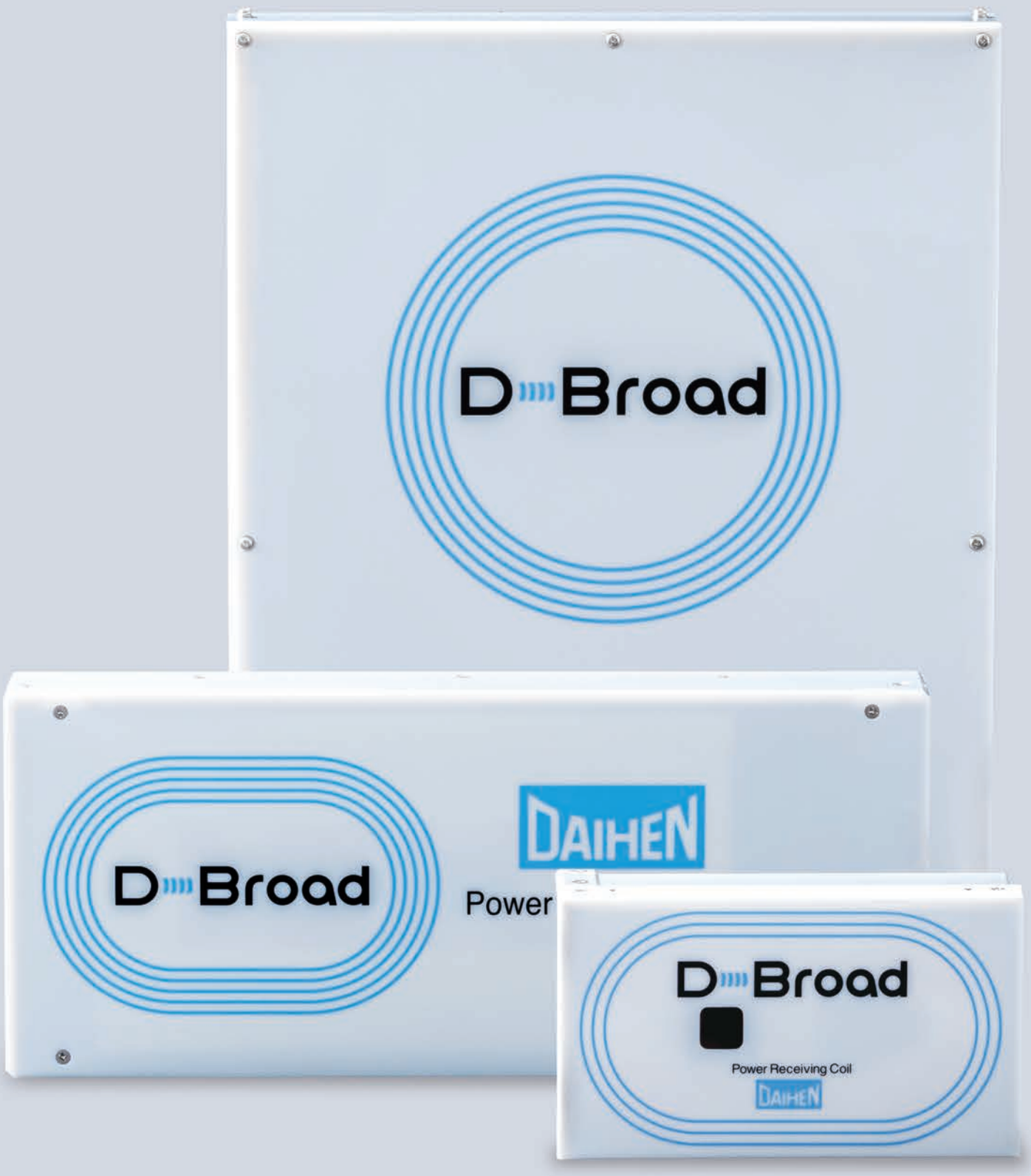
DAIHEN

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

D Broad



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

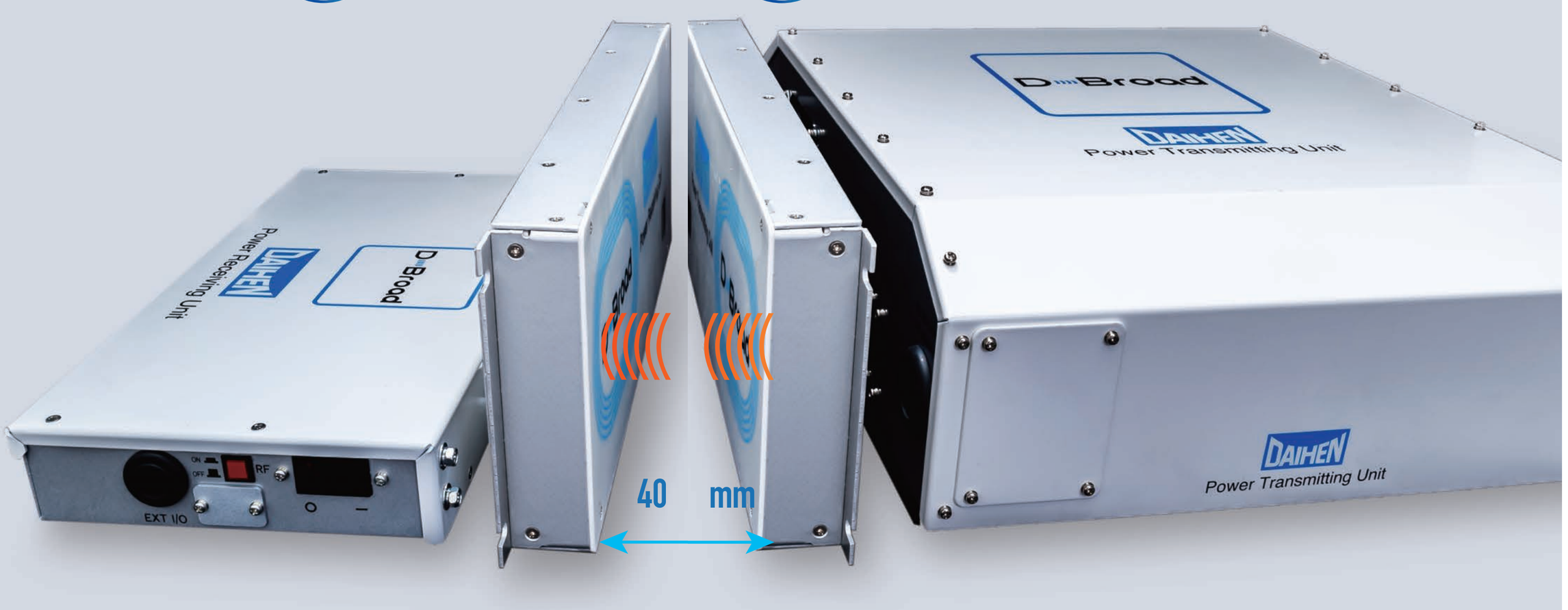
Easy installation and Relocation

Flexible support not only for initial setup, but also for production line updates

D Broad 3

Various lineup meets every customer's need

Parallel charging accepted,
that enables you to charge as quick as you want



Wireless power transfer makes it easy to operate AGVs 24 hours a day.

