

DIESEL MOTIVE POWER

DIESEL LOCOMOTIVES WITH MECHANICAL (HYDRAULIC) DRIVE SYSTEM

DIESEL LOCOMOTIVES WITH HYDRAULIC DRIVE SYSTEM

DIESEL LOCOMOTIVES WITH ELECTRIC TRANSMISSION SYSTEM

RAILCARS AND DIESEL RAILCAR TRAINS (MULTIPLE UNITS, DMU-S)

**DIESEL LOCOMOTIVE WITH
MECHANICAL (HYDRAULIC)
DRIVE SYSTEM**

***Class M28
(Former: Class M275)***

Main Data

Output of Diesel engine	100 kW
Type of Diesel engine	Ganz VI JaR 135
Wheel arrangement (British coding)	0-4-0
Axle arrangement (German coding)	B
Wheel dia	0.950 m
Wheel base	3.560 m
Length over buffers	8.030 m
Maximum height	3.650 m
Maximum width	3.150 m
Running order weight	19 t
Fuel supply*	270 kg
Top speed	
with mechanical drive	30 k.p.h.
with hydraulic drive	
shunting service	30 k.p.h.
line service	50 k.p.h.
* with Class 28 locomotives of the nameplates with No-group 2000	370 kg



The purchase of Diesel shunting locomotives began with MÁV with the Class M28 locomotives designed by MÁVAG of Budapest and manufactured by Magyar Vagon- és Gépgyár of Győr. The locomotives intended for light shunting service were built with two kinds of transmission systems, i.e. with mechanical and hydraulic transmissions. The locomotives – independent of the transmission type – have the same arrangement of machinery. The locomotives with mechanical transmission system a four-stage change speed gear is driven by the Diesel engine and the coupled wheels of the locomotive are driven by the jackshaft of the reverser built together with the change speed gear, by

means of rod drive. At the locomotives with hydraulic transmission system a hydraulic transmission incorporating a hydrodynamic torque converter is driven through an accelerating gear by the Diesel engine. From the hydraulic transmission by means of an universal-joint shaft was driven the two-stage change speed gear and the service change-over gear, the latter built together with the reverser. The wheels of the locomotive were driven from the jackshaft of the service change-over gear by means of rod drive. In the period between 1955 and 1959 24 units of the locomotives with mechanical transmission and 10 units of hydraulic transmission were manufactured.

**DIESEL LOCOMOTIVE WITH
MECHANICAL (HYDRAULIC)
DRIVE SYSTEM**

***Class Mk48
(Former: Class M492)***

Main Data

Gauge	0.760 m
Output of Diesel engine	100 kW
Type of Diesel engine	Ganz 6 Js 13,5/17
Wheel arrangement (British coding)	B-B
Axle arrangement (German coding)	B'-B'
Wheel dia	0.700 m
Bogie wheel base	1.700 m
Pivot pitch	4.000 m
Total wheel base	5.700 m
Length over buffers	8.965 m
Maximum height	3.415 m
Maximum width	2.390 m
Running order weight	17.6 t
Fuel supply	340 kg
Top speed	
with mechanical transmission	30 k.p.h.
with hydraulic transmission	
shunting service	30 k.p.h.
line service	50 k.p.h.



MÁV had purchased the Class Mk48 locomotives from the Győr works of the Magyar Vagon- és Gépgyár (i.e. Hungarian Wagon and Machine Works, Mechanical Engineers) for updating the transportation on her 2'-6" narrow-gauge network. These locomotives were manufactured both with mechanical and hydraulic transmission. At the execution with mechanical transmission the Diesel engine drives through a hydrodynamic coupling the four-stage change speed gear, which drives through universal joint shafts and axledrives the four axles of the bogies. At the locomotives with hydraulic transmission system a

hydraulic transmission incorporating a hydrodynamic torque convertor is driven through an accelerating gear by the Diesel engine. The service change-over gear and the reverser are built in a common housing. The drive of the axles are identical to that of the locomotives equipped with mechanical drive system. 39 units of these locomotives were manufactured in the years 1960 and 1961. They are recently equipped with the Diesel engine Type D2156HM6 built by the Rába works of Győr under licence agreement with MAN, Germany. The replacement engines are rated to 147 kW output and 2200 r.p.m. speed.

DIESEL LOCOMOTIVE WITH HYDRAULIC DRIVE SYSTEM

Class M31

Main Data

Output of Diesel engine	331 kW
Type of Diesel engine	Ganz 12 JV 17/24
Wheel arrangement (British coding)	0-6-0
Axle arrangement (German coding)	C
Wheel dia	1.225 m
Wheel base	3.800 m
Length over buffers	10.095 m
Maximum height	4.105 m
Maximum width	3.000 m
Running order weight	45 t
Fuel supply	2.3 t
Top speed	
in shunting service	30 k.p.h.
in line service	60 k.p.h.



Purchase and commissioning of the MÁVAG-made Class M31 diesel- hydraulic locomotives intended for shunting and goods train service began in 1958. The Diesel engine drives the hydraulic transmission gear incorporating two hydrodynamic torque converters through an accelerating gear. From the hydraulic transmission by means of an universal-joint shaft is driven the jackshaft drive incorpo-

rating a shunting/line service changeover gear and a reverser. The crank on the jackshaft of this drive drives the rear wheels by connecting rod transmission. All wheels are connected with coupling rods. 53 units of the Class M31 locomotive had been manufactured for MÁV in the period of 1958 and 1960.

DIESEL LOCOMOTIVE WITH HYDRAULIC DRIVE SYSTEM

Class M32

Main Data

Output of Diesel engine	257 kW
Type of Diesel engine	Ganz-MÁVAG 8 VE 17/24
Wheel arrangement (British coding)	0-6-0
Axle arrangement (German coding)	C
Wheel dia	0.920 m
Total wheel base	5.100 m
Length over buffers	9.510 m
Maximum height	4.100 m
Maximum width	3.100 m
Running order weight	36 t
Fuel supply	1.450 t
Top speed	
in shunting service	22 k.p.h.
in line service	60 k.p.h.



The Class M32 diesel-hydraulic locomotives were purchased by MÁV from Ganz-MÁVAG for maintaining the light shunting as well as branch line service. Their commissioning began in 1972. The Diesel engine built into the locomotive drives the hydrodynamic transmission, which drives through universal-joint shafts and axledrives the three axles of the locomotive. The speciality of this hydrodynamic transmission gear is that it incorporates two torque converters for forward and two other torque converters for

reverse (backward) travel directions, therefore the conventional mechanical (geared) reverser fails. The high value of starting tractive effort is effected by the slow stage of the two-stage mechanical final drive gear incorporated in the hydraulic transmission while at the fast stage of this gear can reach the locomotive her top speed in line service. The running gear of this locomotive is of the rigid frame type. 56 units of the Class M32 locomotives were manufactured for MÁV within the interval of 1972-1974.

DIESEL LOCOMOTIVE WITH HYDRAULIC DRIVE SYSTEM

Class M43 and Class M47

Main Data

	M43	M47
Output of Diesel engine*	331 kW	514 kW
Type of Diesel engine	MB836Bb	MB820Bb
Wheel arrangement	(British coding) B-B	
Axle arrangement	(German coding) B'-B'	
Wheel dia	1.000 m	
Bogie wheel base	2.500 m	
Pivot pitch	5.640 m	
Total wheel base	8.140 m	
Length over buffers	11.460 m	
Maximum height	4.550 m	
Maximum width	3.050 m	
Running order weight	46 t	48 t
Fuel supply	1.690 t	
Top speed		
in shunting service	30 k.p.h.	35 k.p.h.
in line service	60 k.p.h.	70 k.p.h.

