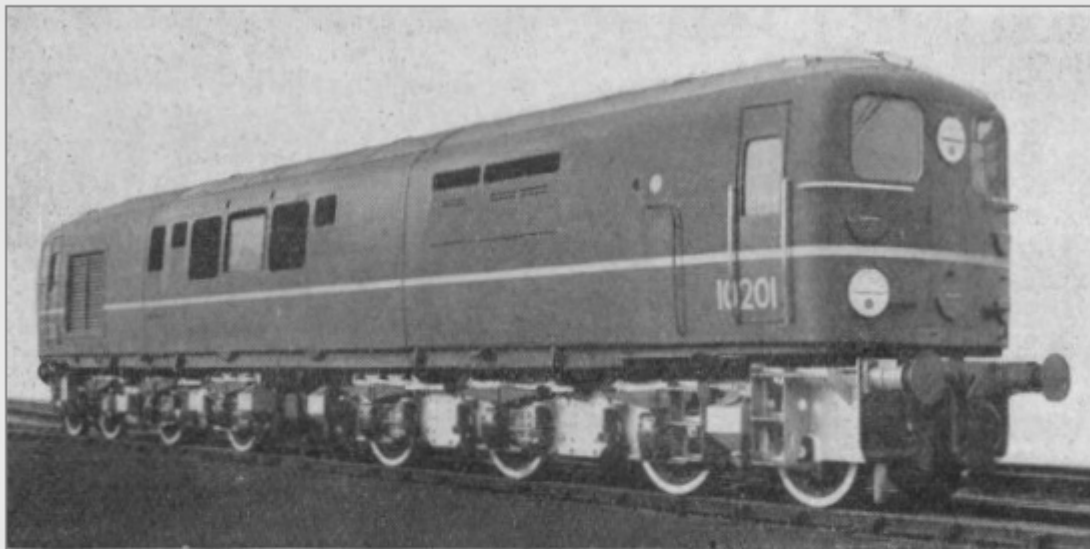


# Southern Region Express Passenger Diesel-Electric Locomotive



**T**OWARDS the end of 1946, the Southern Railway decided to begin construction of three diesel-electric locomotives for express passenger services, and it was intended that the first should be completed within one year. This development was described in our November-December, 1947, issue. Because of other commitments, however, progress was delayed so that only recently has the first locomotive been completed. The project originated before the L.M.S.R. decided to build two similar locomotives, Nos. 10000 and 10001, the first of which appeared in 1947.

The designs were prepared independently to suit the particular requirements of each railway; the Southern Region locomotives are intended for passenger working only, while those on the L.M.S.R. were introduced for mixed-traffic working. In both designs, the power equipment has been supplied by the English Electric Co. Ltd., and is the same in the main items, there being only small differences in the control system and in the gear ratio of the traction motors.

The design of the mechanical part of the locomotives was under the control of the Chief Mechanical Engineer, Mr. O. V. Bulleid, until his retirement in September, 1949, and the power equipment was similarly dealt with by the Chief Electrical Engineer, Mr. C. M. Cock. Subsequently,

the control of the locomotives came under Mr. S. B. Warder on his appointment as Mechanical & Electrical Engineer, Southern Region, in October, 1949. Both the design and the construction have been carried out at the Ashford Works of the Southern Region, British Railways.

After the nationalisation of the railways in 1948, the Railway Executive decided that the third locomotive should be built with a different bogie from that designed by the Southern Railway and used on the first two locomotives; the following description, therefore, applies to the locomotives numbered 10201 and 10202.

The principal particulars are as follow :

Type of locomotive	...	...	...	1-Co-Co-1
Diesel engine	...	...	...	16 S.V.T. type
Continuous rating	...	...	...	1,600-b.h.p.
1-hr. rating	...	...	...	1,750-b.h.p.
Number of cylinders	...	...	...	16
Dimensions of cylinders	...	...	...	10 in. bore x 12 in. stroke
Maximum revolutions of engine	...	...	...	750 r.p.m.
Maximum V of generator	...	...	...	900
Maximum A of generator	...	...	...	3,000
Tractive effort, maximum	...	...	...	31,200 lb.
Tractive effort, continuous rating	...	...	...	14,000 lb.
Length over buffers	...	...	...	63 ft. 9 in.
Weight in working order	...	...	...	135 tons
Fuel oil capacity	...	...	...	1,150 gal.
Water capacity (for train heating)	...	...	...	890 gal.

