● Lens characteristics

Lens	Model	Focal length [mm]	Aperture value [F No.]	Angle-of-view (degrees) With 1/3 inch sensor KCX-M6541-00 (300,000 pixel camera) KCX-M6541-10 (1,300,000 pixel camera)		Angle-of-view (degrees) With 1/1.8 inch sensor KCX-M6541-20 (2,000,000 pixel camera)		Closest approach distance [m]
				Vertical	Horizontal	Vertical	Horizontal	
8 mm	KCX-M7214-00	8	F1.3–CLOSE	25.21	33.2	37.08	47.59	0.2
12 mm	KCX-M7214-10	12	F1.4–CLOSE	16.48	21.86	24.51	31.88	0.3
16 mm	KCX-M7214-20	16	F1.4–CLOSE	12.57	16.71	18.77	24.51	0.4
25 mm	KCX-M7214-30	25	F1.4–CLOSE	8.18	10.89	12.25	16.06	0.5
8 mm (megapixel support)	KCX-M7214-40	8	F1.4–F16	25.36	33.4	37.3	47.86	0.1
12 mm (megapixel support)	KCX-M7214-50	12	F1.4–F16	16.65	22.08	24.76	32.2	0.1
16 mm (megapixel support)	KCX-M7214-60	16	F1.4–F16	12.68	16.85	18.92	24.72	0.1
25 mm (megapixel support)	KCX-M7214-70	25	F1.4–F16	8.24	10.97	12.33	16.16	0.15

* 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
* WD is the lens tip reference.

Close-up ring [mm]	Lens	8 mm KCX-M7214-00		12 mm KCX-M7214-10		16 mm KCX-M7214-20		25 mm KCX-M7214-30	
None	WD [mm]	200		300		400		500	
	KCX-M6541-00 (300,000 pixels)	96.2 × 126.2		91.4 × 119.9		91.4 × 119.9		71.7 × 94.1	
	KCX-M6541-10 (1,300,000 pixels)	95.4 × 126.4		90.6 × 120		90.6 × 120		71.1 × 94.2	
	KCX-M6541-20 (2,000,000 pixels)	143.2 × 188.1		136 × 178.7		136 × 178.7		106.7 × 140.1	
	Optical magnification	0.038		0.040		0.040		0.051	
0.5	WD [mm]	69.5	118.6	143	296.8	222	524.1	358.5	1269.4
	KCX-M6541-00 (300,000 pixels)	36.6 × 48	59 × 77.4	45.7 × 60	91.4 × 119.9	51.5 × 67.6	118 × 154.7	51.5 × 67.6	182.8 × 239.8
	KCX-M6541-10 (1,300,000 pixels)	36.3 × 48	58.5 × 77.5	45.3 × 60	90.6 × 120	51.1 × 67.7	116.9 × 154.9	51.1 × 67.7	181 × 240
	KCX-M6541-20 (2,000,000 pixels)	54.4 × 71.5	87.8 × 115.3	68 × 89.4	136 × 178.7	76.6 × 100.7	175.5 × 230.5	76.6 × 100.7	271.9 × 357.3
	Optical magnification	0.100	0.062	0.080	0.040	0.071	0.031	0.071	0.020
1.0	WD [mm]	38.7	53.8	91.3	142.3	152	257.1	280.8	635.9
	KCX-M6541-00 (300,000 pixels)	22.6 × 29.6	29.5 × 38.7	30.5 × 40	45.7 × 60	36.2 × 47.5	60 × 78.7	40.2 × 52.7	91.4 × 119.9
	KCX-M6541-10 (1,300,000 pixels)	22.4 × 29.7	29.3 × 38.8	30.2 × 40	45.3 × 60	35.9 × 47.6	59.4 × 78.7	39.9 × 52.8	90.6 × 120
	KCX-M6541-20 (2,000,000 pixels)	33.6 × 44.2	43.9 × 57.7	45.4 × 59.6	68 × 89.4	53.9 × 70.8	89.2 × 117.2	59.8 × 78.6	136 × 178.7
	Optical magnification	0.162	0.124	0.120	0.080	0.101	0.061	0.091	0.040
1.5	WD [mm]			65.4	90.8	114.5	168.1	230.9	424.7
	KCX-M6541-00 (300,000 pixels)			22.8 × 29.8	30.3 × 39.7	27.7 × 36.4	39.8 × 52.2	33 × 43.2	61 × 80
	KCX-M6541-10 (1,300,000 pixels)			22.5 × 29.9	30 × 39.7	27.5 × 36.4	39.4 × 52.2	32.7 × 43.3	60.4 × 80
	KCX-M6541-20 (2,000,000 pixels)			33.8 × 44.4	45 × 59.1	41.2 × 54.2	59.2 × 77.7	49 × 64.4	90.7 × 119.1
	Optical magnification			0.161	0.121	0.132	0.092	0.111	0.060
2.0	WD [mm]			50	65.1	91.2	123.6	196.3	319.1
	KCX-M6541-00 (300,000 pixels)			18.2 × 23.9	22.8 × 29.8	22.6 × 29.6	30 × 39.4	28.2 × 36.9	46.3 × 60.7
	KCX-M6541-10 (1,300,000 pixels)			18.1 × 23.9	22.5 × 29.9	22.4 × 29.7	29.7 × 39.4	27.9 × 37	45.9 × 60.8
	KCX-M6541-20 (2,000,000 pixels)			27.1 × 35.6	33.8 × 44.4	33.6 × 44.2	44.6 × 58.6	41.9 × 55	68.9 × 90.5
	Optical magnification			0.201	0.161	0.162	0.122	0.130	0.079
5.0	WD [mm]							104.2	129
	KCX-M6541-00 (300,000 pixels)							14.7 × 19.2	18.4 × 24.1
	KCX-M6541-10 (1,300,000 pixels)							14.5 × 19.2	18.3 × 24.2
	KCX-M6541-20 (2,000,000 pixels)							21.8 × 28.6	27.4 × 36
	Optical magnification							0.250	0.199

