

## Battery Swap



# Unprecedented Robot Utilization For Industry Leading Throughput.

Automation out of service time due to battery charging is often overlooked - which impacts robot utilization and overall return on investment.

As a customer of our own technology for grocery fulfillment, Ocado is on a continuous quest to produce the lowest fulfillment cost per unit shipped. Battery swap is an important step in that journey, enabling unprecedented robot utilization to maximize return on investment.

### Key Features

#### INDUSTRY LEADING ROBOT UTILIZATION:

Robots are in service more than 99% of operating hours with sub-one minute battery hot swaps typically occurring every two hours via robotic handling; more than a 7% increase in robot utilization compared to traditional approaches.

#### HIGH CHARGE CAPACITY:

Battery swap stations support up to 100 robots each and charge up to 10 batteries simultaneously with each battery charge typically taking only 12 minutes - meaning every 72 seconds a battery will be ready.

#### ROBUST MONITORING & REPORTING:

Battery management is critical for optimal system performance. Individual battery voltage and temperature are continuously monitored and automatically disabled if anomalies are detected. Fleet management software ensures an even distribution of battery use.

Battery swap provides high capacity, automated battery exchange and charging for maximum robot uptime.

### Technical Specifications

#### OPERATING SPECIFICATIONS:

**Battery swap time:** Sub-60 seconds

**Battery charge time:** 12 minutes

**Station battery charge capacity:** Up to 10 batteries

#### COMPONENTS:

- Battery swap unit
- Robotic arm (UR10e) + end effector - Power transformer

#### RESOURCE REQUIREMENTS:

**Total power consumption:** 32kW at full capacity

**Network:** Four 100 Mb/s ethernet ports  
30 Mb/s bandwidth requirement

**Dimensions:** L 1.25m x W 1.12m x H 1.23m

**Weight:** 650 kg<sup>1</sup>

**Operating Temperature:** 0-45°C

**Operating Humidity:** 20-80%, 60% nominal

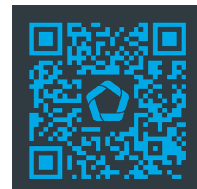
#### CERTIFICATIONS:

- CE & NRTL Approval

1. Relates to the 10 battery capacity model, fully loaded.

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