



FLIRT TRIMODAL MULTIPLE UNIT

Keolis Amey Operations/Gweithrediadau Keolis Amey Limited, UK

In October 2018, Keolis Amey Operations Ltd took over the 15-year Wales & Borders franchise, which incorporates the modernisation of the infrastructure as well as the delivery of new vehicles. Stadler was awarded the contract to build and supply 24 FLIRT tri-mode multiple units in February 2019. These units facilitate seamless travel under overhead contact lines at 25 kV/50 Hz and on non-electrified lines with on-board traction battery power supply. A diesel-electric power supply enables batteries to be charged. The three and four-car units will operate on the South Wales railway network. Thanks to the application of the traction battery system, costly electrification extensions along the routes can be avoided. Traction battery and the diesel motor are in the powerpack, which is separate from the passenger area. In both battery and electric mode, this cuts noise and polluting emissions. Diesel power is limited to certain areas, thus keeping emissions to a minimum. The FLIRT UK developed for Keolis Amey is part of Stadler's successful FLIRT family, which has been already supplied to several operators in the world, including Greater Anglia. The vehicles will be customised for Keolis Amey, complying with the latest TSI-standards including accessibility and to accommodate local infrastructure. Low floors ensure level boarding for passengers throughout, reducing dwell time and making it easier for passengers to get on and off. Additionally, all trains feature air-conditioning, areas for wheelchairs, pushchairs and bicycles, passenger information systems and wi-fi. The new tri-mode vehicles are scheduled to enter passenger service from 2023.

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Technical features

Technology

- Emission-free travel under overhead contact lines and during battery operation
- 25 kV/50 Hz AC, battery and diesel-electric propulsion (diesel with newest emission standard Stage V)
- Balise-supported traction mode change and automated passenger door operation
- Car-bodies made of welded extruded aluminum profiles
- Front cabin made of glass reinforced plastic
- Air-suspended motor- and Jacobs-bogies
- High tractive efforts and acceleration
- Multiple unit traction for up to three units
- Energy-efficient driving by an integrated driver assistance system

Comfort

- Low-floor area and gap-free access for improved passenger flow
- Bright, passenger-friendly interior design with comfortable seats and client-specific design
- Air-conditioned passenger compartments and driver's cabs
- Reduced vibration and noise emissions during diesel operation thanks to the isolated powerpack carriage
- Controlled emission toilets, also suitable for PRM passengers
- Designated areas for wheelchairs, pushchairs and bicycles in the passenger compartments
- Passenger information systems and wi-fi

Personnel

- Separated entry for driver
- Ergonomically-designed driver's desk
- Driver and conductor control panel for the passenger door control including communication
- TSI-compliant GSM-R train radio

Reliability/Availability/Maintainability/Safety

- Redundant power-train with water-cooled IGBT power converters
- Powerpack with integrated traction batteries and redundant diesel motor generator
- Easy access for maintenance
- Prepared for installation of ETCS
- Vehicle control system with train bus and diagnostics computer (CAN open bus)

Vehicle data

	BMU 4-car	BMU 3-car
Customer	Keolis Amey Operations	Keolis Amey Operations
Operated networks	Wales and Borders	Wales and Borders
Gauge	1,435 mm	1,435 mm
Designation	FLIRT UK	FLIRT UK
Power supply for propulsion	25 kV/50 Hz/ battery / diesel- electric	25 kV/50 Hz/ battery / diesel- electric
Axle arrangement	Bo'2'2'2'2'Bo'	Bo'2'2'2'Bo'
Number of units	17	7
Seats in standard class	158	118
Tip-up seats	36	26
Standing capacity	194	142
Floor height, low-floor	960 mm	960 mm
Entrance width	1,300 mm	1,300 mm
Length over coupling	80,700 mm	65,000 mm
Vehicle width	2,720 mm	2,720 mm
Vehicle height	3,915 mm	3,915 mm
Bogie wheelbase	2,700 mm	2,700 mm
Driving wheel diameter, new	870 mm	870 mm
Carrying wheel diameter, new	760 mm	760 mm
Maximum output at wheel	2,600 kW at 25 kV/50 Hz (1,300 kW battery mode)	2,600 kW at 25 kV/50 Hz (1,300 kW battery mode)
Max. starting tractive effort	200 kN	200 kN
Max. starting acceleration	1.1 m/s ²	1.1 m/s ²
Maximum speed	75 mph	75 mph