

# Piece Picking Robot



The piece picking robot picks a specified number of SKUs from storage totes and places them into order totes. It often cooperates closely with upstream goods-to-person systems, such as shuttles, miniload, AutoStore, AGVs, etc.

XYZ Robotics' piece picking robot features **comprehensive SKUs coverage, great efficiency, and high reliability**.



## Adaptable

- Model-free recognition of **10,000+** SKUs
- Fast tool change for SKUs of different properties

## Efficient

- The throughput is up to **1,800 pieces/hour** with fast recognition and teachless robot motion

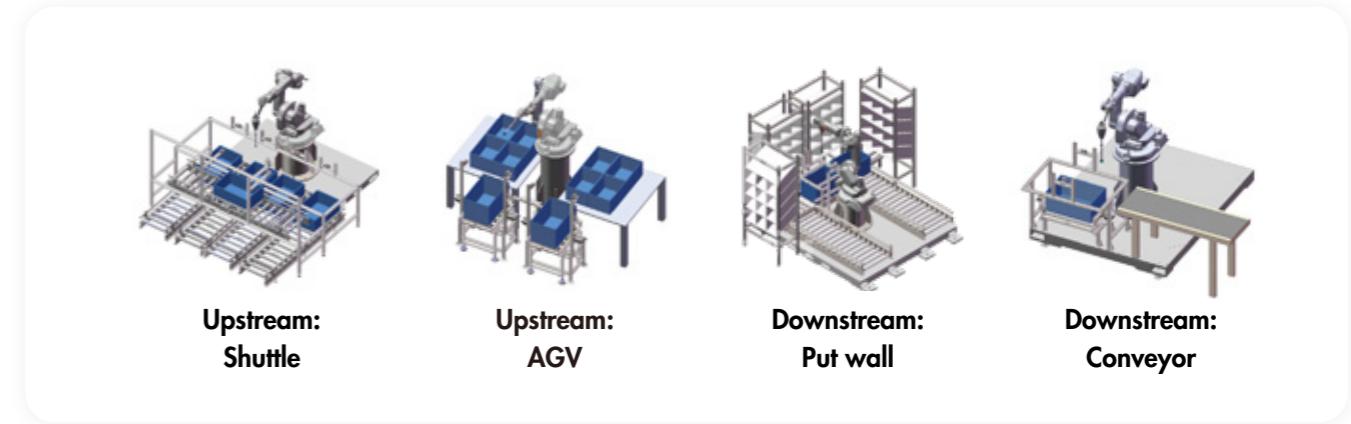
## Reliable

- Achieve **99.9% accuracy** and handle errors like missing, dropping, double-pick, etc.
- Release SKUs from **2 cm above gently** to avoid damage
- Place SKUs orderly and tightly in the tote with a **high loading rate of 90%**

## Specification

## Layout

| Layout            | 1 to 4 order totes   | 1 to 1 order tote  |
|-------------------|--|--|
| Throughput        | 900 pcs/h (< 350 g)<br>700 pcs/h (350 g - 1500 g)<br>400 pcs/h (1500 g - 3000 g) | 1800 pcs/h (< 350 g)<br>1000 pcs/h (350 g - 1500 g)<br>600 pcs/h (1500 g - 3000 g) |
| Working Hours     |  | 24 h/d   |
| Order Accuracy    |  | 99.9%  |
| Tote Loading Rate |  | 60-90%   |



