

Reference list

Selected projects for rolling stock



REFERENCE LIST

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Dinghan products at a glance

Proven systems for global application



SMARTconverter for short-distance trains

The SMARTconverter is an auxiliary power converter with an input converter with medium-frequency galvanic separation. It is highly energy-saving and reliable and used in metros, urban railways and commuter trains all around the world.



SMARTconverter for long-distance trains

The SMARTconverter is also designed for cross-border long-distance passenger trains. The multi-voltage auxiliary power converter with medium-frequency galvanic separation is in service throughout Europe. It is highly reliable since it has no electromechanical change of configuration.



SMARTcharger

The SMARTcharger is a battery charger that converts the input voltage into the DC output voltage required for the train battery. It is available for all common input voltages, battery systems and performance classes as standard and characterized by its compact design and reliability.



SMARTcooler

The SMARTcooler is a reliable inverter especially for air conditioning systems. It is available with and without galvanic separation, universally applicable and delivered either as single device or for integration into the air conditioning inverter.



SMARTview

SMARTview is a diagnostic tool that collects the most important operation data. The collected data is transferred to a PC via an Ethernet interface and displayed with a standard browser in an easy-to-read format. Moreover, SMARTview can be easily retrofitted into products that are already in service.



Custom-tailored solutions

Dinghan also offers customized converters that are suitable for applications other than standard. Together with the customer, experienced development engineers select the ideal power electronics topology. Thus, it is possible to elaborate a custom-tailored solution within a very short time.

SMARTconverter

MEENT-SD: auxiliary power converters for short-distance trains

Project & facts		Quantity	Customer	Type
	Bilbao Metro – Line 3	56	CAF	New built
	Operator: Eusko Trenbideak, Ferrocarriles Vascos S.A., Basque Country, Spain Delivery: 2015 – 2016 Input: 1,500 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 75 kVA DC output: 110 V DC, 20 kW Installation: underfloor container			
	Santiago de Chile Metro	74	CAF	New built
	Operator: Metro de Santiago S.A., Chile Delivery: 2015 – 2017 Input: 1,500 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 140 kVA DC output: 110 V DC, 20 kW Installation: underfloor container			
	Santiago de Chile Metro	70	Alstom	Refurbishment
	Operator: Metro de Santiago S.A., Chile Delivery: 2015 – 2017 Input: 750 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 170 kVA DC output: 72 V DC, 30 kW Installation: underfloor container			
	Kochi Metro	50	Alstom	New built
	Operator: Kochi Metro Rail Ltd., India Delivery: 2015 – 2016 Input: 750 V DC AC output: 3 x 415 V AC, 50 Hz, 170 kVA DC output: 110 V DC, 30 kW Installation: underfloor container			
	NSR Sprinter	236	CAF	New built
	Operator: Nederlandse Spoorwegen N. V., Netherlands Delivery: 2016 – 2019 Input: 1,500 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 145 kVA DC output: 110 V DC, 15 kW Installation: roof-mounted			

SMARTconverter

MEENT-SD: auxiliary power converters for short-distance trains

Project & facts		Quantity	Customer	Type
	Izmir EMU Operator: Izmir Banliyö Tasimaciligi A. S. (IZBAN), Turkey Delivery: 2009 – 2010 Input: 1 x 400 V AC, 50 Hz AC output: 3 x 230 / 400 V AC, 50 Hz, 115 kVA DC output: 110 V DC, 14 kW Installation: underfloor container	66	CAF	New built
	Caracas Metro Operator: C.A. Metro de Caracas, Venezuela Delivery: 2010 – 2012 Input: 750 V DC AC output: 3 x 220 / 380 V AC, 60 Hz, 135 kVA DC output: 72 V DC, 14 kW Installation: underfloor container	192	CAF	New built
	São Paulo Metro – Line 3 and Line 5 Operator: Companhia do Metropolitano de São Paulo, Brazil Delivery: 2009 – 2014 Input: 750 V DC or 1,500 V DC AC output: 3 x 220 / 380 V AC, 60 Hz, 135 kVA DC output: 72 V DC, 14 kW Installation: underfloor container	178	CAF	New built
	Mumbai Monorail Operator: Mumbai Metropolitan Region Development Authority (MMRDA), India Delivery: 2009 – 2010 Input: 750 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 22 kVA DC output: 24 V DC, 13 kW Installation: open frame for integration	60	Scomi	New built
	Kaohsiung Metro Operator: Kaohsiung Rapid Transit Corporation (KRTC), Taiwan Delivery: 2004 – 2006 Input: 750 V DC AC output: 3 x 220 / 380 V AC, 60 Hz, 135 kVA DC output: 110 V DC, 16 kW Installation: underfloor container	84	Siemens	New built

