

ERJ-135/-140/-145 specifications

There are 16 variants available for the ERJ-135, ERJ-140 and ERJ-145 models. Their specifications are analysed.

The ERJ-135, ERJ-140 and ERJ-145 are all members of the ERJ-145 family of aircraft. This is a family that was designed for the regional market from the outset. The design offers the operator 95% commonality in parts and systems across the three main types and their variants. It is also possible for flightcrew to be cross-type-rated for all three model series. The main differences between the three models are the fuselage sizes and seat capacities.

The ERJ-145 was first introduced to airlines in 1989 as a development of the EMB-120. After many design changes, the ERJ-145 entered service in 1996 with rear-fuselage-mounted engines, swept wings and a 'T-tail' configuration. It maintained the three-abreast cabin layout of the EMB-120.

The ERJ-145 family met the needs of regional airlines at the time for a cost-effective jet aircraft for commuter and feeder routes. It also offers Stage III and Stage IV noise compliance capability and low NOx emissions levels that are characteristic of the ERJ-145 family, which makes it acceptable for operations in all parts of the world. Its design makes

it suitable for routes where fast turnarounds and a high daily utilisation are required.

The shortest ERJ-135 has a maximum range of 1,750nm with a full load of 37 passengers. The ERJ-140 has a range of 1,650nm, and can carry an additional seven passengers. The original member of the family, the ERJ-145, has 50 seats but a shorter range of 1,550nm (*see table, page 8*). The newer ERJ 145-XR still has 50 seats, but an increased range of 2,000nm.

With all the aircraft having 50 or fewer seats, the crew can consist of just two pilots and one cabin crew member. Many carriers might prefer, however, to operate with two cabin crew if they have a need for enhanced service standards, especially if business-class products are offered. This minimal crew requirement can give an economical versatility to the aircraft, especially when commonality for all crew on all types is taken into consideration.

All the ERJ-145 family have the same cargo capacity of 325 cubic feet (9.2 cubic metres), found aft of the cabin with the cargo door located under the engine mountings on the left side of the fuselage.

The maximum load is 2,205lbs (1,000kg) for the ERJ-135 and 2,645lbs (1,200kg) for the ERJ-145.

The ERJ-145 has 11 variants in total, including the ERJ-145XR and various types designed for air forces around the world. There are eight airline variants.

The ERJ-135 has three variants: a business jet, and two that are used by airlines.

The ERJ-140 has two variants but only one is used by airlines. The other is a single aircraft operated by Embraer.

Therefore, of the 16 possible variants of the ERJ-145 family, commercial operators use only 11. It is the specifications of these 11 variants that will be discussed in further detail.

ERJ-145

The original ERJ-145 went into service with ExpressJet late in 1996. The 50-seat aircraft has a maximum take off weight (MTOW) of 46,000-48,000lbs, depending on the variant, and a maximum operating speed of Mach 0.78 (*see table, page 8*). The ERJ-145LR is by far the most popular of all the family models, and shows that 50-seat aircraft are increasingly popular with regional and feeder airlines.

The number of seats can be reduced from 50 to 48, if a larger galley is required on board, assuming that a seat pitch of 31 inches is maintained. The galley is at the forward starboard of the cabin and the single toilet is at the rear. Additional stowage and wardrobe space is at the front of the cabin opposite the galley. As the galley and stowage area is adapted, so the wardrobe can double in size. This is an important factor for an aircraft that will be operated on routes favoured by day-return business men, who need hanging space for suit jackets.

The main passenger door is on the port side just aft of the flight deck, while the main service door is not opposite, but is offset and located in the middle of the galley. These are both type I doors. Due to the three-abreast seating, the aisle is off-centre, which means that the large overhead locker is above the twin seats only. This aircraft has two type III overwing exits that are generally positioned just aft of row 11.

The engines on all variants of the ERJ-145 family are versions of the Rolls-Royce (RR) AE 3007A. On the -145s, the version is the AE3007A1 with a maximum take-off thrust of up to 8,169lbs. Many sub-variants exist due to variations in Full Authority Digital Engine Control (FADEC) software. All



The ERJ-145 family has a common pilot type rating for the three main variants, allowing airlines to operate with a single pilot pool.

