Basic specifications of linear conveyor module

<table>
<thead>
<tr>
<th>Model</th>
<th>LCM100-4M / 3M / 2MT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive method</td>
<td>Moving magnet type, Linear motor with flat core</td>
</tr>
<tr>
<td>Pseudo positioning accuracy</td>
<td>+0.015 mm (single slider) (^{\text{Note 1}}) / width 3 mm (mutual difference among all sliders) (^{\text{Note 2}})</td>
</tr>
<tr>
<td>Scale</td>
<td>Electromagnetic type / resolution 5 µm</td>
</tr>
<tr>
<td>Max. speed</td>
<td>3000 mm/sec</td>
</tr>
<tr>
<td>Max. acceleration</td>
<td>2 G</td>
</tr>
<tr>
<td>Max. payload</td>
<td>15 kg (4M) / 12.8 kg (3M) / 10.5 kg (2MT)</td>
</tr>
<tr>
<td>Rated thrust</td>
<td>48 N</td>
</tr>
<tr>
<td>Total module length</td>
<td>640 mm (4M) / 480 mm (3M) / 420 mm (2MT circulation)</td>
</tr>
<tr>
<td>Max. number of combined modules</td>
<td>16 (total length: 10240 mm)</td>
</tr>
<tr>
<td>Min. pitch between sliders</td>
<td>420 mm</td>
</tr>
<tr>
<td>Mutual height difference between sliders</td>
<td>0.08 mm</td>
</tr>
<tr>
<td>Max. allowed size of body cross-section</td>
<td>W 136.5 mm × H 155 mm (including slider)</td>
</tr>
<tr>
<td>Bearing method</td>
<td>1 guide rail / 2 blocks (with retainer)</td>
</tr>
<tr>
<td>Module weight</td>
<td>12.5 kg (4M) / 9.4 kg (3M) / 7.6 kg (2MT)</td>
</tr>
<tr>
<td>Sliders weight</td>
<td>2.4 kg / 3.4 kg (when the belt module is used)</td>
</tr>
<tr>
<td>Cable length</td>
<td>3 m / 5 m</td>
</tr>
<tr>
<td>Controller</td>
<td>LCC140</td>
</tr>
</tbody>
</table>

\(^{\text{Note 1}}\) Repeated positioning accuracy when positioning in the same direction (pulsating).
\(^{\text{Note 2}}\) Positioning accuracy in the pulsating when using the position correction function with the RFID.

Basic specifications of belt module

<table>
<thead>
<tr>
<th>Model</th>
<th>LCM100-4B / 3B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive method</td>
<td>Belt back surface pressing force drive</td>
</tr>
<tr>
<td>Bearing method</td>
<td>1 guide rail / 2 blocks (with retainer)</td>
</tr>
<tr>
<td>Max. speed</td>
<td>560 mm/sec</td>
</tr>
<tr>
<td>Max. payload</td>
<td>14 kg</td>
</tr>
<tr>
<td>Module length</td>
<td>460 mm (4B) / 480 mm (3B)</td>
</tr>
<tr>
<td>Max. number of sliders</td>
<td>1 slider / 1 module</td>
</tr>
<tr>
<td>Min. maximum cross-section outside dimensions</td>
<td>W 173.8 mm × H 155 mm (including sliders)</td>
</tr>
<tr>
<td>Cable length</td>
<td>None</td>
</tr>
<tr>
<td>Controller</td>
<td>Dedicated driver (included)</td>
</tr>
<tr>
<td>Power supply</td>
<td>DC 24 V 5A</td>
</tr>
<tr>
<td>Communication I/F</td>
<td>Dedicated input/output 16 points</td>
</tr>
<tr>
<td>Module weight</td>
<td>11.2 kg (4B) / 8.8 kg (3B)</td>
</tr>
</tbody>
</table>

\(^{\text{Note 1}}\) Efficient transfer processes for increased profitability

From "flow" to "move"

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

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Specifications and appearances are subject to change without prior notice.
From "flow" to "move"

Linear Conveyor Module LCM100
Constructing high-speed throughput lines.

