shelfbot

Shelfbot User Manual v2

February 2nd, 2026

1 Introduction

1.1 About Shelfbot

Shelfbot is committed to making warehouse automation straightforward, reliable, and cost-effective. Our core values are simplicity (intuitive operation and hassle-free integration), reliability (thoroughly tested, locally supported and running 24/7), and a subscription model (a low-risk, OPEX-friendly approach with no large initial investment).

1.2 What is Shelfbot G2P?

The Shelfbot system is a Goods-to-Person (G2P) Automated Storage & Retrieval Solution (ASRS) designed and manufactured in Australia. Our scalable, subscription-based robotic solution optimises productivity, safety, and space utilisation. With no large upfront capital expenditure and rapid implementation, Shelfbot enables you to streamline operations, increase throughput, and rapidly adapt to changing demands without the complexity or long lead times of conventional automation systems.

Shelfbot stores SKUs in bins and automatically brings them to an operator for picking or replenishment. Once items are picked, the bin is returned to its high-density storage location. This approach dramatically reduces operator travel time, cuts labour costs, and boosts order accuracy.

1.3 Key Benefits

- Enhanced Productivity: With Shelfbot delivering bins directly to operators, travel time is virtually eliminated. Typically, a manual picker can walk 10–15 km per day. By minimising this non-value-added movement, Shelfbot reduces cost per pick and significantly increases throughput.
- Improved Safety: Operators work at ergonomic picking stations while Shelfbot retrieves bins from a protected storage system, reducing strain, fatigue, and the risk of workplace injuries.
- Optimised Space Utilisation: Shelfbot's high-density storage configuration can store large volumes on a smaller footprint, freeing up valuable warehouse floor area.
- Superior Accuracy: Automated retrieval and barcode-guided picking reduce human error. Most G2P systems achieve over 99% order accuracy, improving customer satisfaction and minimising returns.

1.4 Document Conventions

The following notation is used throughout this manual to communicate important safety and operational information:

DANGER: Indicates a situation presenting imminent danger, which will lead to death or serious injuries if not prevented. Additionally, there may be severe property damage.

WARNING: Indicates a situation presenting possible danger, which may lead to death or serious injuries if not prevented. There may be severe property damage.

CAUTION: Indicates a situation that may cause minor injury or property damage if not prevented.

TIP: Refers to an instruction providing further information on a particular topic.

NOTE: Provides information about important parts or procedures.

1.5 Prerequisites

This manual assumes the following:

- The intended operator of the Shelfbot robotic system is capable of undertaking necessary training and can demonstrate competence to safely perform assigned tasks.
- The intended operator is capable of undertaking training on responding to emergency or abnormal situations related to the operation of the Shelfbot system.

NOTE: All personnel working with the Shelfbot robotic system must be fully conversant with the safety instructions provided in this document as well as other safety instructions applicable to this type of activity.

2 Safety

2.1 Intended Use

Shelfbot is a vertical automated storage & retrieval system (ASRS) for use in wholesale, retail, e-commerce, third-party logistics and small parts distribution facilities. It is designed to store and retrieve items on demand.

Shelfbot is capable of processing the storage and retrieval of loads of up to 20 kg at high speed and high precision motion to allow fast and accurate order fulfilment within a modular system layout configuration suited to the existing customer's floor plan.

Shelfbot is provided as a Robots As A Service solution and runs on standard warehouse racking. All repairs, maintenance and breakdown recovery is handled by Shelfbot.

2.2 Storage of Dangerous or Flammable Products

Flammable liquids, solvents and hazardous chemicals are not permitted to be stored in the system. Customers must ensure completion of a risk assessment and PPE requirements, as Shelfbot has not been assessed to be intrinsically safe for the storage of hazardous materials.

2.3 General Safety Instructions

The contents of this section supplement the standard regulations that apply at the workplace. Users of a Shelfbot robotic system have ultimate responsibility for safety measures concerning personnel working with the system or in its vicinity.

A Shelfbot robot can cause serious injury or death, or damage to itself and other equipment, if the following safety precautions are not observed:

> **DANGER**: All personnel working with the Shelfbot robotic system must have adequate training for the operation and be fully conversant with the applicable safety instructions. Incorrect usage can cause personal injury and damage the equipment.

> **DANGER**: All personnel who install, operate, or maintain the system must read this guide, associated technical documentation and complete a technicians training course. Installation and support of the system are provided by Shelfbot technicians only.

> **DANGER**: The robot system must not be used for purposes other than described in the Intended Use section of this manual.

DANGER: The operator of the robot system is obligated to operate the robot system only in a safe condition. Possible personal injuries may result if operated in an unsafe condition.

DANGER: In the event of an Emergency Stop or Breakdown, Shelfbot Support must be contacted immediately. DO NOT USE the system until a safety audit has been completed by Shelfbot Support.

WARNING: All personnel working with the Shelfbot robotic system must have adequate training for the operation and be fully conversant with the applicable safety instructions.

WARNING: Incorrect operation of the robot system can lead to severe personal injuries.

WARNING: The bin payload is to stay within the payload rating of the robot. Ensure that the system never exceeds the maximum payload or bins are over-filled over the top edge of the bin.

WARNING: The robot shall be operated within its specified temperature range to ensure proper operation. The robot generates heat during operation. The robot must not be touched during or immediately after operation.

WARNING: The Shelfbot robotic system may only be used for its intended purpose, with all supplied and installed parts fully functional. All other usage is at the user's own risk. All maintenance, repairs, formal inspections and recovery of emergency and breakdowns must be carried out by Shelfbot or authorised personnel.

2.4 Safe Work Procedures

The following safe work procedures must be observed at all times:

- Robots may move at any time.
- Do not operate if protective guards are missing or faulty.
- Do not tamper with safety devices or interlocks.
- Do not perform any maintenance or repairs of the Shelfbot system.
- Do not climb on shelving or use as a climbing aid.
- Report all damage and emergency stops; follow the internal procedures of your company or organisation defined for an emergency situation and report to Shelfbot.
- Do not alter the racking structure without checking with the shelves designer or a competent person.
- Carry out inspections to check for correct application and use of racking, adherence to safe

working loads, and impact damage.
- Ensure that correct clearances are maintained between shelves and stored bins.
- Do not wear loose-fitting garments or belts, bracelets, etc., that can become entangled in the robot when operating/picking items. Always use the prescribed personal protective equipment.
- If in doubt, always contact Shelfbot Support.

2.5 Responsibility

Operating responsibility lies with the operator of the robot system. The operations manager and all operators are obligated to act according to these operation and safety instructions.

It is the supervisory staff's responsibility to arrange for the professional training of the personnel operating the Shelfbot robot system and to recognise known hazards associated with the robot and use it safely. Shelfbot provides a training course with each system installation.

The ongoing safety of the racking and shelves is ultimately the responsibility of the customer. Regular inspection must be undertaken to ensure shelves are in sound condition. For more information, see Section 9 (Maintenance & Inspections).

2.6 Limitation of Liability

The Shelfbot robotic system is intended exclusively for use as described in this user manual. A hazard and risk assessment has been carried out in accordance with the requirements of the Australian Occupational Health and Safety (Plant) Regulations to ensure compliance of the Shelfbot design with AS 4024.1-2019 Safety of machinery and similar ISO/IEC/EN Standards.

Misuse can cause danger to life and limb and impairments and damages to the robot and other material assets. Therefore:

- A Shelfbot Robotic system may only be used in sound technical condition, for its intended purpose and within the technical specifications and operating conditions, with awareness of safety and possible dangers.
- Operators must comply with the instructions of this user manual.
- Malfunctions that may impair safety must be reported and rectified immediately.
- Modifications of the Shelfbot Robotic system are not permissible.
- Shelfbot is not liable for damages caused by misuse as described above.

3 Safety Control System

3.1 Overview

Each Shelfbot is equipped with a Safety Control Panel located at the front of each Shelfbot next to the Front Door. The control panel electrical enclosure houses the safety-related control system parts (SRP/CS) that comply with CAT 3, PLd.

The SRP/CS incorporates the following safety devices and switches:

- Safety PLC Controller, Safety CPU
- Safety Redundant Relays & Contacts
- Emergency Stop Buttons
- Interlocked Front Door Lock
- Interlocked Access Hatch Lock
- Reset Button

The electrical enclosure is made of recessed steel secured with a key lock and is rated at IP66.