SMARTconverter

MEENT-SD: auxiliary power converters for short-distance trains

Project & facts		Quantity	Customer	Type
	Regio Citadis Operator: Regionalbahn Kassel (RBK), Germany, RandstadRail, Netherlands Delivery: 2004 – 2011 Input: 750 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 35 kVA DC output: 24 V DC, 13 kW Installation: roof-mounted	300	Alstom	New built
	Intercity DDZ Operator: Nederlandse Spoorwegen N.V. (NS), Netherlands Delivery: 2011 – 2014 Input: 1,500 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 80 kVA, redundant DC output: 110 V DC, 15 kW, redundant Installation: special integration into vehicle Diagnostics: SMARTview	50	NedTrain	Refurbishment
	Intercity ICM Operator: Nederlandse Spoorwegen N.V. (NS), Netherlands Delivery: 2006 – 2011 Input: 1,500 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 140 kVA DC output: 110 V DC, 16 kW Installation: underfloor container	187	NedTrain	Refurbishment
	Coradia Nordic X60/X61/X62 Operator: e.g. AB Storstockholms Lokaltrafiken, Skånetrafiken, Norrtåg AB, Sweden Delivery: 2003 – 2018 Input: 1,500 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 105 kVA DC output: 110 V DC, 20 kW Installation: roof-mounted	538	Alstom	New built
	Istanbul Metro Operator: İstanbul Ulaşım Sanayi ve Ticaret A.Ş., Turkey Delivery: 2010 – 2012 Input: 1,500 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 135 kVA DC output: 110 V DC, 18 kW Installation: underfloor container	72	CAF	New built

SMARTconverter

MEENT-SD: auxiliary power converters for short-distance trains

Project & facts		Quantity	Customer	Type
	EuskoTren EMU	30	CAF	New built
	Operator: Eusko Trenbideak, Ferrocarriles Vascos S.A., Basque Country, Spain Delivery: 2011 – 2012 Input: 1,500 V DC AC-Ausgang: 3 x 230 / 400 V AC, 50 Hz, 135 kVA DC output: 110 V DC, 18 kW Installation: underfloor container Diagnostics: SMARTview			
	Santiago de Chile Metro	96	CAF	New built
	Operator: Metro de Santiago S.A., Chile Delivery: 2012 – 2016 Input: 750 V DC AC output: 3 x 220 / 380 V AC, 50 Hz, 135 kVA DC output: 72 V DC, 14 kW Installation: underfloor container Diagnostics: SMARTview			
	United Streetcar, USA	22	Siemens AG, Österreich	New built
	Operator: e.g. DC Streetcar, District Department of Transportation (DDOT), Washington DC, USA Delivery: 2011 – 2013 Input: 750 V DC AC output: 3 x 460 V AC, 60 Hz, 50 kVA, redundant DC output: 24 V DC, 5.5 kW, redundant Installation: roof-mounted Diagnostics: SMARTview			
	Panama Metro	38	Alstom	New built
	Operator: Metro Panama City, Panama Delivery: 2012 – 2014 Input: 1,500 V DC AC output: 3 x 220 V AC, 60 Hz, 127 kVA DC output: 72 V DC, 18 kW Installation: underfloor container Diagnostics: SMARTview			
	Singapore Metro	48	Alstom	New built
	Operator: SMRT Corporation Ltd., Singapore Delivery: 2013 – 2015 Input: 750 V DC AC output: 3 x 230 / 400 V AC, 50 Hz, 127 kVA DC output: 110 V DC, 27 kW Installation: underfloor container Diagnostics: SMARTview			