At each end of the locomotive there is a driving compartment which houses the main controller, the driver's brake valve, the control switches, and the indicator lights and alarms connected to the auto-



matic control system. Fitted into the desk opposite the driver's seat is the deadman's panel, which has two treads to suit either standing or sitting positions. Seats are provided for the two enginemen, and in the middle of the end body there are double doors for access to a similar locomotive which may be coupled.

The driver's control desks are located on the left-hand side at each end of the locomotive. In order from the driving compartment at one end of the locomotive are the air-cooled radiators, the exhausters for the vacuum braking side-by-side, and then the main storage fuel-oil tanks, above which are fuel-oil and water service tanks. Adjacent to these is one of the two motor driven fans which supply cooling air to the traction motors. Duplicated arrangements are provided for re-fuelling, consisting of a self-sealing coupling, filter, and automatic float valve; a hand pump is provided for emergency use. The four exhaust gas turbo-blowers for pressure charging the engine are fitted above the engines, air being drawn through the body side and filtered. Next is a partition which separates the engine room from the generating room, as the latter is a filtered air compartment. After cooling the generator air is discharged into the engine room.

The main equipment control frame is situated in the centre beyond the generators, and at each side there is a water tank surmounted by a battery box, access to which is from outside the locomotive so that no inflammable gas can enter the engine room. An electric cooker, hand wash basin, and lavatory accommodation is provided for the locomotive crew, and in a compartment immediately opposite, an automatically controlled oil-fired boiler provides steam for train heating. In this compartment the second blower for the traction motors is located.

The diesel engine is a type 16 SVT pressure-charged 16-cylinder vee-form engine operating on the four-stroke cycle, and is rated at 1,600 b.h.p. continuously and 1,750 b.h.p. for one hour. The main traction generator is a single bearing machine direct coupled to the engine crankshaft. It is a direct current 8-pole machine, self-ventilated and is provided with two separately excited field windings and a series decomposing

winding which is also used when the generator is motored from the battery for starting the diesel engine.

The electrical control equipment, which is housed in the compartment between the engine and No. 2 cab, is carried mainly on a centrally placed control frame. This frame carries the relays, contactors, switches and fuses for the control of the traction equipment and has dust-proof removable covers for access for maintenance purposes. In addition there are separate resistance frames which carry the resistances for the generator fields.

Two automatic alarm systems are embodied into the control equipments, one is for fire detection, the other is designed to give the crew a preliminary warning of the impending shut down of the power unit due to operation of one or other of the safety devices. Indication is also given to the driver of the conditions obtaining on the second locomotive of a coupled pair. In each cab there is a panel carrying ten indicator lights; one of these indicates that the boiler is operating correctly and is not part of the warning system. The remaining nine lights give the crew indication of the condition of the power equipment.

There are six series-wound nose-suspended axle hung traction motors driving three axles on each bogie through single-reduction straight spur gearing with a ratio of 52 : 21. The motors are connected in pairs in series across the main generator and are wound for a nominal 400 V. Arrangement is made to cut out a pair of motors should a fault develop and the locomotive can proceed on the remaining motors. The design of the bogie follows closely that used on the three electric locomotives on the Southern Region, and has an additional axle for weight carrying purposes.

The design of the body follows simple lines, the curved sides being of the same contour as the post-war coaches of the Southern Railway. Steel panels riveted to rolled section framing is used throughout, except for the six hinged covers above the engine, these being in aluminium alloy.

Compressed air brake equipment is fitted on the locomotive and it is controlled by a self-lapping valve in the driver's desk. The same system is used for controlling the train vacuum brake.