3.2 Emergency Stop vs Safeguarded Stop

The safety control interface consists of two safety functions: the emergency stop and the safeguard stop for picking items from the Shelfbot. The differences are summarised below:

Feature	Emergency Stop	Safeguarded Stop
Robot Stops Moving	Yes	Yes
Initiation	Manual	Automatic (open Access Hatch)
Program Execution	Stops	Pauses
Brakes	Yes	Yes
Motor Power	Off	Off
Reset	Manual	Manual
Frequency of Use	Infrequent	Every Picking Cycle
Reinitialisation Needed	Yes – report and contact support	No
Performance Level	Stop category 0	Stop category 0

3.3 Emergency Stop

The SRP/CS will initiate a Category 0 Stop and apply motor brakes if any emergency stop is pressed. There are two Emergency Stop buttons for each Shelfbot: one on the Safety Cabinet and one inside

the Front Door. An additional single Emergency Stop button is located at the rear of each set of Shelfbots.
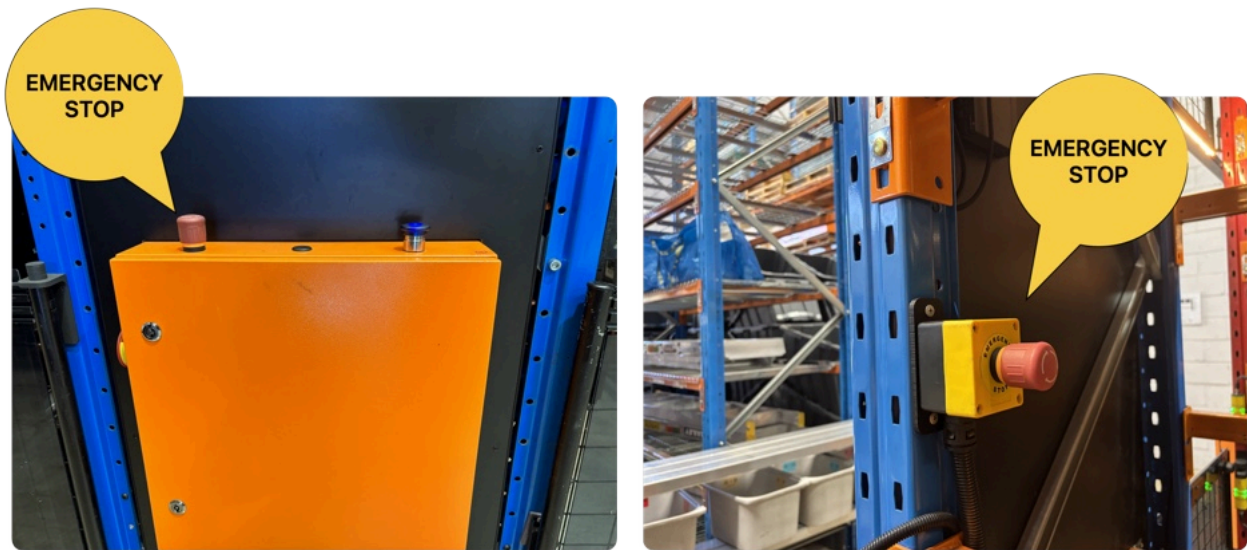
Emergency Stop buttons installed on the Safety Cabinet and inside the Front Door

To immediately abort all running programs and stop all robot movement, press the EMERGENCY STOP button, then follow the internal procedures of your company or organisation defined for an emergency situation and immediately report the stoppage to Shelfbot Support.

The emergency stop function is a separate safety circuit only intended for emergency situations. It will immediately release all safety locks. The function is not intended to be part of a normal routine.

> **WARNING**: DO NOT reset the emergency stop switch until the fault has been reported and rectified by Shelfbot or authorised personnel.

> **DANGER**: Entering the restricted area after an Emergency Stop is not permitted and may result in death or serious injury.

3.4 Front Door Interlock

The Front Door Interlock remains electronically locked during normal operation. The Safety System will initiate a Category 0 Stop and apply motor brakes if the Front Door is opened at any time. If the door is forced open, the SRP/CS will initiate a Category 0 Stop.

3.5 Access Hatch Interlock

When Shelfbot presents a bin at the Pick Station, the Access Hatch interlock is released, allowing the

operator to open the Access Hatch. The RESET button on the safety cabinet flashes blue indicating the door may be opened.

Once the Access Hatch is opened, the system initiates a full Category 0 Stop which applies brakes and disconnects power to all motors. While open, the motors remain without power and the operator has safe access to the bin contents.

Once the Access Hatch is closed, the Operator must press the RESET button to restore power to Shelfbot.

3.6 Reset Button

The RESET button is located on the safety cabinet. It is used to reset the safety circuits for the Access Hatch interlock. The reset function prevents unintentional starting when an operator is inside the safeguarded area.

Blue Reset button installed on the top right side of the Safety Control cabinet

To reset the safety control system after a bin presentation:

1. Ensure the Access Hatch is closed.
2. Ensure that the Shelfbot aisle is clear of people or fallen objects.
3. Press the RESET button on the safety panel.

3.7 Perimeter Guards

The Perimeter Guards surrounding the robot system prevent access to the restricted area where moving parts of the system are activated. The protective perimeter guards are complemented with various interlocks, as detailed below.

- Front Door: An interlocked door connected to the Safety System. The door remains locked at all times during normal operation. It provides a footwell for ergonomics when the operator is standing at a Station.
- Access Hatch: Used regularly by the operator to allow access to presented bins. Secured with a safety interlocked device restricting access to hazards while robot actuators are powered. The Access Hatch may be powered and automated, or a manual gate type requiring the Hatch to be physically opened and closed during normal operation.
- Back Door: A hinged fixed panel attached with security bolts. Only accessible by Shelfbot authorised personnel for installation, support, and maintenance.
- Racking Guards: The exposed sides of the racking are covered with materials permanently fixed to the racks, maintaining a safe distance from the Shelfbot robot.

> **DANGER**: Do not remove any perimeter guarding. Access is not permitted to the restricted area and may result in death or serious injury.

3.8 Motor Brakes

Shelfbot incorporates brakes on all motors. The brakes are applied and motors disabled automatically in the event of an emergency stop, power failure, or when the system is put into REST mode. Brakes are also applied during normal operation when Shelfbot presents a bin at the Station and the Access Hatch is opened.

3.9 Signage

3.9.1 Safe Working Loads

The SWL sign must be positioned in a conspicuous location adjacent to the Shelfbot System. The sign is provided and installed by the racking installer and must be mechanically secured as per Australian Standard AS4084 or the installation region's related specification.

Each bin has a maximum combined weight of 20 kg, which equates to a 100 kg UDL on each shelf. Bottom beam at approximately 300 mm.

3.9.2 Safe Work Procedure Signage

The Safe Work Procedures signage is mounted next to the SWL sign and must display the required danger, warning, and caution messages as specified in Section 2.4.

4 System Components

Each Shelfbot installation is a robotic system consisting of one or more Shelfbots that store and retrieve inventory items located within bins on standard racking shelves. Each module has an identification label showing the Model, Serial Number, and Manufacture Date.
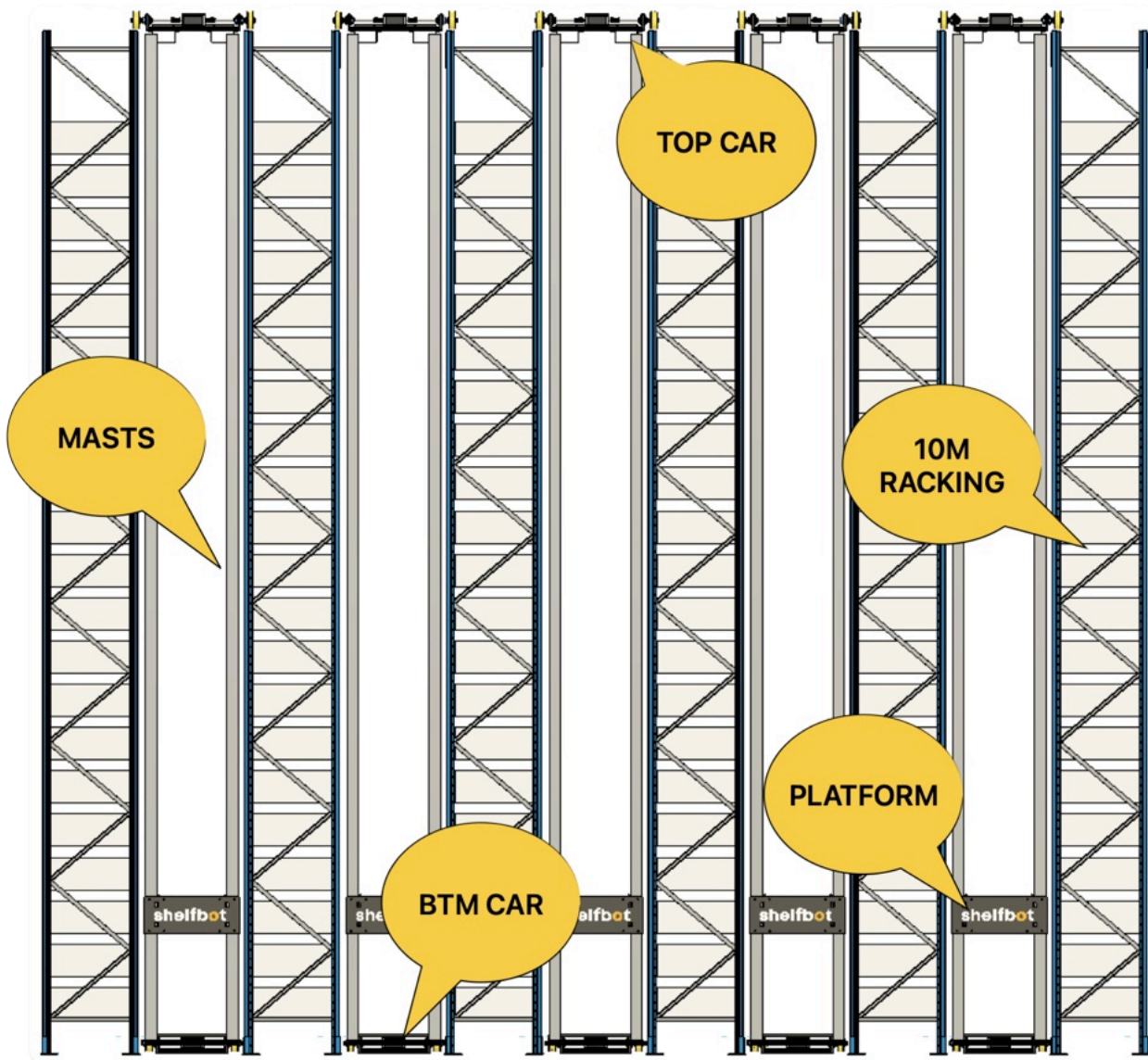
Example Installation with 5 Shelfbots installed on standard 10m high 840mm racking