* The Series M47.2000 locomotives are equipped with electric train heating facilities, therefore the rated output of Diesel engines built into these locomotives is equal to 700 kW



For further updating of the shunting service and the branch-line transportation MÁV purchased from 1974 Roumanian-made diesel-hydraulic locomotives. These locomotives were built in 3 version: the Series 1000 of Class M43 locomotives equipped with a diesel engine of 331 kW output, the Series 1000 of the Class M47 locomotives with 514 kW as well as the Series 2000 of the Class M47 locomotives with 700 kW engine ratings, respectively. The mechanical arrangement of the 3 different executions are very similar to each other. The Diesel engines drive hydraulic transmissions comprising two hydrodynamic torque converters. The drive of these transmissions will be transmitted to the four wheelsets arranged in the two bogies by

means of universal-joint shafts. By means of the mechanical gear incorporated into the hydraulic transmission the locomotives can advantageously maintain both shunting and line services. The Series 2000 of the Class M47 locomotives are provided with an electric train heating equipment with a rated output of 150 kW. The train heating A.C. generator is driven by the diesel engine through a suitable shaft of the hydraulic transmission. MÁV had purchased 160 units of the Class M43 locomotives during the years between 1974 and 1979, 38 units of the Series 1000 of the Class M47 locomotives in the period of 1974-1975 and 75 units of the Series 2000 of the Class M47 locomotives in the interval between 1975 and 1979.

DIESEL LOCOMOTIVE WITH HYDRAULIC DRIVE SYSTEM

Class Mk45

Main Data

Gauge	0.76 m
Output of Diesel engine	331 kW
Type of Diesel engine	MB836Bb
Wheel arrangement (British coding)	B-B
Axle arrangement (German coding)	B'-B'
Wheel dia	0.750 m
Bogie wheel base	1.700 m
Pivot pitch	5.500 m
Total wheel base	7.200 m
Length over buffers	10.200 m
Maximum height	3.100 m
Maximum width	2.490 m
Running order weight	32 t
Fuel supply	1400 kg
Top speed	40 k.p.h.



In the early 1970's the withdrawal of the misfit 0.76 m (= 2'-6") narrow-gauge locomotives became more and more necessary, therefore MÁV contemplated the purchase of new locomotives. In 1973 this purchase became urgent, because a night-watchman, who turned out later to be weak-brained, set on fire the locomotives of the Úttörövasút (i.e. Pioneer Railway, now: Gyermekvasút = Railway of Children) of Budapest and they were completely burnt down. A quick response was given to the bid invitation by the locomotive works „23rd August” of Bucharest (Rou-

mania) having the Class Mk45 narrow-gauge locomotives offered for a short delivery term. The machinery of these locomotives is quite identical with that of the standard-gauge Class M43 engines being manufactured in the same works, with one remarkable exception, namely they have no change-over gear for shunting/line service. 10 units of this Class have been purchased in 1973, a part of them has been still working on narrow-gauge lines of MÁV other than the Pioneer Railway.

DIESEL LOCOMOTIVE WITH HYDRAULIC DRIVE SYSTEM

Class M41

Main Data

Output of Diesel engine	1325 kW
Type of Diesel engine	12 PA 4-185*
Wheel arrangement (British coding)	B-B
Axle arrangement (German coding)	B'-B'
Wheel dia	1.040 m
Bogie wheel base	2.400 m
Pivot pitch	8.650 m
Total wheel base	10.960 m
Length over buffers	15.500 m
Maximum height	4.230 m
Maximum width	3.092 m
Running order weight	66 t
Fuel supply	2550 kg
Top speed	100 k.p.h.
Electric output available for train heating	250 kW

* manufactured by Ganz-MÁVAG under licence from S.E.M.T. Pielstick, France



To maintain the passenger train services on the non-electrified mainlines of MÁV, the purchase of the Class M41 locomotives had been commenced in 1972 from Ganz-MÁVAG. The diesel engine drives a hydrodynamic transmission composed of two torque converters and a reversing gear. The four axles arranged in the bogies are driven from the hydraulic drive by means of universal joint shafts. The electric current for train heating purposes is generated by a synchronous generator driven by the Diesel engine. The

Class M41 locomotives prove themselves extremely well in the suburban passenger transportation. There was a control car designed to work together with these locomotives. In their driver's cab are arranged all of the control and monitoring devices which made unnecessary to stay the crew on the locomotive in push-pull service. 114 units of these locomotives were manufactured during the years between 1972 and 1984.

**DIESEL LOCOMOTIVE
WITH ELECTRIC TRANSMISSION
SYSTEM**

***Class M44
(Former: Class M424)***

Main Data

Output of Diesel engine	440 kW
Type of Diesel engine	Ganz XVI Jv 170/240
Wheel arrangement	(British coding) Bo-Bo
Axle arrangement	(German coding) B'0-B'0
Wheel dia	1,040 m
Bogie wheel base	2,200 m
Pivot pitch	5,500 m
Total wheel base	7,700 m
Length over buffers	11,240 m
Maximum height	4,447 m
Maximum width	3,060 m
Running order weight	62 t
Fuel supply	1000 kg
Top speed	80 k.p.h.



Class M44 (at the beginning marked as M424) is a Diesel locomotive with electric transmission system and the first unit of her was commissioned in 1954. This locomotive was in that time the most powerful Diesel locomotive of the MÁV, designed and manufactured by MÁVAG later by Ganz-MÁVAG. She was intended for the light goods trains and medium shunting service. The Diesel engine built into this locomotive drives a D.C. main generator

supplying the four nosuspended traction motors driving the four axles by means of gear transmissions. The locomotive equipped with a single driver's cab can be controlled both from the right and the left hand side, advantageously for the shunting service. The well-proven design of this locomotive is verified by the fact that her purchase continued up to 1971. 200 units of Class M44 locomotives had been manufactured for MÁV.

DIESEL LOCOMOTIVE WITH ELECTRIC TRANSMISSION SYSTEM

Class M40

Main Data

Output of Diesel engine	740 kW
Type of Diesel engine	Ganz-MÁVAG 16 VFE 17/24
Wheel arrangement	(British coding) Bo-Bo
Axle arrangement	(German coding) B'o-B'o
Wheel dia	1.040 m
Bogie wheel base	2.600 m
Pivot pitch	6.500 m
Total wheel base	9.100 m
Length over buffers	14.250 m
Maximum height	4.150 m
Maximum width	3.115 m
Running order weight	76 t
Fuel supply	700 kg
Top speed	100 k.p.h.
Steam output of the train heating boiler	800 kg/h.



The Ganz-MÁVAG made Diesel-electric Class M40 locomotives had been built first of all to haul passenger trains. The first units of this Class were powered by a 605 kW rated output Diesel engine but the output of the locomotives built later was increased to 740 kW. The four traction motors built into the two bogies are supplied with electric energy from the D.C. main generator driven by the Diesel engine. The wheels are driven by gears from the traction motors. The steam necessary to train heating purposes is

generated by Diesel fuel oil fired boiler of automatic operation. The bonnet-type single-cab locomotive has two diagonally-arranged driver's stands. A total amount of 82 units were manufactured from the Class M40 locomotives within the period of 1963-1970, their distribution concerning track gauge was: 69 units of European standard gauge and 13 units of Soviet broad gauge of 1.524 m (i.e. 5') execution.

**DIESEL LOCOMOTIVE
WITH ELECTRIC TRANSMISSION
SYSTEM**

Class M61

Main Data

Output of Diesel engine	1435 kW
Type of Diesel engine	General Motors 16-567 D1
Wheel arrangement	(British coding) Co-Co
Axle arrangement	(German coding) C'o-C'o
Wheel dia	1.040 m
Bogie wheel base	2.0+2.0 m
Pivot pitch	10.300 m
Total wheel base	14.300 m
Length over buffers	18.900 m
Maximum height	4.295 m
Maximum width	3.090 m
Running order weight	106 t
Fuel supply	2400 kg
Top speed	105 k.p.h.
Steam output of train heating boiler	800 kg/h.



