting modules, two connectors per line are required.



Model	KDK-M5361-00
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Dust cover (for LINK connector)

This dust cover is attached to the insertion port, into which the LINK cable terminator connector is not inserted. When using only one module without connections, two dust covers are required.

Note. The dust cover is essential for the 2MT.

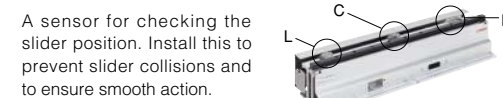


Model	KDK-M658K-00 (for MDR20 pin)
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Selection parts

Proximity sensor for belt module

A sensor for checking the slider position. Install this to prevent slider collisions and to ensure smooth action.



Model	L (left) : KDJ-M2205-L0
	C (center) : KDJ-M2205-C0
	R (right) : KDJ-M2205-R0

Programming box HPB/HPB-D

All operations, such as robot manual operation, program input or edit, teaching, and parameter setting can be performed with this programming box. As an interactive interface with the screen display is used, even personnel who use this programming box for the first time can easily understand how to operate it.

Model	HPB : KBB-M5110-01
	HPB-D : KBB-M5110-21
	(CE specifications / with 3-position enable switch)



HPB-D Backside of HPB-D (with enable switch)

PC supporting software POPCOM+

POPCOM+ software model	KBG-M4966-00
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POPCOM+ environment

OS	Windows XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.2.1.1 or later)
CPU	Processor that meets or exceeds the suggested requirements for the OS being used.
Memory	Suggested amount of memory or more for the OS being used.
Hard disk	50MB of available space required on installation drive.
Disk operation	RS-232C
Applicable controllers	SRX to SR1, DRCX, TRCX, ERCX, ERCD, LCC140 ^{Note 1}

Note 1. LCC140 is applicable to Ver. 2.1.1 or later.

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Data cables (5m)

Communication cable for POPCOM+. Select from USB cable or D-sub cable.



Model	USB type (5m)	KBG-M538F-00
	D-Sub type	KAS-M538F-10
	9pin-9pin (5m)	

Note. This USB cable supports Windows 2000/XP or later. Note. Data cable jointly used for POPCOM+, VIP+, RCX-Studio Pro. Note. USB driver for communication cable can also be downloaded from our website.

RFID

RFID (manufactured by BALLUFF GmbH)

Reader/writer cable



Model	KDK-M6300-00
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RFID (manufactured by OMRON)

Antenna amplifier controller cable



Model	KDK-M6300-A0
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Dust cover (for RFID)

This cover is attached to the insertion port if RFID is not used. (Included as standard)



Model	KDK-M658K-10 (for MDR26 pin)
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Whether or not the RFID system can be used may vary depending on the destination place (country). Before selecting a RFID system, please contact YAMAHA.

Maintenance parts

Robot cable for LCM100



Model	Fixed cable
	KDJ-M4751-30 (3m×1 pc.)
	KDJ-M4751-50 (5m×1 pc.)
	Flexible cable
	KDJ-M4755-30 (3m×1 pc.)
	KDJ-M4755-50 (5m×1 pc.)