4.1 Cars

Shelfbot top and bottom cars are mounted on the upper and lower fixed rails within the racking aisles. They simultaneously drive Shelfbot on the X axis back and forth along the aisle. The top car hoists the suspended Platform up and down on the Y axis adjacent to the racking via four spools.
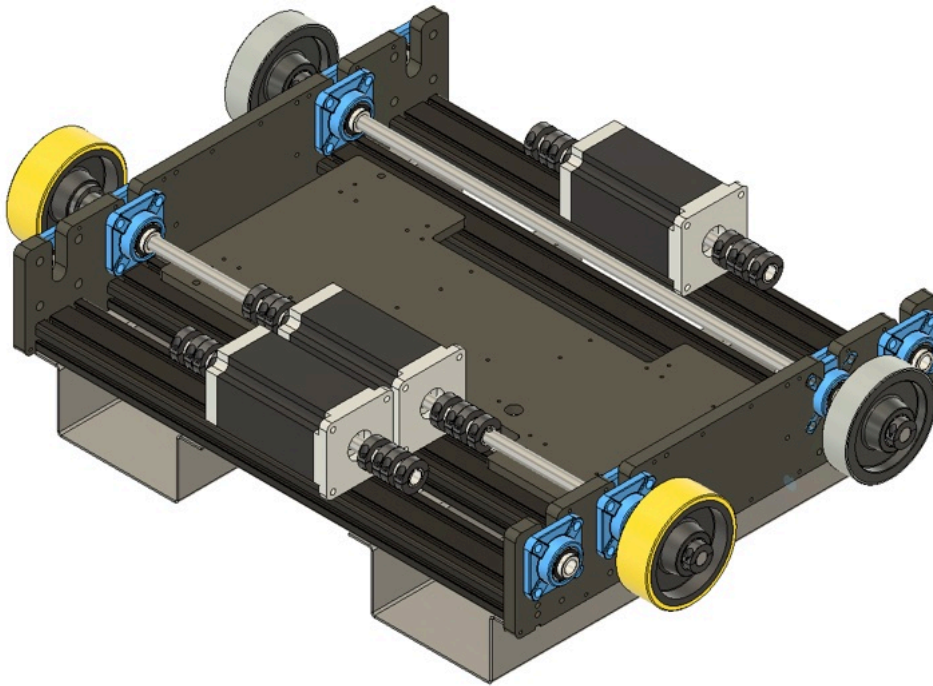
Outline drawing of a Shelfbot Top Car
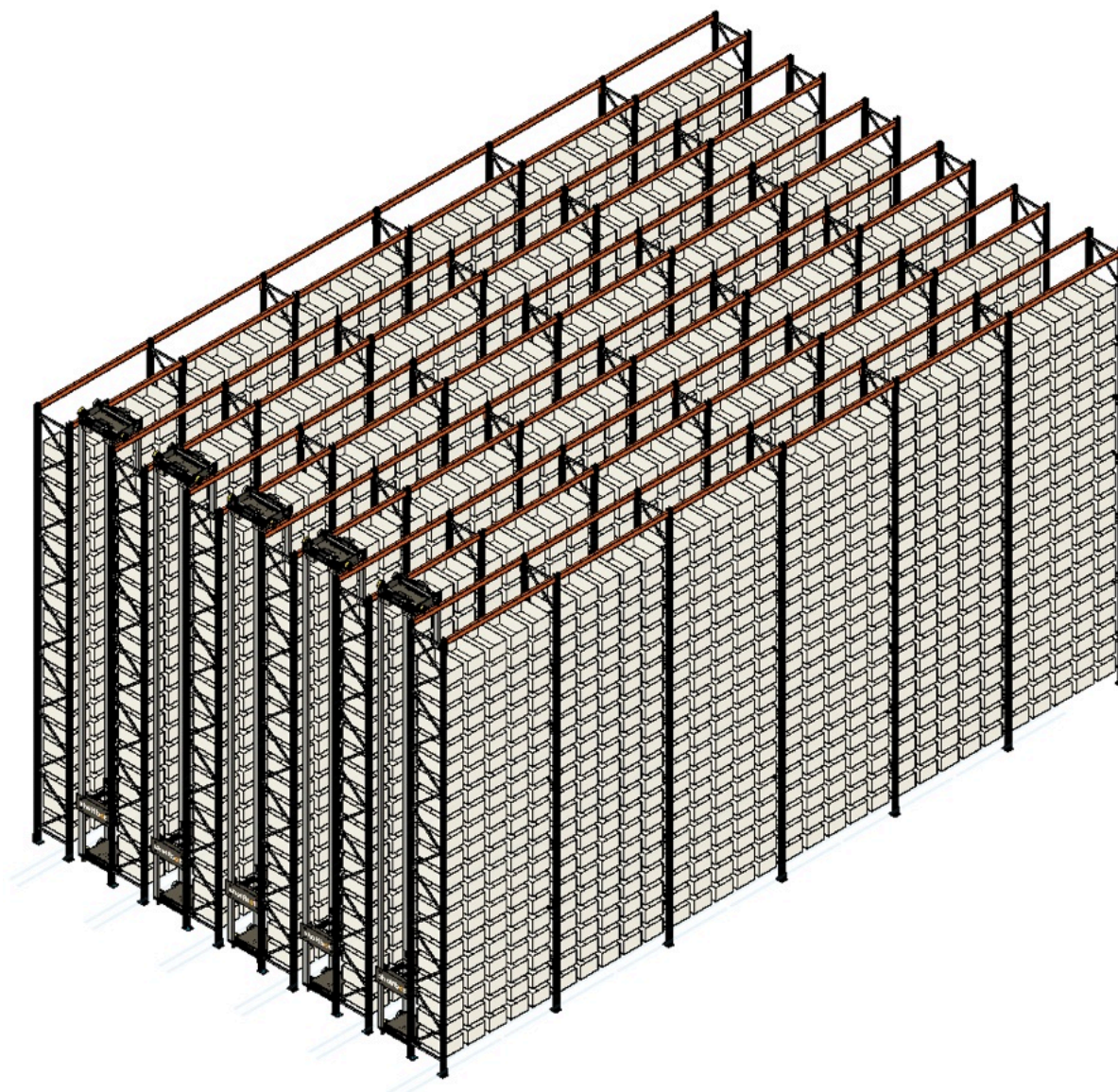
4.2 Platform