Close-up ring [mm]	Lens	8 mm lens for megapixel KCX-M7214-40		12 mm lens for megapixel KCX-M7214-50		16 mm lens for megapixel KCX-M7214-60		25 mm lens for megapixel KCX-M7214-70	
None	WD [mm]	100		100		100		150	
	KCX-M6541-00 (300,000 pixels)	52.3 × 68.5		36.6 × 48		26.9 × 35.3		24.6 × 32.2	
	KCX-M6541-10 (1,300,000 pixels)	51.8 × 68.6		36.3 × 48		26.7 × 35.3		24.4 × 32.3	
	KCX-M6541-20 (2,000,000 pixels)	77.7 × 102.1		54.4 × 71.5		40 × 52.6		36.5 × 48	
	Optical magnification	0.070		0.100		0.136		0.149	
0.5	WD [mm]	46	113.6	66.1	283.2	77.8	505.4	130.3	1232.2
	KCX-M6541-00 (300,000 pixels)	27.7 × 36.4	58.1 × 76.2	25.4 × 33.3	89.2 × 117	22.1 × 28.9	118 × 154.7	21.7 × 28.4	182.8 × 239.8
	KCX-M6541-10 (1,300,000 pixels)	27.5 × 36.4	57.5 × 76.2	25.2 × 33.4	88.4 × 117.1	21.9 × 29	116.9 × 154.9	21.5 × 28.5	181.1 × 240
	KCX-M6541-20 (2,000,000 pixels)	41.2 × 54.2	86.4 × 113.5	37.8 × 49.7	132.7 × 174.3	32.8 × 43.1	175.5 × 230.5	32.2 × 42.3	271.9 × 357.3
	Optical magnification	0.132	0.063	0.144	0.041	0.166	0.031	0.169	0.020
1.0	WD [mm]			47.2	131.9	62.6	243	114.6	607.2
	KCX-M6541-00 (300,000 pixels)			19.8 × 26	45.2 × 59.2	18.6 × 24.4	59 × 77.4	19.4 × 25.4	91.4 × 119.9
	KCX-M6541-10 (1,300,000 pixels)			19.6 × 26	44.8 × 59.3	18.4 × 24.4	58.5 × 77.5	19.2 × 25.4	90.6 × 120
	KCX-M6541-20 (2,000,000 pixels)			29.4 × 38.7	67.2 × 88.3	27.7 × 36.3	87.8 × 115.3	28.8 × 37.9	136 × 178.7
	Optical magnification			0.185	0.081	0.197	0.062	0.189	0.040
1.5	WD [mm]			35.2	81.4	51.5	155.5	102	398.9
	KCX-M6541-00 (300,000 pixels)			16.3 × 21.4	32.7 × 42.9	16.1 × 21.1	39.4 × 51.6	17.5 × 23	61 × 80
	KCX-M6541-10 (1,300,000 pixels)			16.1 × 21.4	32.4 × 42.9	15.9 × 21.1	39 × 51.7	17.4 × 23	60.4 × 80
	KCX-M6541-20 (2,000,000 pixels)			24.2 × 31.8	48.6 × 63.8	23.9 × 31.4	58.5 × 76.9	26.1 × 34.2	90.7 × 119.1
	Optical magnification			0.225	0.112	0.228	0.093	0.209	0.060
2.0	WD [mm]			26.9	56.2	43	111.7	91.5	294.7
	KCX-M6541-00 (300,000 pixels)			13.8 × 18.1	22.5 × 29.5	14.2 × 18.6	29.8 × 39	16 × 21	45.7 × 60
	KCX-M6541-10 (1,300,000 pixels)			13.7 × 18.1	22.3 × 29.5	14 × 18.6	29.5 × 39.1	15.9 × 21	45.3 × 60
	KCX-M6541-20 (2,000,000 pixels)			20.5 × 26.9	33.4 × 43.9	21 × 27.6	44.3 × 58.1	23.8 × 31.3	68 × 89.4
	Optical magnification			0.266	0.163	0.259	0.123	0.229	0.080
5.0	WD [mm]							53.9	107.2
	KCX-M6541-00 (300,000 pixels)							10.5 × 13.8	18.3 × 24
	KCX-M6541-10 (1,300,000 pixels)							10.4 × 13.8	18.2 × 24
	KCX-M6541-20 (2,000,000 pixels)							15.6 × 20.5	27.2 × 35.8
	Optical magnification							0.349	0.200

* The above table shows the field of view when the standard lens and close-up ring are used. (Closest distance value is shown in No Close-up Ring column).
* If a close-up ring is not used, a WD less than the value shown in this table cannot be used.
* If a close-up ring is used, only WD in the region of this value can be used.
* Values in this table are for reference only; Actual values may vary.
* 5 megapixel camera is scheduled to be released in March 2016. Contact a Yamaha representative for details.

YAMAHA
Revs your Heart

Integrated Robot Vision System with "plug-and-play" simplicity

Yamaha's own unique solution
for integrated robot vision

RCX340 CONTROLLER YAMAHA ROBOT VISION
iVY2 SYSTEM

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

RCX340 CONTROLLER YAMAHA ROBOT VISION
iVY2 SYSTEM
New

A robot-integrated vision system that only Yamaha could produce

Simplicity

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

≫ P4-5

Sophistication

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

≫ P6-7

* Support is planned for March 2016

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.

≫ P8

Easy to use, and reduces the number of steps

Adding "eyes" to a robot significantly expands the range of applications.

Basic specifications have been dramatically enhanced while retaining the current iVY system's ease of use.

Camera	Number of registered types	Shorter search time	Longer cables usable	Monitoring
Supports from 300,000 to	Increased to	Approximately	Cables can be as long as	
5 million pixels	**254** types	**50** % less	**20** m	**Monitor output is provided**
Megapixel camera support	Previously 40 types	With capture: 30–40% less Search only: approximately 50% less	Previously 9.5 m	Enables operating status to be monitored without a PC

* 5-megapixel camera: Support planned for March 2016

* Time depends on the workpiece.

Various application examples

Labeling device (affixing labels to food packages)
■ Industry: food ■ Robot used: YK500TW omnidirectional robot
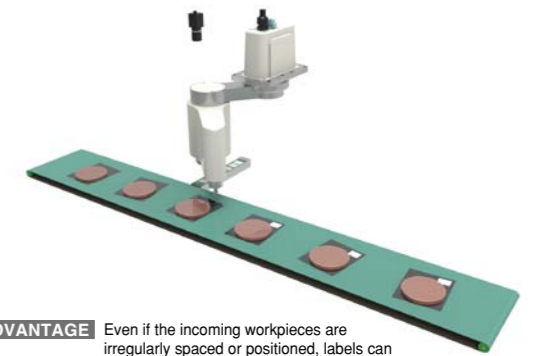
ADVANTAGE Even if the incoming workpieces are irregularly spaced or positioned, labels can be affixed at the same position.

