

TRAMS



*MODERN TECHNOLOGIES
TRANSPORT EFFICIENCY
SAFETY
COMFORT*

THE OPTION OF BATTERY-POWERED OPERATION





The modern low-floor trams of the ForCity family are an intelligent solution for public urban transportation. These new-generation trams are currently in operation in major European cities. Several hundred trams have already been produced and can be found in Prague, the Slovak capital Bratislava, the Latvian capital Riga, the Finnish capital Helsinki, Miskolc in Hungary, Konya in Turkey, Qingdao in China, and soon also coming to Chemnitz, Germany.

Škoda Transportation trams have a state-of-the-art interior which provides plentiful comfortable seats as well as space for standing passengers and room for pushchairs, wheelchairs or oversized luggage. Thanks to air-conditioning, an easy-to-understand information system and the low-floor design, passengers will always feel comfortable. All this also ensures accessibility to everyone. Simple maintenance is yet another advantage of the ForCity family tram.

PLATFORMA FORCITY

The product range of the modern ForCity family vehicles represents the latest stage in the development of Škoda trams. Unlike the previous models, Astra and Elektra, the ForCity trams have a complete low-floor interior, which is made possible by placing the traction equipment on the roof. This in turn ensures we achieve a 100% low-floor status. The ForCity platform consists of trams with pivoting bogies, non-pivoting/rigid bogies or combinations of both. Škoda Transportation has developed several technical solutions for the ForCity tram platform and its strategic development is ongoing.

The main aim of the creation of the ForCity platform was to satisfy a wide range of customers and to manufacture vehicles for the different driving conditions in individual cities. The advantage of the ForCity platform is that it consists of a number of variations which allows you, the customer, to choose a customised solution.

Unification across the ForCity platform includes the same bogies, components, interior characteristics, the driver's cabin and the interior layout above the bogie. The complete design, all major mechanical and electrical components and parts and the final assembly, certification, warranty and customer service are taken care of by Škoda Transportation.





The ForCity trams are divided into four basic types. The first type is the ForCity Alfa with a completely pivoting bogie and gearless design. These vehicles are particularly suitable for tracks with less than ideal operating conditions. The second type of vehicle is the modernised ForCity Alfa tram. This range is accompanied by the ForCity Classic that uses a non-pivoting bogie and which is especially designed for straighter, modern tracks.

The third type of tram, known as the ForCity Plus, is ideally suited for demanding narrow-gauge tracks and offers a combination of pivoting and non-pivoting bogies.

The latest model, the ForCity Smart, is a continuation of the development of the ForCity Alfa with a pivoting bogie. It is suitable for all types of tram networks and for all operating conditions.

The modern ForCity range is available with pivoting and non-pivoting bogies with partially or fully suspended drive and liquid or air-cooled engines.

FORCITY ALFA

ForCity Alfa trams offer a comfortable and flexible interior with plentiful seating.

Advantages include a high passenger capacity with a lower axle load thanks to the use of one extra bogie.

Pivoting bogies are also gentle on the tracks and reduce vehicle maintenance and infrastructure costs.

ForCity Alfa also has the largest proportion of doors per length of vehicle.

The layout of ForCity Alfa trams ensures easy and quick access to all seats throughout the entire car.

MAIN TECHNICAL PARAMETRES

PARAMETER	FOR CITY ALFA			
Version	Uni-directional / Bi-directional			
Low-floor design	100%			
Track gauge	950 – 1 524 mm			
Maximum speed	60 – 80 km/h			
Trolley voltage	600 – 750 V (+20 % / -30 %)			
Vehicle width	2 300 – 2 650 mm			
Maximum output	184 kW × number of driven bogies (368 – 920 kW)			
Longitudinal strength	Up to 400 kN			
Number of tram sections	2	3	4	5
Drive (number of bogies / number of driving bogies- adhesion)	3/3 – 100% 3/2 – 70%	4/4 – 100% 4/3 – 80% 4/2 – 60%	5/5 – 100% 5/4 – 80% 5/3 – 70%	6/4 – 80%



THE RIGHTHAND DOOR OF THE PRAGUE FORCITY ALFA TRAM MAKES UP A THIRD OF THE OVERALL VEHICLE LENGTH.

REFERENCE PROJECTS

FORCITY ALFA PRAHA

The Prague ForCity Alfa tram is the first mass produced 100% low-floor tram in the world that uses a pivoting bogie and the first to have a unique gearless engine with permanent magnets driving all wheels of the four-axle bogie. The location of the bogie under the transition bellows and under the rear of the vehicle allows for greater flexibility of the interior layout.

