ROBOT VISION iVY2 RCX340

Easy to use and reduction of work steps.
"Finds and Picks up" and "Pursues and Picks up" without teaching.

Many robot users might think, "We tried vision recognition, but it seemed to take a lot of work" or "we tried it before, but making adjustments was a tough job". But YAMAHA iVY2 system solves these problems. Anyone can make the setup easily to contribute to reduction of work steps.

Simplicity
Setup is completed as little as eight minutes after power-on. Auto-calibration makes setup easy.

Sophistication
With up to five million pixels, a variety of workpieces can be supported. Improve throughput to 100 CPM with conveyor tracking.

Assurance
Comprehensive support covers everything from camera image acquisition to the operation of the gripper and robot. With support that only the robot manufacturer can provide, you can relax.
### Number of teaching steps needs to be reduced.

Robot teaching work requires a lot of labor and time. The iVY2 system acts as “robot eye”. The final fine positioning can be automated to greatly reduce the teaching time that was required for the conventional models.

### Positioning mechanism needs to be simplified.

In the current trend toward small-lot production of multiple models, a larger number of models means that positioning and other aspects of setup will require more time and trouble. Use of the iVY2 system makes it possible to greatly reduce costs necessary for manufacture, management, and replacement of positioning jigs.

### Random workpieces need to be handled.

Use of a position detection function of the iVY2 system makes it possible to simply construct operations, such as “workpiece is directly placed from the parts feeder” and “workpiece in the pallet is gripped and transferred”.

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**What the iVY2 system can perform.**

- Positioning of products that are taken roughly.
- Following up of products that are flown by the conveyor.
- Finding and taking of products that are arranged randomly.
- Positioning of products that are secured roughly.

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**POINT 1**

Robot controller integrated type
Various application examples

- **Workpieces are flown randomly.**
  
  The workpiece positions are recognized by the camera and the labels are adhered to the determined positions on workpieces. The adhesion position can also be specified for each part type.

**POINT**

Even when the positions or orientations of workpieces that are flown are not aligned, the labels are adhered to the same positions.

- **The sealing position is corrected.**
  
  The placed position is recognized from the workpiece shape correctly. The jig change (setup) is not needed when the part type is changed.

**POINT**

The workpiece shape is recognized by the camera and the sealing is applied to the correct position. Even when flown are not aligned, the labels are adhered to the same positions.

- **The screw tightening position is corrected.**
  
  The correct position of even the workpiece whose hole position varies depending on the workpiece is recognized by the camera and the screw can be tightened.

**POINT**

Even when there are variations in product accuracy such as resin mold product, the products can be assembled correctly.

- **Workpiece is picked up from the tray and assembled directly.**
  
  Workpiece is picked up from the tray, its position is corrected during transfer, and it is assembled directly. Difficult-to-grip workpiece is centered.

**POINT**

Use of the upward camera makes it possible to correct the position during transfer.
POINT 3

Easy for anyone to use, applicable to a wide variety of applications

When the system was upgraded by combining the robot with a generally available image processing unit, it took a long time conventionally to adjust the robot controller and image processing unit, and perform the correction calculation. In YAMAHA "iVY2 system", the vision board is integrated into the robot controller and the functions are limited to the positioning and position correction so as to greatly simplify the operability. This makes the system incredibly easy to use when compared to conventional vision systems. YAMAHA aimed at "a vision system that anyone can easily use". Please try to use YAMAHA’s new robot vision.

Conventional robot vision

1. Alignment with robot coordinates is difficult.
2. Correction calculation is needed when the camera moves.
3. Operation deviation between the camera and robot due to communication time.
4. Adjustment of communication format is needed.

- Difficult to handle
- Hard to actually operate.
- Installation and setup costs are high.
- Difficult to know emergency contact address.

Special skills are required and many work steps are needed.

Connecting an external camera to the robot controller requires tasks such as coordinate alignment (calibration), and correction programs are needed, so the startup work is difficult. When using for simple applications, many work steps are needed. So, possible applications are limited.

iVY2 system

1. Simple calibration function is incorporated.
2. Coordinates are corrected automatically even when the camera moves.
3. High-speed connections through dedicated bus line.
4. Controller is incorporated to provide the central operation.
5. Applicable to all models of YAMAHA robot lineup.