In the early 1960's numerous transportation tasks on the un electrified mainlines of the MÁV (for instance the maintaining of heavy fast as well as goods trains) could be solved only by overcoming many difficulties. The home railway vehicle industry was unready in that times to manufacture high-powered Diesel locomotives therefore MÁV purchased in 1963 and 1964 20 units of Diesel locomotives with electric transmission rated to 1435 kW output from the Swedish NOHAB Works. The Diesel engine as well as the whole power transmission and drive

system had been delivered by the General Motors Corp. of USA. The electric power for the six D.C. traction motors built into the two 3-axled (6-wheeled) bogies is generated by the Diesel-engine driven D.C. main generator, while the wheels are driven from the traction motors by means of gear transmissions. The steam required for heating of the passenger trains is generated by the automatic train heating boiler fired by Diesel fuel oil. The Class M61 Diesel-electric locomotives were well-proved and highly reliable vehicles of the MÁV, too.

**DIESEL LOCOMOTIVE
WITH ELECTRIC TRANSMISSION
SYSTEM**

Class M62

Main Data

Output of Diesel engine	1472 kW
Type of Diesel engine	14D40
Wheel arrangement	(British coding) Co-Co
Axle arrangement	(German coding) C'o-C'o
Wheel dia	1.050 m
Bogie wheel base	2.1+2.1 m
Pivot pitch	8.6 m
Total wheel base	12.8 m
Length over buffers	17.55 m
Maximum height	4.493 m
Maximum width	2.95 m
Running order weight	116.5 t
Fuel supply	3500 kg
Top speed	100 k.p.h.



MÁV began from 1965 the purchase of the Soviet made Class M62 diesel-electric locomotives for working goods trains. The D.C. main generator is driven by means of a two-stroke turbosupercharged Diesel engine. The current generated by this main generator supplies the six D.C. traction motors built into the two bogies. The wheelsets are driven from the traction motors by means of gear drives. These locomotives were not equipped with train heating equipment thus when hauling passenger trains the coaches had to be supplied with steam or electric energy for train heating puposes by a boiler coach or an electric heating

coach having a Diesel generator set, respectively. In 1975 40 per cent of the goods trains transportation performances were accomplished by these locomotives. MÁV purchased from the Class M62 locomotives within the period between 1965 and 1974 a total of 288 units. The distribution of this number is: 270 units of European standard gauge locomotives and 18 units of Soviet broad gauge of 1.524 m (i.e. 5') locomotives, the latters were used for shunting purposes as yards locomotives at the terminals on the Hungarian-Soviet border.

DIESEL LOCOMOTIVE WITH ELECTRIC TRANSMISSION SYSTEM

Class M63

Main Data

Output of Diesel engine	1980 kW
Type of Diesel engine	18 PA4-185*
Wheel arrangement	(British coding) Co-Co
Axle arrangement	(German coding) C'o-C'o
Wheel dia	1.050 m
Bogie wheel base	2.1+2.1 m
Pivot pitch	10.44 m
Total wheel base	14.3 m
Length over buffers	19.54 m
Maximum height	4.22 m
Maximum width	3.06 m
Running order weight	120 t
Fuel supply	4400 kg
Top speed	130 k.p.h.

* manufactured by Ganz-MÁVAG under licence with S.E.M.T. Pielstick, France



MÁV placed an order with Ganz-MÁVAG to deliver the Class M63 diesel-electric mainline locomotives intended to haul the heavy passenger as well as goods trains on mainlines of her network. The first two units of them were built in 1970. The prime mover of this locomotive was a 18-cylinder turbosupercharged Diesel engine manufactured by Ganz-MÁVAG under licence from S.E.M.T. Pielstick. A three-phase A.C. synchronous main generator is driven by the Diesel engine while the six D.C. traction motors built into the two bogies are fed by ripple direct current through a bridge-connected silicon rectifier. The

electro-dynamic (rheostatic) brake of the locomotive can be actuated in the speed range over 30. k.p.h. The electric motors for the auxiliary drives as well as the train heating are supplied by the synchronous auxiliary and heating generator having a common rotor with the main (traction) generator. A total of 10 units had been manufactured only in the interval between 1970 and 1975 as because of the actual liquid fuel situation MÁV have envisaged to electrify numerous lines that had not been involved earlier in the electrification plan.

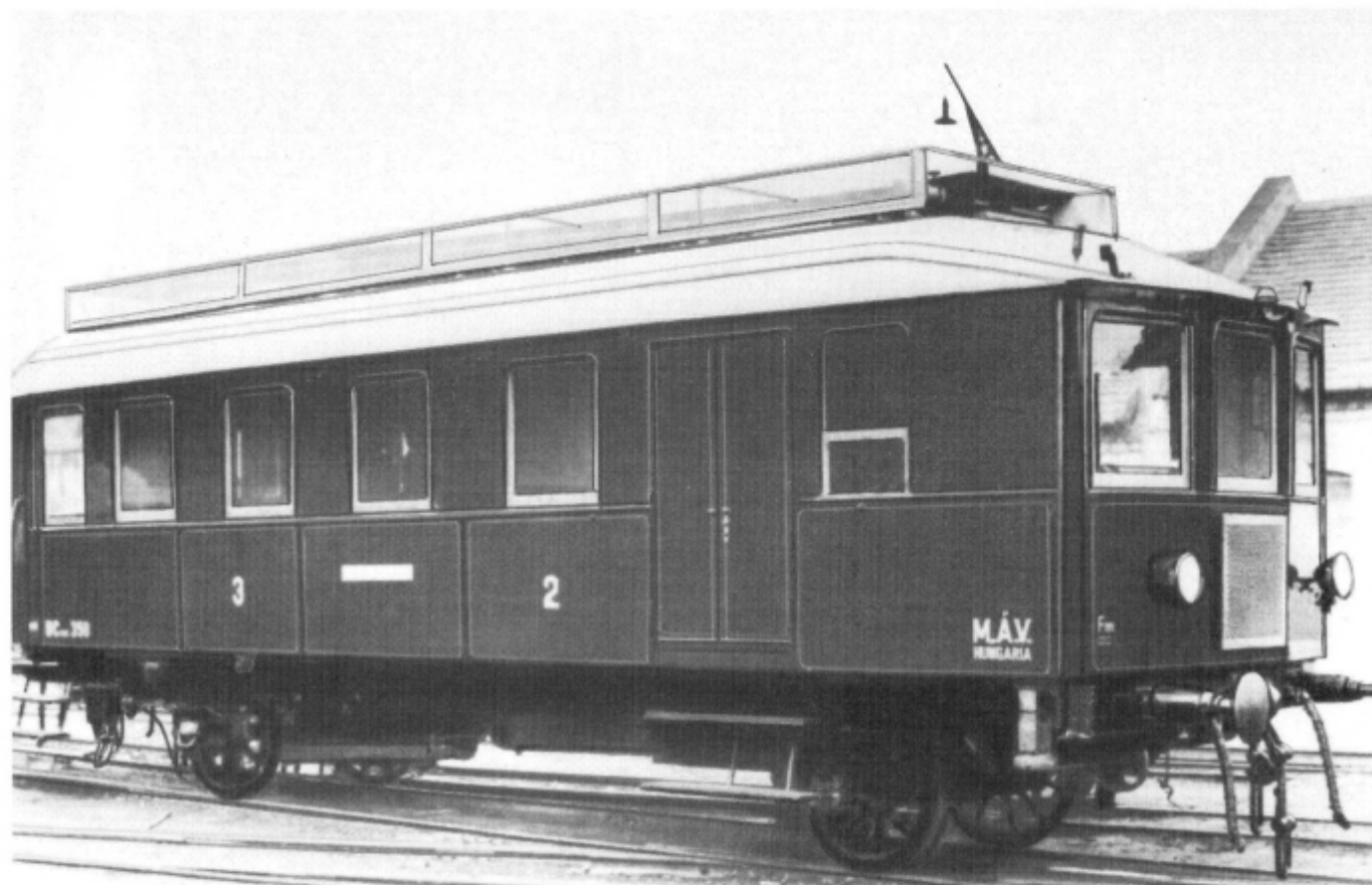
PETROL MECHANICAL RAILCAR

Class BCmot

Nameplate No: 350

Main Data

Engine output	55 kW
Type of engine	NAG BM 70
Wheel arrangement (British coding)	2-2-0
Axle arrangement (German coding)	A 1
Wheel dia	1.020 m
Bogie wheel base	6.700 m
Length over buffers	11.650 m
Running order weight	18.7 t
Top speed	60 k.p.h.
Seats:	
2nd class	10
3rd class	30