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

LCM100
- Linear motor drive for high-speed transfer
- Optimum acceleration/deceleration ensures smooth deceleration and stop
- Slider is supported directly by a highly rigid guide
- High-speed movement
- Work on the slider is possible
- Transfer time is reduced by 2 seconds from 6 to 4 seconds

Conventional conveyor
- Slow transport due to frictional resistance
- Requires some distance for deceleration
- All stop positions require a sensor and stopper
- Workpiece retraction is required because the system does not have rigidity

Increased yield
- Increased by approx. 50%
- Increased yield
- Reduced transport line space
- Lower running costs
- Excellent maintainability
- Shorter start-up time
- Flexible line configurations
- Improved tact time

Production line using LCM100
- Saves space
- Lower total costs
- Increased yield
- Reduced transfer time
A modular structure that allows the connection of modules

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

- 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.

- 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
  - Example of horizontal circulation
  - Example of horizontal branching
  - Example of vertical circulation

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

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

Numerical values are used for setting transfer distance and stop positions.

● 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.

Lattice type: Two units of the same process are on one line.
Process order: A ➔ A → B ➔ C ➔ A
The same process

Linear conveyor Module

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

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.

Conventional system
Two units of the same process are on one line.
Process order: A ➔ A → B ➔ C ➔ A
The same process

Linear conveyor Module

Linear conveyor Module

Example of horizontal circulation
Horizontal circulation mechanism
Linear conveyor
Example of horizontal branching
Branching mechanism
Linear conveyor
Joint mechanism
Example of vertical circulation
Vertical circulation mechanism
Linear conveyor
Belt conveyor

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

Conventional system
Two units of the same process are on one line.
Process order: A ➔ A → B ➔ C ➔ A
The same process

Linear conveyor Module
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.

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

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Signal</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>+24V</td>
<td>Power connection</td>
</tr>
<tr>
<td>A2</td>
<td>GND</td>
<td>DC24V (+/-10%)</td>
</tr>
<tr>
<td>A3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A4</td>
<td>Optional sensor L</td>
<td>Detection output</td>
</tr>
<tr>
<td>A5</td>
<td>Optional sensor C</td>
<td>Detection output</td>
</tr>
<tr>
<td>A6</td>
<td>Optional sensor R</td>
<td>Detection output</td>
</tr>
<tr>
<td>A7</td>
<td>ALARM output</td>
<td>Alarm output</td>
</tr>
<tr>
<td>A8</td>
<td>SPEED output</td>
<td>Speed output</td>
</tr>
<tr>
<td>B1</td>
<td>ALARMRESET input</td>
<td>Alarm reset input ON [L]: reset. OFF [H]: normal.</td>
</tr>
<tr>
<td>B2</td>
<td>INV.VR/EXT input</td>
<td>Speed setting device switching input ON [L]: normal. OFF [H]: external.</td>
</tr>
<tr>
<td>B3</td>
<td>GROUND</td>
<td>Grounding</td>
</tr>
<tr>
<td>B4</td>
<td>Brake input ON [L]: run. OFF [H]: momentary stop.</td>
<td></td>
</tr>
<tr>
<td>B5</td>
<td>RUN/STOP</td>
<td>Brake input ON [L]: run. OFF [H]: momentary stop.</td>
</tr>
<tr>
<td>B6</td>
<td>VRL</td>
<td>+ side</td>
</tr>
<tr>
<td>B7</td>
<td>VRM</td>
<td>+ side</td>
</tr>
<tr>
<td>B8</td>
<td>VRY</td>
<td>+ side</td>
</tr>
</tbody>
</table>

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 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).

Faster circulations between sliders and enables smooth action.

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.
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.

- 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.

- Belt module
  - This interface allows the customer to supply 24V power and select just the necessary signals to use.
    - Note. The customer will need to prepare the wiring on the user side.
Additionally, even when using only one module without connections, one termination module is required.

This part is attached to the right end of the module.

Up to two rails per line are required.

One set of parts per LCC140 is required. One connector per LCC140 is required.

LCM100 main body

LCM100 module

Linear module

Belt module

Robot cable for linear module

Robot cables for the number of modules are required.

Slider

For linear module

For belt module

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. Additionally, even when using only one module without connections, one termination module is required.

Termination module for linear module (R side)

This part is attached to the right end of the module. This block connects modules. (Number of modules making up the line) - 1) blocks are required. Additionally, when installing insertion/ejection rails, one block per rail is required.