Lithium battery for system backup



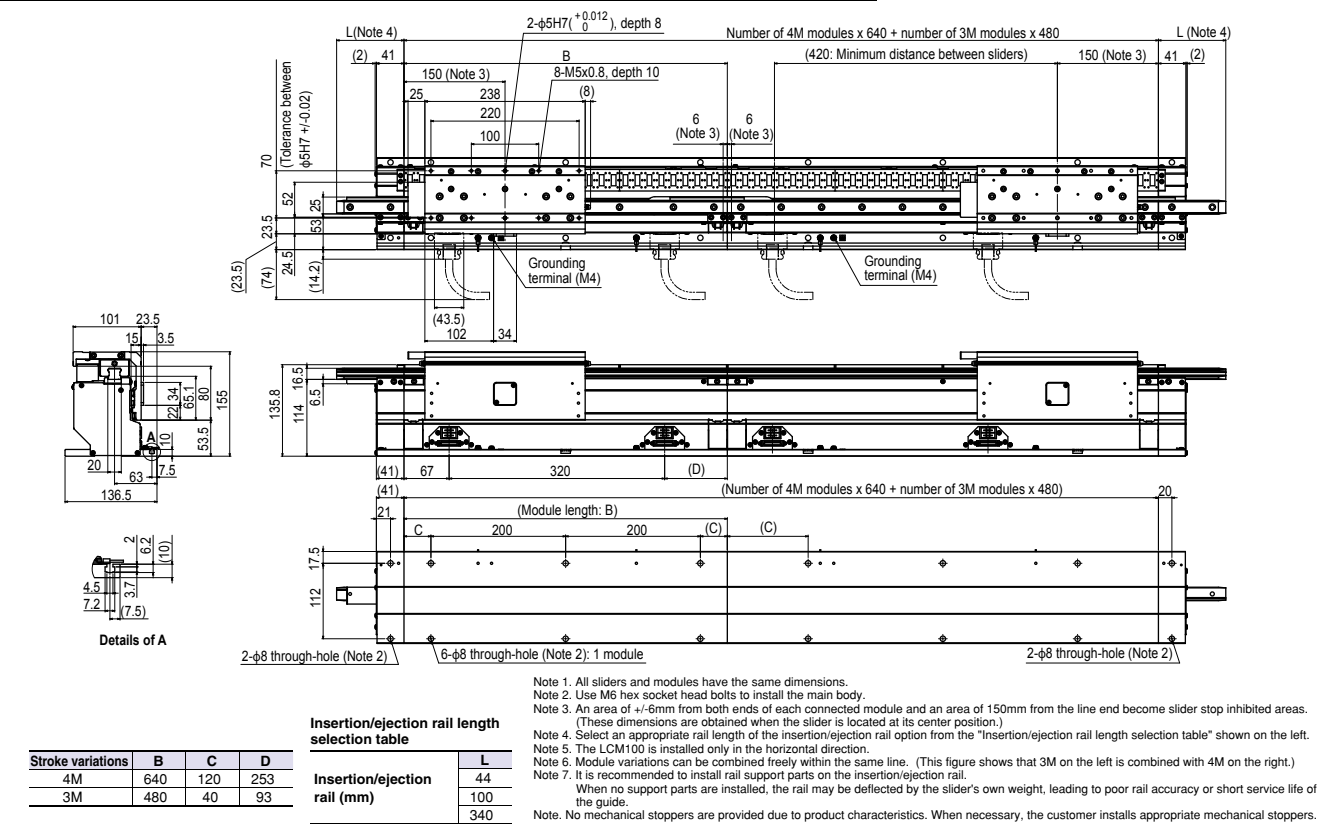
Model	KDK-M4252-00
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Replacement filter for LCC140 (5 pcs. in package)