- Easy to use
- Various applications are supported using easy operation.
- Cost reduction by reducing work steps.
- YAMAHA gives you total support.

Easy operation extends applications

YAMAHA iVY2 system can be calibrated very simply. Furthermore, the coordinates are corrected automatically when a camera is installed on the robot. As iVY2 system can be used, it can be applied to various applications.
**Auto-calibration**

Easily complete high-precision calibration just by following a wizard! Even if equipment becomes misaligned, execute auto-calibration and resume operation.

**STEP. 1**
Register the desired fiducial mark

**STEP. 2**
Select the camera mounting method

- Mounted on robot
- Fixed downward
- Fixed upward

**STEP. 3**
Align fiducial mark position

- If camera is movable, move the robot
- If camera is fixed, attach fiducial mark to robot, and move it

**Execute auto-calibration**

**POINT 5**

Easy workpiece registration only with 3 steps

From image acquisition, registration takes just three steps.

**STEP. 1**
Capture images. Put the workpiece within the camera field-of-view and specify an image capturing range.

**STEP. 2**
Set the contour. Contour is automatically extracted. Paint the necessary contour with a pen tool.

**STEP. 3**
Register the detection position. Specify the detection position with the mouse. Desired positions can be set.

**Search results**
**POINT 6**

Simple calibration function (coordinate matching alignment work) incorporated

The iVY2 system includes dedicated software "iVY2 Studio". All operations related to the vision, such as registration of fiducial marks used for the calibration or workpieces (edge setting, various parameter setting, and image capturing range setting, etc.), backup, restore, and operation monitor can be performed only with this software.

![Image of iVY2 Studio interface]

**POINT 7**

Setup time reduced greatly

When using a general vision, a coordinate conversion program needs to be created in the robot controller since the robot coordinate data differs from the vision format. Since the robot controller is integrated into the iVY2 system, the robot coordinate data can be stored into the robot point data using single process. This ensures very simple operation. Additionally, the unified control of the camera control and light control can be performed using the robot program. The control becomes easy and the number of start-up steps can also be reduced.

![Comparison of setup time diagram]

**POINT 8**

No need to create a coordinate conversion program.

Dedicated robot language for vision is provided.

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**General robot vision**

```
MOVE P, P9
OFF LINE
SEND ( "*" ) TO CMU
SEND CMU TO P10
ON LINE
MOVE P, P10
```

![Diagram showing communication with image processing unit]

**iVY2 system**

```
MOVE P, P9
VSEARCH 1,2,0
P10=VGETPOS(0)
MOVE P, P10
```

- No communication time lag
- Needs only few command lines.
- Simple and easy to understand

![Centralized control using only the robot program]

Camera and robot have separate programs
**POINT 9**

**Easy inter-operation with peripheral equipment**

The same controller provides unified control of robot, gripper, and lighting.

**POINT 10**

**Workpiece handling without teaching**

When the robot handles a workpiece, the teaching work to the correct position is absolutely required. If the workpiece position deviates, the correct handling cannot be performed. Use of iVY2 system makes it possible to detect the correct position through the image recognition after coarse positioning. The workpiece can be transferred without teaching, so the start-up steps are reduced and workpiece can be changed or added flexibly.

**POINT 11**

**Also supports moving camera**

Even if the camera is mounted on the robot, coordinates are automatically converted according to the robot’s movement.

**POINT 12**

**Camera position can be selected in accordance with the application.**

Even when the camera is moved, the coordinates are corrected automatically.
POINT 13

Applicable to conveyor tracking

Ideal for high-speed packaging arrangement high-speed transport of multiple types of items such as pharmaceuticals, cosmetics, and food products. The vision camera detects the position and orientation of parts moving on the conveyor, and the robot picks them up.

Example program

1. New CTMOVE CTMOVE (1),Z=0.0,CTZ=10.0
   Can be executed with a single command

Unify the move up command, follow workpiece command, move down command

Operating conditions: YK500XG / payload 1 kg (total of workpiece and tool) / horizontal movement 250 mm / vertical movement 1 mm / conveyor speed 100 mm/sec

POINT 14

Control multiple robots for even more improvement in production efficiency.

