INTRODUCTION

SATOTO AUTO-ID (THAILAND) CO., LTD.

GENBARYOKU AT THE HEART OF OUR AUTO-ID SOLUTIONS
## CORPORATE PROFILE

### SATO HOLDINGS CORPORATION

<table>
<thead>
<tr>
<th>Location</th>
<th>Tamachi Station Tower N, 3-1-1 Shibaura, Minato-ku, Tokyo 108-0023, Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established</td>
<td>May 16, 1951</td>
</tr>
<tr>
<td>Representative</td>
<td>Ryutaro Kotaki, President and CEO</td>
</tr>
<tr>
<td>Paid-in capital</td>
<td>JPY 8.4 billion (March 31, 2022)</td>
</tr>
<tr>
<td>Employees</td>
<td>Consolidated 5,451 (March 31, 2022)</td>
</tr>
<tr>
<td>Sales</td>
<td>Consolidated JPY 124,783 Million (Fiscal year ended March 31, 2022)</td>
</tr>
<tr>
<td>Business</td>
<td>(SHC) Development of group management strategy; business administration (Pure holding company)</td>
</tr>
</tbody>
</table>

### SATO AUTO-ID THAILAND

<table>
<thead>
<tr>
<th>Location</th>
<th>292/1 Moo 1 Theparak Road, Theparak, Amphur Muang, Samutprakarn 10270,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established</td>
<td>2001</td>
</tr>
<tr>
<td>Representative</td>
<td>Yusuke Konishii, Managing Director</td>
</tr>
<tr>
<td>Paid-in capital</td>
<td>58,000,000 THB (March 31, 2022)</td>
</tr>
<tr>
<td>Employees</td>
<td>Consolidated 189 (March 31, 2022)</td>
</tr>
<tr>
<td>Sales</td>
<td>Consolidated 567,441,752 THB (Fiscal year ended March 31, 2022)</td>
</tr>
<tr>
<td>Business</td>
<td>Data collection system and labelling.</td>
</tr>
</tbody>
</table>

### SATO AUTO-ID THAILAND EASTERN BRANCH

<table>
<thead>
<tr>
<th>Location</th>
<th>483/250, Room 103-104, Moo 3, Nhonkham, Sriracha, Chonburi 20110</th>
</tr>
</thead>
<tbody>
<tr>
<td>Representative</td>
<td>Yusuke Konishii, Managing Director</td>
</tr>
<tr>
<td>Business</td>
<td>Data collection system and labelling.</td>
</tr>
</tbody>
</table>
GLOBAL NETWORK

Offices in 26 countries/regions

Presence in over 90 countries/regions

SATO Group Presence

as of Apr. 2019
SATOH VALUES

Mission
Our mission is to create new value for our customers through products and services of superior quality, and to contribute towards a better and more sustainable world.

Vision
We aim to be the leader and most trusted company in the auto-ID solutions industry worldwide, exceeding customer expectations in an ever-changing world.

Credo
- We inspire changes, new ideas, and the courage of promoting customer-centric innovation in the spirit of Ceaseless Creativity.
- We seek to be true professionals by constantly striving to exceed the expectations of our customers.
- We see things as they are, and do the right thing right away.
- We show respect for all individuals, extend trust to each other, and work together as one cohesive team.
- We enable a vibrant and open-minded workplace, eliminating the formalities that cause “Big Company Disease.”
- We share the returns from our business with our four stakeholders: shareholders, employees, society and the company.
SOLVING ON-SITE CHALLENGES WITH AUTO-ID SOLUTIONS

Challenges on site

SATO’s genbaryoku

A wide range of products and services

DCS & Labeling

Auto-ID technology

Speech recognition
Image recognition
Barcodes
Two-dimensional barcodes
RFID
Location tracking

Solutions

Ensure accuracy
Save labor
Save resources
Offer reassurance
Achieve sustainability
Build emotional connections

Hardware
Consumables
Maintenance
Software
Peripherals
Designs
INDUSTRY FOCUS

**Food & Retail**
Improve customer satisfaction by ensuring product availability & increasing staff efficiency.

**Price Tags & Mark Down**
Improve markdown process and operational efficiency, use eye-catching labels to ease clearance of perishables.

**Food Safety & Traceability**
Convenient and accurate food freshness indication through expiry date labelling. Quality labels with range of adhesive types (including removable & freezer-grade) to meet your needs.

**Manufacturing**
Ensure accuracy using End-to-End identification.

- Scan & match data on items that need to move through the manufacturing line.
- Nameplate labels printed to use on electrical appliances and industrial products.
- Small pitch labels (3mmx7mm) precisely printed for Printed Circuit Board (PCB) or other small electronic components.

