

= OS T1000 =

T1000 and T1300 were two rapid transit train classes used on Oslo Metro in Oslo , Norway . The 197 cars were built by Strømmens Verksted , Norsk Elektrisk & Brown Boveri and AEG between 1960 and 1981 . They were the first metro trains used in Oslo , and had remained in active use until being replaced by OS MX3000 trains in 2007 . Each car is equipped with a driver 's cab at one or both ends and four motors , each with 98 kilowatts ( 131 hp ) . The cars are 17 metres ( 56 ft ) long , 3 @. @ 2 metres ( 10 ft ) wide and 3 @. @ 65 metres ( 12 @. @ 0 ft ) tall . The trains use 750 V current , and are capable of 70 kilometres per hour ( 43 mph ) . Signaling is provided through automatic train protection .

In 1960 , two less powerful T single @-@ car units were built , designed to be prototypes used on the Oslo Tramway . After a one @-@ year trial , they were put into scheduled traffic to the Kolsås Line , where they remained in regular service until 1983 . The production series is somewhat different in design and performance . T1000 is both used to refer to the class as a whole , or the first 162 cars , that are only equipped with third @-@ rail shoes . They have four slight variations , which have been given the designations T1 ? T4 . The T1300 is a series of 33 new and sixteen rebuilt T4 trains equipped with pantographs which previously allowed them operate on the western part of the network , prior to it being upgraded to third @-@ rail metro standards . The newer units were designated T5 and T6 , while the rebuilt units were designated T7 and T8 .

= = History = =

In 1954 , the Oslo City Council decided to build a four @-@ line metro to the new suburbs to the east of the city center . The plans would lead to the system opening in 1966 , after the conversion of the Østensjø and the Lambertseter Line of the Oslo Tramway to metro standard , and supplemented with the new Furuset and Grorud Line . The system would feature higher and longer platforms , allowing step @-@ free access to six @-@ car trains , automatic train protection and third rail power supply . This would make the metro incompatible with the existing tramways .

The first two single @-@ car trains were delivered in 1959 and given the designation T. They were delivered by Strømmens Værksted and NEBB as prototypes , without compensation from the planning office . They were tested on the Østensjø and Lambertseter Lines until 1 December 1960 , when they were transferred to Bærumsbanen , who used them on the Kolsås Line . During their service they were prone to technical problems , and were more in the depot than in service . However , they gave valuable knowledge for the serial production . The trains were originally painted silver with a dark @-@ blue cheatline and numbered 1 and 2 . About 1970 , they were repainted dark blue with a silver cheatline , and in 1971 given the numbers 451 and 452 . The latter remained in service until 1977 , when it was put aside , and scrapped in 1987 . The former remained in service until it was put aside as defect , although it had rarely been used since 1982 . It was fixed up and made operational again 1993 , but was withdrawn the same year and scrapped the following year .

Serial production started in 1964 , with the bodies built at Strømmens Værksted , the motors built by NEBB and the electrical equipment by AEG . By 1978 , 162 cars had been delivered to Oslo Sporveier . These were manufactured in four series , named T1 through T4 , with varying specifications . T1 was manufactured in 90 units from 1964 to 1966 for the opening of the Grorud Line and the conversion of the Lambertseter Line . The first 30 have driver 's cabs in both directions ( designated T1 @-@ 2 ) , while the latter 60 have it in only one end ( designated T1 @-@ 1 ) . In 1967 , 15 T2s were built for the conversion of the Østensjø Line . Although given a new designation , they are in all ways identical to the T1 @-@ 1s . From 1969 to 1972 , 30 T3s were built for the Furuset Line . Further expansions of the lines resulted in 37 T4s being built from 1976 to 1978 . The T1000s are numbered 1001 ? 1162 .

The need for new rolling stock on the western suburban tramways prompted Oslo Sporveier to order a modified version to the T1000 . This was because they had plans to connect the eastern and western networks , and gradually convert the western lines to metro standard . The T1300 units were built with the same specifications as the T1000 , but were also equipped with pantographs so

they could operate on the light rail lines . They also had a slightly different front . The initial order was for 33 units , which were designated T5 and T6 . The former 18 units had a cab in one end , while the latter 15 had a cab in both ends , allowing Oslo Sporveier to operate single @-@ car trains . The new units were put into service on the Røa and Sognsvann Lines , and were also used on the Kolsås Line outside rush @-@ hour .

To replace the aging Class C trains , from 1985 to 1987 , ten T4s were converted to T1300 . They were equipped with a pantograph , received a new front and the doors were moved . Six additional T4s were converted in 1989 , and given the designation T8 . These only had the pantographs equipped and kept the same front and door arrangement . With the introduction of the T1300 , the western lines could remove the conductor and have single @-@ manned trains with the motorman selling tickets . The T1300 @-@ units have had better regularity than the older models they replaced . However , because they are designed for a closed system with automatic train protection , the braking systems are not sufficiently dimensioned for when the drivers use line of sight to regulate the speed and distances between trains . The 1300 units were numbered 1301 ? 1349 . After the conversions , Oslo Sporveier operated 49 T1300 @-@ cars and 146 T1000 @-@ cars . The trains were originally painted red with a beige cheatline .

