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Development of 450-kW Dynamic Charge System for Heavy-duty Electric Trucks

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The widespread adoption of electric vehicles (EV) is key to reducing CO2 emissions from vehicles in operation to zero. One example of an initiative furthering the realization of that aim is the introduction of a Dynamic Charging System that recharges EVs in operation directly from the electric road. This paper describes the results of testing Dynamic Charging System for conductive charging from the side applied to heavy-duty trucks.

Fig.1 Dynamic Charge Driving on Curved Roads

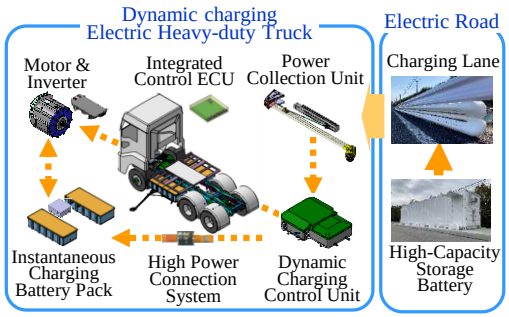


Fig.2 Dynamic Charging Electric Heavy-duty Truck and ERS

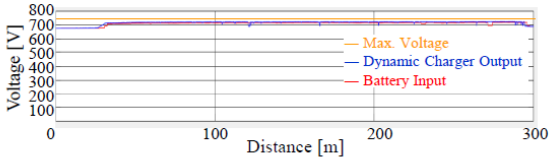
Fig.3 Dynamic Charge Power Unit Layout (6×4 Tractor)

(a) Road Side (b) Shoulder Side

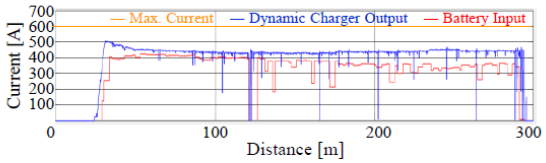
Fig.4 Guardrail Type Dynamic Charge Lane

Table1 Specification of Dynamic Charging Electric Heavy-duty Trucks

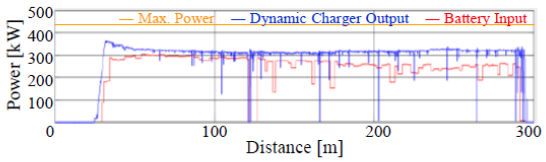
Drive system		4×2	6×4 <New type>
(Total vehicle weight)		(45,290 kg)	(60,940 kg)
Tractor weight		7,250 kg	8,880 kg
Arm opening and closing time		2 sec.	1 sec.
Motor	Max. power	350 kW (476 PS)	
	Max. torque	3,500 N・m	
On-board battery	Max. capacity	100 kWh	
	Max. power	450 kW	
	Max. voltage	DC 750 V	
	Max. current	600 A	
Max. vehicle speed		80 km/h (Limiter)	
Dynamic charge	Vehicle speed	7 (Creep speed) - 80 km/h	
	Max. power	450 kW	
	Max. voltage	DC 750 V	
	Max. current	600 A	
	Power transmission distance	0.1 - 1.6 m	
Cruising distance	Highway	Infinite (km)	
	City	Longer than 50 km	



(a) Dynamic Charge Voltage



(b) Dynamic Charge Current



(c) Dynamic Charge Electric Power

Fig.5 Results of 450-kW Dynamic Charge Test at Curved Roads