

214.00

PANZER TRACTS No.13

Panzerspaechwagen

Armored Cars
Sd.Kfz.3 to Sd.Kfz.263



Assembled by Thomas L. Jentz
Scale Prints by Hilary Louis Doyle

Cover Photo: A s.Pz.Sp.Wg. (5 cm) (Sd.Kfz.234/2) being used for training during the Winter of 1944/45 (RN)

The scale prints, drawn by Hilary Louis Doyle originally in 1/24 scale, have been reduced 68.6 percent to approximately 1/35 scale.

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Armored Car Evolution

Following World War I, a few armored cars were created for the German Army by mounting armor boxes on Krupp-Daimler artillery tractors that had been used during the war. This gepanzerter Kraftwagen (armored motor vehicle) was to be driven only on roads and trails with hard surfaces. It was especially forbidden to drive through roadside ditches, ram street barricades, or climb over tree stumps or similar obstacles. Therefore, this mechanized armored car couldn't fulfill the role of cross-country reconnaissance that had previously been assigned to the cavalry.

In spite of the treaty prohibiting Germany from rearming with modern weapons, a secret program for developing armored vehicles had been initiated by 1926. Specifications for an armored car were very advanced for the era. Contracts awarded for detailed designs in early 1927 required that these armored cars be capable of driving through mud cross-country, crossing low obstacles and narrow trenches, and swimming across lakes and slow rivers. Two each of three different models with 8 or 10 wheels (ARW and ZRW) were ordered from three different firms - Daimler, Buessing-NAG, and Magirus. Even the armament was progressive, with a 37 mm gun mounted in a fully rotating turret. At least one of these turrets was completed by Rheinmetall for mounting on an armored car. Trials were satisfactory, but the state of the world's economy in 1930 at the start of the Great Depression didn't allow further development or mass production.

With a deteriorating political situation, in the early 1930's Germany set out to rapidly rearm and expand their army. The large 8 to 10 wheeled armored car designs were too expensive and not mature enough for mass production. Therefore, a stop-gap solution was achieved by mounting armor bodies on army car and truck chassis. Naturally, these were again virtually restricted to roads and trails - but they were inexpensive and could be acquired in sufficient numbers to fill the establishments of armored car companies in reconnaissance units in a short time. The smaller 4-wheel armored car was either armed with a machinegun (MG Kw.) or outfitted with a short range radio set (Fu.Kw.). The larger 6-wheel armored cars (s.Pz.Sp.Wg.) were armed with a 20 mm gun and a machinegun in a turret, and half were outfitted with a medium-range radio set with a frame antenna (s.Pz.Sp.Wg. (Fu)). In 1936 a small series of 6-wheel armored cars were produced with high power radio sets for longer range communication. Another 6-wheeled chassis, designed and produced by Krupp,

was used to create a small series of s.gl.gep.Pkw. (heavy cross-country armored staff cars).

The next stage in the program was to develop armored cars on chassis specifically designed for that purpose. Buessing-NAG was contracted to design a heavy 8-wheel armored car to meet cross-country driving specifications. This complex machine had all-wheel drive and all-wheel steering. As with the 6-wheel armored cars, there was a second driver's position in the rear so that the vehicle could be driven just as fast in reverse as forward. Again a 20 mm gun and a machinegun were mounted in a turret of this 8-Rad s.Pz.Sp.Wg., and about half were outfitted with a medium range radio set as s.Pz.Sp.Wg.(Fu). This heavy armored car was converted to a grosser Panzerfunkwagen (large armored radio vehicle) by dropping the turret and extending the superstructure sides to create a larger area for the crew and the high powered radio sets.

Because civilian front-wheel drive vehicles weren't suitable for the army's needs, a new program was created to develop standardized light, medium, and heavy cars, including chassis for leichter Panzerspahwagen (light armored cars). These armored cars with 4-wheel drive and 4-wheel steering were known initially as Pz.Sp.Wg.35. When armed with a machinegun in a rotating shield, it was known as a le.Pz.Sp.Wg. (MG) (Sd.Kfz.221), with a 20 mm gun and machinegun as a le.Pz.Sp.Wg. (2 cm) (Sd.Kfz.222), and with a machinegun and radio set as a le.Pz.Sp.Wg. (Fu) (Sd.Kfz.223). This same chassis was used for kleiner Panzerfunkwagen (small armored radio vehicles). The Sd.Kfz.260 was used for communication with aircraft, and the Sd.Kfz.261 was used for long-range ground communication. Another standardized 4-wheel heavy car was also used to produce a s.gl.gep.Pkw. (armored staff car).