The platform extracts bins from the racking shelves by extending arms out to grip bins and pull or push them onto the racking shelves.
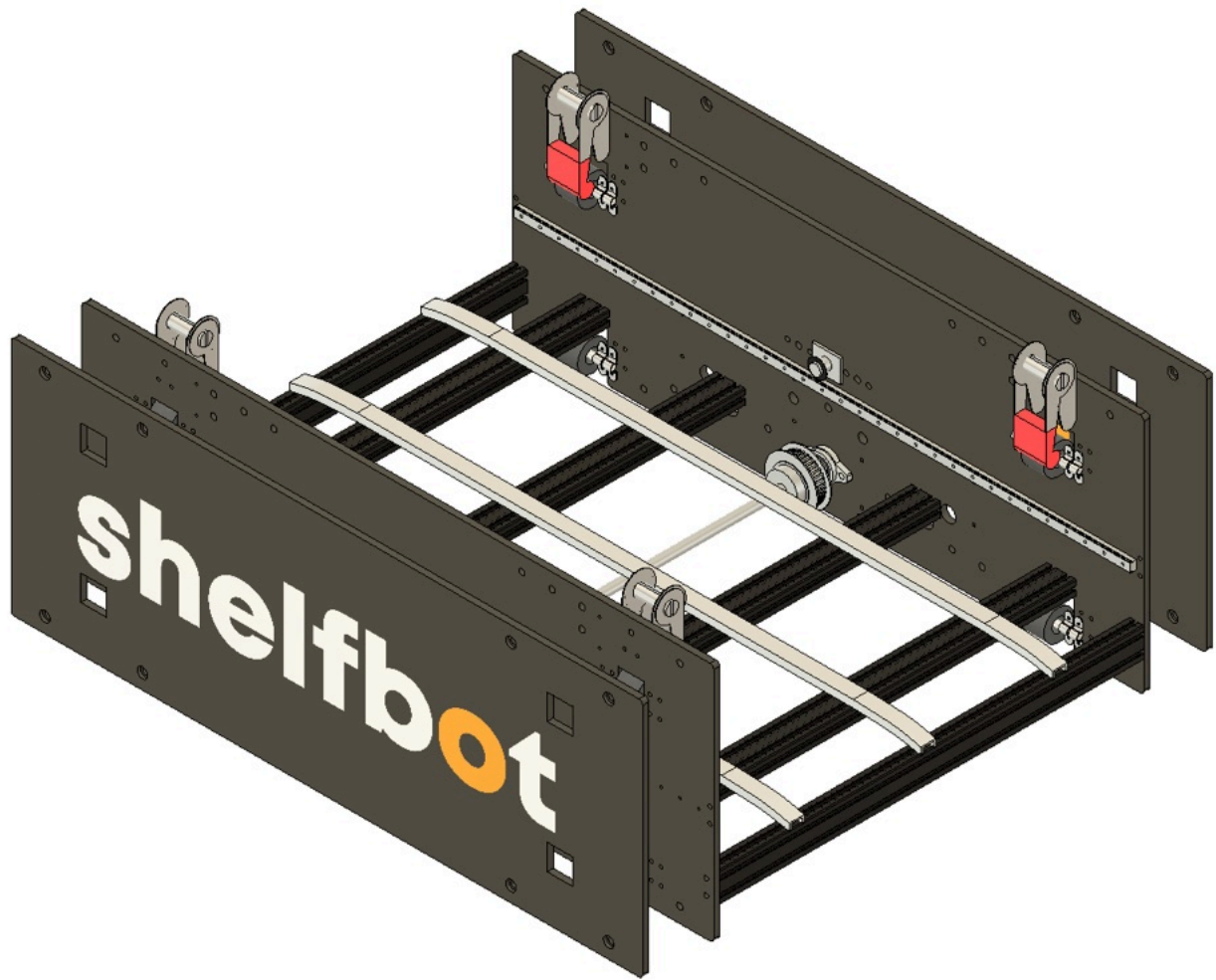
Outline drawing of a Shelfbot Platform

4.3 Racking

The Shelfbot System is installed on standardised steel warehouse racking with optional row widths of 840 mm, 900 mm and 1200 mm.

Five Shelfbots installed on standard racking six bays deep

4.4 Server

The Shelfbot Server runs on a Linux-based NUC located in a safety cabinet installed on the last row of racking. It incorporates the Server, 4G modem/WiFi router, Ethernet switch and UPS. This facilitates cloud replication and technical support via a direct VPN connection.

4.5 Pick Wall

The Pick Wall is a mobile 12-bin batch picking system that enables operators to pick multiple orders

simultaneously while keeping all robots continuously working.

Pick Wall with Pick to Light

Parameter	Value
Bin capacity	12 Bins
Pick-to-light	Sequential (one at a time) with quantity display
Bin tracking	RFID automatic detection on add/remove
Mobility	Mobile (operator-directed between stations)
Order assignment	Automatic via batch optimisation
Multi-bin orders	Supported

Key features:

- RFID Bin Tracking: Automatically detects when bins are added to or removed from the pick wall, assigns orders, and tracks completion status.
- Sequential Pick-to-Light: One bin lights up at a time with the quantity to pick, eliminating picking errors.
- Batch Optimisation: System optimises order assignment and robot dispatch to minimise wait

time.

- Mobility: Operator moves the pick wall between stations as directed by the system.

> **WARNING**: Ensure the pick wall path is clear of obstacles before moving between stations. Do not overload bins beyond the 20 kg maximum bin payload. Keep the pick wall on level ground at all times.

4.6 iPad

The Shelfbot iPad and App serve as the main control station of the Shelfbot system. It is usually mounted on a Pick Trolley or permanently fixed to the Shelfbot Station. A Bluetooth barcode scanner is provided.

4.7 Bins

The Shelfbot bin is an open-top plastic container used for the storage of inventory items. The system only works with a standard bin size and attachments provided by Shelfbot. Shelfbot offers a range of different bin sizes. Bins must maintain uniform spacing on each shelf and must not be filled beyond their top edge.

5 Technical Specifications

5.1 Mechanical Specifications

Parameter	Specification
Payload	5 kg max item weight, 20 kg max total
Presentation Rate	Between 30 and 60 per minute (dependent on length)
Speed	Max. 2500 mm/s
Acceleration	Max. 1500 mm/s^2
Braking Distance	1500 mm

5.2 Electrical Specifications

Each Shelfbot requires a single 16A outlet to be installed by the customer. An additional 10A outlet is required for the server. Refer to the Shelfbot Electrical Specification for detailed information.

Parameter	Specification
Supply Voltage Range	240 VAC ±10%
Current / Power Requirements	16A
Circuit Protection	User-supplied 16A in-line fuse
Power Supply Frequency	50–60 Hz

5.3 Environmental Requirements

Parameter	Specification
Ambient Operating Temperature	5 °C to 55 °C
Air Humidity	5 to 90%, Non-condensing
Altitude	2000 m maximum

6 Integration

The use of third-party e-commerce software or a Warehouse Management System (WMS) is critical in the operation and implementation of the Shelfbot system. This software enables Shelfbot to be integrated into existing warehouses seamlessly, allowing all real-time inventory and order lists along with associated barcodes to be shared between the WMS software and Shelfbot.

6.1 WMS Requirements

The external system must:

- Allow for products, inventory and orders to be managed.
- Have unique SKUs to manage all products and product variants.
- Have unique order ID and line ID to manage orders.

6.2 API Requirements

The external system must have a documented API and provide secure cloud-based API access for:

- Product creation, update and deletion.
- Inventory creation, update and deletion.
- Order creation, update and deletion.

NOTE: Refer to the Shelfbot System Integration documentation for detailed API specifications and integration procedures.

7 Operation

> **TIP**: All robot operations can only be performed when the Perimeter Guards are in place and can only be initiated from outside the Restricted Area.

7.1 Shelfbot App

The Shelfbot App is operated on an iPad with a touch screen interface. The App requires a user login and only permits a single operator login at one time. The App is a single point of control for the entire Shelfbot system.

7.2 User Login

Customers are provided an Admin user login ID and PIN during installation and training of the Shelfbot system. The login screen is the default screen on the Shelfbot App. Click LOGIN and enter your PIN.
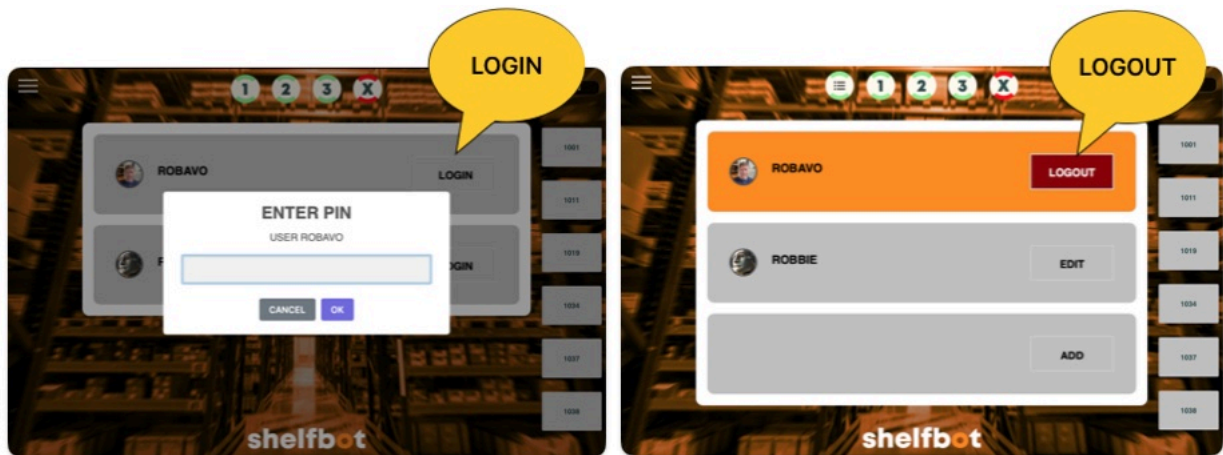
Click LOGIN and enter PIN

> TIP: A user is logged out automatically after a pre-configured time period of no activity. The operator should always manually logout at the end of a shift.