MÁV decided in 1925 the repeated introducing of railcar service and placed orders with home and German manufacturers to deliver experimental railcars to make comparative examinations. The Class BCmot railcar with nameplate No. 350 was one of the experimental railcars. In original execution the underframe of this railcar was that of a two-axled (four-wheeled) steam powered railcar being made suitable for build-in the power pack* which was done by MÁVAG. The German-made petrol engine drove one of the wheelsets through a four-stage gearbox built toget-

her with a reverser. This railcar had a single driver's cab. This railcar worked from 1926 in the regular traffic. After 1927 she ran first of all between Pécsvárad and Fonyód. The railcar was used in the World War II by the supreme command of the Hungarian Army outside the borders of Hungary and in the course of war events she disappeared.

* by MÁV Istvántelki Főműhely (i.e. overhaul shop of MÁV at Istvántelek).

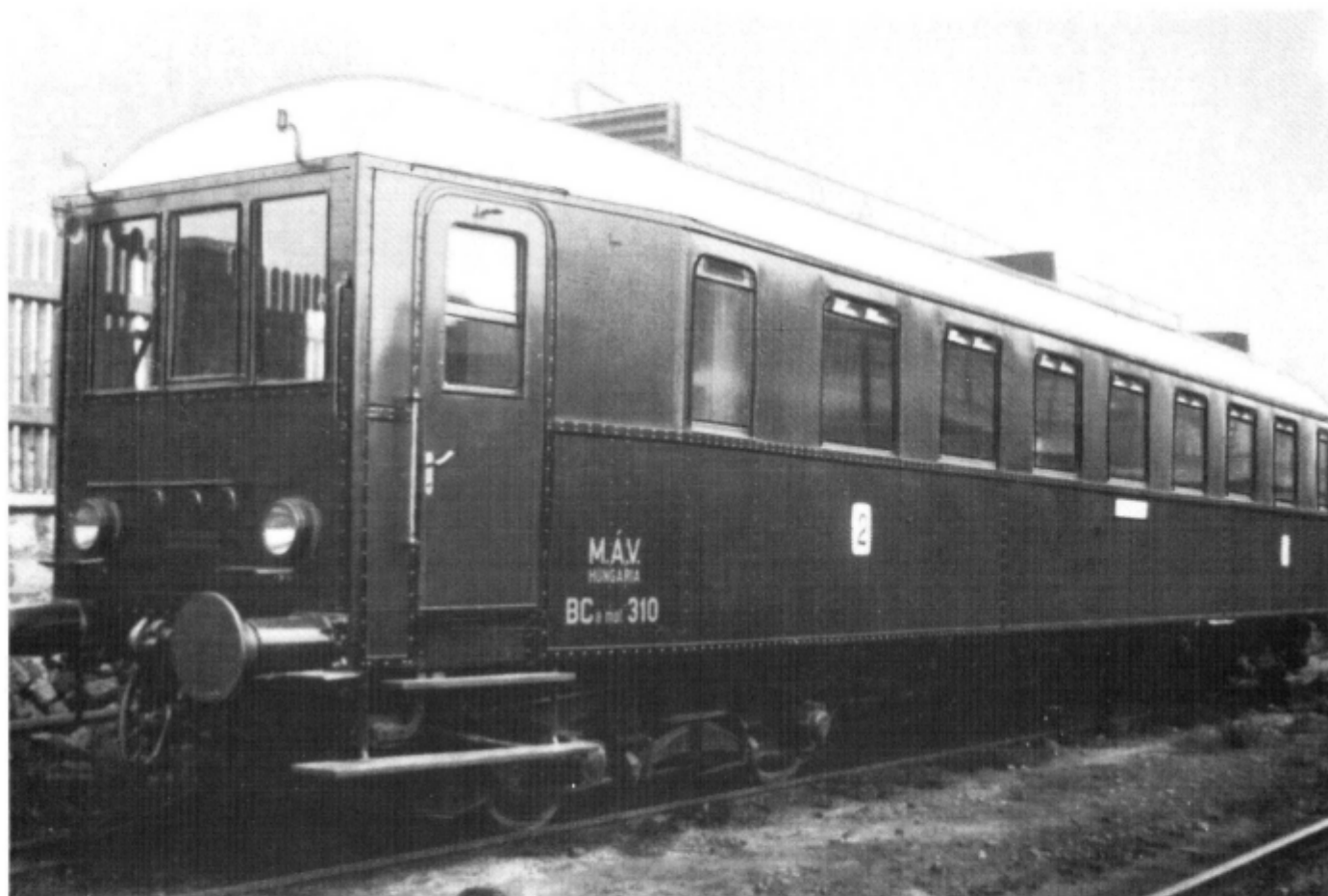
BENZENE MECHANICAL RAILCAR

Class BCamot

Nameplate No: 310

Main Data

Engine output	2x55 kW
Engine type	DWK L6
Wheel arrangement	(British coding) 1A-1A
Axle arrangement	(German coding) 1A'-1A'
Wheel dia	0.850 m
Bogie wheel base	2.500 m
Pivot pitch	11.500 m
Total wheel base	14.000 m
Length over buffers	18.400 m
Running order weight	34.8 t
Top speed	60 k.p.h.
Seats:	
2nd class	24
3rd class	54



The first German-made experimental railcar which was displayed in Munich on an exhibition in 1925 was built by the Deutsche Werke (i.e. German Works) of Kiel. The benzene engine built into the four-axled railcar drove the ones near to the railcar centre through the 4-stage speed change gear forming a compact unit with the reverser. The railcar was re-built in 1931 and afterwards once more in 1947. Along with this second reconstruction the original

benzene engine was changed for a Ganz-made VIJaR 170/240 type Diesel engine improving the performance of the railcar to 162 kW. The Class and nameplate No. had been changed, too, the new marking was Camot 317. The re-built railcar having a top speed of 110 k.p.h. had maintained a light fast train service hauling two four-axled bogie-type coaches.