**Chemical**
Improve safety in chemical industries with better material tracking using chemical/ temperature-resistant RFID tag. RFID technology gives you great visibility of your chemical stock level and enables you to achieve lab regulatory compliance and proper waste disposal.

**Dangerous/ Hazardous Product Handling**
FID Handheld Reader with variable read distance
Scan RFID when smaller bottles disposed into bin.
INDUSTRY FOCUS

**Transportation & Logistics**
Increase efficiency, accuracy and reduce wastage by identifying and tracking assets, people and transactions.

**Receiving**
Generate receiving goods info in the system and print barcode labels.

**Stock Picking**
Indicate fastest route to pick the correct goods according to picking list.

**Stock Picking**
Scan items before shipping to ensure accuracy. This enables tracking and tracing of items during shipping.

**Healthcare**
Enhance patient safety by dispensing the right medication to the right patient at the right time.

**Wristband**
Print wristband for patient identification.

**Specimen/Prescription Labels**
Print specimen labels on-the-spot at patient Bedside with portable scanner and SATO mobile printer.

**One-Check**
Ensure the right medicine is dispensed to the right patient at the right time.

**Other Industries**

**Construction**
Digitalise asset/inventory tracking in Built Environment Supply Chain by using RFID solutions. Leverage on RFID to capture relevant, accurate & timely information across various software platforms.

**RFID Handheld Reader**
RFID Handheld Reader with variable read distance

**RFID Gantry**
RFID Gantry with fixed read distance

**Healthcare**

**PJM RFID**

**Inventory RFID**
Provide 100% real-time inventory accuracy. Track and check inventory anywhere and anytime

**Blood Tracking**
Improve efficiency with better loan kit management for reverse logistics between warehouse and hospital.

Ensure safety and quality of blood efficiently from blood donation to transfusion in hospital throughout supply chain with enhanced traceability.
### PRODUCTS & SERVICES

**One-stop solution for products and services that answer to customers’ on-site challenges**

#### Hardware
- Printers
- Auto-labelers
- Hand labelers

#### Software
- General-purpose software
- Custom software

#### Consumables
- Labels
- Tags, tickets
- RFID
- Carbon ribbons

#### SATO Printer

#### Maintenance support
- Hardware maintenance
- Regular servicing

#### System peripherals
- Scanners
- Handy terminals
- Connection tools
# LABEL FACTORY

## FACTORY 1

<table>
<thead>
<tr>
<th>Certificate</th>
<th>ISO9001, UL certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site area</td>
<td>1150 m² (Production floor 430 m², Warehouse 220 m², Office 100 m²)</td>
</tr>
<tr>
<td>Employees</td>
<td>65 (Label Production)</td>
</tr>
</tbody>
</table>

## FACTORY 2

<table>
<thead>
<tr>
<th>Certificate</th>
<th>ISO9001, UL certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site area</td>
<td>1188 m² (Production floor 828 m², Warehouse 144 m², Office 216 m²)</td>
</tr>
<tr>
<td>Employees</td>
<td>30 (Label Production)</td>
</tr>
</tbody>
</table>
MAINTENANCE SERVICES

Our printer maintenance service offers preventative maintenance support as well as speedy repair so as to ensure smooth operations for your business with minimum downtime.

Depending on your needs such as printer usage level, you can choose from various types of maintenance programmes:

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>Manufacturer Warranty Coverage</th>
<th>Extended Warranty / Maintenance Agreement Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total years of coverage</td>
<td>1 Year</td>
<td>3 to 5 Years</td>
</tr>
<tr>
<td>On-site support</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Preventative maintenance</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Service cost waiver</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Priority support</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Expendable parts replacement</td>
<td>✓*</td>
<td>✓</td>
</tr>
<tr>
<td>Remote issue diagnosis &amp; support</td>
<td>x</td>
<td>✓</td>
</tr>
</tbody>
</table>

* Level of coverage is subject to warranty terms & conditions of country of purchase. Please contact your local SATO representative for details.

SAVE MORE with multi-year agreements right from the start!
Subscribe to our maintenance services at the point of purchasing our printer(s) for the best price and worry-free user experience right from the start. In addition, enjoy greater value when you sign up for multi-year agreement!

Repair process for user with M.A.

CALL TO SATO
Please feel free to contact us if you need any further information.

Head Office (Samutprakarn)
Tel. 02 736 4460
Fax. 02 736 4461

Eastern Branch (Chonburi)
Tel. 038 338 202 - 3
Fax. 038 338 204

Website : satoasiapacific.com/thailand
Facebook : www.facebook.com/satoautoidthailand
SATO

RFID Technology
Contents

1. Basics of RFID technology
2. RFID products
   Label / Tag
   Printer Reader/writer
RFID = Radio Frequency Identification

A technology that uses radio waves to access (read/write) data of tags for identification without making physical contact (contactless communication)

RFID is used for operational improvement, security protection, and many other purposes in various industries.
Basics of RFID technology

**RFID system** consists of

1) **RFID tag**
   - Contains ID information of objects/persons
   - Powered up by radio waves from the RFID reader/writer to transmit data.

