

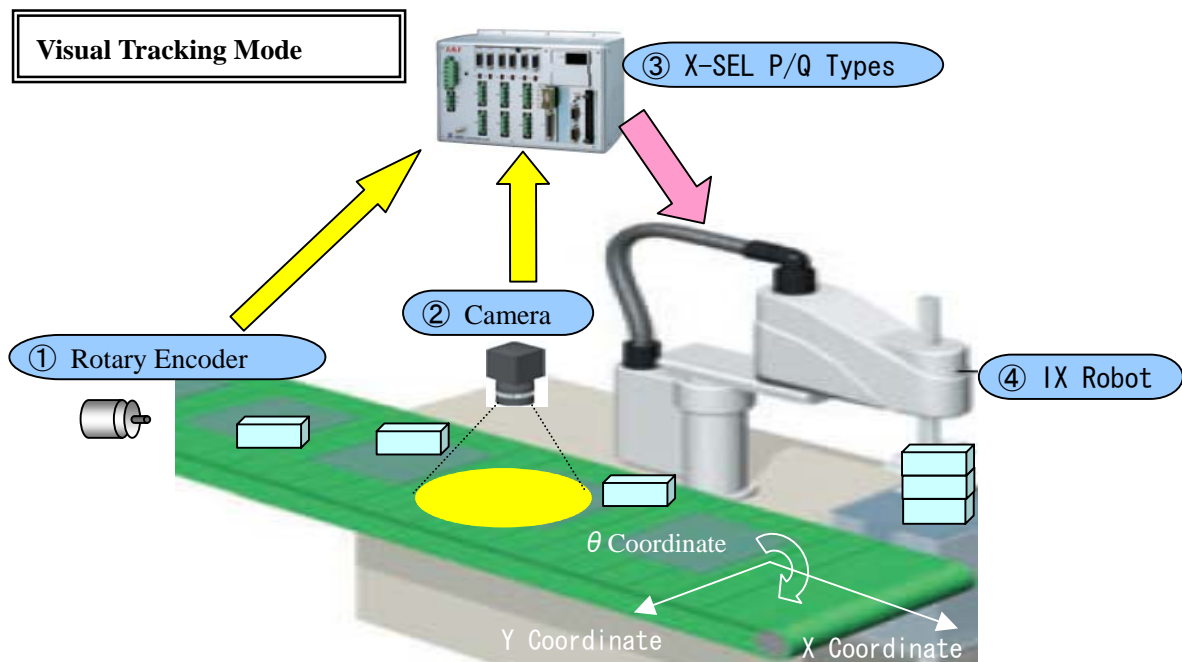
## New Product Information

HORIZONTAL MULTIPUL JOINT ROBOT IX SERIES

Issued on 7/25/2005

### New Conveyor Tracking Feature Option

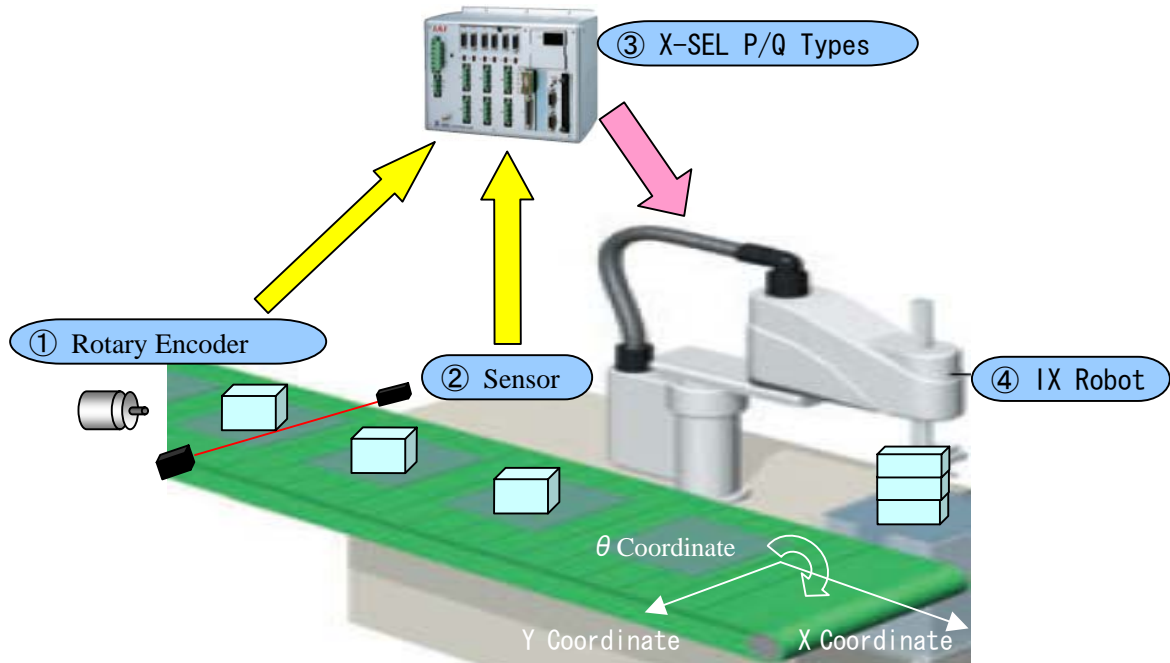
The conveyor-tracking feature was added to the options for the Horizontal Multi Joint Robot IX Series (visual tracking and work sensor tracking modes, X-SEL P/Q types only).



- ① A rotary encoder tracks the travel of a conveyor (X Coordinate)
- ② A camera provides position data of randomly traveling works on the conveyor (XY  $\theta$  Coordinates)
- ③ A X-SEL Controller tracks the works based on the conveyor travel data and the works' position data.
- ④ It enables an IAI Robot to process the works without interfering with the conveyor.

## New Product Information

### Work Sensor Tracking Mode



- ① A rotary encoder tracks the conveyor (X Coordinate).
- ② A sensor detects presence of works with specific Y  $\theta$  coordinate values.
