

# Class 91 Electric Locomotive



The Class 91 locomotive is a GEC registered design.

## For British Rail InterCity

The electrification at 25kv of British Rail's East Coast Main Line requires a new generation of locomotives - the Class 91. Designed for service speeds of 225km/h on existing tracks, the Class 91 displays several unique features along with state-of-the-art technology. These give high levels of utilisation and reliability, with an annual distance run of 420,000 km planned for each locomotive.

During the daytime the Class 91 fleet is used on high-speed InterCity trains. These operate on the push-pull principle, with a Time Division Multiplex system to enable remote control of the locomotive from a Driving Van Trailer. At night other trains can be hauled with either end of the locomotive leading. An asymmetric bodyshell design is thus used, styled to minimise aerodynamic resistance at high speeds.

The traction motors are mounted in the locomotive body, with drive to the axles by cardan shafts. This gives a low unsprung mass, whilst the mounting of the main transformer on the locomotive's underframe gives a low centre of gravity. The result is a locomotive giving a very smooth ride and reduced track wear even at high speeds. Microprocessor traction controls are fitted, together with a maintenance diagnostic system. Thyristors are used to give smooth, stepless changes of both traction and dynamic braking current, whilst the use of a radar-based wheel creep control system allows tractive effort to be maximised.

The Class 91 locomotives are supplied by GEC Transportation Projects Ltd., with the design and manufacture of bogies and mechanical parts contracted to BREL limited. This teamwork by British industry has resulted in one of the world's most advanced high-performance locomotives, meeting the needs of InterCity well into the 21st century.

GEC

## Data

Traffic type:	High speed passenger and freight
Description and wheel notation:	Bo-Bo electric locomotive
Traction supply:	25kV ac 50Hz overhead line
Length over buffers:	19400mm
Width over bodyside:	2740mm
Roof height (service condition):	3757mm
Bodyshell material:	Monocoque/steel
Bogie centres:	10500mm
Bogie wheelbase:	3350mm
Wheel diameter (new):	1000mm
Bogie type:	BREL P7-5A, P7-5B
Unsprung mass per axle:	1.7t
Suspension:	Coil and rubber ring primary flexicoil secondary hydraulic damping
Min. curve radius (horizontal):	90m
Weight in service condition:	81.5t
Continuous power rating:	4530kW at 153km/h 3750kW at 225km/h
Traction motors:	4 x GEC G426 of 1132.5kW separately excited body mounted, driving through cardan shafts
Control system type:	Microprocessor/GTO thyristor
Special features:	Diagnostic system Speed pre-selection facility Radar-based wheel creep control Push-pull control with TDM links
Traction system by:	GEC Traction Ltd.
Transformer by:	GEC Transformers Ltd.
Current collection:	Single arm pantograph
Braking system:	Blended rheostatic/air clasp brakes on wheel treads disc brakes on motor armatures
Drawgear type:	Side buffers, drophead knuckle couplers
Max. speed:	240km/h
Supplied by:	GEC Transportation Projects Ltd.
Mechanical parts by:	BREL Limited
Erected at:	BREL Limited Crewe Works
No. of locos ordered:	31
Delivery commenced:	February 1988

## About BREL

BREL LIMITED, Britain's largest builder and repairer of railway rolling stock, derives its strength from 150 years of experience.

The design and manufacture of vehicles of all kinds is carried out by BREL's New Construction Group, which can offer diesel and electric locomotives of the highest quality, for every application.

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