Module connection block (with fastening bolts)

This block connects modules. (Number of modules making up the line) - 1) blocks are required. Note 2. If using this block, adjust the length of the cable to fit the distance between modules.

Module connection cable

This cable connects modules. (Number of modules making up the line) - 1) cables per line are required. Note 4.

Parts for LCM100

Terminal module for linear module (L side)

Module connection block (with fastening bolts)

Linear module

Belt module

Parts for LCC140 controller

Power connector + connection lever

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

SAFETY connector

One connector per LCC140 is required.

Fixed cable

For LCM100

Flexible cable

For LCM100

Robot cable for LCM100

Lithium battery for system backup

Replacement filter for LCC140

Parts for line configuration

LINK cable

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

Termination connector

When connecting modules, two connectors per line are required.

Dust cover (for LNK connector)

This dust cover is attached to the insertion port, into which the LINK cable connector is inserted. When using only one module without connections, two dust covers are required. Note 8.

Selection parts

Proximity sensor for belt module

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

Programming box HPB/HBP-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.

PC supporting software POPCOM+

The software for POPCOM+ communicates with the programming box. The interface is similar to the POPCOM software.

Data cables (5m)

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

FB-10

Note 9. USB driver for POPCOM+ can also be downloaded from the website.

RFID

RFID (manufactured by BALLUFF GmbH)

RFID (manufactured by OMRON)

Reader/writer cable

Antenna amplifier controller cable

Maintenance parts

Robot cable for LCM100

Lithium battery for system backup

Replacement filter for LCC140

End of document
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 controller LCC140

#### 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.

#### 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.

#### 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.

#### Position correction function using RFID

When multiple sliders are each stopped at a position of your choice, actual stop positions have 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.

---

### 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.

<table>
<thead>
<tr>
<th>FA (mm)</th>
<th>Payload (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>25/40/75/100/125/150</td>
</tr>
<tr>
<td>10</td>
<td>110/160/220/280/340/400</td>
</tr>
<tr>
<td>20</td>
<td>60/110/160/220/280/340</td>
</tr>
<tr>
<td>30</td>
<td>50/100/150/200/250/300</td>
</tr>
<tr>
<td>50</td>
<td>60/120/180/240/300/360</td>
</tr>
</tbody>
</table>

Note: The loads shown above are tolerable loads at a position 10 mm away from the center of the guide rail.

---

### Linear conveyor module LCM100

#### External view

![External view](Image)

#### Linear module slider

![Linear module slider](Image)

#### Belt module slider

![Belt module slider](Image)

---

### Ordering method

#### Linear module

<table>
<thead>
<tr>
<th>LCM100</th>
<th>LCC140 - 10</th>
</tr>
</thead>
</table>

#### Belt module

<table>
<thead>
<tr>
<th>LCM100</th>
<th>LCC140 - 10</th>
</tr>
</thead>
</table>

---

### Basic specifications of LCC140 (Controller for linear module)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>Linear conveyor module LCM series</td>
</tr>
<tr>
<td>Outside dimensions</td>
<td>W 402.5 × H 229 × D 106.5mm</td>
</tr>
<tr>
<td>Main body weight</td>
<td>4.8kg</td>
</tr>
<tr>
<td>Input power voltage</td>
<td>Single-phase AC 200 to 230V ±10% or less (50/60Hz)</td>
</tr>
<tr>
<td>Maximum power consumption</td>
<td>350VA (LCM100-4M 1 slider is driven)</td>
</tr>
<tr>
<td>SAFETY</td>
<td>EtherNet/IP adapter 2 ports</td>
</tr>
<tr>
<td>External input/output</td>
<td>RS-232C (dedicated to RFID), RS-232C (for HPB / doubles as POPCOM+)</td>
</tr>
<tr>
<td>Network option</td>
<td>CC-Link, Ver. 1.1, compatible, Remote device station (2 stations)</td>
</tr>
<tr>
<td>Programming box</td>
<td>HPB, HPB-D (Software version 24.01 or later)</td>
</tr>
</tbody>
</table>

---

### Notes

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

---

![Module for circulation](Image)

- 2MT: 4M: 640mm 3L: 3m 10: 10A
- 3M: 480mm 5L: 5m