- ③ A X-SEL Controller tracks works based on the conveyor travel information and data from the camera.
- ④ It enables IAI Scara Robot to process works without interfering with the conveyor.

※ Selections between the visual and work sensor tracking modes could be made on the parameter.

**NAME: Horizontal Multi Joint Robot IX Series Conveyor Tracking Option**

## New Product Information

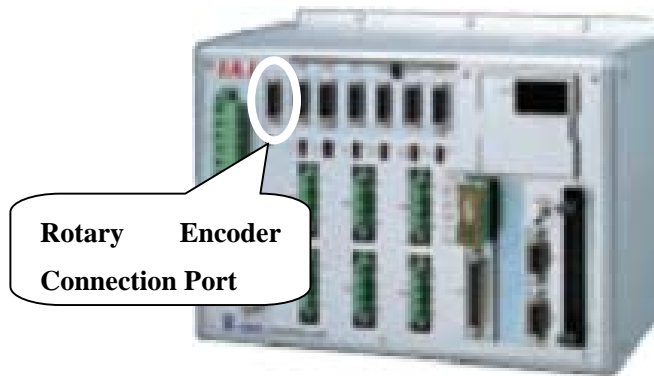
### 1. SPECIFICATIONS

#### CONTROLLER

The conveyer tracking system is compatible with X-SEL P/Q types.

(Main application ROM0.06 or newer)

A rotary encoder connector will be added to the above X-SEL P/Q types.



#### PC SOFTWARE

A separate conveyer tracking software needs to be purchased for the X-SEL controller.

#### OPTION BOARD 【 Visual Tracking Mode 】

An EtherNet board needs to be purchased for the visual tracking mode (For communication between a X-SEL and DVT Camera).