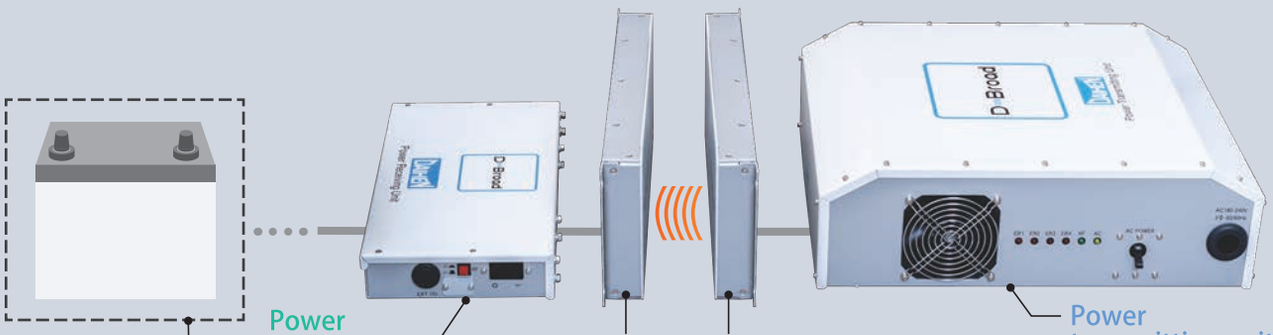
Configuration and usage

"D-Broad" System consists of 4 units.

Power Receiving Side
(Set to AGV)

Wireless Power Transfer

Power Transmitting Side
Set at the AGV stop positions.



Power storage devices,
battery or others

Power receiving unit
85 kHz power is rectified to charge power storage device

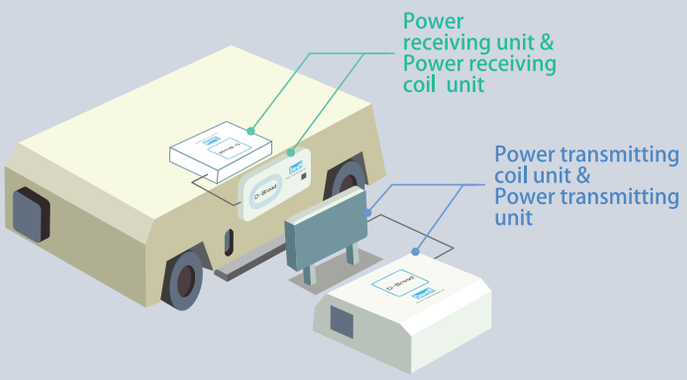
Power receiving coil unit
Converts magnetic energy to electrical energy.

Power transmitting coil unit
Converts electrical energy to magnetic energy.

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

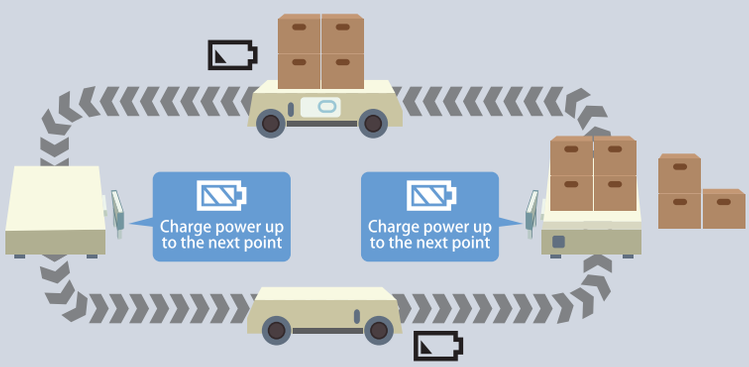
Easy to mount on general-purpose AGVs

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 of single power cycles in a short time.



Opportunity charge at point where loading and unloading stops.

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.

Work hours required for battery replacement

10 units (number of AGV units)
×
5 minutes (replacement work time)
×
2 shifts
×
240 days (annual days of operation)

= **400 hours** (24,000 minutes) × **hourly cost $25**

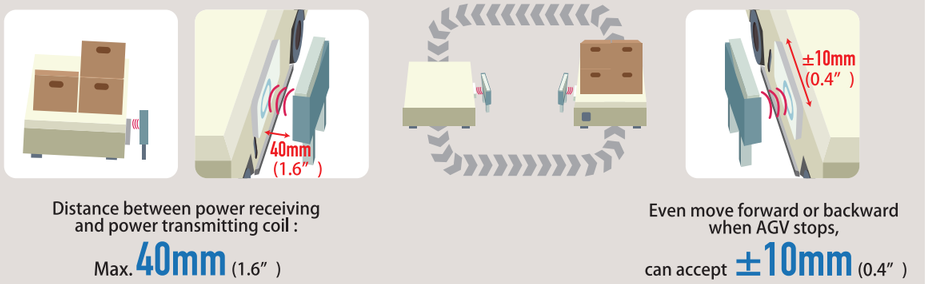
$10,000 reduction in annual labor costs!