7.3 User Management

An operator logged in with Admin or Super user privileges can add a new user. Each user is assigned a Permission Level as follows:

Permission Level	Capabilities
Operator	Pick, Replenish, Reset Operations
Admin	User Admin and Reporting
Super	System Administration

To create a new user:

1. Click ADD.
2. Enter a user name.

3. Fill in user details.
4. The PIN and PHOTO are optional.
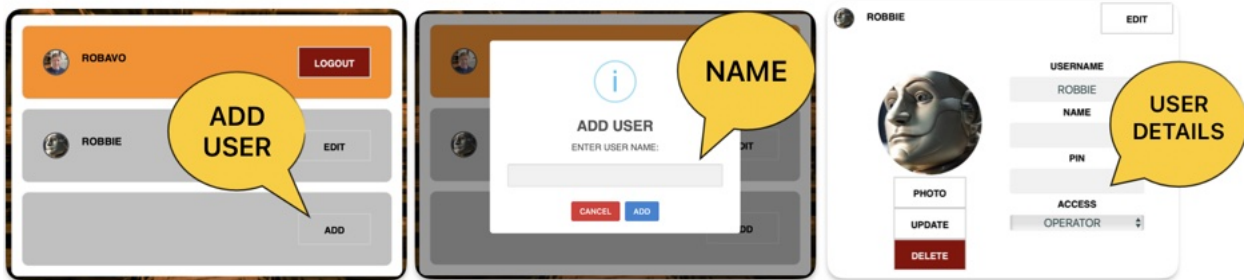
TIP: Upload a photo to personalise the Shelfbot App.

7.4 System Status

7.4.1 System Mode

The System Mode button displays the current Shelfbot running mode.

TIP: Click on the System Mode button at any time to reset the current mode and return to an IDLE state. Once RESET MODE has been initiated, all robots will return to their home position.

System Mode	Description
IDLE	The System is idle waiting for a job request
REST	The System is at rest. Platform is lowered to ground and motors disabled
PICK	Pick Mode. Orders are being processed
FETCH	Bins are being fetched for replenishment or manual item retrieval
MAINTENANCE	The system is undergoing maintenance

7.4.2 Shelfbot Status

Each Shelfbot is shown as an icon at the top of the Shelfbot App. The icon colour indicates the current state:

Status	Description
DISABLED	This Shelfbot is disabled. It may be powered off or in an error state.
READY	This Shelfbot is ready and waiting for a job.
RUNNING	This Shelfbot is fetching a bin en route to the Pick Station.
STATION	This Shelfbot is at a Station ready for bin presentation.

7.5 Order Picking

7.5.1 Manual Picking

The Order Menu is displayed on the right side of the Shelfbot App. To manually pick an order, select the order number and click PICK ORDER. One or more robots will fetch the bins to fulfil all order lines and present them at Pick Stations.
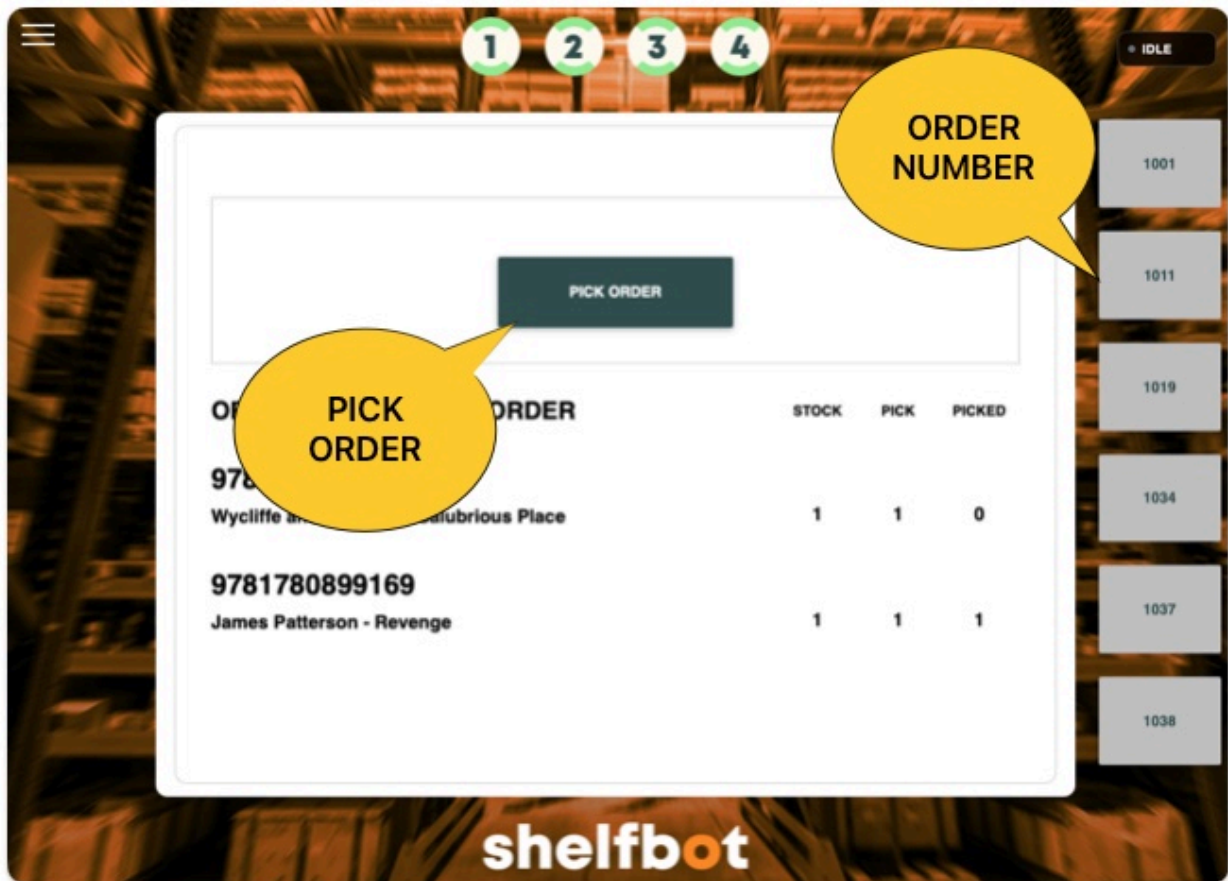
7.5.2 Auto Picking

Auto Pick will set the system mode to PICK. In this mode, the system will cycle through all orders automatically and present bins at Pick Stations. The system algorithm will always select orders that maximise bin presentation rates based on Shelfbot and SKU availability.

To enable Auto Pick, induct a Pick Bin by scanning the Pick Bin QR code.

7.5.3 Bin Presentation (Picking)

When a bin is presented at the Pick Station, the Shelfbot App displays the Pick Screen. When the Access Hatch is open, the operator picks the required item(s) from the bin and scans the item barcode to complete the pick.

Once the pick is completed and the Access Hatch is closed, the operator must:

1. Tap the RESET button on the Safety Cabinet.
2. Tap the CLOSE/RETURN button on the Shelfbot App, or scan a RETURN QR code.

This completes the pick and returns the bin. The Shelfbot App then directs the Operator to the next Pick Station.

> TIP: If the barcode is not available, the operator can manually tap the SKU PICK button on the App.

7.6 Pick Wall Operation

Batch picking to the Pick Wall enables the operator to pick multiple orders (up to 12) simultaneously, maximising throughput and keeping all robots continuously working.

7.6.1 Prerequisites

- Pick wall is positioned near pick stations.
- Empty pick bins are available.

- App shows available orders for picking.

7.6.2 Setup Procedure

1. Place pick bins on the pick wall: Add up to 12 empty bins to the pick wall slots. RFID readers automatically detect each bin. The system assigns orders to bins based on batch optimisation.
2. Confirm assignments: The App displays which order is assigned to each bin position. Review assignments before proceeding. Tap "Start Picking" to begin.
3. Move to the first station: The App directs you to the next ready pick station. Move pick wall to the indicated station. Wait for source bin to arrive.

> **CAUTION**: Do not remove or rearrange bins once orders are assigned. This will cause order assignment errors.

7.6.3 Picking with Sequential Pick-to-Light

Once a source bin arrives at the station:

1. Open access hatch (triggers safeguarded stop).
2. Wait for pick-to-light indication. One bin on the pick wall lights up with the quantity to pick. Only one bin lights up at a time (sequential).
3. Scan the item from the source bin using the handheld scanner. The system confirms the correct item.
4. Pick the indicated quantity and place items into the lit bin. Platform scales verify weight.
5. Repeat for next order bin. The next bin lights up automatically. Continue until all orders from this source bin are picked.
6. Close hatch and press reset. Robot returns source bin to storage. App directs you to the next station.
7. Move to next station when prompted. Move pick wall to the indicated station. Repeat process until all orders are complete.