Control two robots to let downstream robot handle missed items

Program allows differentiation by model for even more improvement in production efficiency

Information from a single camera can be shared by multiple robots

Connect up to four units 100 CPM/unit x 4 units (maximum 400 CPM)

RCX340 + IVY2

RCX340

YC-Link/E

Cable -...- Cable -...- Cable -...- Cable -...-

Conveyor direction
**POINT 15**

**Approximately double the search speed** *(compared to previous model)*

Even a large number of workpieces can be detected at high speed. The search speed is approximately double that of the previous model. This can be used for a wide variety of applications, including molded plastic parts or food items.

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**POINT 16**

**Support for five-megapixel cameras**

*(Choose from 300,000 pixel, 1.3 megapixel, and 2 megapixel, and 5 megapixel)*

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**POINT 17**

**254 types can be registered**

Setup changes require only that part numbers be changed. Setup changes are easy.

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**POINT 18**

**Monitor output is provided**

- Monitor the operating status
- Monitor the search status while making calibration settings or during automatic operation.

**Contents of output**

- Selected type / Captured image
- Search result (position, score, scale)
- Executed command
- Time required by command

**Output method**

- DVI-I (supports digital monitor or analog monitor)

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**POINT 19**

**High-precision search even under low light**

- Edge search engine is built-in
- Supports a variety of applications while being minimally affected by the external environment.
POINT 20

Preparatory evaluation and advice give you peace of mind

We borrow the workpiece from you, evaluate it, and submit an evaluation report. In addition, we draw on our wealth of experience and evaluation results to provide advice and training regarding selection and installation of robots and peripheral equipment.

Hearing  Workpiece is borrowed  Preliminary evaluation  Advice (evaluation report is submitted)  Robot training  Follow-up after delivery

Preliminary evaluation

<table>
<thead>
<tr>
<th>Evaluation conditions (example)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting</td>
</tr>
<tr>
<td>Lens: 8 mm</td>
</tr>
<tr>
<td>Lighting height: 375 mm</td>
</tr>
<tr>
<td>WD: 400 mm</td>
</tr>
<tr>
<td>Workpiece</td>
</tr>
<tr>
<td>Background: black</td>
</tr>
</tbody>
</table>

We borrow a workpiece from you and conduct an evaluation.

Advice (evaluation report is submitted)

Advice regarding camera, lens, and lighting settings

The results of our preliminary evaluation regarding camera, lens, lighting selection, and setup are summarized as a report and submitted.

Robot training

Training can be performed according to the content of the customer's application.

POINT 21

Choose freely from Yamaha's lineup of robots

A low-cost and convenient robot vision system can be constructed using the models that are optimal for the customer's application.

- XY-X Cartesian robots
- YK-XG/XE SCARA robots
- YK-TW orbit type robots
- FLIP-X single-axis robots

Note. The YA series is not supported.

POINT 22

Easy-to-use dedicated software iVY2 Studio

With support software "iVY2 Studio", all vision related operations such as registration of fiducial marks and workpieces used for calibration (contour settings, various parameter settings, and read range settings), backup, restore operation, and operation monitor can be performed.

Support software iVY2 Studio

- Search trial-run, part type registration
- Reference mark registration (for calibration)
- Up to 40 workpiece types can be registered.
- Workpiece can also be added easily.
- Up to 40 workpieces can be detected at once.
- Data backup
- This software functions as a monitor during program operation.

Download from website (member site)
iVY2 System configuration illustration

* The illustration left shows an example system with the tracking board and an iVY2 unit (when the lighting control board option is selected).

* Connections to the STD.DIO, ACIN, and SAFETY connectors are not shown in the left illustration.
iVY2 System

Integrated Robot Vision System with “plug-and-play” simplicity.
Basic specifications have been dramatically enhanced while retaining the current iVY system’s ease of use.