D-Broad 1

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.

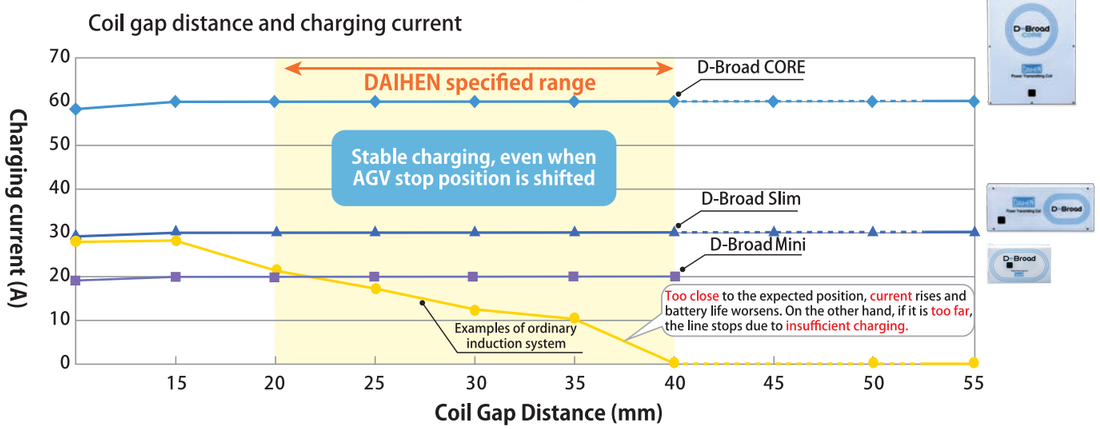


Distance between power receiving and power transmitting coil :
Max. **40mm** (1.6″)

Even move forward or backward when AGV stops,
can accept **±10mm** (0.4″)

AGV alignment mechanisms or guide rails are unnecessary.

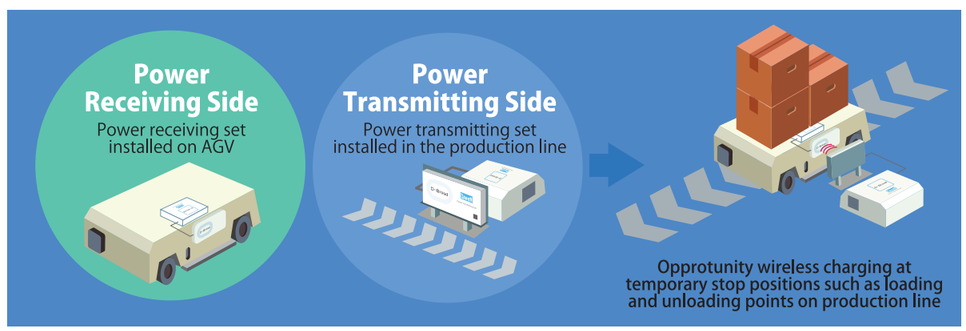
Even if there is some misalignment, charging current will not change



D-Broad 2

Easy installation and relocation

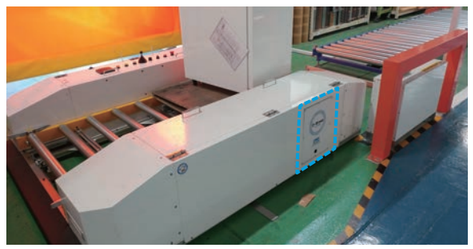
Even if coil gap shifts, a preset level of electric power is stably supplied with high efficiency



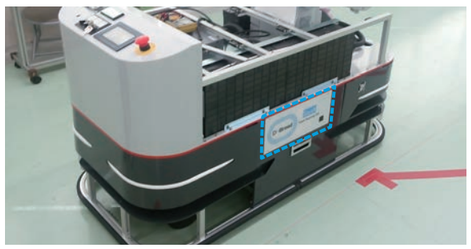
Easy installation on various types of AGVs including under-cart AGVs

Select from a lineup according to the sizes of AGV and power storage device

D-Broad CORE



D-Broad Slim



System introduction flow

1 Verification of operation status

DAIHEN will verify AGV operation status and inquire about requests and areas in need of improvement.