Sealant touch-up (engine block sealant)
■ Industry: automotive ■ Robot used: SXYX Cartesian robot

ADVANTAGE Even if the workpiece is skewed from its correct position, the skew and angle are detected, and the application path is automatically compensated.

Screw attachment position detection (television panel screw attachment)
■ Industry: electronics ■ Robot used: NXY Cartesian robot
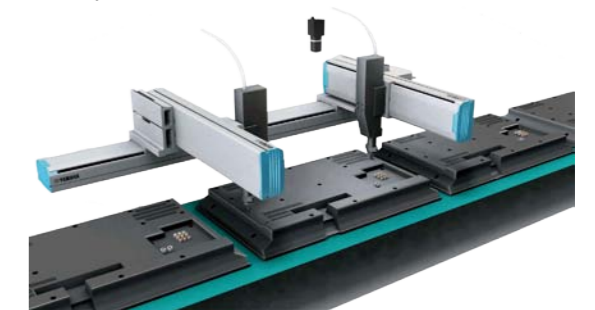
ADVANTAGE Hole position is detected, and screws are fastened accurately.

Position compensation with upward-facing camera (installing irregularly-shaped parts on a circuit board)
■ Industry: electronics
■ Robot used: YK150XG SCARA robot
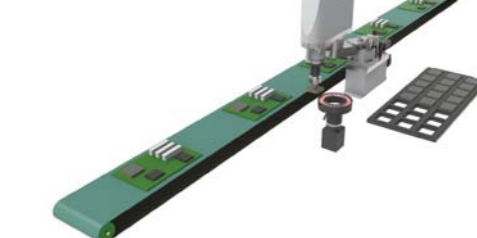
ADVANTAGE The roughly-positioned circuit board connector is picked up, the upward-facing camera is used to apply position compensation, and the part is mounted directly on the circuit board.

Simplicity
iVY2 SYSTEM

Our goal: "A vision system that anyone can use easily, even for the first time"

SPEED UP — Auto-calibration

Requires as little as **5** minutes

≫ 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
Can be mounted on moving part
Camera
Camera

Fixed downward
Camera

Fixed upward
Camera

STEP 3
Align fiducial mark position

If camera is movable, move the robot
Camera

If camera is fixed, attach fiducial mark to robot, and move it
Camera

Execute auto-calibration
Fiducial mark

SPEED UP — Easy workpiece registration

Requires as little as **3** minutes

≫ 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

No need to make time-consuming connection settings. Dramatic reduction in setup time.

■ Comparison of setup time

- Installation
- Pattern registration
- Calibration
- Debug
- Communication setting
- Parameter setting
- Program setting

iVY2 system

General-purpose vision
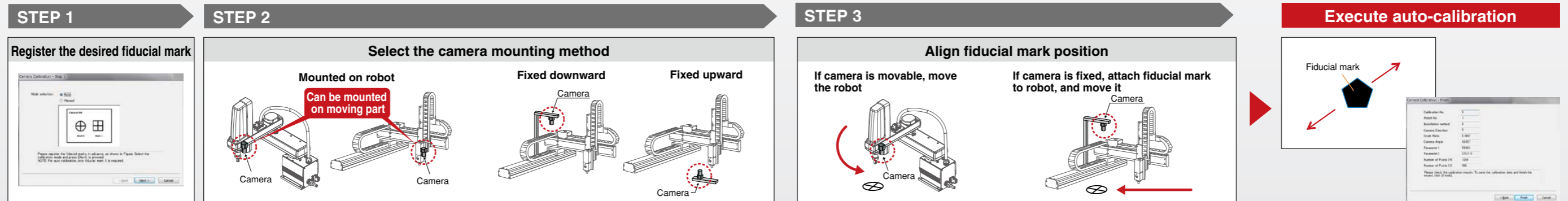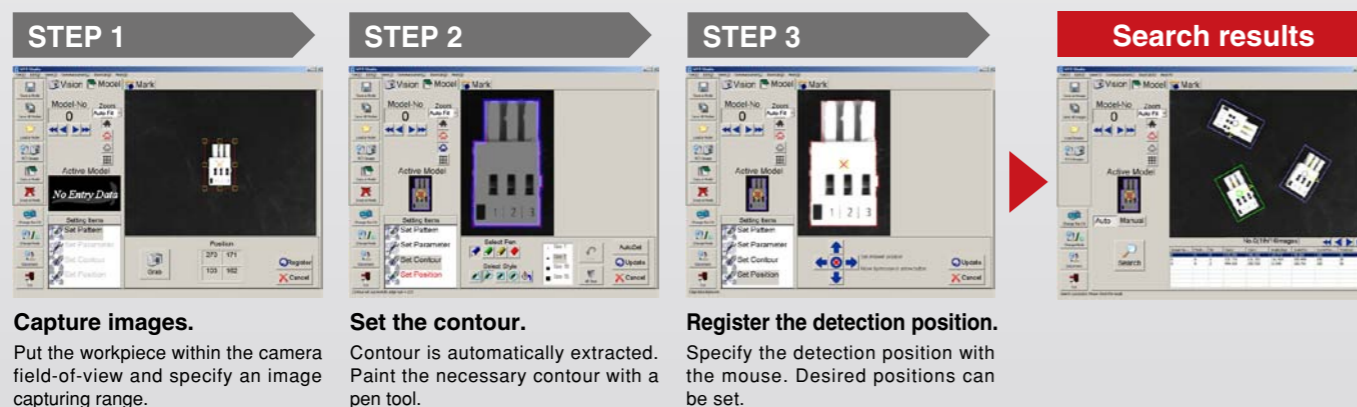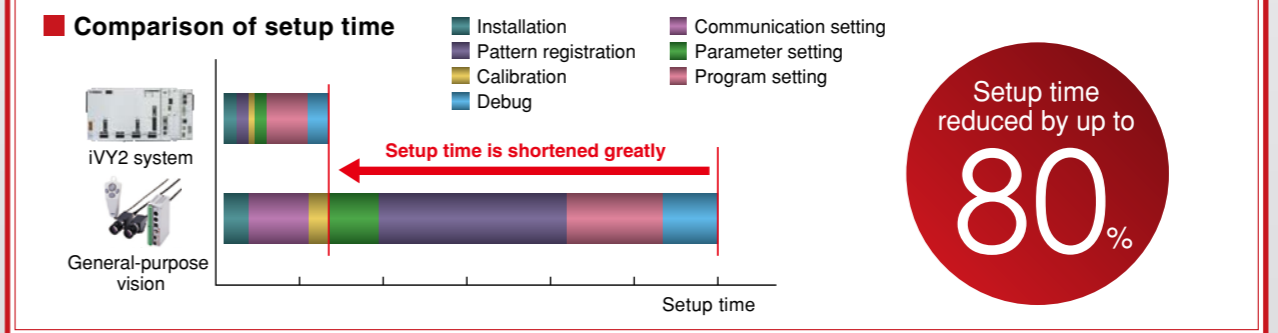
Setup time is shortened greatly