Main functions ➔ P.78

Ordering method

<table>
<thead>
<tr>
<th>RCX320</th>
<th>RCX340</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td></td>
</tr>
<tr>
<td>Total controllable axes</td>
<td>6</td>
</tr>
<tr>
<td>Safety standards</td>
<td></td>
</tr>
<tr>
<td>Regenerative units</td>
<td>1</td>
</tr>
<tr>
<td>Controller option A</td>
<td></td>
</tr>
<tr>
<td>Option A</td>
<td></td>
</tr>
<tr>
<td>Vision System</td>
<td></td>
</tr>
<tr>
<td>Absolute battery</td>
<td></td>
</tr>
</tbody>
</table>

Basic specifications

Robot vision basic specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>iVY2 unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable controllers</td>
<td>RCX320 / RCX340</td>
</tr>
<tr>
<td>Number of screen pixels</td>
<td>648(H) × 494(V) (300,000 pixels, VGA) 1280(H) × 966(V) (1,300,000 pixels, SXGA) 1624(H) × 1236(V) (2,000,000 pixels, UXGA) 2592(H) × 1944(V) (5,000,000 pixels, QSXGA)</td>
</tr>
<tr>
<td>Model setting capacity</td>
<td>254 models</td>
</tr>
<tr>
<td>Number of connectable cameras</td>
<td>Max. 2 cameras</td>
</tr>
<tr>
<td>Connectable camera</td>
<td>GigE camera (VGA, SXGA, UXGA) PoE: IEEE802.3af 1 ch up to 7W</td>
</tr>
<tr>
<td>External interface</td>
<td>Ethernet (1000BASE-T) Note. For setting and monitor operations</td>
</tr>
<tr>
<td>External monitor output</td>
<td>DVI-I Note. Also usable with an analog monitor by using a conversion adaptor. Monitor resolution: 1024 × 768</td>
</tr>
<tr>
<td>Power supply</td>
<td>DC24V +/-10% 1.5A Max.</td>
</tr>
<tr>
<td>Dimensions</td>
<td>W45 × H195 × D130 (iVY2 unit only)</td>
</tr>
<tr>
<td>Weight</td>
<td>0.8kg (iVY2 unit only, when the lighting control board option is selected)</td>
</tr>
<tr>
<td>Search method</td>
<td>Edge search (correlated edge filter, Sobel filter)</td>
</tr>
<tr>
<td>Image capturing</td>
<td>Trigger mode S/W trigger, H/W trigger</td>
</tr>
<tr>
<td>External trigger input</td>
<td>2 points</td>
</tr>
<tr>
<td>Function</td>
<td>Position detection, automatic point data generation</td>
</tr>
<tr>
<td>Camera installation position</td>
<td>Fixed to the fixed camera (up, down) or robot (Y-axis, Z-axis). Perpendicular to the workpiece to be captured.</td>
</tr>
<tr>
<td>Setting support function</td>
<td>Calibration, image save function, model registration, fiducial mark registration, monitor function Note. iVY2 Studio function (requires a Windows PC)</td>
</tr>
<tr>
<td>Lighting control options</td>
<td>Number of connectable lighting units Max. 2 lighting units Modulated light format PWM modulated light control (0 to 100%), PWM frequency switchable 62.5 kHz/125 kHz Continuous light, strobe light (follows camera exposure) Lighting power input 12VDC or 24VDC (external supply shared by both channels) Lighting output For 12VDC supply: Total of less than 40W for both channels. For 24VDC supply: Total of less than 80W for both channels.</td>
</tr>
</tbody>
</table>
Instruction manuals can be downloaded from our company website. Please use the following for more detailed information.
https://global.yamaha-motor.com/business/robot/

### Tracking board basic Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Tracking board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable controllers</td>
<td>RCX320 / RCX340</td>
</tr>
<tr>
<td>Number of connected encoders</td>
<td>Up to 2 units.</td>
</tr>
<tr>
<td>Encoder power supply</td>
<td>5VDC (2 counters total 500 mA or less) (Supplied from controller)</td>
</tr>
<tr>
<td>Applicable encoder</td>
<td>26LS31/26C31 or equivalent line driver (RS-422 compliance).</td>
</tr>
<tr>
<td>Input phase</td>
<td>A, A, B, B, Z, Z</td>
</tr>
<tr>
<td>Max. response frequency</td>
<td>2MHz or less</td>
</tr>
<tr>
<td>Counter</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>Multiplier</td>
<td>4x</td>
</tr>
<tr>
<td>Other</td>
<td>With disconnection detection function</td>
</tr>
</tbody>
</table>

