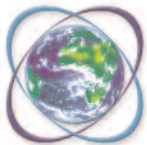


# Rail Projects

Year Entered Service & Vehicle Builder	Customer	Wiper Arm Type	Motor Torque	Max Speed	Voltage	Quantity	Year Entered Service	Country	Vehicle Type
Alstom Transport GEC	London Jubilee Line L14	Pantograph	50Nm	100 Km/h	-52V DC	348	1998	UK	LUL
Alstom Transport GEC	London Northern Line L15	Pantograph	50Nm	100 Km/h	-52V DC	636	1998	UK	LUL
Alstom Transport Ltd (Juniper)	Gatwick Airport - Class 460	Pantograph	80Nm	160 Km/h	110V DC	32	2001	UK	EMU
Alstom Transport Ltd (Juniper)	South West Train - Class 458	Pantograph	80Nm	160 Km/h	110V DC	120	2001	UK	EMU
Alstom Transport Ltd (Juniper)	Scot Rail - Class 334	Pantograph	80Nm	160 Km/h	110V DC	160	2001	UK	EMU
Alstom Transport Ltd (Coradia)	Firstgroup DMU - Class 175	Pantograph	80Nm	160 Km/h	110V DC	108	2000	UK	DMU
Alstom Transport Ltd (Coradia)	Firstgroup DMU - Class 180	Pantograph	80Nm	200 Km/h	110V DC	56	2002	UK	DMU
Alstom Transport Ltd	Arlanda Airport Project	Pendulum	80Nm	200 Km/h	110V DC	28	2000	Sweden	Metro
Alstom Transport SA (Metropolis)	Singapore Metro	Pantograph	80Nm	100 Km/h	110V DC	50	2001	Singapore	Metro
Alstom Transport SA (Metropolis)	Shanghai Metro	Pantograph	80Nm	100 Km/h	24V DC	56	2002	China	Metro
Alstom Transport SA (Metropolis)	Nanjing Metro	Pantograph	80Nm	100 Km/h	24V DC	20	2004	China	Metro
Alstom Transport SA (X'trapolis)	Melbourne Hillside	Dual Pendulum	80Nm	120 Km/h	24V DC	120	2003	Australia	Metro
Alstom Transport SA (X'trapolis)	Merval	Dual Pendulum	80Nm	120 Km/h	24V DC	54	2004	Chile	Metro
Alstom Transport SA (Petite Foret)	Marina Line	Pantograph	80Nm	90 Km/h	110V DC	88	2003	Singapore	Metro
Alstom Transport Ltd	London Underground L17	Pantograph	50Nm	100Km/h	-52V DC	96	2004	UK	LUL
Alstom Transport Ltd	Alstom X60	Pantograph	80Nm	200 Km/h	110V DC	55	2005	Sweden	EMU
Alstom Transport Ltd	Alstom X61	Pantograph	80Nm	200 Km/h	110V DC	30	2008	Sweden	EMU
Bombardier (Austria)	Istanbul (LRV)	Pantograph	110Nm	100 Km/h	24V DC	120	2002	Turkey	LRV
Bombardier (Austria)	Eskisehir (LRV)	Pantograph	110Nm	100 Km/h	24V DC	36	2003	Austria	LRV
Bombardier (Austria)	Geneva (LRV)	Pantograph	110Nm	100 Km/h	24V DC	40	2003	Switzerland	LRV
Bombardier (Austria)	U6 (LRV)	Pantograph	110Nm	100 Km/h	24V DC	36	2005	Austria	LRV
Bombardier (Austria)	Cologne Tram	Pantograph	80Nm	100 Km/h	24V DC	134	2005	Germany	LRV
Bombardier (Austria)	Marseille	Pantograph	110Nm	100 Km/h	24V DC	52	2006	France	Metro
