Conveyor Tracking Feature Option

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

Visual Tracking Mode

① Rotary Encoder
② Camera
③ X-SEL P/Q Types
④ IX Robot

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 θ Coordinates]
③ A X-SEL Controller tracks the works based on the conveyer travel data and the works’ position data.
④ It enables an IAI Robot to process the works without interfering with the conveyer.
Selections between the visual and work sensor tracking modes could be made on the parameter.

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

※ Selections between the visual and work sensor tracking modes could be made on the parameter.
Application Example: Conveyor Tracking by X-SEL-P/Q

1. SPECIFICATIONS

CONTROLLER

The conveyor 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 conveyor 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).
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 250 – 600 are compatible with the option. |

<table>
<thead>
<tr>
<th>ROTARY ENCODER</th>
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<tr>
<td>• A-B Phase differential output type.</td>
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<td>• Resolution 2000 – 3600 pulse/rev.</td>
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<td>• Encoder speed 5000rpm max.</td>
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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.

<table>
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<th>SENSOR</th>
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<td>[ Work Sensor Tracking Mode ]</td>
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<td>A 3-line 24V sensor (A/B connection capable) needs to be prepared by the end user.</td>
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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.

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

**Application Example: Conveyer Tracking by X-SEL-P/Q**
Application Example: Conveyer Tracking by X-SEL-P/Q

**Capable of Monitoring Conveyer Speed Variations**

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

**Compatible for Both Continuous & Incremental Conveyer Travel Modes**

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

**CAUTION !**

The performance of the conveyer 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 conveyer tracking system.

Example: The factors affecting the accuracy of conveyer tracking

① The number, position, and angle of cameras (shades/shadows could affect camera accuracy.)

② Deviations of the conveyer’s travel with respect to the X-Axis

③ Accuracy of the rotary encoder’s tracking on conveyer

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 conveyer 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