Advanced Energy

BATTLE CARD

AGV ROBOTICS

SOLUTION OVERVIEW

Automated Guided Vehicles (AGV) are battery operated, self-contained robots used for in-house logistics in manufacturing facilities. They are equipped with sensors and control systems that allow them to transport and handle materials by following predefined paths or using localization techniques (AMR). Charging stations are placed along their routes. The robots can autonomously navigate to the next charging station and recharge their batteries when they fall below a preset limit.

An intelligent fleet system monitors the job and battery status of each robot to optimize the effective operating time through opportunity charging.

Our power supplies are designed and built into the AGV charging stations along with complementary components like heatsinks and fans. Depending on the requirements, various charging approaches might be consider, so AE power supply models that can be switched between constant voltage and constant current are generally suitable.

AC-DC High Power Single Output
- LCM, HPS, CSU

AC-DC Configurable Multi-Output Power
- iVS, uMP, iHP24

Quick-Turn Modified Standards
- Electrical, Mechanical

Target Markets/Customers

Primarily AGV manufacturers for **in-house logistics**.

Additional new types of robotics opportunities include:

- **Autonomous, battery-electric agricultural robots** for planting, spraying, harvesting, and monitoring crop health, allowing for data driven decision making and maximizing yield.
- **Electric tunneling and mining vehicles** that have reduced emissions, ventilation requirements, and noise levels to protect operators, staffs and the environment.
- **Commercial cleaning and disinfection robots** for cost-effective, continuous cleaning of highly frequented buildings like airports, train stations, shopping malls, hospitals, and schools.

Where to Avoid

Robots for domestic tasks such as vacuuming, lawn mowing, and pool cleaning due to the low price segments.

Audience – who to engage and when

Who to engage:

- Manufacturers of AGVs or AMRs.
  - In-house logistics is the largest group of about 280 manufacturers. For example, Linde Material Handling or ABB.
  - Cleaning and disinfection is the second largest group of about 60 manufacturers. For example, Nilfisk or Kärcher.
  - Other segments including outdoor delivery, inspection, hospital support, and agriculture.
- Manufacturers of battery systems and charging infrastructure. For example, Leclanché.

Functions:

Director and manager levels in technical sourcing/purchasing, engineering, and product management.

When to Engage:

In early design stages or after they have completed their designs and are starting to look for the required components.

Business Benefits

- Focus on core competency by leaving battery charging to AE experts.
- Reliable partnership with AE that has the factory capacities and worldwide presence to handle the rapid market growth with scalable solutions.

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Qualifying Questions

- What ranges need to be covered on the input side (voltage, current, frequency, phase)?
- What are power requirements on the output side?
- What are the physical size constraints?
- Are specific connectors or interfaces required?
- What are the operating conditions in terms of temperature range, humidity, and altitude?
- What are the requirements for noise from the power supply and for protections (overcurrent, etc.)?
- What standards or certifications does the power supply need to comply with?
- What is the current purchase volume and how will that change over time?
- What are expectations for delivery lead times?
- How long must spare parts be available?
- Do you have future projects that affect your power supply needs and should be considered in the solution?

Customer Challenges

The main challenge is finding an industrial power supply that can be controlled by a battery charging management system and is compact enough to fit into the existing charging station, further allowing scalability. New AGV markets will require higher payloads that require larger batteries, thus higher charging currents to maintain the same charging times of the AGVs.

1. Compact size constraints.
2. Scalable power.
3. Certified for worldwide use.

Key Features & Specs (high-level differentiators)

Our power supplies meet the requirements of a wide range of applications within robotics.

1. Robust metal case for use in harsh industrial environments meets required IP ratings.
2. Broad input range from 90 VAC to 264 VAC covers available single-phase power grids worldwide.
3. Remote setting and monitoring via I2C/PMBus allows the robot's battery management system to adjust the power supply output according to needs.
4. Constant current mode selectable via PMBus allows for different charging approaches depending on charging stage.
5. Compliance: EMI class B, EN61000 immunity.
6. Safety: UL+CSA/CCC/CE/UKCA that permits the use in all major regions.

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COMPETITIVE ANALYSIS

Competitor	Sells their power supply as a component
Their Positioning & Selling Points	▪ CANBus interface ▪ Programmable charging curves ▪ Display for visualization of voltage, current, time etc.
Our Differentiation	▪ AGV manufacturers have higher loads and additional functionality on their roadmap. This requires increased battery capacities and charging speeds. Instead of a high-tech power supply as a component, they are looking for partners who are open to supporting their roadmap with adapting power supply solutions and providing expertise. We can be the ideal partner.
Comparative Positioning	▪ Converter unit to interface between the AGV's CANBus and the power supply's PMBus, as there are no hard real-time requirements. ▪ More cost-effective approach, as the customer does not need a display for the power supply in the charging station, and charging is managed via the AGV itself.

uMP Gen II Series

CSU2400AT Series

7.23

AGV ROBOTICS

ADDITIONAL REFERENCES

We Power AGV Charging Stations