## New Product Information

### **CAMERA** 【 Visual Tracking Mode 】

A camera needs to be prepared by the end user. The compatible cameras are inclusive to DVT 540/544/550/554/542C/544C/552C/554C. (A lighting system is required for the camera)

Maximum 4 work pieces could be recognized simultaneously.  
(X-SEL can calculate positions of total 8 work pieces)

### **IX SCARA**

IX SCARA 250 – 600 are compatible with the option.

### **ROTARY ENCODER**

- A-B Phase differential output type.
- Resolution 2000 – 3600 pulse/rev.
- Encoder speed 5000rpm max.

The above encoder needs to be prepared by the end user. (including the connection between the encoder and a conveyer.)

No specific manufacturer or brand is required.

### **SENSOR** 【 Work Sensor Tracking Mode 】

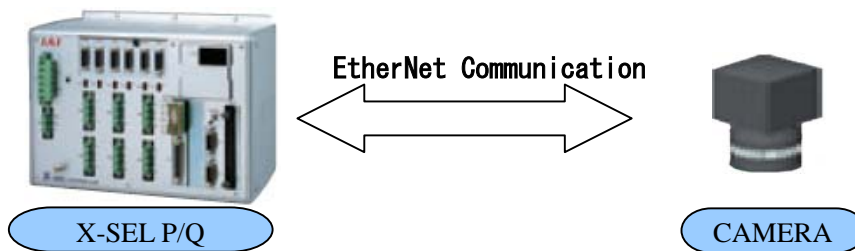
A 3-line 24V sensor (A/B connection capable) needs to be prepared by the end user.

## New Product Information

### 2. FEATURES

#### CAMERA COMMAND, COORDINATE COMMUNICATION PROGRAM UNNECESSARY

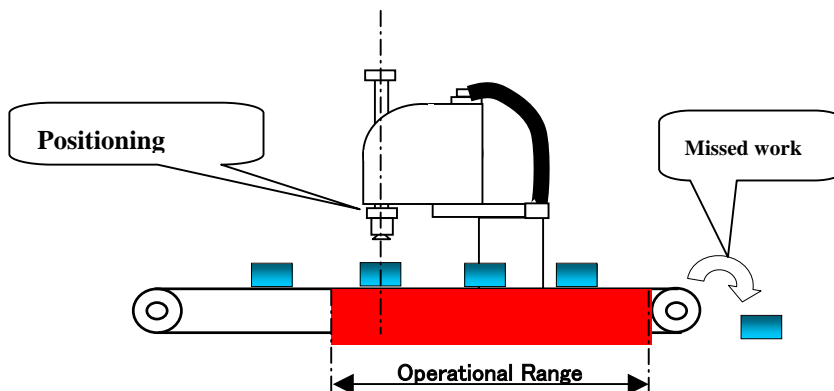
A X-SEL controller automatically performs communications between the controller and the camera for ready mode, vision command, coordinate data transmission, etc., and communication program is not required.



#### CAPABLE OF MONITORING CONVEYER TRACKING PROCESS

A X-SEL controller can monitor the following.

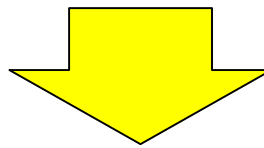
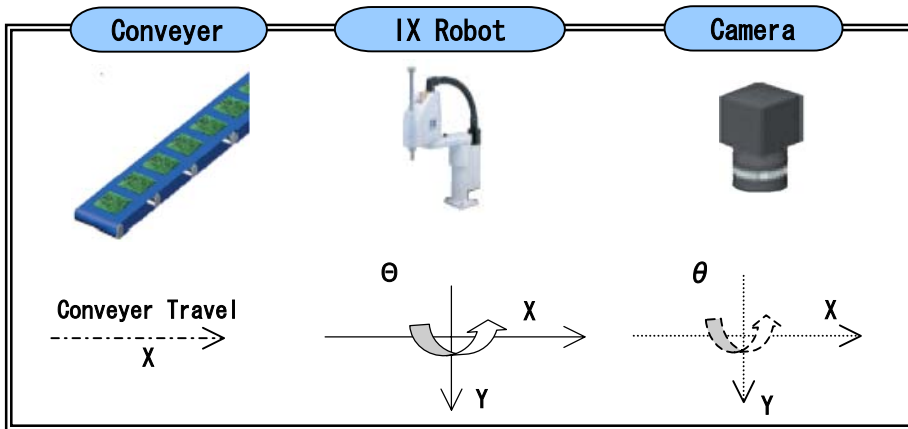
- ① Positioning of IX Robot directly above a work piece.
- ② Work pieces being missed and going over the conveyer.
- ③ Synchronization of an IX Robot and work pieces in the operational range.



