YAMAHA Robot vision

iVY SYSTEM

YAMAHA robot powered by iVY

A whole new concept in robot vision from YAMAHA!

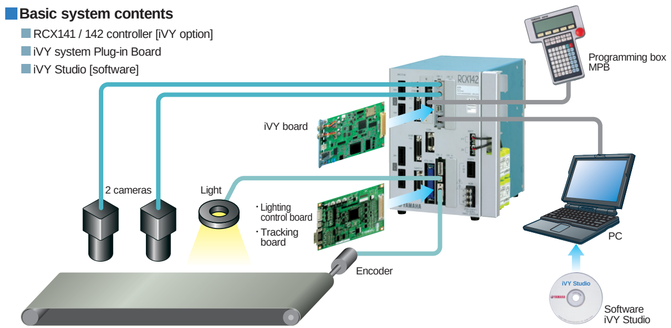
The long awaited robot vision **“iVY system”** for YAMAHA robots is now on the scene!
The “Eyes” with robots drastically reduces the number of steps in the so-called “Setup” needed for handling tasks such as positioning, sorting parts, and teaching.
“SEARCH and TAKE” “CHECK POSITION and ASSEMBLE”
YAMAHA offers a whole new production line concept that eliminates time-consuming teaching and positioning tasks with **“iVY-system”**!

- **Plug-in board specifications for YAMAHA robot controller RCX141 / RCX142.**
- **Integrates all functions including robot control, vision processing, lighting control.**
- **“New generation edge (contour) search function” for pattern matching in a wide range of systems and work environments.**
- **Powerful PC support software for full support of calibration, data entry, and memory storage tasks.**

iVY system layout

Basic system contents

- RCX141 / 142 controller [iVY option]
- iVY system Plug-in Board
- iVY Studio [software]



Support software iVY Studio

- **Makes searches, registers part types, registers reference marks (for calibration)**
- **Data backup**
- **Functions as a monitor during program operation**

Options

- **Lighting control board**
- **Tracking board**
- **Camera cable**
- **CCD camera**
- **Lens**
- **LAN cable (Shield crossing)**

Robot vision language

By using programming box, it is possible to enter robot vision language directly.

Typical robot vision language terms

Command names	Functions	Command names	Functions
VCAPTURE	Loads camera images	VGETCNT	Acquires count of components found
VSEARCH	Searches for desired component type	VGETPOS	Acquires position data
VSEARCHM	Searches for selected component type from memory images	VGETTIME	Acquires time expended by search command
VMONITOR	Switches the monitor mode on and off	VGETSCR	Acquires pass / fail values for inspected work
VSELCAM	Switches cameras	VSAVEIMG	Saves image in BMP format

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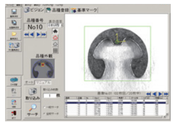
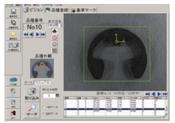
iVY system features

1 NEW GENERATION EDGE (CONTOUR) SEARCH ENGINE

Machine vision on most current equipment uses gray search (normalized correlative search) which is tough to work with because it is easily affected by dirt, notches or breaks on the work and lighting conditions which limit its usable applications, work environment and installation location. The iVY system however contains a new generation search engine that makes searches using the contour shape of the part. This contour search is strongly resistant to outside effects and so opens up a whole range of machine vision job applications.



Search made with good lighting



Search is accurate even with poor lighting

2 SUPER SIMPLE CALIBRATION (Coordinate matching alignment tasks)

Calibration is the task of making the camera coordinates match the robot coordinates. Commercial products that combine “machine vision + robots” contain a huge number of job steps that make just setting up robot vision system a tremendous task. The iVY system on the other hand is operated with conversation type commands from a programming box that let you finish jobs in a short time. Select any desired camera position from fixed upper-section downward facing, fixed lower section upward facing, fixed robot Z axis, to SCARA robot Y arm fixed methods, etc.

Step 1 Register 2 reference marks in iVY Studio

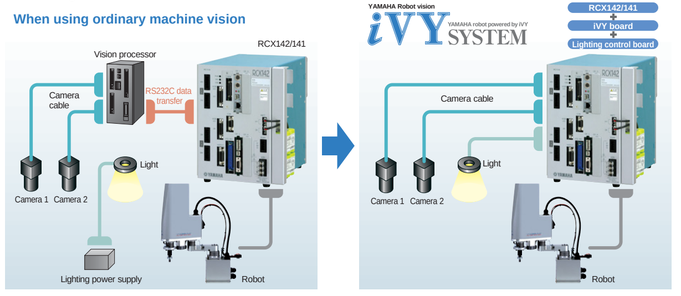
Step 2 Load the 2 marks into the camera

Step 3 Teach the 2 marks to the robot hand

3 UNIFIED ROBOT PROGRAM OPERATION

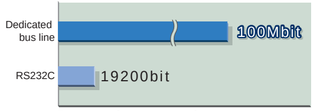
Other machine vision products on the market use different robot coordinate data and formats so a separate coordinate conversion program has to be written and loaded into the controller. In the iVY system however, robot point data is stored in one extremely easy step. Camera control and lighting control are simple to operate on the robot controller via unified operation that eliminates I/O device and data switching tasks.

When using ordinary machine vision



4 HIGH-SPEED CONNECTIONS ON DEDICATED BUS LINE

Connecting a bus line directly to the CPU in the robot controller yields data transfer speeds some 50,000 times higher than serial transfer on ordinary machine vision equipment! Also easily handles conveyor tracking tasks that require high-speed processing.



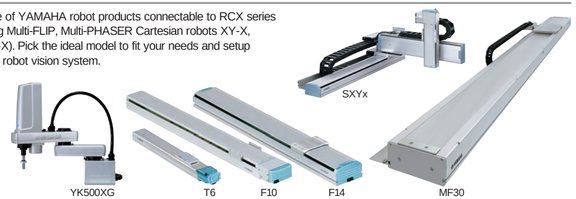
Data transfer per second

5 HANDLES CONVEYOR TRACKING!

To handle conveyor tracking tasks just add the tracking board! Pulse (AB phase) signals from an encoder installed on the conveyor are input to an optional tracking board to continuously recognize work positions in the process flow to allow picking up without stopping the conveyor. Low cost tracking systems can also be setup for some applications not requiring a camera vision board.

6 SELECT FREELY FROM THE YAMAHA ROBOT LINEUP

Select from a range of YAMAHA robot products connectable to RCX series controllers (including Multi-FLIP, Multi-PHASER Cartesian robots XY-X, SCARA robots YK-X). Pick the ideal model to fit your needs and setup a low-cost versatile robot vision system.



iVY system basic specifications

Basic Specifications

ITEM		iVY system
Basic specifications	Pixels	640 (H) x 480 (V) (300,000 pixels, VGA)
	Settable part types	40 part types
	Connectable cameras	Maximum 2 units Note : If connecting 2 units, then must be the same model
	Camera types	Double speed compatible analog camera
	Memory	128MB SDRAM, 256MB miniSD card
	External I/F	Ethernet (100BASE-TX)
Search method		Edge search (Correlative edge filter, Sobel filter)
Image input	Trigger mode	S/W trigger, H/W trigger, Camera internal synch
	External trigger input	2 points
Functions	Search function	Position offset, Auto registry of point data
	ID recognition	QR-Code [Model2], DataMatrix (usage planned)
Setup support functions		Calibration, image storage function Note1 (all images / specified image)
Options		Conveyor tracking Note : Requires tracking board

Note1 : Requires Windows PC