Setup time

Setup time reduced by up to
80%

No need to create a coordinate conversion program.

≫ **Dedicated robot language for vision is provided**

General robot vision
```
MOVE P, P9
OFFLINE
SEND ( * *) TO CMU
SEND CMU TO P10
ONLINE
MOVE P, P10
```
Communication with image processing unit

RS-232C

Program of image processing unit

Program of host PLC

Camera and robot have separate programs

iVY2 system
```
MOVE P, P9
VSEARCH 1,2,0        Searches for workpiece.
P10=VGETPOS(0)       Reads the point.
MOVE P, P10          Moves to this point.
```

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

Centralized control using only the robot program

Easy inter-operation with peripheral equipment

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

Robot vision: iVY2 System
Camera   Light

Electric gripper: YRG series

YAMAHA

RCX340
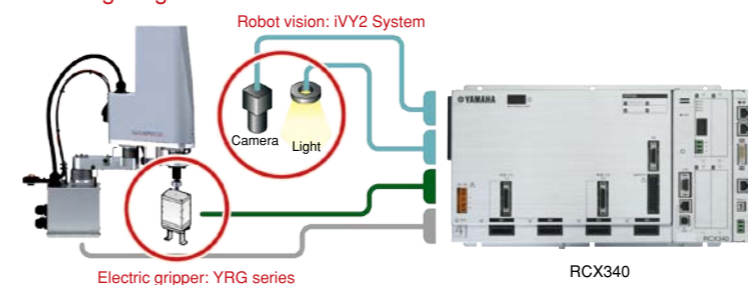
Also supports moving camera

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

Sophistication

iVY2 SYSTEM

Megapixel camera supports high precision and wide field of vision.
Conveyor tracking reaches 100 CPM.

SPEC UP

Conveyor tracking

Ideal for high-speed packaging | arrangement | high-speed transport of multiple types of items such as pharmaceuticals, cosmetics, and food products.

Conveyor tracking reaches 100 CPM per unit

➤ **The vision camera detects the position and orientation of parts moving on the conveyor, and the robot picks them up.**
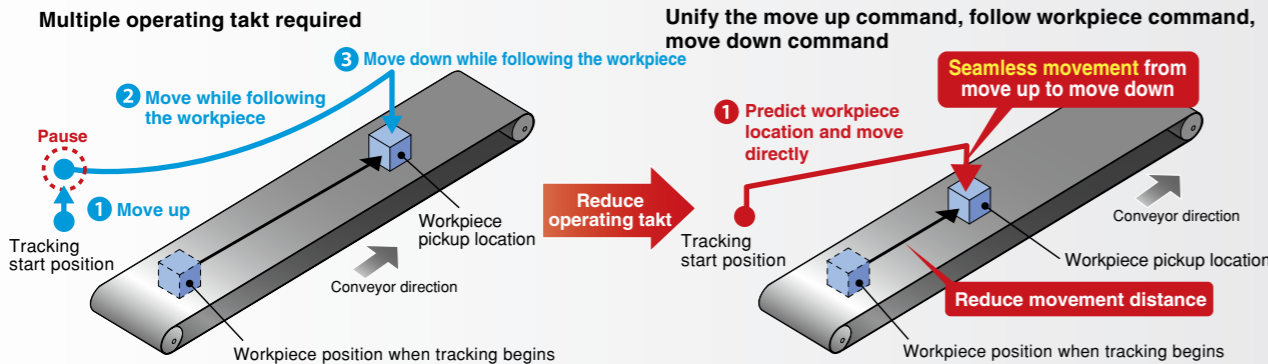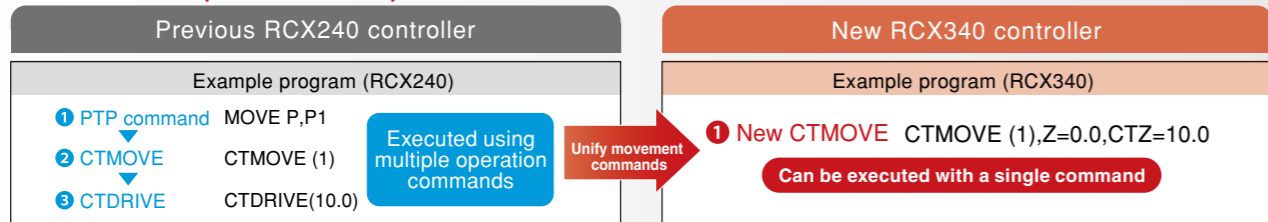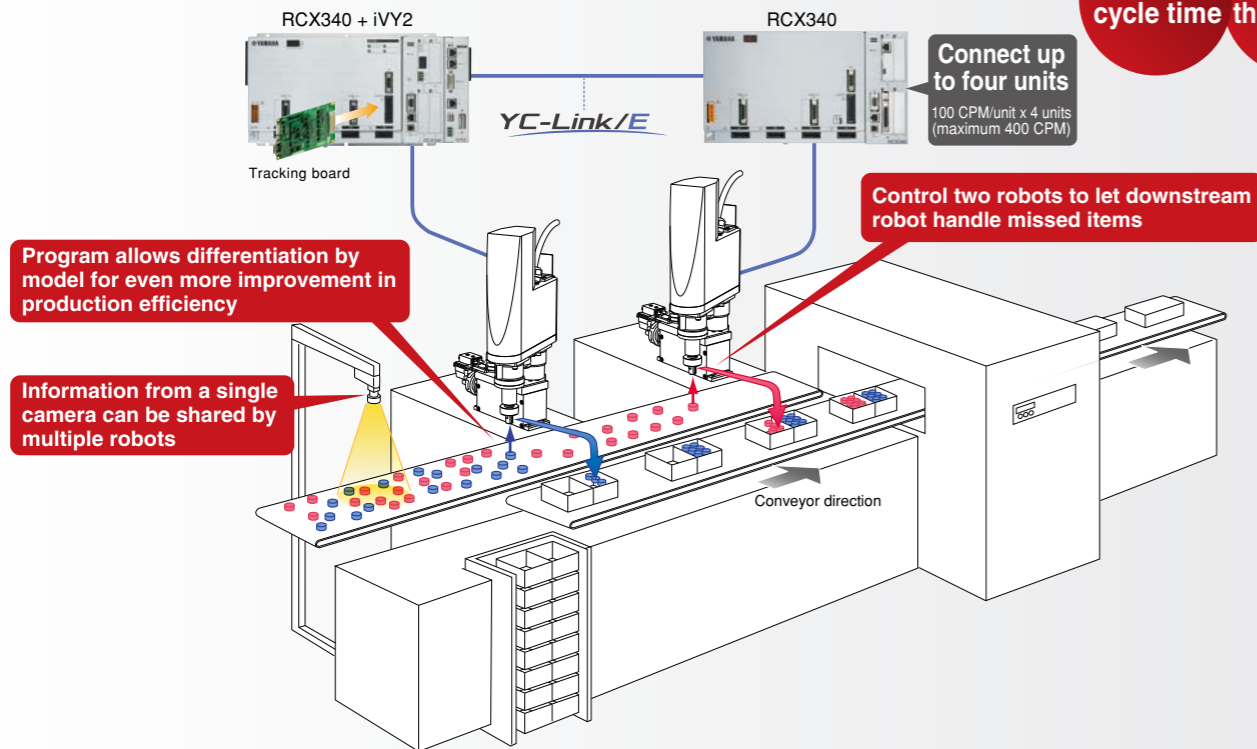
Previous RCX240 controller	New RCX340 controller
Example program (RCX240)	Example program (RCX340)