2 Power consumption measurement and cost estimate

DAIHEN will measure power consumption during AGV operation and calculate necessary charging time and initial cost.

3 Proposed system introduction and cost estimate

DAIHEN 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

Please apply to the Bureau of Telecommunications for your region before using the product.

*DAIHEN will prepare necessary documents. It will take about one month to approve the application.

6 Delivery

DAIHEN will deliver the productto the location designated by the customer.

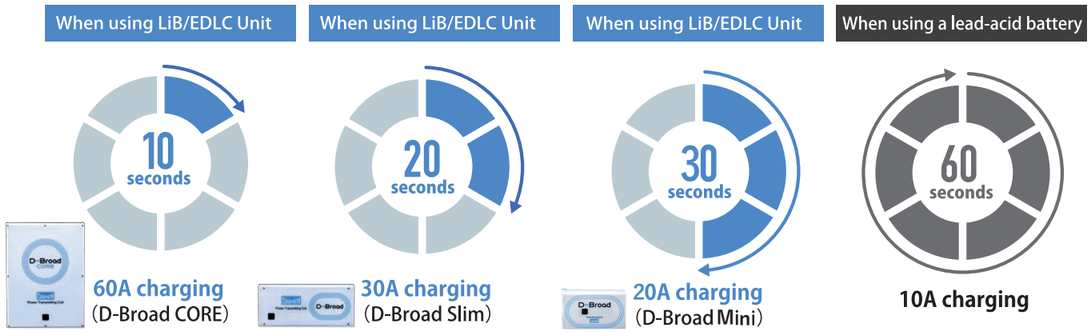
D-Broad 3

Various lineup meets every customer's need

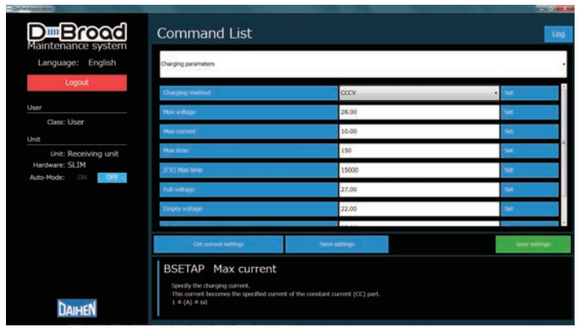
Parallel charging accepted,
that enables you to charge as quick as you want

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

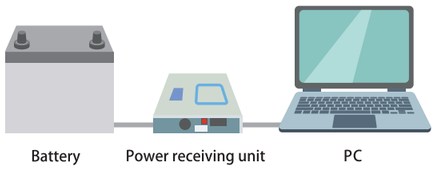
Compare required charge time, such as AGV stop time...



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 occureven if someone puts their hands between or touch it by any chance. When the product is used within the specifiedrange, it is less than the standard values stipulated by the Japanese Guidelines for Protection from Radio Waves and he 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 MHz band, so they do not interfere with each other because their frequency bands are significantly different.