2) **RFID Reader/writer** and **Antenna**
   - Enable the detection of RFID tags and the reading/writing data

3) **RFID Printer**
   - Print and encode RFID tags

4) Host system (including PC)

![Diagram showing the components of an RFID system: Computer, RFID Reader/writer, Antenna, RFID tag, and RFID Printer.](www.satoasiapacific.com/thailand)
Basics of RFID technology

What is the difference between Barcode and RFID?

Advantages of using RFID
• Multiple RFID tags can be scanned at once
• Long read range (several meters)
  • Good for reading from high locations, etc.
• Can uniquely identify each item/asset tagged
• Re-writable and re-usable
• RFID tags can be read even when dirty, smudged or obstructed

Disadvantages of using RFID
• Expensive
• RFID readers may capture stray (i.e. unintended) reads from other tags in the vicinity
• Reading distance varies in the presence of metals or liquids

Disadvantages of using barcode
• Barcodes need to be scanned one by one
• Short read range
• Not re-usable
• Barcodes cannot be read when dirty, smudged or obstructed

Advantages of using Barcode
• Less expensive (incl. cost of barcode labels)
• Stable reading range performance in any environment

It is important to do a cost-benefit analysis before deciding on either technology
### Types of RFID tags and usages

<table>
<thead>
<tr>
<th></th>
<th>Active tag</th>
<th>Passive tag</th>
<th>Semi-passive tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Powered by <em>internal battery</em></td>
<td>Powered using radio waves from RFID reader/writer</td>
<td>Powered using radio waves from RFID reader/writer (Battery-assisted)</td>
</tr>
<tr>
<td>Communication range</td>
<td>From several meters to <em>tens of meters</em></td>
<td>Up to several meters</td>
<td>Up to several meters</td>
</tr>
<tr>
<td>Cost</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Extra functionalities</td>
<td>Can be connected to sensors</td>
<td>-</td>
<td>Can be connected to sensors</td>
</tr>
<tr>
<td>Maintenance</td>
<td><em>Limited battery life</em></td>
<td>Maintenance free</td>
<td><em>Limited battery life</em></td>
</tr>
<tr>
<td>Usage</td>
<td>For tracking objects/persons, etc.</td>
<td>For managing inventory, etc.</td>
<td>For timing marathon races, etc.</td>
</tr>
</tbody>
</table>

### Basics of RFID technology

<table>
<thead>
<tr>
<th>Types of RFID tags and usages</th>
<th>Label</th>
<th>E-money card</th>
<th>Key</th>
<th>Passport</th>
<th>Sushi dish</th>
<th>Ski resort ticket</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Passive</td>
<td>Passive</td>
<td>Active</td>
<td>Passive</td>
<td>Passive</td>
<td>Passive</td>
</tr>
</tbody>
</table>

www.satoasiapacific.com/thailand
## Types of RFID technology

<table>
<thead>
<tr>
<th></th>
<th>UHF</th>
<th>HF</th>
<th>HF (PJM)</th>
<th>HF (NFC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
<td>860-960MHz</td>
<td>13.56MHz</td>
<td>13.56MHz</td>
<td>13.56MHz</td>
</tr>
<tr>
<td><strong>International Standard</strong></td>
<td>ISO/IEC 18000-6</td>
<td>ISO/IEC 15693</td>
<td>ISO/IEC 18000-3 (Mode 1)</td>
<td>ISO/IEC 14443</td>
</tr>
<tr>
<td><strong>Communication Distance</strong></td>
<td>Approx. 3-8m</td>
<td>Less than 1m</td>
<td>Less than 1m</td>
<td>Less than 10 cm</td>
</tr>
<tr>
<td><strong>Typical Form factor</strong></td>
<td>Tag / Label</td>
<td>Tag / Label</td>
<td>Tag / Label</td>
<td>Card</td>
</tr>
<tr>
<td><strong>Data size in IC chip</strong></td>
<td>Very limited</td>
<td>Limited</td>
<td>Limited</td>
<td>Large memory size in IC chip</td>
</tr>
<tr>
<td><strong>Data security</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>Major Use Cases</strong></td>
<td>Inventory mgmt, Asset mgmt, etc.</td>
<td>Inventory mgmt, Asset mgmt, etc.</td>
<td>Asset mgmt, etc</td>
<td>Transportation card, eMoney card, etc</td>
</tr>
<tr>
<td><strong>Remarks</strong></td>
<td>Good performance at Stacked situation</td>
<td></td>
<td></td>
<td>Smartphones support NFC</td>
</tr>
</tbody>
</table>
Factors affecting read performance of RFID tags (especially UHF RFID):

(1) Presence of liquids
- Liquids absorb RF waves and affect the reading of RFID tags nearby.