Bombardier (Austria)	Innsbruck	Pantograph	80Nm	100 Km/h	24V DC	22	2006	Austria	Metro
Bombardier (Austria)	Porto	Pantograph	80Nm	100 Km/h	24V DV	30	2007	Portugal	Metro
Bombardier (Austria)	Stockholm	Pantograph	110Nm	100 Km/h	24V DV	9	2007	Sweden	LRV
Bombardier (Austria)	Manchester Tram	Pantograph	110Nm	100 Km/h	24V DC	12	2008	UK	LRV
Bombardier (Austria)	Postlingbergbahn	Pantograph	110Nm	100 Km/h	24V DC	3	2008	Austria	LRV
Bombardier (Belgium)	T3000	Pantograph	110Nm	100 Km/h	24V DC	94	2005	Belgium	LRV
Bombardier (Canada)	Yong In	Pantograph	80Nm	120 Km/h	48V DC	60	2006	Taiwan	ART
Bombardier (Canada/USA)	North East Corridor	Pantograph	80Nm	240 Km/h	72V DC	84	1999	USA	Inter city
Bombardier (Canada)	Vancouver LRV	Pantograph	80Nm	100 Km/h	48V DC	60	2001	Canada	LRV
Bombardier (China) Sifang Power	Qingdao	Pantograph	80Nm	200 Km/h	24V DC	40	2005	China	EMU
Bombardier (France)	AGC (SNCF)	Pantograph	80Nm	160 Km/h	72V DC	500	2003	France	EMU
Bombardier (Germany)	Berlin	Pantograph	80Nm	100 Km/h	24V DC	200	2007	Germany	Metro
Bombardier (Germany)	Frankfurt	Dual Wrapover	80Nm	100 Km/h	24V DC	146	2007	Germany	Metro
Bombardier (Germany)	Valencia	Pantograph	110Nm	100 Km/h	24V DC	60	2006	Spain	Metro
Bombardier (Germany)	Rotterdam	Pantograph	110Nm	100 Km/h	24V DC	42	2007	Holland	Metro
Bombardier (Germany)	Docklands	Pantograph	80Nm	100 Km/h	24V DC	55	2007	UK	Metro
Bombardier (Germany)	Delhi	Pantograph	80Nm	100 Km/h	110V DC	83	2008	India	Metro
Bombardier (Germany)	BDT	Pantograph	80Nm	120 Km/h	24V DC	24	2006	Hungary	EMU
Bombardier (Mexico)	Hiawatha (LRV)	Pantograph	80Nm	100 Km/h	24V DC	55	2002	USA	LRV
Bombardier (Portugal) (Eurotram)	Metro do Porto	Pendulum	80Nm	80 Km/h	24V DC	72	2002	Portugal	LRV
Bombardier (UK) (Eurotram)	CTS Strasbourg Phase I	Pendulum	80Nm	60 Km/h	24V DC	52	1996	France	LRV
Bombardier (UK) (Eurotram)	CTS Strasbourg Phase II	Pendulum	80Nm	60 Km/h	24V DC	54	1998	France	LRV
Bombardier (UK) (Electrostar)	LTS (C2C) - Class 357	Pantograph	80Nm	160 Km/h	110V DC	88	2001	UK	EMU
Bombardier (UK) (Electrostar)	Connex/Govia - Class 375	Pantograph	80Nm	160 Km/h	110V DC	60	2001	UK	EMU
Bombardier (UK) refit	Class 91	Pantograph	80Nm	200 Km/h	110V DC	62	2001	UK	Inter city
Bombardier (UK)	Nottingham Tram	Pendulum	80Nm	80 Km/h	24V DC	30	2003	UK	LRV
Bombardier (UK) (Electrostar)	Connex 8/9 - Class 376	Pantograph	80Nm	160 Km/h	110V DC	72	2003	UK	EMU