#### Dimensional outlines

- **RCX320+iVY2**
  - Dimensions: 130 x 130 x 213 mm
  - Dimensions: 130 x 213 x 213 mm
- **RCX340+iVY2**
  - Dimensions: 130 x 130 x 213 mm
  - Dimensions: 130 x 213 x 213 mm
**iVY2 System**

### Dimensional outlines

- **CCD camera**
  - (300,000 pixels • 1,300,000 pixels • 2,000,000 pixels)
  - 4-M4 depth 4 (Top and bottom sides)
  - Tripod depth 5 (Top and bottom sides)

- **CMOS camera**
  - (5,000,000 pixels)
  - 4-M4 depth 4 (Top and bottom sides)
  - Tripod depth 5 (Top and bottom sides)

### Lenses

- **8mm lens**
  - (Model No. : KCX-M7214-00)
  - 2-M1.7 Lock screw

- **12mm lens**
  - (Model No. : KCX-M7214-10)
  - 2-M1.7 Lock screw

- **16mm lens**
  - (Model No. : KCX-M7214-20)
  - 2-M1.7 Lock screw

- **25mm lens**
  - (Model No. : KCX-M7214-30)
  - 2-M1.7 Lock screw

- **8mm lens (megapixel support)**
  - (Model No. : KCX-M7214-40)
  - 2-M1.7 Lock screw

- **12mm lens (megapixel support)**
  - (Model No. : KCX-M7214-50)
  - 2-M1.7 Lock screw

- **16mm lens (megapixel support)**
  - (Model No. : KCX-M7214-60)
  - 2-M1.7 Lock screw

- **25mm lens (megapixel support)**
  - (Model No. : KCX-M7214-70)
  - 2-M1.7 Lock screw
## Lens characteristics

<table>
<thead>
<tr>
<th>Lens</th>
<th>Model</th>
<th>Focal length [mm]</th>
<th>Aperture value [F No.]</th>
<th>Angle-of-view (degrees) with 1/3 inch sensor [KCG-M6541-00 (300,000 pixel camera)]</th>
<th>Angle-of-view (degrees) with 1/1.8 inch sensor [KCG-M6541-20 (2,000,000 pixel camera)]</th>
<th>Closest approach distance [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>8mm</td>
<td>KCG-M7214-00</td>
<td>8</td>
<td>F1.3–CLOSE</td>
<td>25.1</td>
<td>23.2</td>
<td>0.2</td>
</tr>
<tr>
<td>12mm</td>
<td>KCG-M7214-00</td>
<td>12</td>
<td>F1.4–CLOSE</td>
<td>33.2</td>
<td>31.1</td>
<td>0.3</td>
</tr>
<tr>
<td>16mm</td>
<td>KCG-M7214-00</td>
<td>16</td>
<td>F1.4–CLOSE</td>
<td>41.7</td>
<td>39.6</td>
<td>0.4</td>
</tr>
<tr>
<td>25mm</td>
<td>KCG-M7214-30</td>
<td>25</td>
<td>F1.4–CLOSE</td>
<td>61.8</td>
<td>59.6</td>
<td>0.5</td>
</tr>
<tr>
<td>12mm (megapixel support)</td>
<td>KCG-M7214-00</td>
<td>12</td>
<td>F1.4–CLOSE</td>
<td>31.2</td>
<td>29.1</td>
<td>0.1</td>
</tr>
<tr>
<td>16mm (megapixel support)</td>
<td>KCG-M7214-00</td>
<td>16</td>
<td>F1.4–CLOSE</td>
<td>49.2</td>
<td>47.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Note: This table shows the angle-of-view for Yamaha's standard lenses. If the angle-of-view is greater, there might be more distortion at the edge of the image.

## Angle-of-view size, WD, and magnification when close-up ring is used

### Close-up ring [mm]

<table>
<thead>
<tr>
<th>8mm lens for megapixel</th>
<th>12mm lens for megapixel</th>
<th>16mm lens for megapixel</th>
<th>25mm lens for megapixel</th>
</tr>
</thead>
<tbody>
<tr>
<td>WD [mm]</td>
<td>200</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>Angle of view X × Y [mm]</td>
<td>Angle of view X × Y [mm]</td>
<td>Angle of view X × Y [mm]</td>
<td>Angle of view X × Y [mm]</td>
</tr>
<tr>
<td>None</td>
<td>89.6 × 119.9</td>
<td>114.5 × 150.1</td>
<td>161.8 × 213.2</td>
</tr>
<tr>
<td>Optical magnification</td>
<td>0.102</td>
<td>0.094</td>
<td>0.087</td>
</tr>
</tbody>
</table>

Note: WD is the lens tip reference.
iVY2 System

Accessories and part options

iVY2 System

- Standard accessories

  1. **iVY2 unit**
     The iVY2 unit adds robot vision to the RCX320 / RCX340 robot controller.