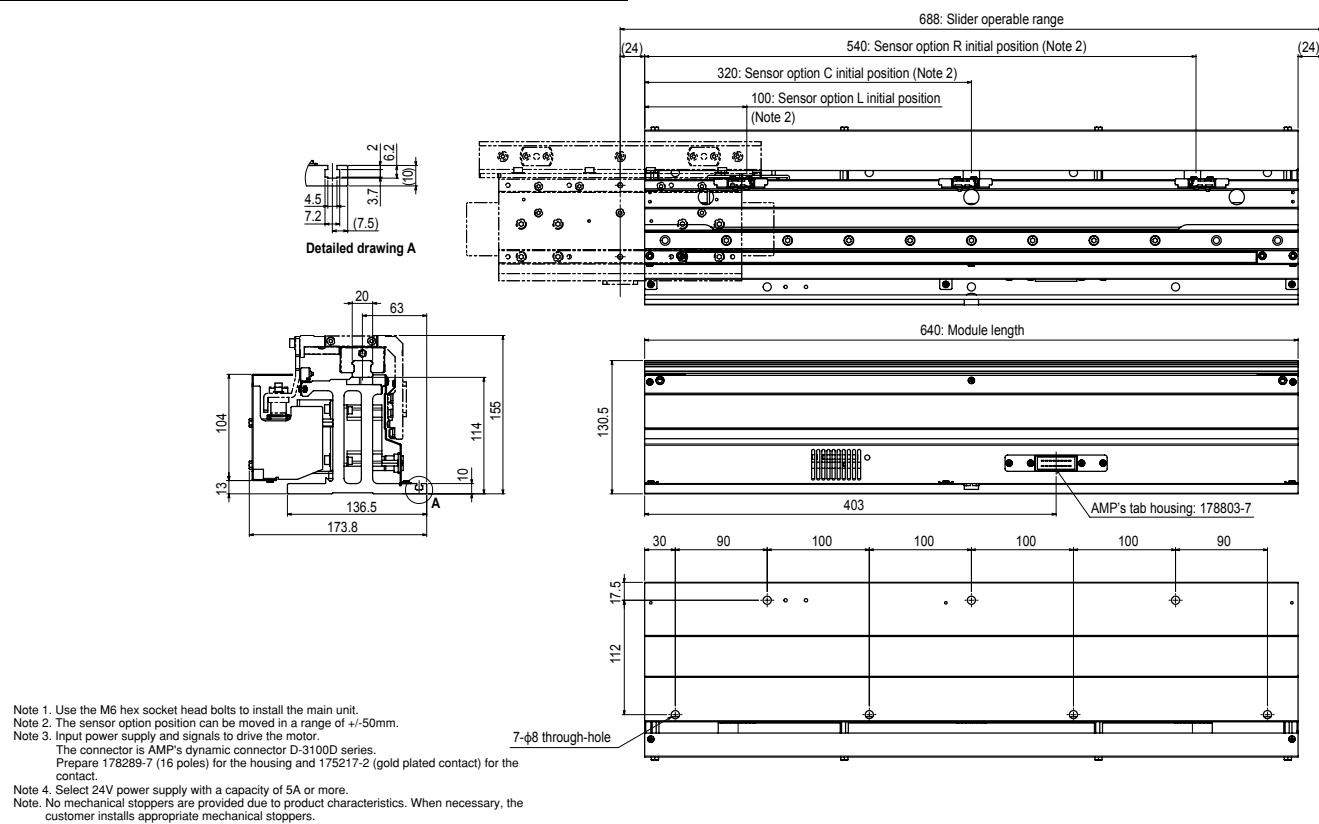


Model	KDK-M427G-00
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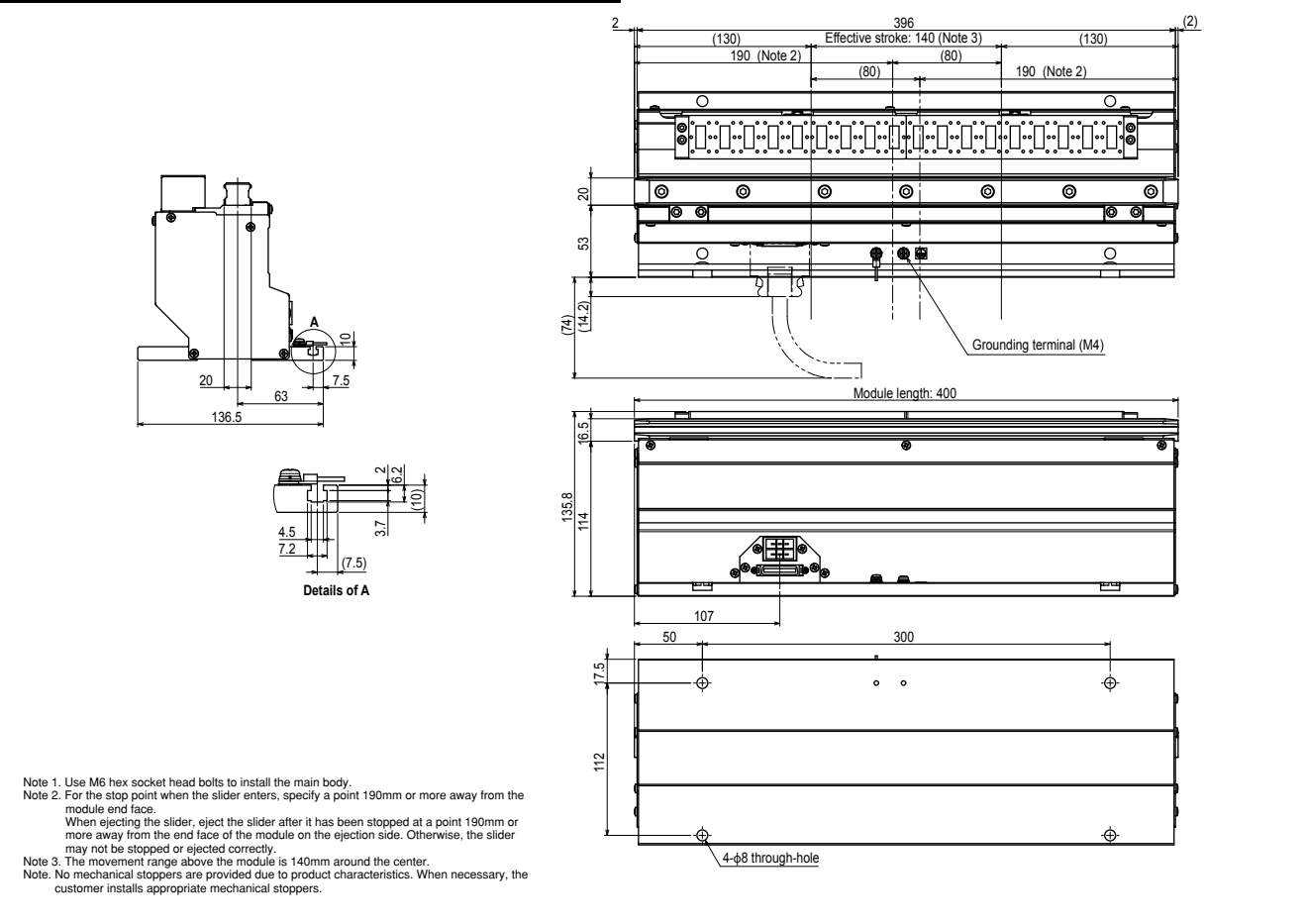
LCM100-4M/3M Linear conveyor module (640mm/480mm)