With an overall length of 31.4 metres and a width of less than 2.5 metres, this 1435 mm gauge, uni-directional three-section tram can accommodate up to 180 passengers (4 persons/m²) – 61 of which are seated.

Six wide double doors allow for extremely fast boarding and exiting, and along with a design enabling the smooth passage through city arches, the tram helps reduce journey times and makes transportation faster.

After intensive testing from 2008-2010, the vehicles have been supplied to the Czech capital since 2011, and by the time the order is completed, the entire fleet will consist of a total of 250 red and white trams with a timeless, original design.





FORCITY ALFA RIGA

ForCity Alfa Riga trams are similar in design to the Prague ForCity Alfa trams. The main differences include bogies adapted for a wider track gauge, the drive of only three of the four bogies suitable for the flat character of the city and the use of components suitable for harsh northern winters.

This uni-directional tram is of the same length and width as the Prague tram. It has a three-section design with a 1524 mm gauge and can accommodate 189 passengers (4 persons/ m²), 60 seated, and the four section extended version can accommodate 255 passengers, 79 of which are seated. An interesting feature is a lift which facilitates the loading of a wheelchair from ground level for stations that don't have a platform.

The first tram was delivered to the capital city of Latvia in the first half of 2010. In total there are twenty four three-section and six four-section white and blue trams in Riga.



FORCITY CLASSIC

The ForCity Classic tram is one of the most versatile vehicles on the market. The concept and design allows a wide variation in the length and width of the vehicle, the track gauge, the number of seats and the drive mechanism.




The ForCity Classic tram has a non-pivoting bogie. The vehicles are equipped with a rigid axle that ensures reliable operation.

ForCity Classic trams are 100% low-floor compliant allowing the quick boarding and exiting of passengers and which guarantees wheelchair access.

In relation to its size, the advantages of the vehicle include high capacity, a uniform layout of boarding doors along the entire length of the vehicle and a design that optimises the passage of the vehicle making it suitable for areas with limited infrastructure.

MAIN TECHNICAL PARAMETRES

PARAMETERS	FOR CITY CLASSIC			
Version	Uni-directional / Bi-directional			
Low-floor design	100%			
Track gauge	950 - 1 524 mm			
Maximum speed	70 km/h			
Trolley voltage	600 - 750 V (+20 % / -30 %)			
Vehicle width	2 300 - 2 650 mm			
Maximum output	480 - 1 200 kW			
Longitudinal strength	Up to 400 kN			
Number of tram sections	3	5	7	9
Drive (number of bogies / number of driving bogies - adhesion)	2/2 - 100%	3/3 - 100% 3/2 - 67%	4/4 - 100% 4/3 - 77% 4/2 - 55%	5/4 - 80% 5/3 - 60%

Vehicle length (in mm)	BASIC VEHICLE CONFIGURATION ● non-pivoting bogie / ● pivoting bogie	Passenger capacity - seated/standing (4 persons/m ²)							
		Vehicle width							
		2 300 mm		2 400 mm		2 500 mm		2 650 mm	
		1	2	1	2	1	2	1	2
20 870		38/112	30/107	42/122	34/117	43/129	34/124	46/138	36/133
31 000		59/175	46/172	65/190	52/187	66/201	52/198	72/216	56/213
41 680		80/242	66/240	88/263	74/261	89/278	74/276	98/299	80/297



THE NEW FORCITY CLASSIC KONYA BATTERY-POWERED TRAM CAN TRAVEL UP TO 15 KM WITHOUT NEEDING FURTHER MAINS POWER.

REFERENCE PROJECTS

FORCITY CLASSIC MISKOLC

The ForCity Classic Miskolc trams are the most popular model of 100% low-floor trams and they are well-suited for modern tram networks. These vehicles have three bogies and a proportionally increased axle load which enables a reduction of their own weight, a maximum utilization of the track profile and that optimizes the costs of maintenance and economy.

The 32.1 meter long and 2.65 meter wide five-section bi-directional tram can accommodate 220 passengers (4 persons/m²), 56 of whom are seated. The large capacity of the vehicle is made more comfortable thanks to its well-designed layout.

It is worth mentioning that the vehicle has robust bogies with axles and double spring-suspension, two of which are driven by powerful water-cooled asynchronous engines with a total output of 4x100 kW.