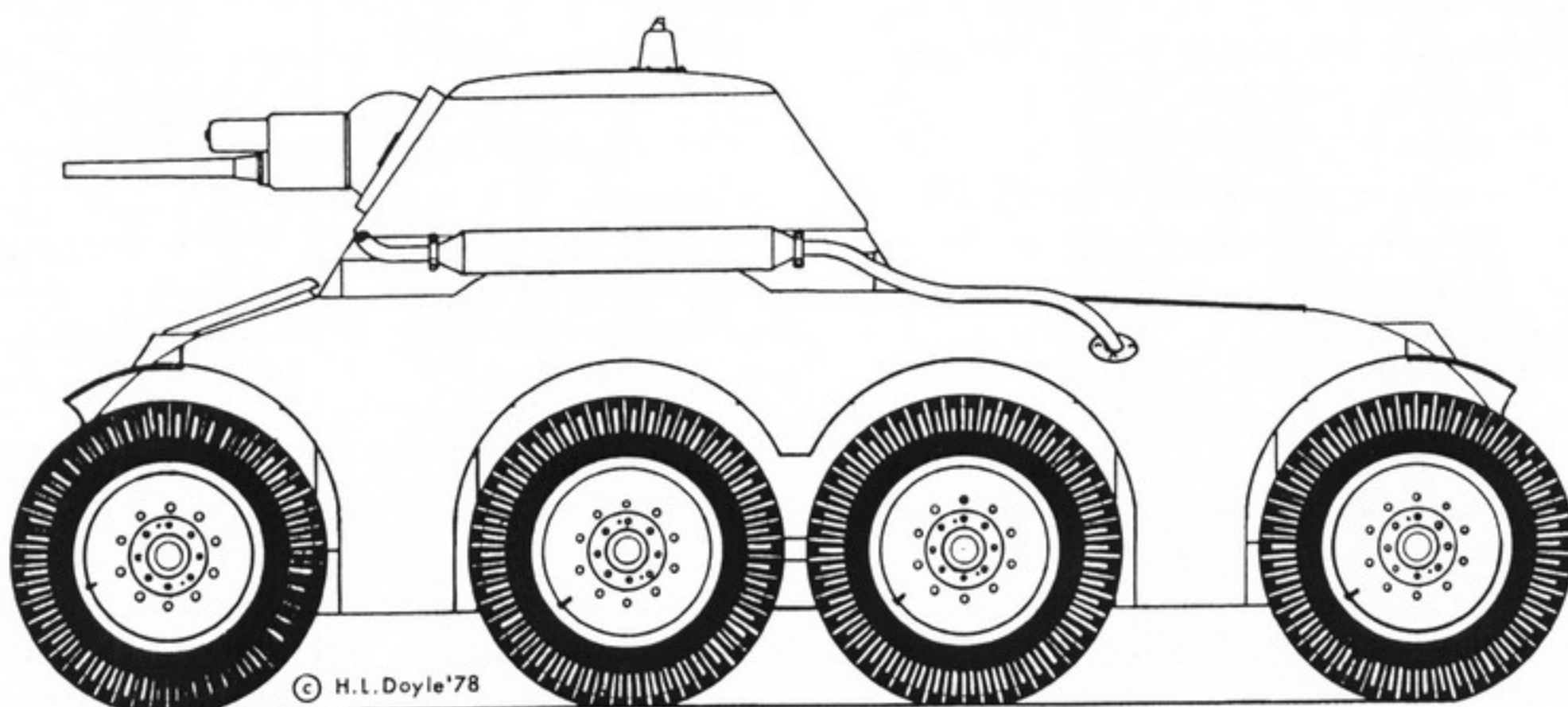
Already in 1939 during the first campaign in Poland, reconnaissance units complained that armored cars didn't have the cross-country performance necessary to fulfill their missions. They wanted full-tracked armored vehicles. However, the full-tracked vehicles couldn't approach the desired top speed of 85 km/hr, achievable with a wheeled vehicle. Therefore, armored cars were given a new lease when in 1940 and 1941 the army ordered the design and production of a heavy 8-Rad Tp (8-wheel hot climate) and a light 4-Rad Tp. The lighter design was dropped, but the heavier 8-Rad Tp was produced with various armament (20 mm gun, 50 mm gun, 75 mm short gun, and 75 mm anti-tank gun) up to the end of the war.