Configuration

- Power transmitting unit ····· 1 unit
- Power transmitting coil unit (including 1m cable connecting to power transmitting unit) ····· 1 unit
- Power receiving unit ····· 1 unit
- Power receiving coil unit (including 1m cable connecting to power transmitting unit) ····· 1 unit

Specifications

		D-Broad CORE	D-Broad Slim	D-Broad Slim (30A continuous)	D-Broad Mini
Common to all units	Distance between the power transmitting and power receiving coil units	30 mm ± 10 mm(1.2" ±0.4") Charging current does not change even if the distance changes			
	AGV stop position misalignment allowable range (In the travelling direction)	Charging current does not change even if the position deviates by ± 10 mm(±0.4")			
	Operating temperature range	0 - 40° C			
	Operating humidity range	20 - 80 % (No dew condensation)			
	Storage temperature range	-20 - 55° C			
	Storage humidity range	20 - 80% (No dew condensation)			
	Recommended maintenance cycle	7 years (Aluminum electrolytic capacitor, fan, semiconductor parts)			
Power transmitting unit	Number of phases	3 phases *			1 phase
	Rated input frequency	50/60Hz			
	Rated input voltage	200/220V±10%			200/230V±10%
	Rated input power	4.0kW	2.0kW		1.0kW
	Required power supply capacity	4.6kVA	2.3kVA		1.1kVA
	Weight	Approx. 7.5 kg			Approx. 8kg
	External dimensions (W×D×H)	343 × 421 × 130 mm (Excluding protrusions)			340x230x150mm (Excluding protrusions)
Power transmitting coil unit	Weight	Approx. 3 kg	Approx. 2.8 kg	Approx. 3.7 kg	Approx. 2kg
	External dimensions (W×D×H)	290 × 66 × 396 mm (Excluding protrusions)	380 × 38 × 150 mm (Excluding protrusions)		230x45x155mm (Excluding protrusions)
Power receiving unit	Maximum charging voltage	60 V			30V
	Maximum current (when charging for a short time)	60 A	30 A		20A
	Maximum current (continuous charging)	30 A	15 A	30 A	20A
	Weight	Approx. 4 kg	Approx. 2.5 kg		Approx. 1.6kg
	External dimensions (W×D×H)	261 × 354 × 80 mm (Excluding protrusions)	355 × 183 × 50 mm (Excluding protrusions)		145x135x80mm (Excluding protrusions)
Power receiving coil unit	Weight	Approx. 3 kg	Approx. 2.6 kg	Approx. 3.6 kg	Approx. 1.5kg
	External dimensions (W×D×H)	290 × 66 × 396 mm (Excluding protrusions)	380 × 38 × 150 mm (Excluding protrusions)		210x45x100mm (Excluding protrusions)

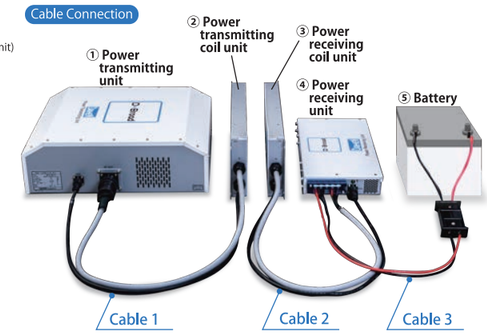
* In the case you would like to use the 1 phase transmitting unit for Slim type, please contact us.

Options

Cable

	Line up	Notes
Cable 1	(2m optional cable) * 1m cable included as standard	(① Power transmitting unit ⇔ ② Power transmitting coil unit)
Cable 2		(③ Power receiving coil unit ⇔ ④ Power receiving unit
Cable 3	Round terminals M6 (1m, 2m)	(④ Power receiving unit ⇔ ⑤ Battery)
	Round terminals M8 (1m, 2m)	
	D1 plug connector (1m, 2m)	
	SB50 connector (1m)	

Cable Connection



Capacitor unit

	57F Capacitor unit	171F Capacitor unit
Capacity	57F	171F
Output voltage range	24V±10% or 48V±10%	
Maximum output current	67.2A (DC24V), 33.6A (DC48V)	
Weight	20kg	40kg
External dimensions (W×D×H)	260 × 346 × 284 mm (Excluding protrusions)	398 × 500 × 359 mm (Excluding protrusions)

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 manufacture.)
- Permission is required for installation because this equipment uses high frequencies (when installed in Japan).

* The specification or design can be changed without announcement.

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September 2020