The Sognsvann Line was finished upgraded to metro standard on 7 January 1993 , allowing the first T1000 trains to operate through the Common Tunnel into the western network , converting parts of the Oslo Tramway to metro . The Røa Line was finished on 19 November 1995 , allowing all trains from the east to operate through the city center . To have sufficient metro @-@ compatible trains , six two @-@ car T2000 units were bought , and during the mid @-@ 1990s were considered to be a possible replacement for the T1000s . Starting in 1995 , Oslo Sporveier made an interior and livery upgrade to the T1000 trains . The main red color to the exterior was kept , but the doors and around the windows were painted blue . The lights and seats were changed , and the latter colored gray . The interior walls were painted red at the end , white on the sides , blue on the doors and received yellow hand bars .

Oslo City Council decided in 2003 to order 33 new three @-@ car units from Siemens , that would be designated MX3000 . In 2005 , the city council voted to replace all existing T1000 and T1300 stock with the MX3000 , increasing the order by another 30 units . Following a labor dispute in 2006 , it was decided that all rolling stock belonging to Oslo Sporveier would be transferred to a new holding company , Oslo Vognselskap .

The first deliveries of the MX3000 were made in April 2007 . The first T1000 was scrapped on 14 March 2007 , and the last T1000 train was run on 19 July 2009 . Oslo Tramway Museum has preserved seven T1000 cars : numbers 1002 ( T1 @-@ 2 ) , 1018 ( T1 @-@ 2 ) , 1076 ( T1 @-@ 1 ) , 1089 ( T1 @-@ 1 ) , 1092 ( T2 ) , 1129 ( T3 ) and 1141 ( T4 ) . 1089 is displayed in the museum , the other six cars are meant to be kept as an operative train . Of the T1000 units , no . 1076 was the one to run the furthest , reaching 2 @, @ 974 @, @ 076 kilometres ( 1 @, @ 848 @, @ 005 mi ) before retirement . On 22 April 2010 , the last T1300 was taken out of service , leaving only MX3000 units in service . Oslo Tramway Museum has preserved three T1300 cars : numbers 1306 ( T5 ) , 1320 ( T6 ) and 1335 ( T7 , originally T4 no . 1155 ) . The three cars are meant to be kept as an operative train . No T8 car was preserved .

= = Specifications = =

All versions have identical bodies , that are 17 metres ( 55 ft 9 in ) long , 3 @. @ 2 metres ( 10 ft 6 in ) wide and 3 @. @ 65 metres ( 12 ft 0 in ) high . Each car is equipped with two bogies , each with two axles . The axle distance is 2 @. @ 17 metres ( 7 ft 1 in ) , the bogie distance is 11 metres ( 36 ft 1 in ) and the wheel diameter is 82 centimetres ( 2 ft 8 in ) . They are each equipped with four 98 @-@ kilowatt ( 131 hp ) motors from NEBB , giving a maximum speed of 70 kilometres per hour ( 43 mph ) . They each weigh 27 @. @ 740 tonnes ( 27 @. @ 302 long tons ; 30 @. @ 578 short tons ) . The electrical equipment was delivered by AEG .

The train 's speed is controlled by an ATP system . The speed codes are transferred from the ATP points in the infrastructure , using 75 hertz pulses in the tracks . The trains pick up the signals via

antennas . The speed codes are 15 km / h ( 9 mph ) , 30 km / h ( 19 mph ) , 50 km / h ( 31 mph ) and 70 km / h ( 43 mph ) . The permitted speeds are presented to the driver via displays in the driver 's cab ; in addition , the system will automatically reduce the speed , should the limit be exceeded . The driver can put the trains in an automatic mode , where the train adjusts its own speed to match the speed limit . The driver is always responsible for starting and stopping the train at stations .

The prototype T series consisted of two single @-@ car units . It had the same dimensions as the T1000 and T1300 , but had four 75 @-@ kilowatt ( 101 hp ) motors and weighed only 26 @.@ 5 tonnes ( 26 @.@ 1 long tons ; 29 @.@ 2 short tons ) . They were equipped with a pantograph and were bi @-@ directional , but lacked ATP and third rail shoes . For the T1000 @-@ series , the T1 @-@ 2 are the only to have a cab on both ends , although this is also featured on the T6 . Since the T3 , the trains have been delivered with electromagnetic brakes in addition to dynamic brakes , hand brakes and air brakes with . Models from T4 and onwards have larger cabs .

The T1300 differ in that they had a pantograph and were built for conductors . The seating varies between the models : T1000 has a total capacity of 180 passengers , of which 63 can be seated . T5 has the same total capacity , but 70 people can be seated . T6 has a capacity for 154 people , of which 64 can be seated . T7 and T8 have a capacity for 177 passengers , of which 60 can be seated . All models are capable of operating six cars in multiple , although they are commonly used in shorter configurations .