The delivery of the first vehicles to the Hungarian city of Miskolc took place at the beginning of 2013. The remaining vehicles (of 31 in total), were delivered in 2014 after one full year's successful trial operation.





FORCITY CLASSIC KONYA

The ForCity Classic Konya trams are of the same design concept as the trams for Miskolc and they use identical components. The main difference is the reduced overall width of the vehicle (by 100 mm), the installation of automatic couplings that enable the operation of large-capacity tram units, as well as the use of more powerful air conditioning systems that are required for the hot summers.

The last 12 vehicles were equipped with a high-capacity battery which allows the tram to travel up to 15 km without the need for recharging. This facility will be used on a newly constructed city centre line.

The 32.5 meter long, five-section bi-directional tram can carry 210 passengers (4 persons/m²) with 56 seats.

The delivery of the first vehicles to the Turkish city of Konya took place in autumn 2013; the remaining 72 vehicles were delivered in 2015. A motif of Whirling Dervishes, the ancient symbol of the city, was included in the vehicle design at the customer's request.



FORCITY PLUS

The ForCity Plus tram combines the advantages of vehicles with pivoting and non-pivoting bogies. Thanks to the location of the pivoting bogie at both ends of the vehicle, the standard version of the 1435 mm gauge tram is 100% low-floor compliant.

The layout of the interior of the end sections ensures the rapid exchange of passengers and allows the location of multi-purpose spaces for people with reduced mobility and passengers with prams amongst others.

The ForCity Plus tram is also designed with an optimum passage profile that is well-suited to European cities. Additionally, due to the pivoting bogie positioned at the end sections of the vehicle, there is less wear and tear when entering and going through a curve.

MAIN TECHNICAL PARAMETRES

PARAMETRE	FOR CITY PLUS	
Version	Uni-directional / Bi-directional	
Low-floor design	80 - 100 %	
Track gauge	950 - 1 524 mm	
Maximum speed	80 km/h	
Trolley voltage	600 - 750 V (+20 % / -30 %)	
Vehicle width	2 300 - 2 650 mm	
Maximum output	480 - 1200 kW	
Longitudinal strength	Up to 400 kN	
Number of tram sections	3	5
Drive (number of bogies / number of driving bogies- adhesion)	3/3 - 100% 3/2 - 60%	4/4 - 100% 4/3 - 75% 4/2 - 55%



THE STRIKING TIP AT THE FRONT OF THE TRAM CAR MIMICS THE BOWS OF THE BOATS WHICH SAIL ALONG THE DANUBE IN BRATISLAVA.

Vehicle length (in mm)	BASIC VEHICLE CONFIGURATION ● non-pivoting bogie / ● pivoting bogie	Passenger capacity – seated/standing (4 persons/m ²)							
		Vehicle width							
		2 300 mm		2 400 mm		2 500 mm		2 650 mm	
		1	2	1	2	1	2	1	2

30 080



57/169 42/168 63/184 48/181 68/193 48/191 68/209 48/207

41 360



78/239 58/239 86/259 66/259 91/273 66/273 98/294 72/294

23 650



51/121 42/118 57/133 48/128 58/141 48/136 58/153 48/148

34 930



72/191 58/189 80/208 66/206 81/221 66/218 88/238 72/235

1 = uni-directional / 2 = bi-directional

REFERENCE PROJECT



FORCITY PLUS BRATISLAVA

The ForCity Plus Bratislava vehicle is intended for tram networks that use a narrow gauge. End sections are fitted with pivoting bogies. The arrangement of inner components and bogies are similar to the ForCity Classic trams. The vehicle retains its excellent driveability and optimum placement of doors and despite the narrow gauge of only 1 000 mm, it still offers a spacious interior providing plenty of comfortable seating.

Five-section trams with four robust bogies, three of which are driven, are delivered to the customer in two versions with a length of 32.5 m and width of less than 2.5 m. The uni-directional version of the tram can accommodate 207 passengers (4 persons/m²) with 69 seats and 88 % low floor compliancy; the bi-directional version holds 204 passengers (4 persons/m²) with 52 seats and has a 92 % low floor compliancy.

Deliveries to the Slovakian capital city began at the start of 2015. All sixty vehicles were delivered by mid 2016.



FORCITY SMART

ForCity Smart incorporates many advantages for both, passengers and operators. The vehicle layout helps to achieve balanced distribution of weight across the bogies. This in turn results in a low axle load, which, in combination with a pivoting bogie, results in lower overall infrastructure maintenance costs.