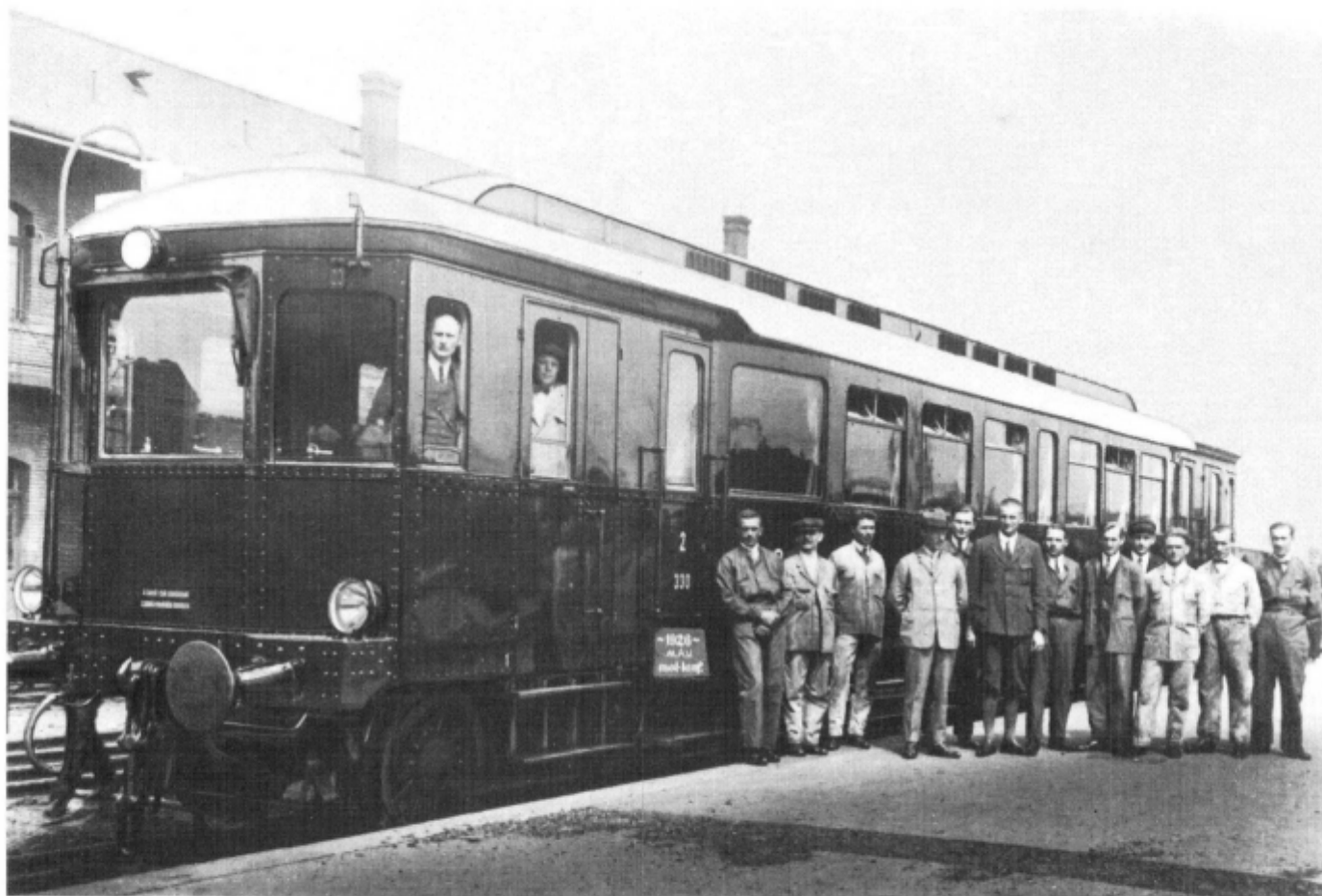
DIESEL MECHANICAL RAILCAR

Class BCamot

Nameplate No: 330

Main Data

Engine output	110 kW
Engine type	Maybach G4a
Wheel arrangement (British coding)	B-2
Axle arrangement (German coding)	B'-2'
Wheel dia	1.000 m
Bogie wheel base (power/trailer)	3.5/2.5 m
Pivot pitch	13.300 m
Total wheel base	16.900 m
Length over buffers	20.900 m
Running order weight	40 t
Top speed	60 k.p.h.
Seats:	
2nd class	29
3rd class	51



This experimental railcar (later marked with nameplate No. 304) was built in 1926 by the German Eisenbahn Verkehrsmittel AG (EVA) company (i.e.: Railway Vehicle Company). The Maybach-type Diesel engine built in this railcar was the most up-to-date model in the middle 1920's. The power pack was accommodated in one of the bogies. The mechanical transmission (change gear) drove a dummy shaft through a bevel-gearred reversing gear. The four

wheels of the power bogie were driven by side coupling rods from the dummy cranks fixed on the dummy shaft ends. Because her relative high axle load this railcar ran on the mainlines only, regularly on the line between Budapest-Keleti (i.e. Eastern Railway Station of Budapest) and Tapolca. This railcar was furnished in 1933 with a Diesel engine of improved performance of 130 kW.

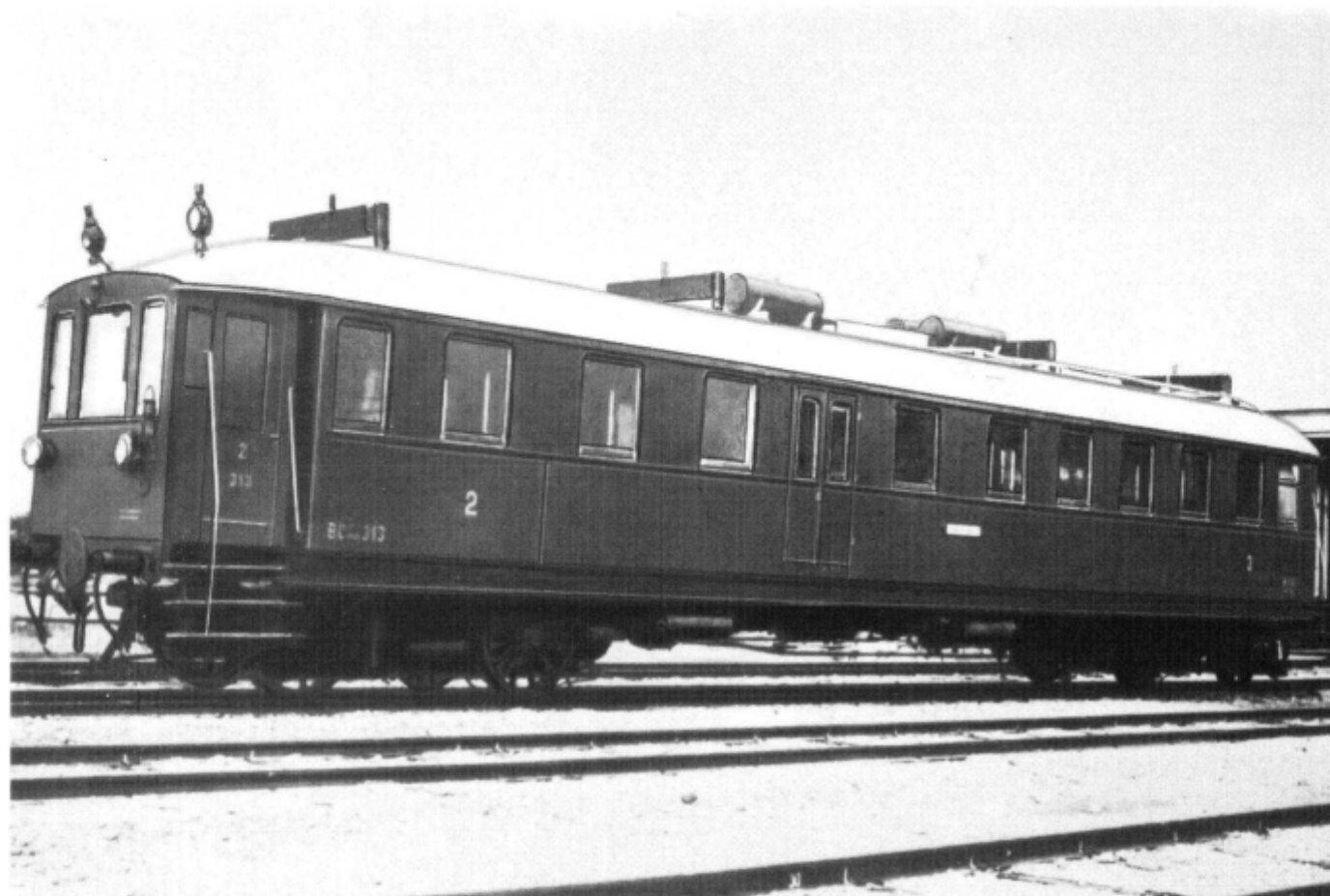
PETROL MECHANICAL RAILCAR

Class BCmot

Nameplate No-s: 311-313

Main Data

Engine output	2x55 kW
Engine type	NAG BM70
Wheel arrangement	(British coding) 1A-1A
Axle arrangement	(German coding) 1A'-A1'
Wheel dia	1.020 m
Bogie wheel base	2.200 m
Pivot pitch	12.800 m
Total wheel base	15.000 m
Length over buffers	19.870 m
Running order weight	38.6 t
Top speed	60 k.p.h.
Seats:	
2nd class	24
3rd class	49



In 1926 MÁV had three 4-axled railcars built. These railcars were built by using up and strenghtening the underframes of former 4-axled steam engine powered railcars by MÁVAG and MÁV Istvántelki Főműhely (i.e. overhaul shop of MÁV at Istvántelek) and got nameplate No-s 311, 312 and 313. The railcars were equipped with two complete power packs composed of engine, mechanical speed change gear and axle drive, each being identical with that

of the railcar Class BCmot having nameplate No 350. One axle of each bogie nearer to the railcar centre were driven by the engine through 4-stage speed change gear forming a compact unit with the reverser. In the early 1930's new engines of improved output (2 x 73 kW) were built into the railcars and simultaneously the permitted top speed had been increased up to 70 k.p.h. They worked first of all the passenger transportation on branch lines.