Previous RCX240 controller:
- ❶ PTP command — MOVE P,P1
- ❷ CTMOVE — CTMOVE (1)
- ❸ CTDRIVE — CTDRIVE(10.0)

Executed using multiple operation commands

Unify movement commands

New RCX340 controller:
- ❶ New CTMOVE — CTMOVE (1),Z=0.0,CTZ=10.0

Can be executed with a single command

Multiple operating takt required

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

❸ Move down while following the workpiece
❷ Move while following the workpiece
Pause
❶ Move up
Tracking start position
Workpiece pickup location
Conveyor direction
Workpiece position when tracking begins

Reduce operating takt

❶ Predict workpiece location and move directly

Seamless movement from move up to move down

Tracking start position
Conveyor direction
Workpiece pickup location
Reduce movement distance
Workpiece position when tracking begins

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

➤ **Control multiple robots for even more improvement in production efficiency.**

RCX340 + iVY2
RCX340
YC-Link/E
Tracking board

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

Shortened cycle time
Improve throughput

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

Information from a single camera can be shared by multiple robots

Control two robots to let downstream robot handle missed items
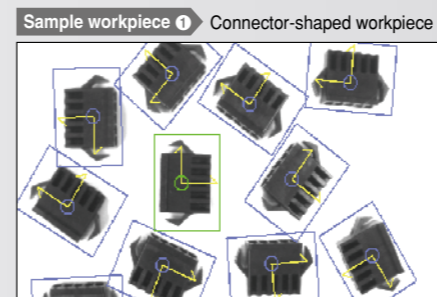
Conveyor direction

SPEED UP

Approximately double the search speed
(compared to previous model)

Approximately 50% reduction in search time

➤ **Even numerous workpieces can be detected at high speed**

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

Sample workpiece ❶ Connector-shaped workpiece

RCX240 + iVY	RCX340 + iVY2
158.7 ms	83.8 ms

Sample workpiece ❷ Washer-shaped workpiece

RCX240 + iVY	RCX340 + iVY2
200.2 ms	91.7 ms

Sample workpiece ❸ Food item workpiece

| RCX240 + iVY	RCX340 + iVY2
149.8 ms	91.1 ms

Support for five-megapixel cameras*
(Choose from 300,000 pixel, 1.3 megapixel, and 2 megapixel, and 5 megapixel)

➤ **Stable workpiece detection**
Detailed edge detection is possible even if workpieces are touching each other or have a complex shape.
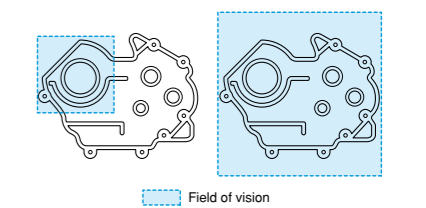- ● Previous: 300,000 pixel camera
- ● New: 1.3 megapixel camera

(partial detail illustration) (partial detail illustration)
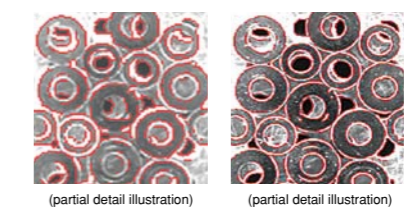
➤ **Decreased number of search detections**
A single search allows detection even for a large workpiece, improving takt.
- ● Previous: 300,000 pixel camera
- ● New: two-megapixel camera