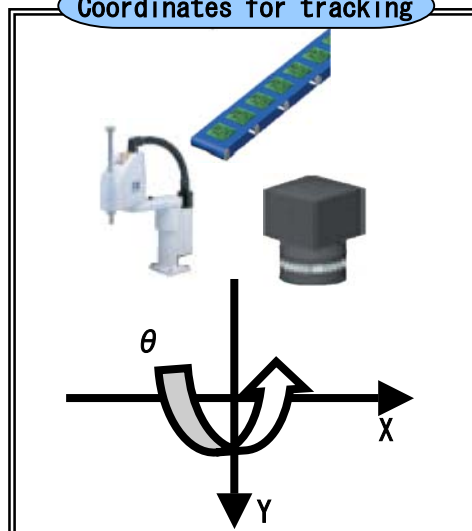
# New Product Information

## CALIBRATION SUPPORT

IAI software assists users' calibration/coordinate change process among the conveyor, IX Robot, and camera.



## Coordinates for tracking



## New Product Information

### Capable of Monitoring Conveyor Speed Variations

A built-in feature communicates any decrease in the conveyor speed to the X-SEL controller via an input port, and it allows the system to monitor conveyor travel speed variations.

### Compatible for Both Continuous & Incremental Conveyor Travel Modes

The IX Robot is synchronized with the conveyor, and the robot automatically responds to changes in the conveyor's motions (reverse, pause, acceleration/deceleration, incremental moves, etc.) in the robot's operational range.

### **CAUTION !**

The performance of the conveyor tracking system is affected by the operation environment, equipment conditions, etc. A careful review of those factors with an IAI representative would be required for installation of the conveyor tracking system.

Example: The factors affecting the accuracy of conveyor tracking

- ① The number, position, and angle of cameras (shades/shadows could affect camera accuracy.)
- ② Deviations of the conveyor's travel with respect to the X-Axis
- ③ Accuracy of the rotary encoder's tracking on conveyor
- ④ Holding power of work-securing devices (work may shift its position)
- ⑤ Accuracy of camera's CG calculation on the work piece.
- ⑥ Trueness of the Z-Axis to the conveyor plain, etc.

The above list is not inclusive; however, the tracking accuracy could be calculated as:

Tracking Accuracy = Sum of the Variations in the above 6 Factors

## New Product Information

### 4. COMPETITOR INFORMATION

Each company below has marketed conveyer-tracking systems. However, no comparative analysis data is available due to the fact that the systems are heavily influenced by end users' equipment, operation conditions and environment, etc.

- Denso Vertical Multiple Joint Robot RC5 Controller  
Conveyer Tracking Board Option
  
- Mitsubishi Electric. Vertical Multiple Joint Robot CR3-535M, CR2B-574  
Controller Conveyer Tracking Interface Card Option
  
- Epson Vertical Multiple Joint Robot, Scara Robot Controller RC520,  
RC-420 Conveyer Tracking Option  
Only RC520 offers multi manipulator, multi conveyer features.
  
- Yamaha Scara Robot Controller (Special Order Item?)

### 5. PROSPECTIVE MARKETS AND INDUSTRIES

Pharmaceutical, Food Processing, Automotive, the Other.