7.6.4 Completing Orders

When an order is fully picked, remove the completed bin from the pick wall at any time. RFID automatically detects removal and marks the order ready for packing. Place the bin in the packing area and continue picking remaining orders. Add new bins to vacant pick wall slots as needed.

7.6.5 Multi-Bin Orders

The system tracks partial completion automatically. A bin remains on the pick wall until its order is fully picked. The Shelfbot App shows order progress (e.g., "3 of 5 items picked"). Pick-to-light will activate the same order bin when additional source bins arrive.

7.6.6 Pick Wall Best Practices

Maximise Throughput:
- Keep all 12 bins filled when possible.
- Move promptly between stations when directed.

- Remove completed bins quickly to free up slots.

Maintain Accuracy:

- Always scan items, even if confident it's correct.
- Trust the sequential pick-to-light — don't pick ahead.
- If weight verification fails, stop and investigate.

Handle Interruptions:

- Tap RESET SYSTEM on the Shelfbot App to stop picking and resume later.

7.6.7 Pick Wall Safety

Before moving the pick wall:

- Confirm the path is clear of people, equipment, and obstacles.
- Ensure the floor is level and free of debris.
- Check all bins are securely seated in slots.

During operation:

- Do not reach into source bins before pick-to-light indicates.
- Do not remove or swap pick bins during active picking.
- Keep hands clear of RFID reading zones.

7.7 Replenishment

7.7.1 Manual Replenishment

Scan the item barcode or manually search for an item. This will display a list of existing bins in use for this item. For each bin, the list shows the most recent replenishment date, weight, location and quantity.

The operator may choose to add items to an existing bin to maximise storage, or add a new bin for this item. Tapping either button will fetch a bin and present it at the pick station.
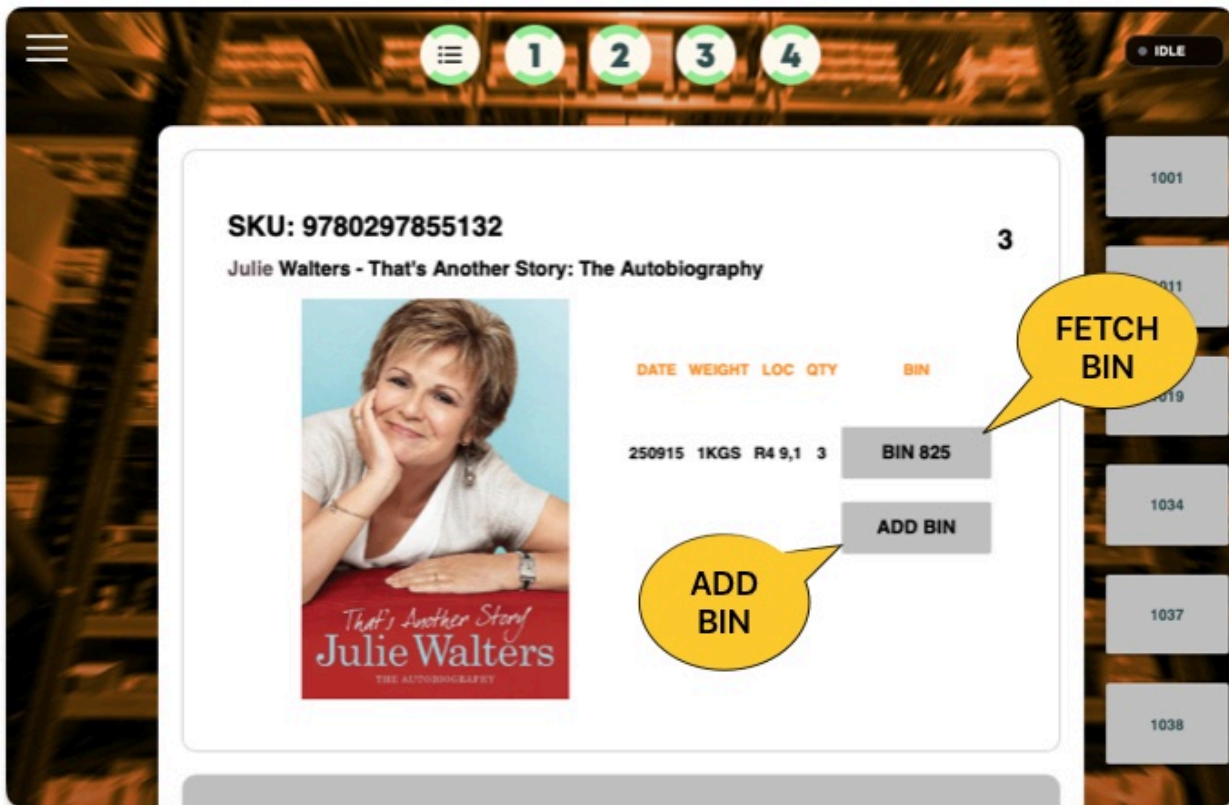
> TIP: Batch or FIFO considerations may require ADD BIN when replenishing.

7.7.2 Auto Replenishment

Tapping FETCH BINS from the menu will change the System Mode to FETCH. In this mode, the system will continuously present empty bins for replenishment at Pick Stations.

> TIP: When the system is in FETCH mode, tap the System Mode button in the top right of the screen at any time to reset the system to IDLE.

7.7.3 Bin Presentation (Replenishment)

In FETCH mode, when a bin is presented at the Station, the App displays the bin contents. Tap an item to expand its details. Use the UP arrow to add inventory and the DOWN arrow to take stock out of the bin.
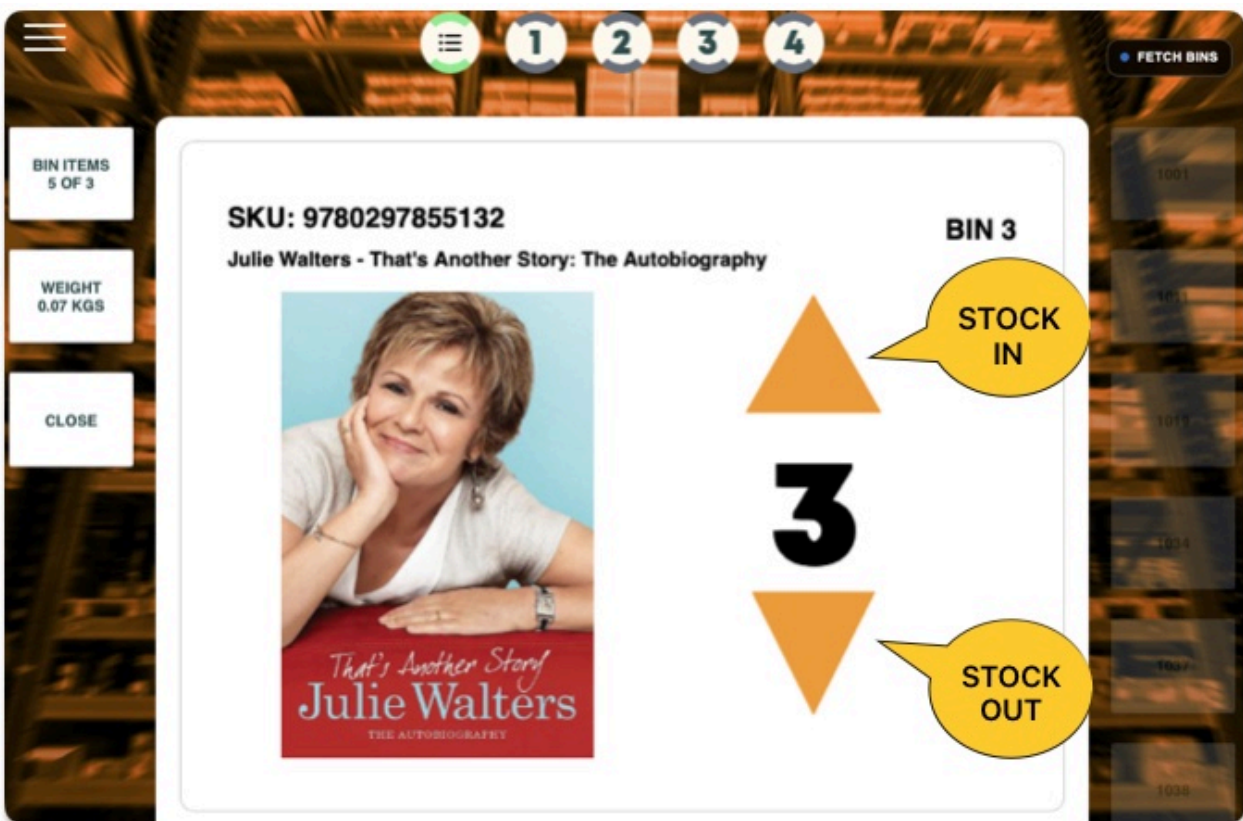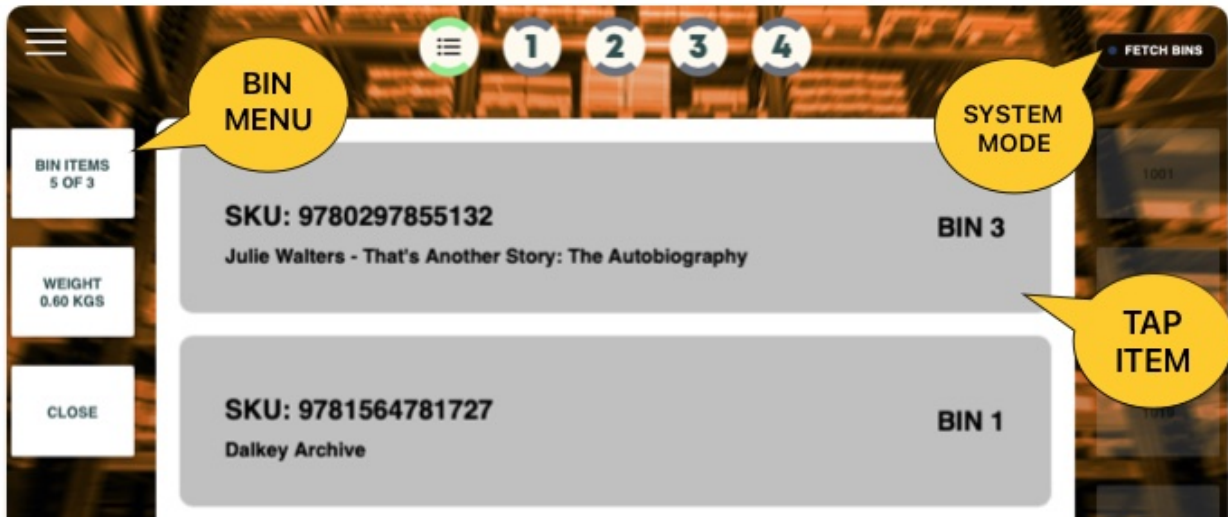
7.8 Search