Field of vision

* 5-megapixel camera: Support planned for March 2016

254 types can be registered

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

254 types (0–253) can be registered

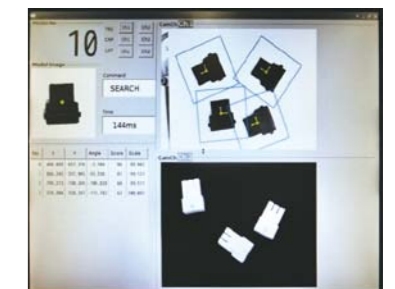## Monitor output is provided

➤ **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)
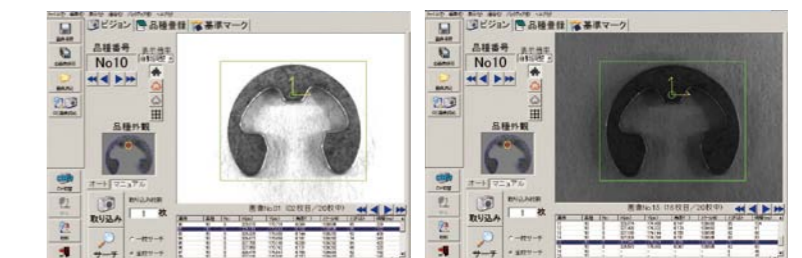- Executed command
- Time required by command

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

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.
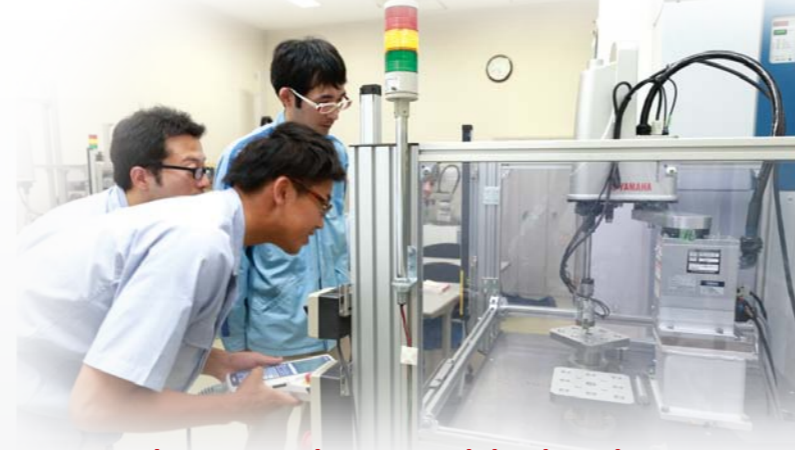
When lighting is sufficient
Accurate search even if lighting is insufficient
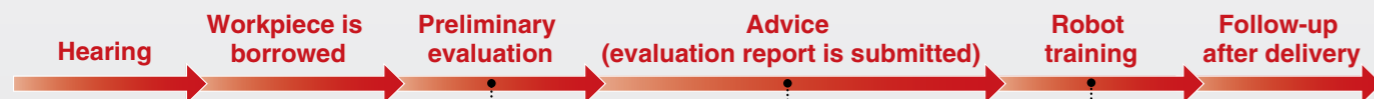
Assurance

iVY2 SYSTEM

You have the assurance of support that can be provided only by Yamaha, the robot manufacturer.
You can rely on us both before installation and after installation.

ADVICE

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	Advice (evaluation report is submitted)	Robot training

■ Evaluation conditions (example)

Lens: 8 mm
Lighting
Lighting height: 375 mm
WD: 400 mm
Workpiece
Background: black

We borrow a workpiece from you and conduct an evaluation.

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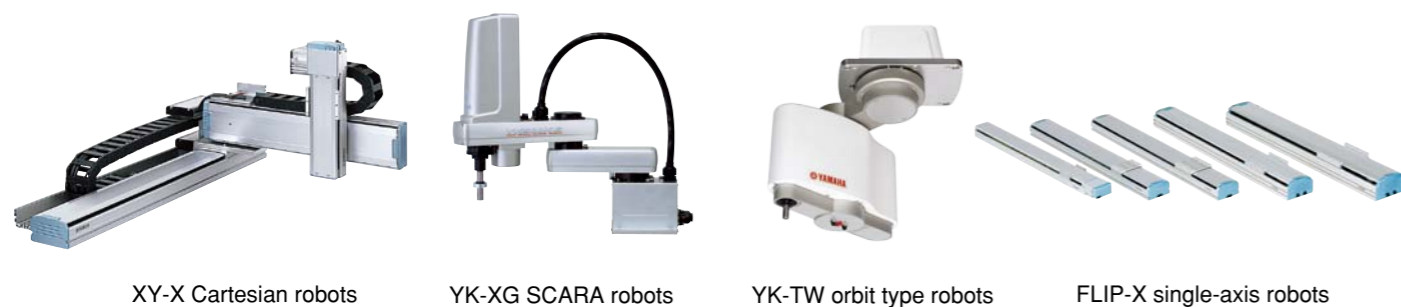
The results of our preliminary evaluation regarding camera, lens, lighting selection, and setup are summarized as a report and submitted.

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

Choose freely from Yamaha's lineup of robots
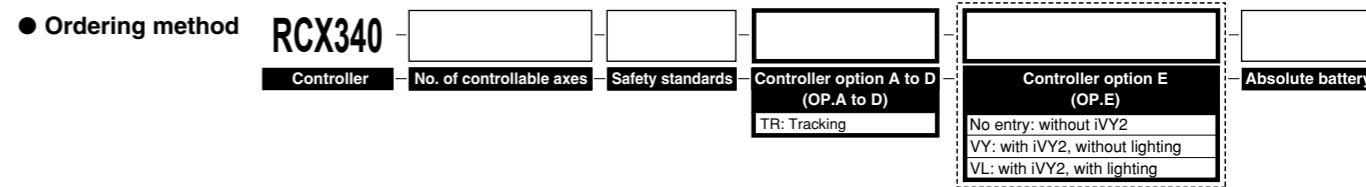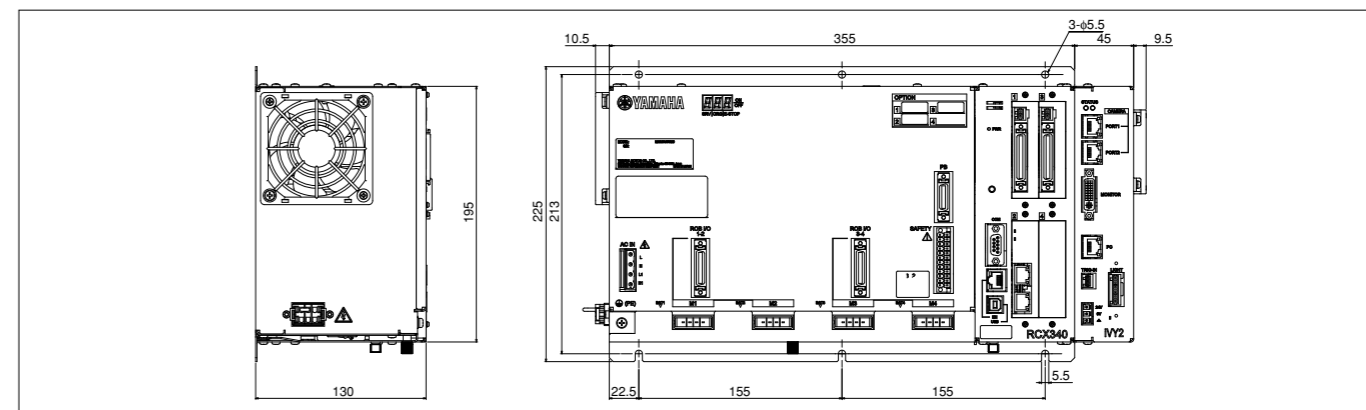
A low-cost and convenient robot vision system can be constructed using the models that are optimal for the customer's application.