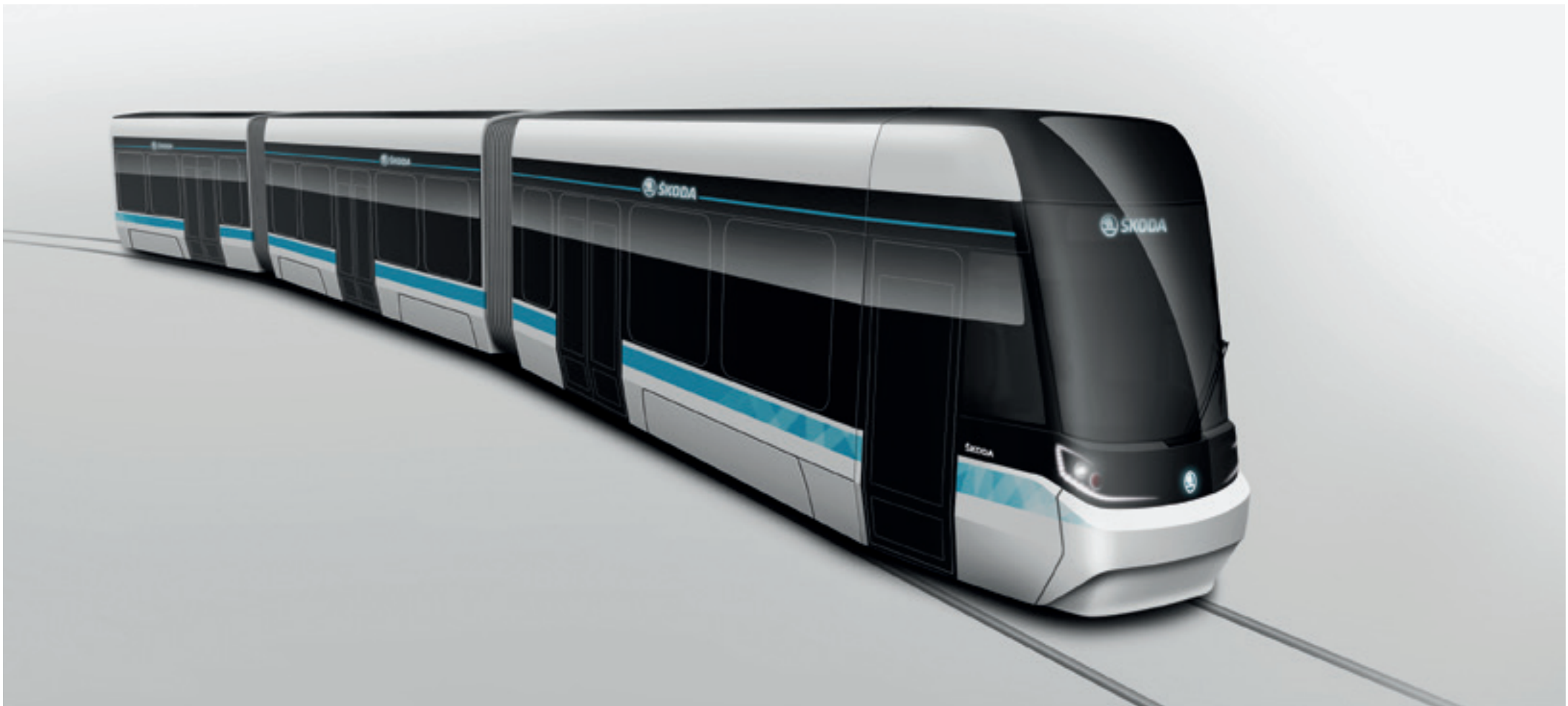
The ForCity Smart vehicle benefits from excellent driving characteristics and its configuration ensures maximum comfort as well as smooth simplicity of use during operations.











The lower number of bellows help to get a better sound and thermal insulation of the vehicle while reducing operating costs.

The ForCity Smart's interior also provides a large number of seats. The clever design of the bogie and vehicle enable an ergonomic layout of sixteen additional raised seats.