DIESEL MECHANICAL RAILCAR

Class ABmot (former: Class BCmot)

TRAILER

Class ABx (former: Class BCx)

Main Data

	Railcar	Trailer
Diesel engine output	110 kW	
Type of Diesel engine		
Ganz	VIJaR 135	
Wheel arrangement (British coding)	A1	2-0-2
Axle arrangement (German coding)	A1	2
Wheel dia	0.920 m	
Total wheel base	6.200 m	7.000 m
Length over buffers	12.020 m	
Maximum height	4.080 m	3.590 m
Maximum width	3.080 m	
Running order weight	18 t	13 t
Fuel supply	630 kg	
Top speed	60 k.p.h.	75 k.p.h.
Seats:		
1st class		15
2nd class	31	41



MÁV placed an order also with Ganz in 1926 to deliver experimental railcars. The prototype unit was a two-axled railcar equipped with mechanical transmission and driven by a petrol engine of 55 kw output. Based on the performed comparative examinations the Ganz-made railcar proved to be the most suitable for MÁV. The reason of this fact was first of all that the main structural components of biggest importance like engine, speed change gear as well as vehicle part had been developed by the same manufacturer, by the Ganz works. In 1927 MÁV began to purchase the Ganz-made two- and three-axled railcars to maintain the passenger traffic on branch-lines, marked originally as class BCmot and BCymot railcars. These railcars were originally equipped with petrol engines but from 1934 these were changed for Diesel engines. One wheelset of the railcar was driven through a four-stage mechanical

speed-change gear by the Diesel engine. Interesting feature of the mechanical part was the radiator of the engine cooling water being accommodated on the roof. There were manufactured trailer cars to the railcars, too, having identical vehicle part. The railcar service proved to be significantly more economical than the steam service. The mixed-train traffic had been given up on the branch lines, as a consequence, the average travelling speed of 17 k.p.h. could be doubled. In the middle 1930's the complete passenger traffic was maintained with 2- and 3-axled railcars on the branch-line network of appr. 4400 km of MÁV, representing the 55 per cent of the whole MÁV railway network of that times. A total of 128 units had been manufactured from these railcars in the period between 1926 and 1937.

DIESEL MECHANICAL RAILBUSES

Nameplate No-s 7 and 8

Main Data

Diesel engine output	68 kW
Type of Diesel engine	Ganz VIII. JaR 105
Wheel arrangement	(British coding) 1A
Axle arrangement	(German coding) 1A
Wheel dia	0.750 m
Wheel base	6.700 m
Length over buffers	10.700 m
Maximum height	2.944 m
Maximum width	3.100 m
Running order weight	12 t
Fuel supply	215 kg
Top speed	90 k.p.h.
Seats	46



There is a known fact, that the travelling speed of the fast trains can be increased by reducing of number of stops, too. This principle can be realized by introducing the so-called collecting and distributing trans. The collecting and distributing train ran before and after the fast train. By these trains passengers were transported to and from the stopping stations of the fast trains. The vehicles intended to meet these demands had to have a very high rate of acceleration for ensuring a travelling speed being nearly equal to that of the fast train as they ran always close before and after the fast train. MÁV used as such a collecting and distribu-

ting train their two-axled railbuses of light-weight construction manufactured by Ganz in 1934. These railbuses had one driver's stand only thus the vehicles had to be turned at the terminal stations. The power of the Diesel engine built into the railbus was transmitted to the driving wheels by means of a four-stage speed-change gear built together with the reverser. The railbuses had no standard buffers and draw gears as they ran always alone. The dynamical properties of these vehicles can be characterized by their accelerating rate, reaching a speed of 90 k.p.h. within 160 seconds.

DIESEL HYDROMECHANICAL RAILCAR

Class Bzmot

TRAILER

Class Bzx

Main Data

	Railcar	Trailer
Diesel engine output	141 kW	
Type of Diesel engine	Skoda ML 634	
Wheel arrangement		
(British coding)	A1	2-2
Axle arrangement		
(German coding)	A'-A'	1'-1'
Wheel dia	0.840 m	
Total wheel base	8.000 m	
Length over buffers	13.970 m	
Maximum height	3.500 m	
Maximum width	3.073 m	
Running order weight	19 t	15 t
Fuel supply	270 kg	
Top speed	70 k.p.h.	
Seats	55	67



To replace the 2- and 3-axled railcars purchased before the World War II MÁV began to purchase in 1977 the Czechoslovak made 3-unit railcar trains composed of one railcar and 2 trailers each, manufactured by Tatra Works, Studenka. The power pack of this railcars is completely of the underfloor arrangement. One of the axles is driven by means of a hydromechanical transmission gear and an universal joint shaft. Interesting feature of the vehicle part of this railcar is the one-axled bogie. The safety of the passengers is served by the centrally controlled opening and closing the doors. After releasing the lock they can be