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

* The YA series is not supported.

RCX340 + iVY2

10.5   355   3-ø5.5   45   9.5
195   225   213
130   22.5   155   155   5.5

● **Ordering method**

RCX340 — [Controller] — [No. of controllable axes] — [Safety standards] — [Controller option A to D (OP.A to D)] — [Controller option E (OP.E)] — [Absolute battery]

Controller option A to D (OP.A to D)
TR: Tracking

Controller option E (OP.E)
No entry: without iVY2
VY: with iVY2, without lighting
VL: with iVY2, with lighting

* Refer to the comprehensive catalog for details on the order format.

● **Robot vision basic specifications**

Specification item		iVY2 unit
Basic specifications	Supported controllers	RCX340
	Number of screen pixels	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)　* 5-megapixel camera: Support planned for March 2016
	Model setting capacity	254 models
	Number of connectable cameras	Max. 2 cameras
	Connectable camera	GigE camera PoE support
	External interface	Ethernet (1000BASE-T)　* For setting and monitor operations
	External monitor output	DVI-I *　Also usable with an analog monitor by using a conversion adaptor. 　　Monitor resolution: 1024 × 768
	Power supply	DC24V±10% 1.5A Max.
	Dimensions	W 45 × H 195 × D 130 (iVY2 unit only)
	Weight	0.8 kg (iVY2 unit only, when the lighting control board option is selected)
Search method		Edge search (correlated edge filter, Sobel filter)
Image capturing	Trigger mode	S/W trigger, H/W trigger
	External trigger input	2 points
Function		Position detection, automatic point data generation
Camera installation position		Fixed to the fixed camera (up, down) or robot (Y-axis, Z-axis). Perpendicular to the workpiece to be captured.
Setting support function		Calibration, image save function, model registration*, fiducial mark registration*, monitor function* * iVY2 Studio function (requires a Windows PC)
Lighting control options	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.

● **Tracking board basic specifications**

Specification item		Tracking board
Basic specifications	Supported controller	RCX340
	Number of connected encoders	up to two units
	Encoder power supply	DC5V (less than 500 mA total for two counters) (provided by controller)
	Applicable encoders	26LS31 / 26C31 equivalent line driver (RS422 compliant)
	Input phase	A, Ā, B, B̄, Z, Z̄
	Highest response frequency	2 MHz or lower
	Counter	0–65535
	Multiplier	4 times
	Other	disconnection detection function is provided

Accessories and part options

Standard accessories

● iVY2 unit
The iVY2 unit adds robot vision to the RCX340 robot controller.

Model	No lighting	KCX-M4400-V0
	With lighting	KCX-M4400-L0

• iVY2 unit accessories
Camera trigger input cable connector

Model	KX0-M657K-00

24V power supply connector

Model	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.

Model	KCX-M4988-00

■ Environment

OS	Microsoft Windows XP / Vista (32 bit / 64 bit) / 7 (32 bit / 64 bit) / 8, 8.1 (32 bit / 64 bit)
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 capacity	16MB of available space required on installation drive.
Display	800 x 600 dot, or higher, 32768 colors (16bit High Color) or higher (recommended)
Communication Port	Ethernet Port of TCP/IP

* Microsoft, Windows XP, Windows Vista, Windows 7, Windows 8, 8.1 are registered trademarks of the Microsoft Corporation, USA.
* Ethernet is a registered trademark of the XEROX Corporation, USA.

Options

● CCD camera

Model	300,000 pixel	648 × 494 (VGA)	KCX-M6541-00
	1,300,000 pixel	1280 × 966 (SXGA)	KCX-M6541-10
	2,000,000 pixel	1624 × 1236 (UXGA)	KCX-M6541-20

* 5-megapixel camera: Support planned for March 2016

● Lens

Model	8 mm	KCX-M7214-00
	12 mm	KCX-M7214-10
	16 mm	KCX-M7214-20
	25 mm	KCX-M7214-30
	8 mm (megapixel support)	KCX-M7214-40
	12 mm (megapixel support)	KCX-M7214-50
	16 mm (megapixel support)	KCX-M7214-60
	25 mm (megapixel support)	KCX-M7214-70

● Close-up ring

Model	0.5 mm	KX0-M7215-00
	1.0 mm	KX0-M7215-10
	2.0 mm	KX0-M7215-20
	5.0 mm	KX0-M7215-30

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

Model	KCX-M4403-L0

• Lighting control board accessories
Lighting power cable connector

Model	KX0-M657K-10

● Tracking board
This board adds conveyor tracking functionality to the RCX340 controller.

Model	KCX-M4400-T0

• Tracking board accessories
AB phase input cable connector

Model	KX0-M657K-20

• Recommended option cable*
* Not included.
   We can provide an option that is pre-wired to the AB phase input cable connector.
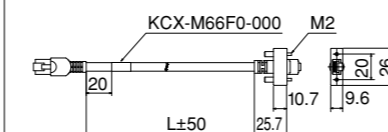AB phase input cable (10 m, only for counter 1)

Model	KX0-M66AF-00

● Camera cable
Cable for connecting the camera to the iVY2 board.