ERJ-135/-140/-145 SPECIFICATIONS

Aircraft	Engine	Take-off thrust lbs	MTOW lbs	Basic OEW lbs	Maximum payload lbs	Fuel capacity USG	Seats at 31" pitch	Range nm full payload & LRC	Maximum cruise speed
ERJ-135ER	AE3007A3	7,201	41,887	25,137	9,255	1,360	37	1,300	0.78
ERJ-135LR	AE3007A1/3	7,580	44,092	25,355	9,919	1,690	37	1,750	0.78
ERJ-140ER	AE3007A1/3	7,580	44,313	26,050	11,649	1,360	44	1,250	0.78
ERJ-140LR	AE3007A1/3	7,580	45,517	26,032	11,667	1,690	44	1,650	0.78
ERJ-145EP	AE3007A1, A1/1 AE2007A1P	7,580 8,338	46,275	26,339	11,359	1,360	50	1,200	0.78
ERJ-145ER	AE3007A1, A1/1 AE3007A1P	7,580 8,338	45,415	26,339	11,359	1,360	50	1,170	0.78
ERJ-145EU	AE3007A1, A1/1 AE3007A1P	7,580 8,338	44,070	26,339	11,359	1,360	50	940	0.78
ERJ-145LI	AE3007A1/2, A1	7,580	48,502	26,707	12,755	1,690	50	1,550	0.78
ERJ-145LR	AE3007A1/1 AE3007A1P	7,580 8,338	48,502	26,707	12,755	1,690	50	1,550	0.78
ERJ-145LU	AE3007A1 AE3007A1P	7,580 8,338	48,480	26,707	12,755	1,690	50	1,550	0.78
ERJ-145MP	AE3007A1/1 AE3007A1P	7,580 8,338	46,275	26,539	12,923	1,360	50	1,200	0.78
ERJ-145XR	AE3007A1E	8,895	53,131	27,758	13,027	1,965	50	2,000	0.80

the engines offer uncomplicated maintenance procedures thanks to engine inter-changeability design, common hardware among all ERJ family members and trend data monitoring capability. A dual-channel FADEC system and functional redundancy help to reduce the pilot's workload and deliver maximum engine reliability.

Some of the ERJ-145 variants are specific to their operator, for example the ERJ-145LU, which is only operated by Luxair. The ERJ-145LI, which is only operated in China, is the aircraft designator for ERJ-145s that have been assembled in China by a joint venture between Harbin Aircraft Manufacturing Corporation and Embraer. The partnership started in 2003, under the name of Harbin Embraer and the aircraft produced are not for export. The -EU model was designed for the European market, and is essentially the same as the -LR apart from the -EU's lower MTOW. The lower MTOW was planned in order to take advantage of lower airport and navigation charges in Europe. The -MP and -MK models are the updated versions of the -ER and -EU, but no -MKs have been sold so far.

All of the standard models for each of the three types have a maximum fuel capacity of 9,110 US Gallons (USG). This is the case for all -ER models. The -LR models on the other hand have a maximum fuel capacity of 11,323USG. The only change from this is the slightly lower maximum fuel capacity of the ERJ-145XR, 113,168USG, which gives it a longer range.

The ERJ-145XR is the extra-long-range version of the ERJ-145, designed

for long and thin routes. Not only does it have greater range and fuel capacity, but its MTOW (53,131Lbs), speed (Mach 0.80) and engine power have also been increased. The more powerful RR AE 3007A1E engine, with up to 8,917lbs of take-off thrust, has lower fuel consumption and improved performance in hot and high situations than the previous models. This has been made possible through new engine software and upgraded mechanical components. Other structural differences on the ERJ-145XR are additions such as winglets and a third fuel tank.

ERJ-140

The ERJ 140 entered service in mid-2001, with the ERJ-140LR the only variant to be flown commercially. The aircraft was designed with only 44 seats, and the American market in mind. The ERJ-140 satisfied many of the agreements that US carriers had with their pilot unions.

The ERJ-140 shares more than 95% parts commonality with the ERJ-145 and has the same pilot type rating. The fuselage is shorter by four feet and six inches (1.42m), but the aircraft has 100nm more range than the -LR versions. The ERJ-140's MTOW is 44,313lbs and 45,518lbs for the -ER and -LR models respectively. This is generally less than the ERJ-145s, but similar to the ERJ-145EU that was developed for the European market.

Again the AE3007A1 engine is used, but this time it is slightly de-rated, with a maximum take-off thrust of up to 7,426lbs.

The ERJ-140 also has two overwing exits like the ERJ-145, but these are behind row 10.

ERJ-135

The ERJ-135 is the smallest aircraft in the family, and entered service in 1999. Of the three variants of this aircraft, one is marketed as a corporate jet, and two are commercial airliners: the ERJ-135ER and ERJ-135LR. As with the ERJ-140 and ERJ-145 types, the -ER is the standard or baseline model, while the -LR is the longer-range version, which has increased fuel capacity and upgraded engines.

The ERJ-135 also shares 95% parts commonality and a pilot type rating with the ERJ-145. The ERJ-135's fuselage is 11 feet and seven inches (3.54m) shorter than that of the ERJ-145, and the -135 carries only 37 passengers. Due to the reduction in weight, but no reduction in fuel capacity, the ERJ-135 has a longer range. This works out as 100nm more than the ERJ-140 and 200nm more than the ERJ-145, when comparing -LR versions.

The general internal layout is the same as for the ERJ-145, but with a shorter fuselage, with the overwing exits being behind row eight. The galleys and toilet are in the same place, except on Delta's feeder aircraft, which have a small galley at the rear of the cabin forward of the toilet, thereby reducing the number of passengers. [AC](#)

To download 100s of articles like this, visit:
www.aircraft-commerce.com