To find an item in Shelfbot, scan the barcode of the item or choose SEARCH from the main menu and type in the barcode or any text from the item name to list all matches. Tap an item to see inventory detail, which lists all bins allowing a specific bin to be fetched or a new bin to be added.
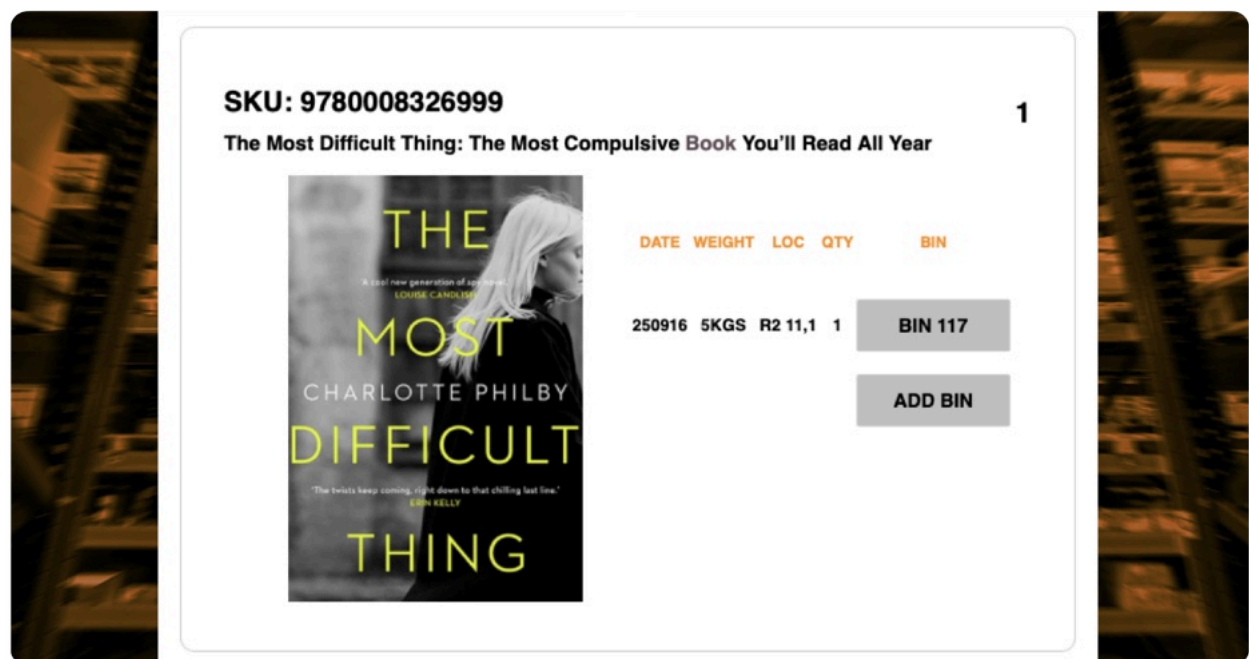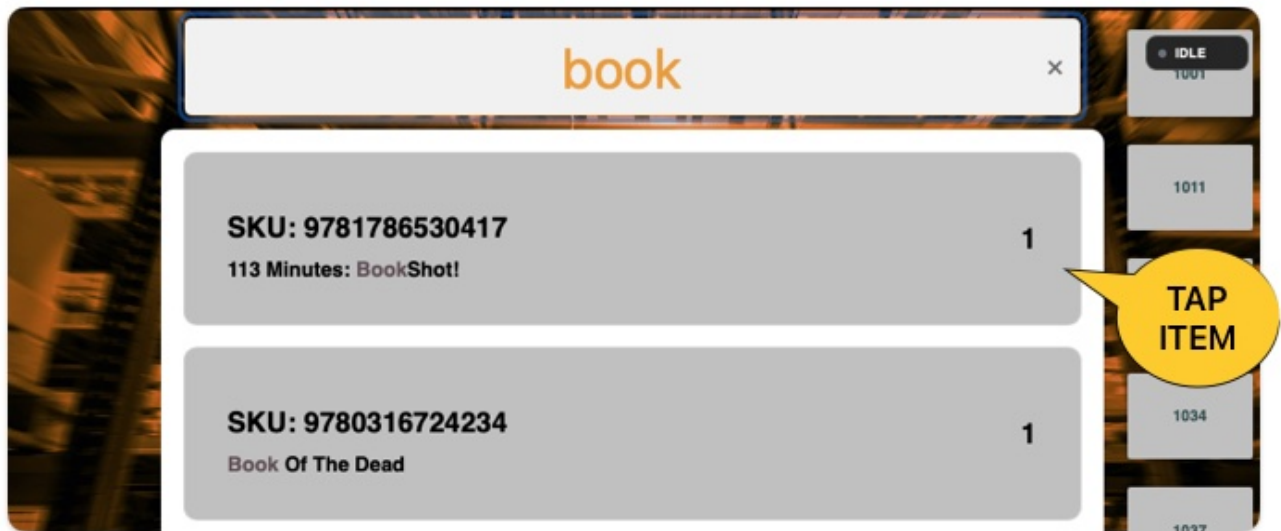
7.9 Charging

The iPad is constantly charged via a power bank or fixed power supply. A redundant power bank is provided and allows for hot-swapping continuous operation. The Bluetooth scanner must also be charged at the end of each shift.

8 Shutdown & Restart

<div style="border:1px solid orange;">
WARNING: Contact Shelfbot Support prior to Shutdown and Restart.
</div>

Under normal operation, a full shutdown of the system is not required.

8.1 Rest Mode

The system automatically enters a REST mode after a period of inactivity. This drives the Platform to its ground position and removes all power to motors and actuators. All interlocked doors and panels remain locked, safeguarding the system from unauthorised access.

8.2 Shutdown Procedure

<div style="border:1px solid red;">
DANGER: Shutdown of the system releases the interlocks, allowing access to the restricted and safeguarded space. Operator access to these areas without undertaking a full risk assessment is not permitted and presents imminent danger, which can lead to death or serious injury. Contact Shelfbot Support prior to Shutdown and Restart.
</div>

Shutdown is not required under normal operation. Shutdown of the system must be completed in an orderly manner on each Shelfbot robot as follows:

1. Contact Shelfbot Support to review steps.
2. Undertake an independent Risk Assessment.
3. Ensure all Bins are safely on shelves.
4. Ensure security bolts are installed on Front and Back Doors.
5. Run System RESET and wait for IDLE confirmation.
6. Run System REST and wait for REST confirmation.
7. Ensure all Shelfbots are safely at Rest with Platforms at ground level.
8. Power off the Shelfbot at the Safety Cabinet isolator switch.
9. Lock Out Tag Out at the Safety Cabinet isolator switch.
10. Install a Safety Barrier Tape across the front door.