SMARTconverter

MEENT-LD: auxiliary power converters for long-distance trains

Project & facts		Quantity	Customer	Type
	Venice Simplon Orient Express Operator: Orient-Express Hotels Ltd., United Kingdom Delivery: 2005 – 2006, 2016 Input: 1 kV AC, 1.5 kV AC and DC, 3 kV DC AC output: 3 x 230 / 400 V AC, 50 Hz, 35 kVA DC output: 24 V DC, 6.6 kW Installation: underfloor container	18	Rail Service International	Refurbishment
	CityNightLine Operator: City Night Line AG (CNL), Switzerland Delivery: 2003 Input: 1 kV AC, 1.5 kV AC and DC, 3 kV DC AC output: 3 x 230 / 400 V AC, 50 Hz, 69 kVA DC output: 24 V DC, 6.6 kW Installation: special integration into vehicle	8	Bombardier	Refurbishment
	EuroCity Operator: Schweizerische Bundesbahnen (SBB), Switzerland Delivery: 2009 – 2014 Input: 1 kV AC, 1.5 kV AC and DC, 3 kV DC AC output: 3 x 230 / 400 V AC, 50 Hz, 57 kVA DC output: 36 V DC, 16 kW Installation: underfloor container	240	Schweizerische Bundesbahnen	Refurbishment
	Various German InterCity and EuroCity coaches, including couchette, service and bistro coaches Operator: Deutsche Bahn AG (DB), Germany Delivery: 2000 – 2014 Input: 1 kV AC, 1.5 kV AC and DC, 3 kV DC AC output: e.g. 3 x 230 / 400 V AC / 50 Hz, 35 kVA DC output: e.g. 24 V DC, 6.6 kW Installation: underfloor container Diagnostics: SMARTview	296	Deutsche Bahn AG	Refurbishment
	Sleeping car, Bulgaria Operator: Bulgarian State Railways (BDZ), Bulgaria Delivery: 2011 – 2012 Input: 1 kV AC, 1.5 kV AC and DC, 3 kV DC AC output: 3 x 230 / 400 V AC, 50 Hz, 35 kVA DC output: 24 V DC, 8 kW Installation: underfloor container Diagnostics: SMARTview	30	Medel	New built

SMARTview

Diagnostics via Ethernet interface

Project & facts		Quantity	Customer	Type
	AGV Operator: Nuovo Trasporto Viaggiatori, Italy Delivery: 2010 – 2011 Type: Ethernet, integrated webserver Function: diagnostic, vehicle interface	100	Alstom	New built
	Intercity DDZ Operator: Nederlandse Spoorwegen N.V. (NS), Netherlands Delivery: 2006 – 2011 Type: Ethernet, integrated webserver Function: diagnostic, vehicle interface	50	NedTrain	Refurbishment
	Civity DMU / EMU Operator: Trenitalia, Sardinia, Italy Delivery: 2012 Type: Ethernet, integrated webserver Function: diagnostic	34	CAF	New built
	EuroCity Operator: Schweizerische Bundesbahnen (SBB), Switzerland Delivery: 2009 – 2014 Type: Ethernet, integrated webserver Function: diagnostic	240	Schweizerische Bundesbahnen	Refurbishment
	Melbourne Metro Operator: Metro Trains Melbourne Pty Ltd (MTM), Australia Delivery: 2011 Type: Ethernet, integrated webserver Function: diagnostic	2	UGL Rail	Refurbishment