Continued overleaf...

Year Entered Service & Vehicle Builder	Customer	Wiper Arm Type	Motor Torque	Max Speed	Voltage	Quantity	Year Entered Service	Country	Vehicle Type
Bombardier (UK) refit	DVT	Pantograph	80Nm	200 Km/h	110V DC	62	2003	UK	Inter city
Bombardier (UK) refit	Class 315	Pantograph	80Nm	160 Km/h	110V DC	12	2003	UK	EMU
Bombardier (UK)	Turbostar - Class 170	Pantograph	80Nm	160 Km/h	24V DC	74	2003	UK	DMU
Bombardier (UK)	VLU	Pantograph	80Nm	150 Km/h	110V DC	47	2005	UK	LUL
Bombardier (UK)	SSL	Pantograph	80Nm	150 Km/h	110V DC	190	2007	UK	LUL
Bombardier (UK)	Gautrain	Pantograph	80Nm	200 Km/h	110V DC	48	2007	UK	EMU
Bombardier (UK)	ELR	Pantograph	80Nm	160 Km/h	110V DC	44	2007	UK	EMU
Bombardier (UK)	Southern 44	Pantograph	80Nm	160 Km/h	110V DC	22	2008	UK	EMU
Bombardier (UK)	Southern 48	Pantograph	80Nm	160 Km/h	110V DC	24	2008	UK	EMU
Brel ABB	Railpart Brel	Pantograph	80Nm	121 Km/h	110V DC	95	2003	UK	EMU
GEC Alstom	Railpart Metcam	Pantograph	80Nm	121 Km/h	110V DC	105	2003	UK	EMU
Loetec	Loetec	-	80Nm	-	24V DC	250	2003	Germany	-
Poznan Rail Bus	Romac	Pantograph	80Nm	100 Km/h	24V DC	12	2007	Poland	LRV
RCS Gmbh	Talgo 250	Pantograph	80Nm	250 Km/h	24V DC	20	2005	Germany	Metro
Rotem (Korea)	Manila	Pendulum	80Nm	100 Km/h	110V DC	36	2002	Philippines	Metro
Slingsby	Oslo Tram	Pantograph	50Nm	100 Km/h	24V DC	33	2005	Norway	Metro
Tranzrail (New Zealand)	Tranzrail	Pantograph	50Nm	120 Km/h	72V DC	70	1998	N. Zealand	Loco
Woojin (Korea)	Busan LRT	Pantograph	80Nm	60 Km/h	110V DC	40	2007	Busan	LRT
Changchun Rail Company (China)	Beijing Metro	Dual Pantograph	80Nm	100 Km/h	24V DC	112	2003	China	Metro
Changchun Rail Company (China)	Tianjing	Pendulum	110Nm	100 Km/h	110V DC	40	2003	China	Metro
Changchun Rail Company (China)	Wuhan Metro	Pendulum	110Nm	100 Km/h	24V DC	30	2003	China	Metro
Changchun Rail Company (China)	Iran Metro	Pendulum	110Nm	100 Km/h	24V DC	22	2004	Iran	Metro
Changchun Rail Company (China)	Iran 77	Dual Pendulum	80Nm	100 Km/h	110V DC	22	2004	Iran	Metro
Changchun Rail Company (China)	Iran 105	Dual Pantograph	80Nm	100 Km/h	110V DC	32	2004	Iran	Metro
Changchun Rail Company (China)	Beijing Extension	Pantograph	80Nm	100 Km/h	24V DC	2	2005	China	Metro
Changchun Rail Company (China)	Tianjing Metro	Pantograph	80Nm	100 Km/h	24V DC	49	2005	China	Metro
Changchun Rail Company (China)	Chong Qing	Pantograph	80Nm	100 Km/h	24V DC	38	2005	China	Metro
Changchun Rail Company (China)	Iran 119	Dual Pantograph	80Nm	100 Km/h	110V DC	34	2005	China	Metro
Changchun Rail Company (China)	Beijing Line 5	Pantograph	80Nm	100 Km/h	24V DC	85	2005	China	Metro
Changchun Rail Company (China)	Beijing Line 2	Pantograph	80Nm	100 Km/h	24V DC	48	2007	China	Metro
Changchun Rail Company (China)	Beijing Line 10	Pantograph	80Nm	100 Km/h	24V DC	68	2007	China	Metro
Changchun Rail Company (China)	Beijing Airport Line	Pantograph	80Nm	100 Km/h	48V DC	10	2007	China	Metro
Changchun Rail Company (China)	Shenzhen	Pantograph	80Nm	100 Km/h	24V DC	20	2007	China	Metro
Changchun Rail Company (China)	Shenyang	Pantograph	80Nm	100 Km/h	24V DC	23	2007	China	Metro
Changchun Rail Company (China)	Dual 300	Pantograph	80Nm	300 Km/h	24V DC	10	2008	China	Metro
CSR (China)	Guangzhou Line 4	Pantograph	80Nm	100 Km/h	110V DC	30	2008	China	Metro
CSR (China)	Guangzhou Line 5	Pantograph	80Nm	100 Km/h	110V DC	30	2008	China	Metro
Siemens (Czech)	Maracaibo	Pantograph	110Nm	120 Km/h	24V DC	14	2005	Czech	EMU
Siemens (Germany)	Oslo Tram	Pantograph	50Nm	100 Km/h	24V DC	33	2004	Norway	Metro
Siemens (Germany)	Kaohsiung	Pantograph	50Nm	100 Km/h	24V DC	33	2005	Taiwan	Metro
Siemens (Germany)	Avanto	Pantograph	110Nm	120 Km/h	24V DC	36	2005	France	EMU
Siemens (Germany)	Bangkok	Pantograph	80Nm	180 Km/h	24V DC	18	2006	Thailand	DMU
Siemens (Germany)	Avanto Mullhouse	Pantograph	110Nm	120 Km/h	24V DC	12	2008	France	EMU
Siemens (UK)	Siemens Desiro	Pantograph	80Nm	180Km/h	24V DC	800	2003	UK	DMU
Siemens (USA)	Portland LRV	Dual Pendulum	80Nm	100 Km/h	24V DC	34	2003	USA	LRV
Siemens (USA)	Houston LRV	Pantograph	80Nm	100 Km/h	24V DC	36	2003	USA	LRV
Siemens (USA)	San Diego LRV	Pantograph	80Nm	100 Km/h	24V DC	24	2004	USA	LRV
Siemens (USA)	Charlotte	Pantograph	80Nm	100 Km/h	24V DC	30	2006	USA	LRV
Siemens (USA)	Portland IV	Pantograph	80Nm	100 Km/h	24V DC	21	2007	USA	LRV
Siemens (USA)	Edmonton	Pantograph	80Nm	100 Km/h	24V DC	26	2007	USA	LRV



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