  2. **iVY2 unit accessories**

     | Name                                | Individual model |
     |--------------------------------------|------------------|
     | Camera trigger input cable connector| KX0-M657K-00     |
     | 24V power supply connector           | KCF-M5382-00     |

- **Support software for PC iVY2 Studio**

  iVY2 Studio is support software for the iVY2 system that allows registering part types and reference marks as well as monitoring the work search status during automatic robot operation by connecting to the robot controller. When the iVY2 unit is purchased, iVY2 Studio is supplied with it.

- **Environment**

<table>
<thead>
<tr>
<th>Software model</th>
<th>KCX-M4988-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Windows XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.2.01.01.00 or later)</td>
</tr>
<tr>
<td>CPU</td>
<td>Processor that meets or exceeds the suggested requirements for the OS being used.</td>
</tr>
<tr>
<td>Memory</td>
<td>Suggested amount of memory or more for the OS being used.</td>
</tr>
<tr>
<td>Hard disk capacity</td>
<td>30MB of available space required on installation drive. * Additional vacant space is required for saving images and data.</td>
</tr>
<tr>
<td>Display</td>
<td>800 x 600 dot, or higher, 32768 colors (16bit High Color) or higher (recommended)</td>
</tr>
<tr>
<td>Communication Port</td>
<td>Ethernet Port of TCP/IP</td>
</tr>
</tbody>
</table>

Note. This software is only downloaded from the website.

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

### Camera

<table>
<thead>
<tr>
<th>CCD camera</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>300,000 pixel</td>
<td>KCX-M6541-00</td>
</tr>
<tr>
<td>1,300,000 pixel</td>
<td>KCX-M6541-10</td>
</tr>
<tr>
<td>2,000,000 pixel</td>
<td>KCX-M6541-20</td>
</tr>
<tr>
<td>CMOS camera</td>
<td>5,000,000 pixel</td>
</tr>
</tbody>
</table>

### Lens

<table>
<thead>
<tr>
<th>Model</th>
<th>KCX-M7214-00</th>
<th>KCX-M7214-10</th>
<th>KCX-M7214-20</th>
<th>KCX-M7214-30</th>
<th>KCX-M7214-40</th>
<th>KCX-M7214-50</th>
<th>KCX-M7214-60</th>
<th>KCX-M7214-70</th>
</tr>
</thead>
<tbody>
<tr>
<td>8mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12mm</td>
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<td></td>
</tr>
<tr>
<td>16mm</td>
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### Close-up ring

<table>
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<tr>
<th>Model</th>
<th>KCX-M7215-00</th>
<th>KCX-M7215-10</th>
<th>KCX-M7215-20</th>
<th>KCX-M7215-30</th>
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<td>5.0mm</td>
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### Lighting control board

This board adds lighting control functionality to the iVY2 system. Installed in the iVY2 unit when shipped.

### Lighting control board accessories

- Name: Lighting power cable connector
  - Model: KCX-M657K-10

### Tracking board

This board adds conveyor tracking functionality to the RCX320 / RCX340 controller.

### Tracking board accessories

- Name: AB phase input cable connector
  - Model: KCX-M657K-20

### Recommended option cable

- Name: AB phase input cable (10 m, only for counter 1)
  - Model: KCX-M66AF-00
  - Note: Not included.
  - We can provide an option that is pre-wired to the AB phase input cable connector.

### Camera cable

Cable for connecting the camera to the iVY2 board.

### LAN cable with shield cloth (5 m)

Model: KX0-M55G0-00

### Tracking encoder cable (10m)

Model: KX0-M66AF-00

Instruction manuals can be downloaded from our company website. Please use the following for more detailed information.

https://global.yamaha-motor.com/business/robot/

iVY2 System