SMARTcharger

Compact battery chargers for every application

Project & facts		Quantity	Customer	Type
	AGV Operator: Nuovo Trasporto Viaggiatori, Italy Delivery: 2010 – 2013 AC input: 3 x 400 V AC, 50 Hz DC output: 110 V DC, 30 kW Installation: underfloor container	100	Alstom	New built
	Pesa DMU 620M Operator: different operators, Lithuania, Ukraine Delivery: 2006 – 2011 AC input: 3 x 400 V AC, 50 Hz DC output: 24 V DC, 6.6 kW Installation: open frame for integration	40	Pesa	New built
	Movia Shanghai, Guangzhou and Shenzhen Operator: Shanghai Shentong Metro Group Co., Ltd., Guangzhou Metro Corporation (GMC), Shenzhen Metro Co., Ltd., China Delivery: 2000 – 2011 DC input: 1,500 V DC DC output: 110 V DC, 25 kW Installation: underfloor container	348	Changchun Bombardier RC	New built
	TGV POS, TGV Dasye and RGV2N2 Operator: Société Nationale des Chemins de Fer Français (SNCF), France Delivery: 2006 – 2018 DC input: 530 V DC DC output: 72 V DC, 9 kW Installation: underfloor container	700	Alstom	New built
	Interregio coaches Operator: Deutsche Bahn AG (DB), Germany Delivery: 1990 – 1996 AC input: 1,000 V AC, 16.7 Hz DC output: 24 V DC, 6.6 kW Installation: underfloor container	650	Deutsche Bahn AG	Refurbishment

SMARTcharger

Compact battery chargers for every application

Project & facts		Quantity	Customer	Type
	Civity DMU, Sardinia Operator: Trenitalia, Sardinia, Italy Delivery: 2012 – 2013 AC input: 3 x 400 V AC, 50 Hz DC output: 24 V DC, 10 kW Installation: roof-mounted Diagnostics: SMARTview	8	CAF	New built
	Civity EMU, Trieste Operator: Trenitalia, Italy Delivery: 2011 – 2012 AC input: 3 x 400 V AC, 50 Hz DC output: 24 V DC, 10 kW Installation: roof-mounted Diagnostics: SMARTview	15	CAF	New built
	DMU, Czech Republic Operator: České dráhy a.s., Czech Republic Delivery: 2012 – 2013 AC input: 3 x 400 V AC, 50 Hz DC output: 24 V DC, 10 kW Installation: open frame for integration	62	PESA	New built
	Shanghai Metro Operator: Shanghai Shentong Metro Group Co., Ltd. China Delivery: 2008 – 2010 AC input: 3 x 400 V AC, 50 Hz DC output: 110 V DC, 9 kW Installation: underfloor container	85	Alstom	New built
	DMU, Oberpfalzbahn Operator: Netinera Deutschland GmbH, Germany Delivery: 2012 – 2014 AC input: 1 x 230 V AC, 50 Hz DC output: 24 V DC, 6.6 kW Installation: open frame for integration Diagnostics: SMARTview	24	PESA	New built

SMARTcooler

Compact and flexible three-phase inverters

Project & facts	Quantity	Customer	Type
 Combino Plus Operator: BKV Zrt. Budapest, Hungary Delivery: 2006 – 2007 DC input: 600 V DC AC output: 3 x 400 V AC, 50 Hz, CVCF, 30 kVA Installation: special integration into vehicle	120	Thermo King / Siemens	New built
 Riyadh Metro Operator: Saudi Railways Organization (SRO), Saudi Arabia Delivery: 2010 – 2011 DC input: 750 V DC AC output: 3 x 400 V AC, 50 Hz, VVVF, 30 kVA Installation: open frame for integration	44	Webasto / Ansaldo Breda	New built
 Athens Metro Operator: ISAP S.A. (urban rail), Greece Delivery: 2007 DC input: 750 V DC AC output: 3 x 400 V AC, 50 Hz, CVCF, 35 kVA Installation: special integration into vehicle	240	Thermo King	Refurbishment
 AGV Operator: Nuovo Trasporto Viaggiatori, Italy Delivery: 2010 – 2011 AC input: 3 x 400 V AC, 50 Hz, PWM AC output: 3 x 400 V AC, 60 Hz, VVVF, 6 kVA Installation: special integration into vehicle	275	Mitsubishi Electric, Alstom	New built
 Arriva-Länderbahn Express ("Alex") Operator: Regentalbahn AG, Germany Delivery: 2008 Input: 1 kV AC, 1.5 kV AC and DC, 3 kV DC AC output: 3 x 400 V AC, 50 Hz, VVVF, 35 kVA Installation: underfloor container	17	Verkehrs Industrie Systeme GmbH	Refurbishment