## Upstream System

## HMI

### • Real-time Monitoring

Display the SKUs information, order progress and onsite monitoring



### • Tool Selection

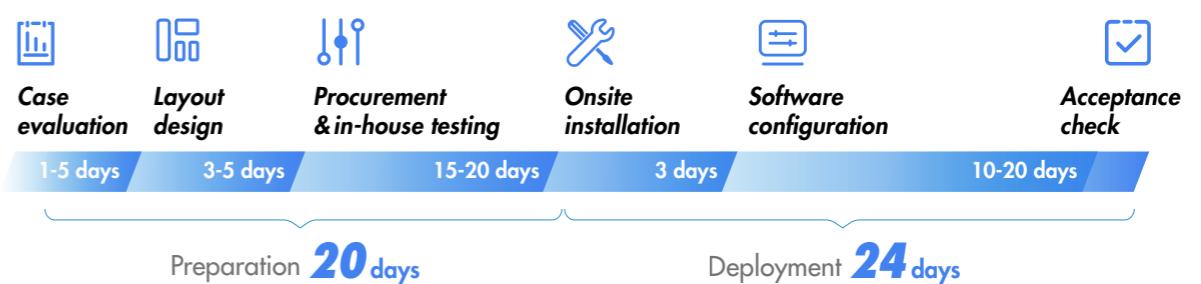
Select the best-fit tool

### • Fast Troubleshooting

Check saved error logs for troubleshooting

## Lead Time

Business days



## Handling Range

## Handling Range

### Acceptable SKUs



Boxes



Cans



Tubes



Bags



Bottles



Irregular SKUs



Medicines



Apparels



Cosmetics



3C



Snacks



Tobacco



Personal care



Groceries

### Unacceptable SKUs

#### Glass or fragile SKUs



#### Loose packaging



#### Slim SKUs

\* width < 0.5 inches/1.5 cm



#### SKUs without flat and sealed surfaces

\* bath sponge



#### Loose packaging



#### Irregular shapes

\* hair clip



#### Lid box without seal

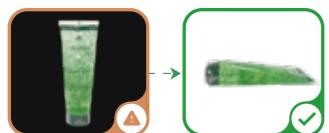


#### Unpackaged book

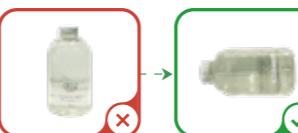


### SKUs Requiring Special Placement

**Tubes** \* need to lie down to increase picking efficiency



**Bottles** \* need to lie down



**Flat SKUs** \* large side up



**Labeled SKUs** \* non-labelled side up



## Core Technology **Vision System**



Camera



Vision Algorithm

- **Model-free**

Recognize massive SKUs with advanced deep learning algorithm



Mixed SKUs

- **High-speed**

Scan the first SKU in only 1 s with no extra waiting time for the rest



Black SKUs with reflective packaging

- **Adaptable**

Capable of handling SKUs with dark, patterned, reflective, and semi-transparent surfaces



Densely packed SKUs

- **Reliable**

3D camera can recognize SKU pose for better placement and detect errors like double-pick



- **Weight Sensor**

- **Accurate Picking**

Detect possible errors like double-pick and dropping (detecting range: 30–3000 g)

- **< 0.1% Dropping Rate**

Dynamic robot speed adjustment according to the SKU weight



- **Tool**

- **Comprehensive SKUs Coverage**

Multiple tools designed for SKUs of various sizes, materials, and hardness

- **High-speed Tool Change**

Switch into the best-fit tool automatically in only 0.5 s



## SHOE BOX AND APPAREL BAG PICKING

E-commerce Industry

### Overview

Guided by the vision, the robot picks shoe boxes or apparel bags and places them on a conveyor for downstream delivery.



### Highlights

- Use custom grippers and a switching device to handle SKUs with diverse packagings
- A custom turnover device paired with vision ensures that the barcode sides of SKUs are upward for downstream scanning

### Overview

The vision-guided robot picks and places a specified number of medicines in one of the six outbound totes. The medicine packages include different sizes of bottles, bags, and boxes in the form of individuals or sets. These different packages are visually confusing.



### Highlights

- The vision distinguishes a set of densely-packed medicine boxes from single ones accurately
- Verified with the vision and the weight sensor, the robot handles with a high picking accuracy of > 99.9%
- 5 suction cups for numerous SKUs

## PHONE BOX PICKING

E-commerce Industry

### Overview

The vision-guided robot picks mixed phone boxes and places them on the conveyor in a designated pose for downstream barcode scanning and automated packing.



### Highlights

- The robot recognizes and picks disordered and mixed boxes accurately
- Guided by vision, the robot places large sides upwards for barcode scanning
- Handle massive orders 24/7 without errors during Chinese Black Friday

## CONSUMER GOODS PICKING

E-commerce Industry

### Overview

The vision-guided robot picks a specified number of SKUs from totes and places them on the conveyor. SKUs are confirmed by barcode scanning.



### Highlights

- The robot picks a specified number of SKUs from different totes and they are confirmed by barcode scanning
- Model-free recognition of massive fast-changing SKUs

**GROCERY PICKING**

Retail Industry

**Overview**

After a specified number of groceries are collected in a tote, the robot picks and places them one by one onto the conveyor for downstream sorting.

**Highlights:**

- Model-free recognition of 2,000+ SKUs
- Use multiple grippers with fast tool change to fit diverse SKUs from mini chocolate bars to bread bags
- Enable manual adjustment of task priorities on HMI

**Overview**

After the tote with SKUs is transported to the robot by AGV, the vision-guided robot picks items according to the WCS order and places them in the grid container or on the conveyor leading to a downstream delivery robot.

**Highlights:**

- Cover a wide range of SKUs, including glues, markers, folders, notebooks, power strips, etc.
- The vision detects errors, such as double-pick and missing pick, to ensure the picking accuracy
- Fully automated management and outbound paired with AGVs, a grid container, and a delivery robot

## Case Study

# CARRIER REEL PICKING

Electronics Industry

## More Customer Cases

### Overview

The delta robot picks certain SKUs one by one from different totes containing various SKUs, puts them on a barcode scanning platform for confirmation, and then places them into the order tote.



Manufacturing



Machinery



Auto Supplier



Personal Care



E-commerce



Scientific Research