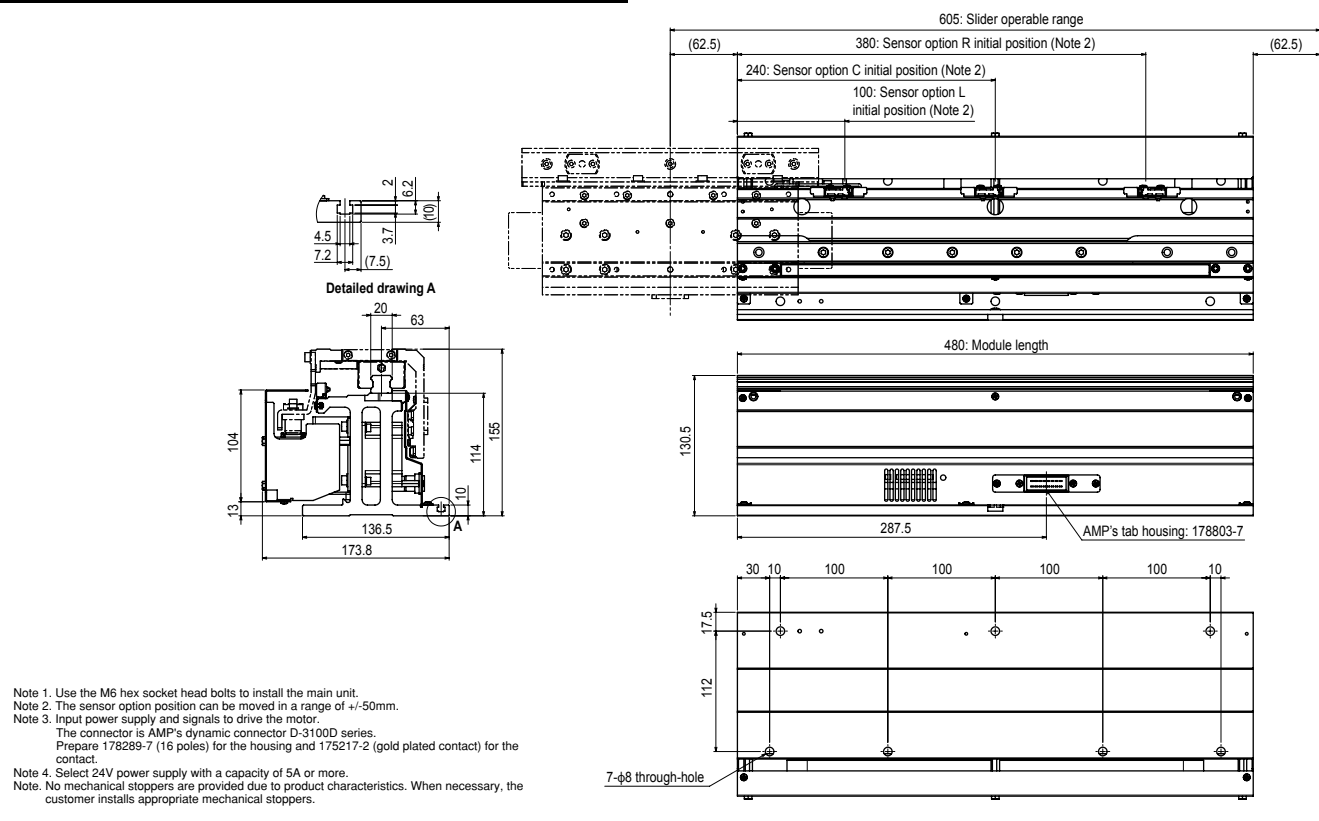
LCM100-4B Belt module (640mm)