8.3 Restart Procedure

After a Shutdown, the system must be restarted on each Shelfbot in an orderly manner as follows:

1. Contact Shelfbot Support to review steps.
2. Undertake an independent Risk Assessment.

3. Ensure security bolts are installed on Front and Back Doors.
4. Ensure all Bins are safely on shelves.
5. Remove Safety Barrier Tape across the front door.
6. Remove Lock Out and Tag Out at the Safety Cabinet isolator switch.
7. Power on the Shelfbot at the Safety Cabinet isolator switch.
8. Wait for each Shelfbot to connect and show a Status Ready (Green icon).
9. Run System WAKE and wait for IDLE confirmation.

9 Maintenance & Inspections

9.1 Maintenance Schedule

Shelfbot maintenance is performed according to the schedule below. Customers will be notified about upcoming services once the system reaches interval milestones.

Activity	Component	Interval
SERVICE	Cars	1000 km or 12 Months
SERVICE	Platform	250 km or 3 Months
OVERHAUL	Platform	2000 km or 24 Months

9.2 Monthly Visual Inspection

The customer is required to undertake a monthly inspection of Shelfbot and the Racking according to the Inspection Checklist below. This is a visual inspection performed from outside the Safeguarded area.

9.3 Inspection Checklist

Inspections shall include the following checks:

- Ensure that unit loads adhere to specified dimensions to maintain specified bin clearances.
- Check the stability of bins. No bins sticking out or items/objects visible within the aisle.
- Check if racking installation has been modified using SWL and Installation signage.
- Ensure that all signage is current, legible, and free from damage and obstruction.
- Verify that all racking components including frames, beams, floor fixings, bracing, and ancillary devices are consistent with the design.
- Assess for damage to racking uprights, beams, baseplates, and frame bracing caused by impact.
- Check for out-of-plumb (non-vertical) racking uprights in both the cross-aisle and down-aisle directions.
- Identify any corrosion of racking components.
- Examine the floor condition, checking for signs of deformation, out of level, and cracks.
- Assess if forklift protection barriers are securely fixed, if applicable.
- All guarding and panels around the Shelfbot zone are straight and undamaged with no loose fittings.
- Confirm that all Perimeter guards are undamaged and locked.
- No loose materials, hanging cables, or fittings directly above the Shelfbot structure.

10 Troubleshooting & FAQs

10.1 Troubleshooting

10.1.1 Over Filling

Overfilling a bin beyond the top edge may result in a jam or dislodgment of adjacent bins on a shelf. Operator discretion is required to ensure items placed in the bin do not exceed the top edge. If a bin is over-filled or a jam occurs, immediately contact Shelfbot Support and shut down the system.

10.1.2 Over Weight

When inserting items into bins, Shelfbot will alert the operator if the total bin weight exceeds the defined Payload. Shelfbot will only send a notification when the bin is near to or over weight. It is the responsibility of the Operator to remove items from the bin until the weight has stabilised under the defined Payload.

10.1.3 Resetting Safety Control System

If a bin remains at the Station after a Pick or Fetch, check the Access Hatch is closed fully and the blue RESET button on the control panel has been pressed. The blue RESET button will revert to a steady blue light once the safety control system is reset.

If the blue light is still flashing or the interlock shows a RED light, the Interlock may have failed to latch fully and lock the Access Hatch. Please contact Shelfbot Support.

10.1.4 Inventory Discrepancies

Taking or placing items into a bin without scanning the item into the Shelfbot system will result in an inventory discrepancy between Shelfbot and the external system. The Operator must ensure that every item is scanned in or out of the Shelfbot bin.

Shelfbot will produce a report based on the inventory discrepancy between Shelfbot and the external system when observable and observed.

10.1.5 Jams

Do not attempt to release a jammed robot. Contact Shelfbot Support. The operator must complete an independent risk assessment before entering the Shelfbot restricted area.

10.2 Frequently Asked Questions

Can I use the Emergency Stop button to enter the Shelfbot restricted area?

No. The Emergency Stop button is for emergency stops only. Pressing it will immediately stop all

robots in the Shelfbot system. This action will immediately notify Shelfbot Support and require a manual reset of the entire system.

What is the flashing blue button for?

The blue button on the Safety Cabinet is a RESET button. Once a bin is presented at a Station and the Access Hatch has been opened, the blue button will start flashing. Once the Access Hatch is closed, press this button to reset the robot safely and allow the bin to return. If the button continues to flash, ensure the Access Hatch is fully closed and try pressing the button again.

How do I add new SKUs to Shelfbot?

Use the external system (e.g., customer WMS or e-commerce platform) to add new SKUs. Once added to the external system, they will be pushed to Shelfbot automatically.

How do I add an Order to Shelfbot?

Orders are managed by the external system. They are automatically pushed to Shelfbot and displayed on the Shelfbot App.

What happens if an Order cannot be fulfilled by Shelfbot?

Accurate inventory management on the external system is critical. When inventory has been assigned to Shelfbot, the operator must ensure that items have been physically added into Shelfbot bins prior to picking orders. Shelfbot will only attempt to fulfil order lines that are held in Shelfbot Inventory.

What happens if there is a jam?

Do not attempt to release a jammed robot. Contact Shelfbot Support. The operator must complete an independent risk assessment before entering the Shelfbot restricted area.

11 Appendices

11.1 Glossary

Term	Definition
Authorised Personnel	Individuals who have received proper training and authorisation to operate, maintain, or access the Shelfbot robotic system.
Bin	A container used for storage of items. Transports items between storage position on racking and the Pick Station during bin presentation.
CAT 3	Category 3 function of a safety control system. Provides fault detection and maintains safety function in presence of a single fault.
Emergency Stop	An action or device used to immediately stop the robot in hazardous situations. Also referred to as E-stop or ESTOP.
ERP	Enterprise Resource Planning. Software integrating business management functions in a unified platform.
External System	Any system or equipment that interfaces with the Shelfbot robotic system, such as WMS or ERP systems.
FIFO	First In, First Out. An inventory management method where the first items received are the first items sold or used.
Pick Bin	A designated bin used at the pick station with QR codes on all sides. When inducted, Shelfbot commences picking orders automatically.
Pick Station	The location at the Access Panel where personnel pick and place items into bins during normal operations.
PLd	Performance Level d. Indicates the ability of safety-related parts to perform their safety function under foreseeable conditions.
Restricted Area	The designated space established by physical or virtual means to limit motion and prevent unauthorised access.
Safe State	A condition where the system is stopped, platform lowered, and doors closed, ensuring no hazardous movement can occur.
Safeguarded Space	An area enclosing a hazard zone where guards and/or protective devices are installed.
Safety Cabinet	An enclosure containing safety-related controls and components of the Shelfbot system.
SKU	Stock Keeping Unit. A unique identifier for each distinct product or item for inventory tracking.
SRP/CS	Safety-Related Parts of Control Systems. Components preventing hazardous conditions.
System Mode	The operating state of the robot. Modes include FETCH, PICK, REST, IDLE and MAINTENANCE.

Term	Definition
WMS	Warehouse Management System. Software managing warehouse, distribution center, or fulfilment center operations.

11.2 Applied Standards

11.2.1 Racking Standards

The Shelfbot System is installed on standardised steel storage racking that complies with the following codes:

- AS4084-2023 Steel racking standards
- AS1250-1981 SAA Steel structures code
- AS1538-1988 SAA Cold-form steel structures code
- FEM 10.2.02 European code of practice for the design of static steel pallet racks
- SEMA-1980 (UK) Storage equipment manufacturers' association of practice
- RMI-1985 (USA) Rack manufacturers' institute specification

11.2.2 Perimeter Guard Standards

- Guards and protective devices — ISO 12100
- Safe distance over and through — ISO 13857
- Fixed and movable guards — ISO 14120
- Minimum distances for interlocking guards and other trip devices — ISO 13855 / ISO 14119
- Crushing prevention by maintaining minimum gaps — ISO 13854

11.2.3 Electrical Standards

- IEC 60204
- IEC 60204-1 — Grounding
- ISO 13849 — SRP/CS
- ISO 13849-1 — Emergency Stops

11.3 Conformities and Certificates

A plant safety risk assessment of the Shelfbot system was undertaken by Jason Lim of Plant Safety Solutions Pty Ltd on Friday 24th May, 2024. The focus of this assessment is on the safety of machinery for compliance with the recommendations of AS/NZS 4024 Safety of Machinery where reasonably practicable to meet the requirement of the OHS Act in the provision of safe plant.

For a copy of the full report, please contact Shelfbot Support.

11.4 Support

For all support enquiries regarding Shelfbot, call us on +61 3 9069 5000 or the assigned representative for your region.

11.5 Revision History

Revision	Date	Notes
V1.0	20/10/25	Original Document
V2.0	02/02/26	Pick Wall Added, revised sections with numbering