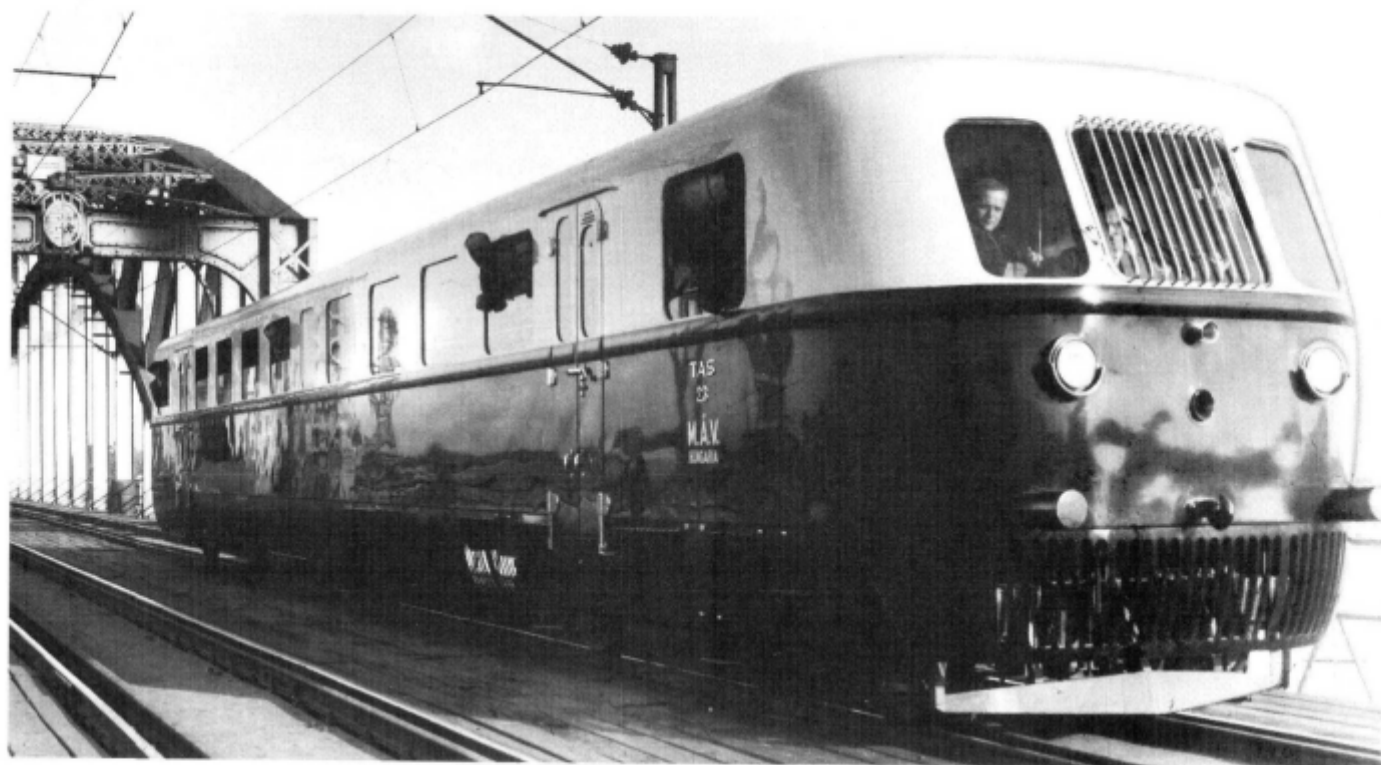
opened manually while their closing will be performed pneumatically. Two kinds of trailer cars of identical construction with the railcar were manufactured: trailers with and without luggage room. A total of 205 units of this DMU-s had been purchased by MÁV in the interval between 1977 and 1984. After a 2-years operation period the Skoda-type engines had been replaced with home-made Rába-type D2156HM6U engines manufactured under licence from MAN, Germany. The ratings of these engines are 147 kW output and 2200 r.p.m.

DIESEL MECHANICAL RAPID RAILBUSES

„Árpád“-type

Main Data

Diesel engine output	160 kW
Type of Diesel engine	Ganz VI. JaR 170
Wheel arrangement (British coding)	B-2
Axle arrangement (German coding)	B'-2'
Wheel dia	0.930 m
Bogie wheel base	
power	3.950 m
trailer	2.500 m
Pivot pitch	15.400 m
Total wheel base	18.000 m
Length over buffers	22.000 m
Maximum height	3.300 m
Maximum width	2.985 m
Running order weight	33 t
Fuel supply	340 kg
Top speed	110 k.p.h.
Seats:	
saloon seats	64
folding seats	8



MÁV put into operation in 1934 the first „Árpád“-type-rapid railbus intended for maintaining light fast train (today so-called Intercity) traffic. The Ganz-made vehicle caused rightly a sensation with her up-to-date construction and refined shape and brought the Ganz railcars well into repute. The Diesel engine built into the power bogie of the rapid railbus drives both axles of the same bogie through a 5-stage mechanical speed-change gear. The Árpád-type rapid railbuses perform the rapid connection not only between the capital city and the country cities but as power vehicles for the first time in Europe they took part in the international railway traffic, too. These railbuses covered the route of 278 km between Budapest and Vienna within a schedule time of 2 hours and 58 minutes with one intermediate stop, a shorter travel time could be performed by the fast trains only 55 years later again. The rapid

railbuses wore each of the name of a Hungarian historical personality were manufactured in total unit number of 7 units between 1934 and 1940, they wore the nameplate No-s from 20 to 26. The rapid railbus of this type which wore the nameplate No. 23 (called originally „Tass“**) has been renewed and under the name „Árpád“ works as a history vehicle of the MÁV fleet.

** Árpád was the name of the first prince of the Hungarian tribes entered from East the today's territory of Hungary at the end of 800' s A.D. as one of the last waves of the great invasions.*

*** Tass was also a chieftain of the Hungarian tribes mentioned above.*

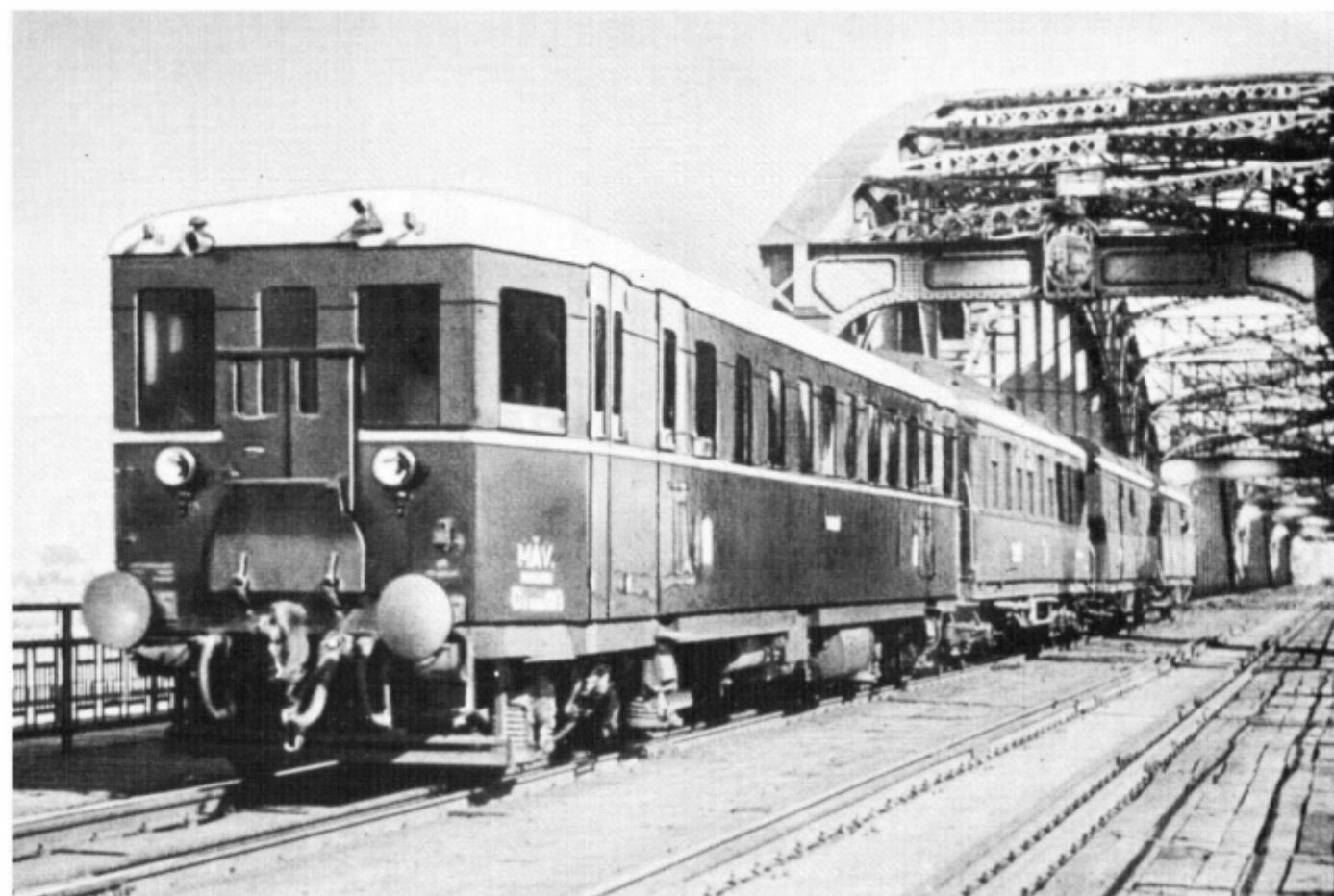
DIESEL MECHANICAL RAILCAR

Class Camot

Nameplate No: 315-316

Main Data

Diesel engine	2x160 kW
Type of Diesel engine	Ganz VI. JaR 170
Wheel arrangement (British coding)	B-B
Axle arrangement (German coding)	B'-B'
Wheel dia	0.920 m
Bogie wheel base	3.950 m
Pivot pitch	15.000 m
Total wheel base	18.950 m
Length over buffers	23.230 m
Maximum height	3.600 m
Maximum width	2.930 m
Running order weight	50 t
Fuel supply	2x340 kg
Boiler feedwater supply	1500 lit
Top speed	90 k.p.h.
Seats	64