LCM100-2MT Module for circulation

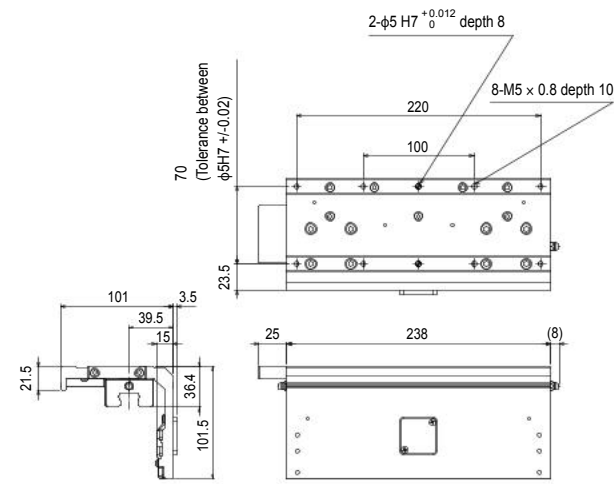


LCM100-3B Belt module (480mm)

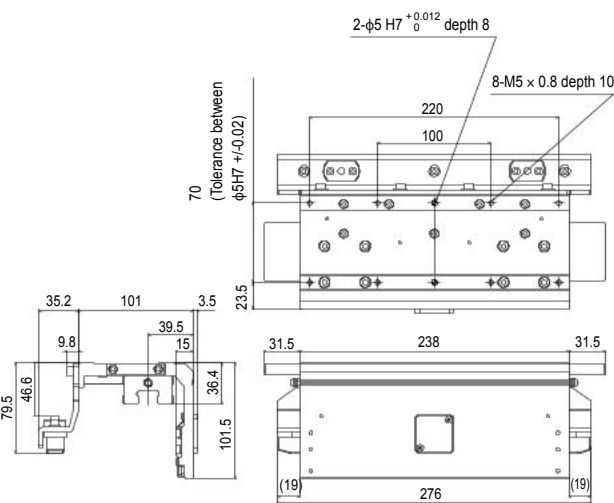


Details including specifications and restrictions should be consulted before considering specific applications of LCM100. Please contact our sales representatives in advance for consultations concerning the customer's requests.

Linear module slider

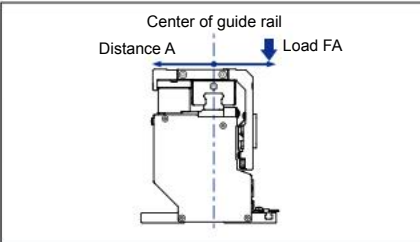


Belt module slider



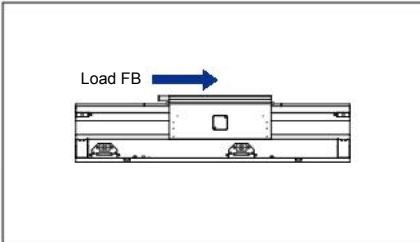
Static tolerable load of slider

Static loads shown below are tolerable as references when performing the screw tightening, part assembly, or light press-fitting on the slider.

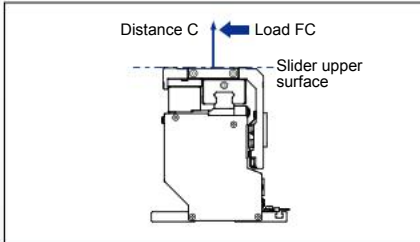


FA	A (mm)	Payload (N)		
		5kg	10kg	15kg
	0	2550	1560	1270
	10	1790	1280	1170
	20	1380	780	630
	30	1130	520	420
	40	900	390	310
	50	720	310	250
	60	600	260	210

Note. The loads shown above are tolerable loads at a position *A*mm away from the center of the guide rail.