Model	5 m	KCX-M66F0-00
	10 m	KCX-M66F0-10
	15 m	KCX-M66F0-20

External diagram of camera cable

KCX-M66F0-000   M2
20   10.7   9.6   20 26
L±50   25.7

● LAN cable with shield cloth (5 m)

Model	KX0-M55G0-00

CCD camera

Dimensional outlines

15.5±0.05
14.5±0.05   34.7   4-M4 depth 4 (Top and bottom sides)
25±0.05   20±0.05
Tripod depth 5 (Top and bottom sides)
64.5
55.9
4-R3   35   φ36
35
1"-32UNF (C-mount)
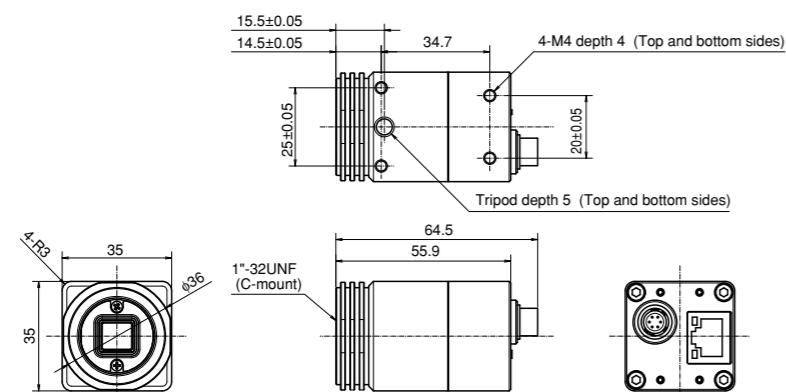
Dimensional outlines

Lenses

8 mm lens
Model: KCX-M7214-00
34   17.526
2-M1.7 Lock screw   4   3.4
φ28   M25.5 P-0.5   φ16.4   φ29.5
C mount
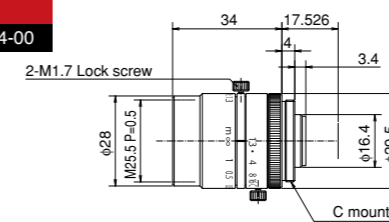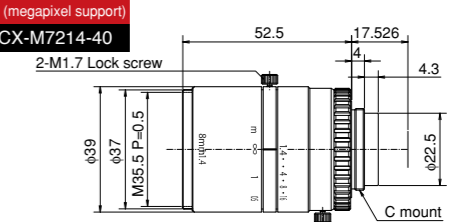
8 mm lens (megapixel support)
Model: KCX-M7214-40
52.5   17.526
2-M1.7 Lock screw   4   4.3
φ39   φ37   M35.5 P-0.5   φ22.5
C mount

12 mm lens
Model: KCX-M7214-10
29.5   17.526
2-M1.7 Lock screw   4   0.3
φ29   M27 P-0.5   φ16   φ29.5
C mount

12 mm lens (megapixel support)
Model: KCX-M7214-50
51   17.526
2-M1.7 Lock screw   4   3.6
φ30   φ28.5   M27 P-0.5   φ22.5
C mount

16 mm lens
Model: KCX-M7214-20
24   17.526
2-M1.7 Lock screw   4   1.5
φ29   M27 P-0.5   φ16   φ29.5
C mount

16 mm lens (megapixel support)
Model: KCX-M7214-60
47.5   17.526
2-M1.7 Lock screw   4   2.5
φ30   φ28.5   M27 P-0.5   φ23
C mount
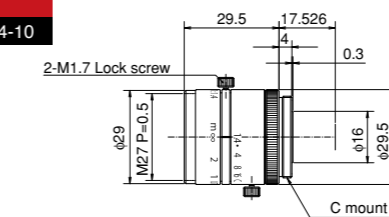
25 mm lens
Model: KCX-M7214-30
24.5   17.526
2-M1.7 Lock screw   4   1.7
φ29   M27 P-0.5   φ16   φ29.5
C mount
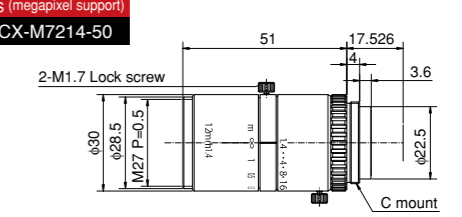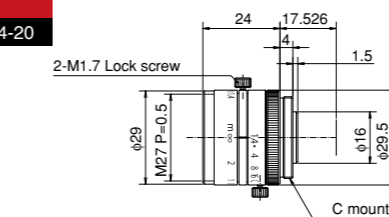
25 mm lens (megapixel support)
Model: KCX-M7214-70
36   17.526
2-M1.7 Lock screw   4   3.5
φ30   φ28.5   M27 P-0.5   φ22.5
C mount
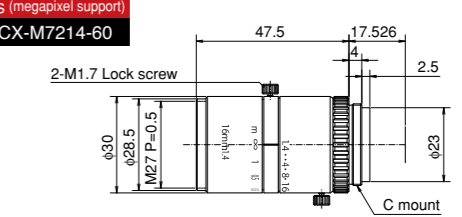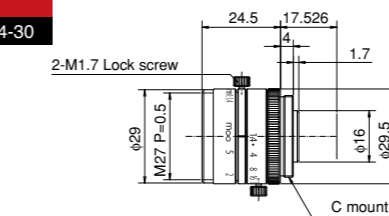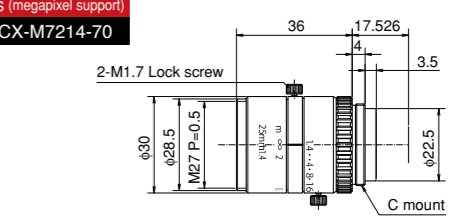
System configuration illustration

Programming box PBX
Monitor
iVY2 unit
Software iVY2 Studio
24VDC power supply
Camera
Photoelectric or proximity sensor, etc.
Lighting
Robot
Tracking board (when installed in option slot 4)
Encoder

* 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.