Wireless Power Transfer System for Charging Automatic Guided Vehicles (AGV)

D-Broad

D-Broad CORE

Power Transmitting Coil
A leading-edge technology: contact-less charging.

Wireless power transfer opens up a future world of fully automated factories.

Wireless Power Transfer System for Charging Automated Guided Vehicles (AGV)

Do you have a factory system where conveyance is automated, but there need to be employees on hand to change batteries? DAIHEN offers safe, maintenance-free contactless charging solutions.

**D-Broad 1**

Robust to mis-alignment
Even if coil gap shifts, a preset level of electric power is stably supplied with high efficiency

**D-Broad 2**

Easy installation and Relocation
Flexible support not only for initial setup, but also for production line updates

**D-Broad 3**

Large capacity lineup for rapid charging
Charge parameters can be freely set, and the unit supports rapid-charging power storage devices
Wireless power transfer makes it easy to operate AGVs 24 hours a day.

**Configuration and usage**

“D-Broad” System consists of 4 units.

- **Power Receiving Side** (Set to AGV)
  - Power storage devices, battery or others
  - Power receiving unit
  - 85 kHz power is rectified to charge power storage device

- **Power Transmitting Side**
  - Power transmitting unit
  - Converts commercial frequencies (50/60Hz) to high frequency (85kHz)

**Easy to mount on general-purpose AGVs**

Use immediately by attaching the power receiving set to the AGV and installing the power transmitting set at the AGV stop position on the production line.

**Opportunity power charge without stopping production line**

In the past, it was necessary to wait until batteries ran out and then charge them for long periods of time, but now it is possible to operate AGVs 24 hours a day with opportunity charging to compensate for single power cycles in a short time.

**Benefits of Using**

With D-Broad, it is possible to fully automate battery charging operations that have thus far required employee labor, improving productivity and reducing labor costs.

<table>
<thead>
<tr>
<th>Work hours required for battery replacement</th>
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<tbody>
<tr>
<td>10 units (number of AGV units)</td>
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<tr>
<td>5 minutes (replacement work time)</td>
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<tr>
<td>2 shifts</td>
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<tr>
<td>240 days (annual days of operation)</td>
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= 400 hours (24,000 minutes) × hourly cost $25

$10,000 reduction in annual labor costs!
Robust to mis-alignment

Even if coil gap shifts, a preset level of electric power is stably supplied with high efficiency.

Constant current is supplied when distance between power receiving and the power transmitting coil is 20 to 40 mm (0.8" to 1.6"), and stable charging is possible even if AGV stop position is shifted.

AGV alignment mechanisms or guide rails are unnecessary.

» Even if there is some misalignment, charging current will not change

Coil gap distance and charging current

D-Broad CORE

DAIHEN specified range

Stable charging, even when AGV stop position is shifted

D-Broad Slim

Examples of arbitrary production system

System introduction flow

1. Verification of operation status
   D-Broad will verify AGV operation status and report any issues and areas in need of improvement.

2. Power consumption measurement and cost estimate
   D-Broad CORE measures power consumption during AGV operation and calculates necessary charging time and install cost.

3. Proposed system introduction and cost estimate
   D-Broad will propose an optimum system based on customer needs.

4. Order
   Customer approves specifications and cost estimate.

5. Application for High-Frequency Equipment Usage Permit "In Japan"
   Make a supply of the Bureau of Telecommunications for your region before using the product.
   (Please refer to the necessary documents that will be documented.)

6. Delivery
   D-Broad will deliver the product to the location designated by the customer.

Easy installation and relocation

Even if coil gap shifts, a preset level of electric power is stably supplied with high efficiency.

Opportunity wireless charging at temporary stop positions such as loading and unloading points on production line.

» Easy installation on various types of AGVs including under-cart AGVs

» Select from a lineup according to the sizes of AGV and power storage device
Large capacity lineup for rapid charging

Charge parameters can be freely set, and the unit supports rapid-charging power storage devices.

When connecting a lithium-ion battery (LIB), capacitor unit (EDLC), etc. enables quick charging.

Compare required charge time, such as AGV stop time...

When using LiBi/EDLC Unit

10 seconds

20 seconds

60 seconds

When using a lead-acid battery

10A charging

D-Broad Maintenance Tool (Parameter Setting Software)

When changing line layout, AGV operation method, or battery, it is possible for customers to change charging parameters such as charging current and full-charge voltage by themselves.

Frequently Asked Questions

Q. What happens if someone puts their hands between the power transmitting and receiving coils during charging?
   A. There are no exposed metal contact surfaces as there are on conventional chargers, so electric shock will not occur even if someone puts their hands between or touches it by any chance. When the product is used within the specified area, it is less than the standard values stipulated by the Japanese Guidelines for Protection from Radio Waves and the international standards of ICNIRP (International Commission on Non-Ionizing Radiation Protection).

Q. I have heard that batteries’ life is shortened by frequently charging them for short periods of time. Is this true?
   A. For both lead-acid batteries and LIB batteries, lifespan is extended by frequently charging for short periods and not letting them discharge too much.

Q. Do radio frequencies during wireless power transfer interfere with RFID, communications equipment, etc.?
   A. While this product runs at a fundamental wave, 85 KHz, RFID and communication devices normally use the MRH band, so they do not interfere with each other because their frequency bands are significantly different.

Precaution for Use

Use this system in places where not contacted by water.
Use this system in places where not exposed to direct sunlight.
Do not place metallic objects between the power transmitting and receiving coils.
Use the system as a complete set. (This product cannot be combined with wireless power transfer systems of other manufacturers.)
Permission is required for installation because this equipment uses high frequencies (when installed in Japan).

Product specifications and designs are subject to change without notice.

DAIHEN Corporation

This product and its technologies, including software, are the subjects of rights-controlled and export controls. When exporting, it is necessary to verify proper usage and use as regulated by law, and in some cases to carry out application procedures to obtain an export license from the Ministry of Economy, Trade and Industry.

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