FB	Payload (N)		
	5kg	10kg	15kg
	38		



FC	C (mm)	Payload (N)		
		5kg	10kg	15kg
	0	1190	850	780
	10	970	710	650
	20	760	610	560
	30	630	530	490
	40	540	480	430
	50	470	430	390
	60	410	390	360

Note. The loads shown above are tolerable loads at a position *C*mm away from the slider upper surface.

Ordering method

Linear module

LCM100		LCC140		10	
Model	Cable length ^{Note 1}	Controller	Current sensor	Network option ^{Note 2}	
4M: 640mm	3L: 3m		10: 10A	No entry: None	
3M: 480mm	5L: 5m			CC: CC-Link	
2MT:	3K: 3m (Flexible cable)			DN: DeviceNet™	
Module for circulation	5K: 5m (Flexible cable)			EP: EtherNet/IP™	

The above shows "one module + one controller" ordering method. When connecting modules, please separately inform the number of necessary modules.

Note 1. The cable for 2MT has flexible specifications.

Note 2. For 2MT, be sure to select an appropriate network option.

Belt module

LCM100				
Model	Termination module for belt module ^{Note 1}			
4B: 640mm	No entry: None			
3B: 480mm	R: Linear module is connected to the right.			
	L: Linear module is connected to the left.			
	RL: Linear module is connected to both sides.			

Note. Please see page 07 for the proximity sensor used for checking the slider position.

Note 1. Parts necessary to connect the belt module and linear module. Parts are incorporated into the belt module.

Linear module controller LCC140

Feature 01 Program operation

The LCC140 controller can perform operations using registered programs and operations using remote commands from the PLC. In addition to the control of input/output signals such as movement or positioning, processes related to the insertion/ejection of sliders can be performed.



Feature 02 SR1 controller base operation system

The same user interface as the SR1 controller is incorporated, and specifications and functions specific to the linear conveyor module have been added based on this user interface. A very user friendly operation system is provided. ^{Note 1}

Feature 03 Controller-linking function

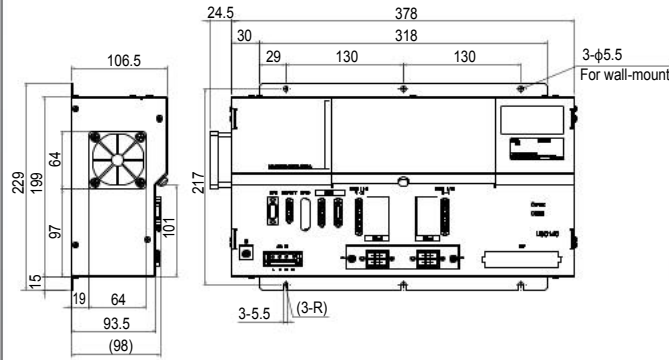
You can use the link cables dedicated to LCC140 controllers to connect the controllers when two or more modules are connected. You can handle multiple controllers as if they were one controller.

Feature 04 Position correction function using RFID

When multiple sliders are each stopped at a position of your choice, actual stop positions has an error width (machine difference) of 500 μm. This is because each slider has a different stopping accuracy. Link the RFID unit and LCC140 controller to suppress the machine difference of individual sliders to an error width of approximately 100 μm. ^{Note 2}

Note 1. Please note that some Yamaha single-axis controller SR1 functions are not available with the linear conveyor controller.
Note 2. All sliders stop within the width of 100μm that includes a teaching point.

LCC140 controller



Basic specifications of LCC140 (Controller for linear module)

Controllable robot	Linear conveyor module LCM series
Outside dimensions	W 402.5 × H 229 × D 106.5mm
Main body weight	4.8kg
Input power voltage	Single-phase AC200 to 230V +/-10% or less (50/60Hz)
Maximum power consumption	350VA (LCM100-4M 1 slider is driven.)
SAFETY	
External input/output	RS-232C (dedicated to RFID)
	RS-232C (for HPB / doubles as POPCOM+)
Network option	CC-Link Ver. 1.10 compatible, Remote device station (2 stations)
	DeviceNet™ Slave 1 node
	EtherNet/IP™ adapter 2 ports
Programming box	HPB, HPB-D (Software version 24.01 or later)