Robot Substrate Handling System
Corrugated Board (Full Auto) (Dual Robot)

Why choose a Robot Substrate Handling System?

- **Range of Load &Unload Options**
  - **Load** - From a single stack to 1, 2, or 3 up on the vacuum table using the load robot.
  - **Unload** - From the vacuum table to an uncollated stack using the unload robot.

- **Reduced Handling Time & Faster Changeover**
  - Robot Substrate Handling Systems reduce the overall cycle time of Onset X printers, offering users improved productivity.
  - Load and unload pallets can be changed quickly, with printed sheets released to post-print finishing with minimal delay.

- **Supports a Range of Corrugated Board & Grades**
  - Head effectors designed and manufactured by Inca feature a number of suction cups that can be arranged in a variety of configurations, catering to a wide range of corrugated substrate sizes and flute grades.
  - Distorted (bowed) substrate can be handled and comprehensive control of table vacuum level and zoning always ensures a flat surface for maximum print quality.

- **Reliability & Accuracy of Substrate Placement**
  - ABB robots have outstanding position repeatability and excellent path accuracy, permitting accurate and repeatable sheet loading on the vacuum table. This means images can be consistently printed in the same position on the substrate, making post-print finishing easier and more efficient.

- **Multiple Standard Layout Configurations with the Option to Customise**
  - Standard layout configurations offer a reduced footprint over traditional automation systems. If required, robot positioning and safety systems can be customised (subject to extra cost, delivery and installation time) to further maximise space utilisation.

- **Ease of Use**
  - Robot Substrate Handling Systems are fully integrated within the Inca GUI, making operation simple with minimal training requirements.

- **Supported by all Onset X Printers**
  - Robot Substrate Handling Systems are supported from the entry level Onset X1 through to the ultra-high productivity Onset X3.
Technical Specification

While every reasonable effort has been made to ensure the accuracy and appropriateness of the content of this document, Inca Digital Printers Limited cannot be held responsible for any errors, omissions or consequential loss/damage howsoever caused. The information supplied is subject to change without notice due to on-going design improvement and a unit may differ in detail from that described.

Robots\(^1\)

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Load Effector Only</th>
<th>Ultrasonic Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABB Area Brown Boveri Ltd.</td>
<td>Load effector only</td>
<td>1 per effector</td>
</tr>
</tbody>
</table>

Inca Digital Printers Ltd. Head Effectors

Quantity
- 1 x Load; 1 x Unload

Suction Cups
- 36 per effector (12 adjustable)

Vacuum Bars
- 3 per effector (2 adjustable)

Media & Handling - Full Automatic Operation

Supported Media Types\(^2\)
- Corrugated Board
- Micro, E, C, B, EB, BC

Number of Sheets\(^3\)
- Single Pick Configuration: Up to 3 sheets load & unload
- Multi-Pick Configuration: 1,300 mm (51.2 in)

Maximum Sheet Size
- Length (X): 3,220 mm (126.8 in); Width (Y): 1,600 mm (63 in)

Minimum Sheet Size
- Length (X): 805mm (31.7 in); Width (Y): 800mm (31.5 in)

Gauge (Thickness)\(^4\)
- Minimum: 2 mm (0.078 in); Maximum: 50 mm (2 in)

Maximum Weight\(^5\)
- 10 kg (22 lb); Distortion\(^6\): 25 mm (1 in); Distribution: 125-300 gsm

Maximum Stack Capacity (Height)\(^7\)
- Load: 1,300 mm (51.2 in)
- Unload\(^8\): 1,300 mm (51.2 in)

Table Loading Accuracy
- Accurate to ± 1 mm (0.039 in)

1. Refer to manufacturer’s instructions for full specification including but not limited to dimensions, weight, service requirements (electrical, compressed air, etc.), environmental effects and safety systems.

Safety System

Components and specification are installation specific

Load & Unload Area Light Curtains\(^5\)
- Entry into load and unload areas is detected by invisible infra-red light curtains; breaking a curtain stops printer and robot operation

Programmable Laser Scanning System\(^5\)
- Configured with multiple exclusion (or safety) zones and controlled by multiple safety scanners to monitor equipment area for presence of (unprogrammed) obstacles and motion

Protective Hard Guarding
- Protective hard guarding prevents incursion into the load/unload areas

1. Active in Automatic and Semi-Automatic modes only.

2. Incursions will stop printer when operating (robots non-operational in Manual mode).

Vacuum Bars
- Three vacuum bars (two of which are adjustable to provide greater support for multiple substrate sizes) are fitted on the underside of each head effector.

Smart Camera System (Load Effector Only)
- The load head effector features a smart digital camera system to identify and interpret the position of substrate prior to loading/unloading. Two digital cameras are mounted vertically to the underside of the effector. Camera operation is supplemented by floodlamps to ensure reliable image quality.

Suction Cups
- Thirty six suction cups (fitted in pairs) are distributed equally over three vacuum bars on the underside of each head effector and enable substrate to be loaded and unloaded reliably. Suction is created by vacuum generation operating on the Venturi effect. If a loss of vacuum is detected on the load effector, the sheet is dropped instantly. To provide greater support for multiple substrate sizes, the position of twelve cups can be moved along the X axis.

1. Check media specification and test performance before printing; effectors limited to handling corrugated board.

2. Micro and E grades should be tested to ensure repeatability of sheet separation before printing.

3. Maximum number of sheets and collation ability dependent on installation layout, head effectors fitted and range of robotic movement available. Maximum thickness reduced to 48 mm (1.88in) with printed shim & table skin fitted.

4. Maximum total of all sheets distributed evenly over table: 20 kg (44 lb); maximum weight when operating in Manual mode at maximum print speed; 80 kg (176 lb) maximum weight when operating in Manual mode at reduced print speed using maximum table vacuum (speed dependent on substrate). Over maximum sheet size on pallet.

5. From floor; pallet + media; height installation specific and repeatable sheet separation required.

6. The load head effector features a smart digital camera system to identify and interpret the position of substrate prior to loading/unloading. Two digital cameras are mounted vertically to the underside of the effector. Camera operation is supplemented by floodlamps to ensure reliable image quality.

7. Accurate to ± 1 mm (0.039 in)

8. Solid pallet required to ensure accurate ultrasonic sensing.