Liftians
Site Deployment Guide

Liftians Inc. v0.1

Scope

This document will begin as a rough outline of all the steps needed to properly deploy Liftians robotic solution at a client location. This is the starting point document for creating a comprehensive deployment guide for future Field Service Engineers. The guide will be improved iteratively after first deployments are made and lessons are learned. The focus of this guide will be concerned with the physical aspects of deployment and not on software development, device pre-configurations, and API integrations. Those are assumed to be completed successfully behind the scenes before physical implementation begins.

Document Revisions

Version	Author	Date	Changes
v0.1	Nick Baker	1/20/2022	First draft
V1.0	Jonathan Huang	4/20/2023	V1.0

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1 Warehouse Floor Preparation

1.1 Area designated for robot operation

1.1.1 Robot Work Area

Proper square footage has been identified and cleared of all possible obstructions (bolted shelves removed, column protectors removed etc.)

1.1.2 Cleaning

Floor has been cleaned of dust while imperfections and cracks are patched

1.1.3 Painting

Floor paint applied to the working area and allowed to cure at least 24 hours. It is recommended that an epoxy base coating be used in conjunction with a flat or matte polyurethane top coating.

1.1.4 Fiducials

Applied to the robot working areas using laser level guides to keep lanes straight. Start at 0.5, 0.5 location with laser level. Mark 1m increments (or whatever grid size is specified (ex. 1.2x1.4m starts at 0.6x0.7).

1.2 Area designated for Pick/Replenishment Stations

1.2.1 Pick/Replenishment Station Work Area

Proper square footage has been identified for the correct number of stations to be implemented and has been cleared of all possible obstacles

1.2.2 Ensure Electrical Drops

The area the pick/replenishment stations will occupy need easy access to standard power outlets for the equipment to be provided with power

1.2.3 Fiducials

Applied to the pick/replenishment stations

1.3 Area designated for charging stations

1.3.1 Need Proper 240V outlet installation

Need specifications on NEMA style 240V outlet that needs to be installed

2 Infrastructure Preparation

2.1 Receive Infrastructure Hardware

2.1.1 Unpack Hardware

Check the packing slip to ensure the proper number of hardware devices are received

2.1.2 Check Hardware

Inspect the hardware devices for any obvious signs of damage during shipping

2.1.3 Commission Hardware Devices

Before final installation at their proper location, check the device configurations against the settings defined in the project scope. Ensure that IP addresses and server configurations are valid. Update and make changes as needed. Refer to Liftians Network Topography Document.

2.1.4 Install Hardware at Proper Locations

Install the hardware in the predesignated locations per the project scope. Ensure proper access to electrical infrastructure. Check for device connectivity and functionality before proceeding.

2.1.5 Pick/Replenishment Station Hardware Installation

Install the PC, touchscreen, and scanner. Load the Liftians WMS software to the PCs and check for connectivity to the Liftians server.

3 Charging Station Preparation

3.1 Receive Charging Stations

3.1.1 Unpack Charging Stations

Check the packing slip to verify the correct number of chargers have been delivered and check for any obvious signs of damage during shipping

3.1.2 Install in Charging Location

Move chargers to the designated charging area and plug them in to the appropriate (prepared 240v?) power sources. *Are the chargers heavy enough that a forklift is needed?*

4 Robot Preparation

4.1 Receive Robots

4.1.1 Unpack Robots

Check the packing slip to ensure the proper number of robots have been delivered

4.1.2 Check Robots

Make sure the robots are received in working order and no damage has been sustained during shipping

4.1.3 Move Robots to Staging Area

Move the robots to the staging area that will be used for enrollment. This area should be near the charging area as the robots will have to be charged first. *Are the robots heavy enough that a forklift is needed?*

4.2 Enroll Robots

4.2.1 Charge Robots

Ensure the robots are fully charged before trying to enroll them. *They most likely ship without a charged battery (if they're shipping directly from China the batteries will most likely be drained).*

4.2.2 Enroll Robots into the System

Log in to the server and enroll all the AGVs into BotService on the server

4.2.3 Check for Updates

Once enrolled, check for and load the newest OTA update for robots if available. *Is there a version check on robot boot?*

4.2.4 Enroll Fiducials into the System?

Log in to the server and enroll all fiducials into the system?

4.3 Function Testing

4.3.1 Test Orders

Create basic test order from customer's WMS and send it to the Liftians server. Verify behavior is satisfactory with expectations. *Simulate an order without any real stock in the bins to not get ahead in case there are issues.*

4.3.2 Check Proper Guidance

Ensure proper navigation of fiducials by testing a pickup of rack and drive to pick location

4.3.3 Verify Map Monitor Behavior

Check that the map monitor software functionality is behaving as expected

5 MSU Preparation

5.1 Build all the MSUs

5.1.1 Assembly

Put all the shelves together with the proper tools. The shelves should be predetermined from the customer for configurations. There might be a mix of 3-tier, 4-tier, and 5 or 6-tier shelves. You should know ahead of time what mix of shelving needs to be assembled. For example: 200 total MSUs, 100 5-tier, 60 4-tier, 40 3-tier. This needs to be intentionally assembled per customer requirements. Apply proper MSU fiducials under the bottom platform. Apply color Vinyl strips to each tier using the correct color. Lengths of vinyl predetermined from customer shelving configuration. Use MSU Striping Calculator to find length required (example The Feed 7,177ft of striping).

5.1.2 Put in Proper Locations

Send all the shelves to their proper predetermined location on the work floor to have the AGV enroll the fiducial and take the MSU to its grid location.

6 Initial Replenishment

6.1 Inventory Loading

6.1.1 Initiate loading of all inventories into MSUs

Send replenishment requests to do the initial loads of all inventories

6.2 Training

6.2.1 Start Training of Warehouse Associates

During the initial replenishment process of filling the inventory shelves, it is a good time to show the warehouse associates the process and train them on the proper use of our system

7 Go Live

7.1 Initiate the Go Live Switch

7.1.1 Turn on Orders from Customer WMS

Let the orders start coming in from customer WMS and let the system start full operation

7.1.2 Monitor System Behavior

Make sure the system is acting nominally for a few days and be present for any questions or follow up from warehouse associates or customer management team