MAIN TECHNICAL PARAMETRES

PARAMETER	FOR CITY SMART			
Version	Uni-directional / Bi-directional			
Low-floor design	100%			
Track gauge	950 - 1 524 mm			
Maximum speed	80 km/h			
Trolley voltage	600 - 750 V (+20 % / -30 %)			
Vehicle width	2 300 - 2 650 mm			
Maximum output	240 - 1 200 kW			
Longitudinal strength	Up to 400 kN			
Number of tram sections	1	2	3	4
Drive (number of bogies / number of driving bogies - adhesion)	2/2 - 100% 2/1 - 50%	3/3 - 100% 3/2 - 65%	4/4 - 100% 4/3 - 75% 4/2 - 55%	5/5 - 100% 5/4 - 80% 5/3 - 60%



Vehicle length (in mm)	BASIC VEHICLE CONFIGURATION ● non-pivoting bogie / ● pivoting bogie	Passenger capacity - seated/standing (4 persons/m ²)							
		Vehicle width							
		2 300 mm		2 400 mm		2 500 mm		2 650 mm	
		1	2	1	2	1	2	1	2
16 820		38/84	31/77	43/94	36/86	44/97	36/88	44/104	36/96
26 980		58/149	45/144	65/161	52/158	68/167	52/162	68/183	52/178
37 140		78/211	63/209	89/230	72/228	92/242	72/241	92/262	72/261
43 900		92/251	77/249	103/274	88/272	108/288	88/288	108/312	88/311
53 500		138/306	113/304	153/337	128/334	154/349	132/345	154/379	136/374
15 320		31/73	28/67	35/84	32/76	36/86	32/78	36/92	32/84
21 350		49/107	42/103	55/120	48/115	56/125	48/120	56/133	48/130
29 210		65/155	56/152	73/169	64/165	74/179	64/175	74/195	64/190
35 970		79/194	70/191	89/213	80/209	90/225	80/222	90/245	80/240
47 150		117/261	100/260	125/289	112/291	126/299	116/300	126/325	120/324

1 = uni-directional / 2 = bi-directional

REFERENCE PROJECT

FORCITY SMART ARTIC HELSINKI

The ForCity Smart Artic Helsinki tram is the world's first mass-produced narrow-gauge 100% low-floor tram with a fully pivoting bogie. All-wheel drive and robust bogie design with axles ensures smooth operation in the challenging conditions in the capital of Finland. An axle load of less than 8.5 tons results in the reduction of infrastructure maintenance costs. An efficient heating system designed for northern conditions that includes thorough thermal insulation along with innovative use of regenerative brake energy for heating the vehicle.

This 27.6 metre long, 2.4 metre wide, uni-directional three-section tram with a 1 000 mm gauge can carry 125 passengers (5 persons/m²), with 74 seats and 14 folding seats.

Two tram units were delivered to the capital city of Finland, Helsinki in 2014 and after a successful trial operation, including two harsh winters, the delivery of an additional 38 + 20 trams of this type is in progress. The Scandinavian design contributes to the high useability value of the vehicle.



SERVICE

Škoda Transportation provides a warranty service for their products within the scope of the guarantee agreed with the customer.

The warranty service is set up to resolve any basic defects that may arise during operations – for corrective maintenance and repairs. Of course the supplies of spare parts to the customer are also guaranteed.

The European and world trend is, however, leaning towards the complex care and maintenance of vehicles commonly known as full-service. This trend includes the responsibility of the operator being transferred to the company responsible for the full-service. This company then guarantees the daily availability of vehicles needed for the operation of transport services. The full service performed by Škoda Transportation is guaranteed both with regard to preventive and corrective maintenance and repairs of products, fault diagnosis and troubleshooting, along with quick response to faults. At the same time they will also be responsible for the development of any obsolete spare parts and for collaboration with suppliers.

At present, Škoda Transportation provides a full service for trams in Pilsen, in the Hungarian city of Miskolc, in Cagliari, Italy, and in the Turkish city of Konya.





ECOLOGY

The complete production cycle of ForCity vehicles, from their production, during operation, and right through to their disposal is environmentally friendly.

During the production of all vehicles we take into account the relationship with, and impact on, the environment – in accordance with to EN ISO 14001. Our suppliers adhere to the same principles.

Due to low maintenance costs and reduced energy consumption, significant savings in operating costs can be seen. This is positive for the environment and a lower consumption of natural resources.

Components and parts of ForCity vehicles are more than 95% recyclable.



ŠKODA TRANSPORTATION a.s.

Emila Škody 2922/1

301 00 Pilsen

Czech Republic

T +420 378 186 666

F +420 378 186 455

E transportation@skoda.cz

www.skoda.cz