(2) Presence of metals
- Metals reflect RF waves and affect the reading of RFID tags nearby.
- RFID tags cannot be read if they are attached directly on metal surfaces.

(3) Stacked tags
- When multiple RFID tags are stacked together, they interfere with each other so that the RFID reader/writer can only detect responses from some and not all of the tags.
RFID products (Special UHF Tag)

Special UHF tags:

• Label-type RFID tags CANNOT be used under some conditions (e.g. extreme temperatures, tagged items made of metallic or other offending materials).
• These environments require the use of special purpose tags.

On-metal tag
- Designed for use on metal surfaces

Use cases:
- Logistics containers
- Vehicles (entry/exit control)

Laundry tag
- Resistant to heat, high pressure, etc.

Use cases:
- Uniforms
- Industrial linens

Tag for odd shapes/sizes
✓ Embeddable, Flexible (to adhere to curved surfaces), etc.

Use Cases:
- Folding storage bins
- Concrete objects

Ricoh can propose various types of RFID tags to match diverse customer requirements.
RFID printers can print and encode RFID tag-embedded labels at the same time.

* IC chips are checked before printing

**Defective chips will not be used**

**RFID tag-embedded label**

**CL4NX**

- General purpose printer
- Especially suitable for high-volume printing at manufacturing, logistics sites
- SOS (SATO Online Services)-ready
- Tag Print/Encode speed: approx. 1,800 / hour

**CT4-LX**

- Compact size printer
- Especially suitable for on-demand printing in small volume at retail stores, offices, etc.
- Tag Print/Encode speed: approx. 1,200 / hour
RFID products (Reader/Writer)

Types of UHF RFID reader/writer:

Handheld type
• Mainly used for stocktaking, order picking, etc.
• Good for use cases where it makes more sense to bring read points to tagged items/assets than the other way round

Stationary type
• R/W and antenna are separate
• Up to 4 antennas can be connected to one R/W (Speedway Revolution R/W (Impinj))
• The fixed R/W and antennas can also be installed on a physical doorway to function as an RFID gate
Managing roll cage trolleys with UHF RFID

Current situation

• Only able to track number of roll cage trolleys but not their locations
• Many roll cage trolleys are lost (resulting in additional costs to replace them) or not used efficiently

To solve the problem, it is necessary to identify and manage the roll cage trolleys individually

We control the movement of goods but not the roll cage trolleys used to transport them...
## Case study

### Tag, R/W selection

<table>
<thead>
<tr>
<th>Category</th>
<th>Points to check</th>
<th>Customer's requirements</th>
<th>RFID tags (conditions of use, benefits)</th>
<th>Barcodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items/assets to manage</td>
<td>Roll cage trolleys (metal type)</td>
<td>Can use on-metal tags or special tags that are not attached directly on metal surfaces</td>
<td></td>
<td>OK</td>
</tr>
<tr>
<td>Data to be written</td>
<td>Unique ID information of roll cage trolley</td>
<td>Can store unique ID data inside tag</td>
<td></td>
<td>OK</td>
</tr>
<tr>
<td>Tag size, durability</td>
<td>- To use outdoor for extended periods of time (must be weather-resistant) - Subject to dirt, rust, and wear and tear</td>
<td>Available in various shapes/sizes and specifications</td>
<td></td>
<td>△ (weatherproofing barcodes may affect their print and read performance)</td>
</tr>
<tr>
<td>requirements, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read points</td>
<td>To read data from a distance of several decimeters, or at multiple locations in warehouse without direct line of sight</td>
<td>Data can be read at high speeds without making contact (RFID: less than 1 sec for 100 tags vs. Barcode: approx. 0.5 sec per code =&gt; min. 50 sec for 100 codes)</td>
<td></td>
<td>Not OK</td>
</tr>
<tr>
<td>Single-use tag or reusable tag</td>
<td>To re-use tags until roll cage trolleys are damaged</td>
<td>Can be used for a long time even when dirty or smudged</td>
<td></td>
<td>Not OK</td>
</tr>
<tr>
<td>Operation</td>
<td>Recovery method when tags fail to read</td>
<td>Printed data can still be used if encoded data fails to read</td>
<td></td>
<td>Not OK</td>
</tr>
</tbody>
</table>

- **Special RFID tag for roll cage trolley**
- **Read tag using handheld terminal from a distance**

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*www.satoasiapacific.com/thailand*
Please feel free to contact us if you need any further information.

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