

# Electro-diesel loco offers flexible traction

Spanish rolling stock builder CAF has developed its Bitrac dual-mode locomotive for the domestic market

**L**AUNCH customer for CAF's Bitrac electro-diesel locomotive is Ferrocarriles Suroccidentales (Fesur), a private-sector operator established in February 2007 by Spanish industrial groups GEA 21 and Alfonso Gallardo. The company has ordered nine six-axle CC3600 Bitrac locomotives for hauling freight.

CAF has developed Bitrac as a dual-mode locomotive platform with considerable flexibility to operate on routes wired at 3 kV DC or on non-electrified lines. Versions can be built to run on 1 435 or 1 668 mm gauge with either a Bo-Bo or Co-Co configuration (Fig 1). Both freight and passenger

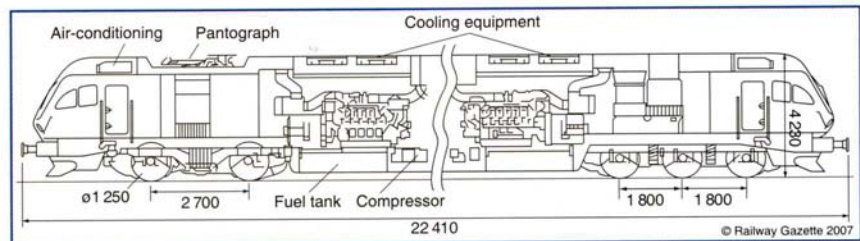


Fig 1. CAF's Bitrac electro-diesel locomotive can be supplied in Bo-Bo or Co-Co configuration

versions can be supplied, with speed maxima of 120 km/h and 180 km/h respectively.

The base concept is a twin-engined diesel, with two 1 800 kW power plants driving separate alternators. Each alternator feeds a bank of IGBT-based inverters, each of which supplies variable-frequency and variable-voltage power to one asynchronous traction motor to give independent control and so ensure good adhesion.

As the electric traction equipment is intended to operate only at 3 kV DC, there is no need for a transformer, which makes it relatively simple to add a package which includes a pantograph, main circuit-breaker and a bank of brake resistors. Regenerative braking is possible, and both clasp and disc brakes are fitted. Each loco carries two IGBT-based 115 kVA auxiliary converters.

The bodyshell is an integral structure of laminated steel with crashworthy ends

meeting the relevant TSI. The diesel engines are mounted towards the centre of the body, with the cooling plant located in the roof, which also houses the cab air-conditioning packs. There is space for a single pantograph towards one end.

The locos being built for Fesur will operate on broad gauge track and will be fitted with the digital ASFA train protection system with provision for installation of ERTMS. Fesur is investing around €70m in rolling stock, which includes up to 400 wagons as it expects to be handling 4 million tonnes of rail freight a year by 2010; this will consist mainly of heavy bulk products such as cement and steel. ■

## Principal data for CAF Bitrac dual-mode locomotive

	Four-axle	Six-axle
Gauge mm	1 435 or 1 668	
Wheel arrangement	Bo-Bo	Co-Co
Overall length mm	22 410	22 410
Height mm	4 230	4 230
Fuel capacity litres	4 000	8 000
Power rating (diesel) kW	2 x 1800	
Power output at wheel rim (electric) kW	4 450	
Traction motors kW	4 x 1 000	6 x 750
Starting tractive effort kN	300	445
Weight tonnes	90	130