SMARTcooler

Compact and flexible three-phase inverters

Project & facts		Quantity	Customer	Type
	Rotterdam Citadis	61	Alstom	Refurbishment
	Operator: Rotterdamse Elektrische Tram N.V., Netherlands Delivery: 2015 – 2016 DC input: 600 V DC AC output: 3 x 480 V AC, 60 Hz, 57 kVA 3 x 400 V AC, 50 Hz, 5 kVA Installation: roof-mounted container			
	Bursa Tram	49	Webasto	Refurbishment
	Operator: Burulaş Bursa Ulaşım Toplu Taşıım İşletmeciliği Turizm San. Ve Tic. A.Ş., Turkey Delivery: 2011 DC input: 1,500 V DC AC output: 3 x 400 V AC, 50 Hz, 36 kVA Installation: roof-mounted Diagnostics: SMARTview			
	ET 474 Plus, S-Bahn Hamburg	3	Faiveley	Refurbishment
	Operator: Deutsche Bahn AG (DB), Germany Delivery: 2010 DC input: 1,200 V DC AC output: 3 x 460 V AC, 60 Hz, 13 kVA 3 x 560 V AC, 35 ... 65 Hz, 18 kVA Installation: open frame for integration Diagnostics: SMARTview			
	Bistro coaches, Germany	239	Deutsche Bahn AG	Refurbishment
	Operator: Deutsche Bahn AG (DB), Germany Delivery: 2002 – 2009 AC input: 460 V AC (2 x 230 V AC) 50 Hz, 16 2/3 Hz AC output: 3 x 285 V AC, 65 Hz, 25 kVA Installation: special integration into vehicle			
	Denver Light Rail	65	Thermo King / Ingersoll Rand	Refurbishment
	Operator: Denver Regional Transit District (RTD), Colorado, USA Delivery: 2013 – 2015 DC input: 600 / 750 V DC AC output: 3 x 208 V AC, 60 Hz, 21 kVA Installation: special integration into vehicle			

Special solutions

Customized systems from one source

Project & facts	Quantity	Customer	Type
	80	AKN Eisenbahn AG	Refurbishment
IGBT traction power stack Type: DRTU Operator: AKN Eisenbahn AG, Germany Delivery: 2005 DC input: 750 V DC AC output: 0 ... 560 V AC, 0 ... 200 Hz, 200 kVA			
	1	Alstom	New built
Electronic replacement of traction transformer Type: MEV Operator: Alstom, Germany Delivery: 2004 AC input: 15,000 V AC, 16.7 Hz DC output: 1,650 V DC, 1,500 kW			
	85	Kirsch GmbH	New built
Power converter for variable speed generator set Type: MSA125 and MSA40 Operator: various military applications Delivery: 2009 – 2011 AC input: 3 x 310 ... 620 V AC, 120 ... 240 Hz AC output: 3 x 230 / 400 V AC, 50 Hz, CVCF, 125 or 44 kVA			
	1,200	Deutsche Bahn AG	New built
Heat regulator for ICE 1, ICE 2, BVMZ IC coaches Type: NHS Operator: Deutsche Bahn AG, Germany Delivery: 2002 – 2007 AC input: 3 x 400 V AC, 50 Hz AC output: 3 x 0 ... 400 V AC, 50 Hz, 2 kVA			
	18	e.g. Hydro- genics Europe	New built
Step-up/step-down converter for fuel cells Type: Hotis Operator: e.g. Kasseler Verkehrs-Gesellschaft AG (KVG), Germany Delivery: 2006 – 2008 DC input: 37 ... 57 V DC DC output: 60 ... 110 V DC, 12 kW			

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