MÁV placed an order with the Ganz works to deliver the Class Camot railcars for working the fast trains and stopping trains on mainlines. The railcars were equipped with standard drawgears and side buffers so they could haul coaches of standard design. The curiosity of this railcar type was the doubled machinery having in both bogies the same power packs as „Árpád” fast railbus in one of her bogies has. The steam necessary for heating of the train was generated by the automatically-operating train heating

boiler fired by oil and installed in the railcar herself. The railcar was capable to haul on level track two bogie-type (4-axled) coaches at a speed of 90 k.p.h. or eight 2-axled coaches at a speed of 60 k.p.h. A total of 2 units had been manufactured in 1934, they wore the nameplate numbers 315 and 316. In 1946 along with their reconstruction one of their machinery was removed thus their hauling capacity was reduced by half.

DIESEL MECHANICAL RAILCAR

Class ABbmot

Nameplate No: 601-618

Class Bbmot

Nameplate No: 631-652

Main Data

	Class ABb	Class Bb
Diesel engine output	331 kW	370 kW
Type of Diesel engine	XII. Jv	12 Jv
Wheel arrangement	170/240	17/24
(British coding)	1B-2	
Axle arrangement		
(German coding)	1B'-2'	
Wheel dia	0.920 m	
Bogie wheel base		
power bogie	1.450+2.750 m	
trailer bogie	2.950 m	
Pivot pitch (theoretical)	16.920 m	15.560 m
Total wheel base	20455 mm	19235 mm
Length over buffers	24.470 m	23.000 m
Maximum height	3.861 m	4.131 m
Maximum width	2.860 m	2.956 m
Running order weight	56.5 t	59 t
Fuel supply	720 kg	
Top speed	100 k.p.h.	
Seats:		
1st class	12	
2nd class	32	46



Already in 1942 MÁV contemplated the purchase of the 5-axled railcars of 220 kW performance to haul the passenger trains on branch-lines. The realization of this idea began in 1956 only with the purchase of Ganz-made Class ABbmot railcars and followed with the very similar Ganz-MÁVAG made Class Bbmot railcars of improved execution. The differences between the two types are in the types and outputs of the Diesel engines, in the types of train heating boilers, in some dimensions and in the layout of the passenger rooms. The power packs of these railcars were accommodated in the 3-axled power bogie. Two of the

power bogie axles are driven by the Diesel engine through a 5-stage mechanical speed-change transmission gear by means of universal-joint shafts. Deviating from their original destination, right at the beginning the bulk of these railcars did not work on branch lines but on mainlines first of all to maintain fast trains. 18 units of the Class ABbmot railcars were manufactured within the period of 1956 and 1958 with nameplate numbers 601-618 while the Class Bbmot ones had been purchased in 1958 and 1959 totalling a unit No. of 22, they ran under nameplate No-s 631-652.

DIESEL MECHANICAL MULTIPLE UNITS

„Hargita”*-type

Main Data	Power car	Trailer with dining compartment	Trailer
Diesel engine output	331 kW		
Type of Diesel engine	XII Jv 170/240		
Made of Diesel engine	Ganz		
Wheel arrangement (British coding)	1B-2	2-2	
Axle arrangement (German coding)	1B'-2'	2'-2'	
Wheel dia		0.920 m	
Bogie wheel base	1.47 + 2.63 m		
trailer bogie		2.950 m	
Pivot pitch	17.100 m	17.600 m	
Total wheel base	19.135 m	19.250 m	
Length over buffers	23.340 m	23.500 m	
Maximum height		3.861 m	
Maximum width		2.830 m	
Running order weight	53 t	42 t	
Fuel supply	750 kg		
Top speed		120 k.p.h.	
Seats 1st class	-	56**	54

** 32 seats of this seat No. in the dining compartment

The total length over buffers of the Diesel multiple unit composed of railcar + trailer + trailer with dining room + railcar amounts to 94 m, the total seating capacity /without the seats of the dining compartment is 188 and the running order weight is a total of 190 tonnes.



MÁV placed an order with Ganz in 1942 to manufacture 3 sets of 3-unit DMU-s for maintaining the long-distance light fast train traffic. This order had been modified in 1943 to 4-unit DMU-s. Because of the War happenings the DMU-s were commissioned with a significant delay only. The four-unit trains are composed of railcars (power cars) at front and rear, one of each, and two intermediate trailer coaches. The machinery of the power car was accommodated into the 3-axled power bogie, whereas two axles of this bogie were driven by the Diesel engine through a 5-stage mecha-

nical speed-change gear by means of Universal-joint shafts. The first of the three DMU-s having been built in 1951 was used for the purposes of the Government. The other two DMU-s commissioned in 1958 and in 1960, respectively, ran in the international as well as home fast train traffic.

* *Hargita* is a mountain of central lay in „Székely” land, in Eastern Transylvania, today in the territory of Roumania

DIESEL HYDROMECHANICAL MULTIPLE UNITS

Class MD

Main Data	Power car with luggage compartment	1st-class trailer	2nd-class trailer	2nd-class control trailer
Engine output	590 kW			95.5 kW*
Engine type	12VFE 17/14			D2156HM6
Engine builder	Ganz			Rába
Engine duty	traction			heating
Wheel arrangement (British coding)	B-B		2-2	
Axle arrangement (German coding)	B'-B'		2'-2'	
Wheel dia		0.920 m		
Wheel base bogie	2.400 m	2.300 m		
Pivot pitch	8.050 m	15.100 m	14.675 m	
Wheel base total	10.420 m	17.400 m	16.975 m	
Length over buffers	15.520 m	22.400 m	21.080 m	
Maximum height	4.320 m	4.027 m	4.210 m	
Maximum width		2.850 m		
Running order weight	41 t	30 t	29 t	32.5 t
Fuel supply	800 kg			425 kg
Top speed		100/70 k.p.h.		
Seats	-	60	80	56

* this Diesel engine is driving the train heating A.C. generator
The total length over buffers of the complete Diesel Multiple Unit composed of power car + 3 pcs of 2nd-class trailers + 1st-class trailer + 2nd-class control trailer amounts to 127.2 m, the total seating capacity is 356 and the running order weight is a total of 189 tonnes.



The dieselization of the MÁV branch-line service in the late 1960's was in significant backlog to that of the mainline service. MÁV published a tender invitation in 1968 for delivery of new DMU-s partly for replace the outdated branch-line Diesel railcars commissioned in the period between the two World Wars, partly for the extension of Diesel traction on their network. The tender was won by Ganz-MÁVAG and in 1970 the manufacture of the 6-unit Class MD DMU-s had begun. The DMU consists of a power car furnished with a luggage compartment, four trailers and a control trailer equipped with a driver's cab and a Diesel engine driven A.C. generator set for train heating purposes. All of the

four axles of the power car are driven by the Diesel engine through a 3-stage hydromechanical transmission consisting of one hydrodynamic torque converter and two mechanical gears, by means of Universal-joint shafts. The DMU-s were delivered with different final drive gear ratios thus the top speed was corresponding to the actual gear ratio 70 or 100 k.p.h. The speciality of this DMU was the Diesel generator set for train heating purposes accomodated into the control trailer. The Class MD was the first DMU at MÁV equipped with control trailer. A total of 42 sets were manufactured of this Class in the interval between 1970 and 1975.