ARW/ZRW

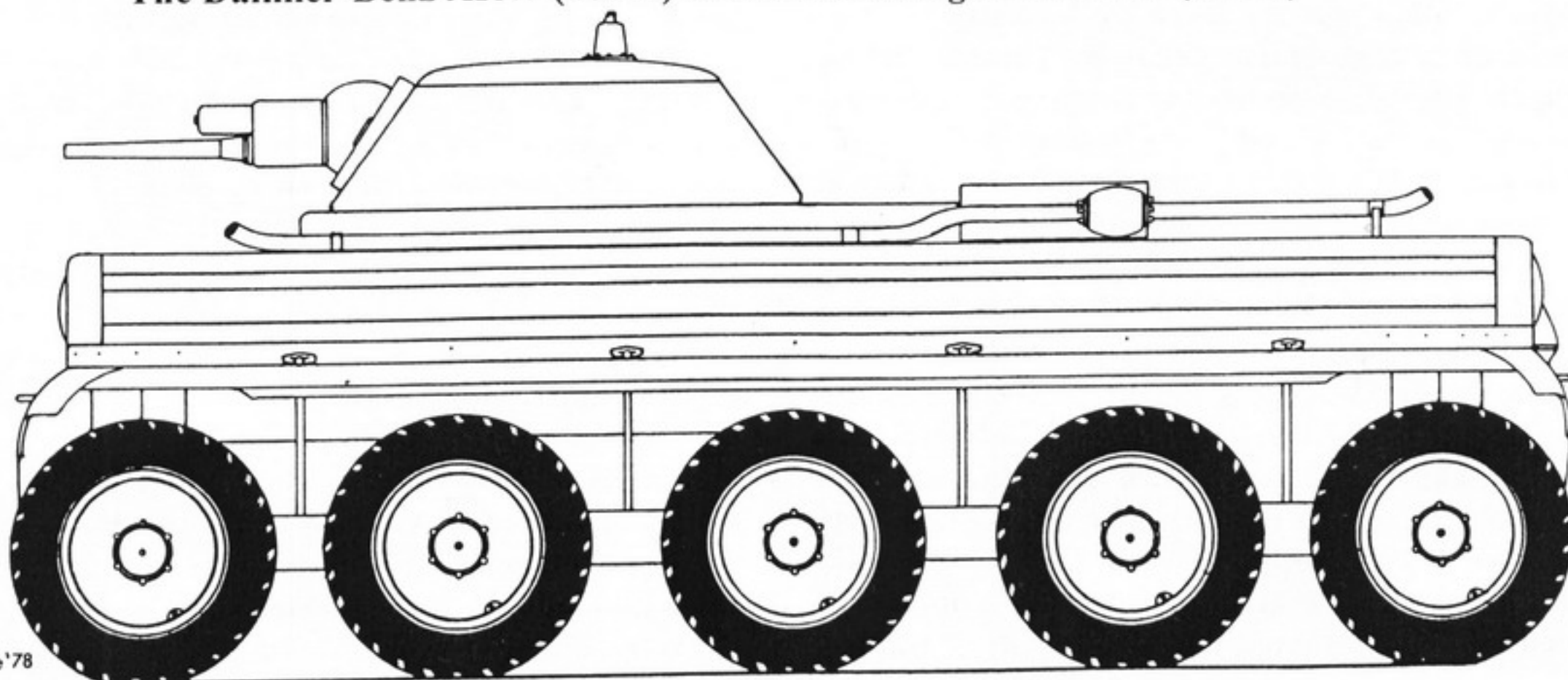
In March 1927, Wa Prw 6 awarded Daimler-Benz a contract to design and produce by mid-April 1928 two "ARW" (8-wheeled vehicles), also known as Mannschaftstransportwagen. The specifications called for a top speed of 65 km/hr, average speed of 32 km/hr, and daily range of 200 km. Off-road capabilities were important with the ability to climb a 1:3 grade on a grass-covered slope, cross a 1.5 m wide trench, ford a 1 m deep creek, drive over obstacles up to 0.3 m tall, and cross soft ground by keeping the weight under 7.5 tons to maintain ground pressure below 0.7 kg/cm². The vehicle was to have the same capabilities to be driven forward or in reverse and be driven on railroad tracks. It was to be manned by a crew of five - commander, driver, two gunners, and a radio operator.

On 17 April 1928, the defense ministry

approved a "Pzkw" acquisition program for six trial vehicles to be completed by the spring of 1928 and tested in 1929. Wa Prw 6 had also awarded contracts to two additional firms: Buessing to produce two "ZRW" (10-wheeled vehicles) and Magirus to produce two "ARW". Rheinmetall was awarded a contract to design and produce turrets with a 3.7 cm gun as armament and reported that the 3.7 cm Pz.Frk.Wg. (armored scouting vehicle) turrets were ready for installation in Untertass. Comparative trials of the three competitors' designs were held in the Spring of 1930. Even though these trials had proven to be satisfactory, they were too expensive for limited production in Germany's economic situation in 1930. In January 1931, a decision was made to defer development of multiwheeled vehicles to the distant future.



The Daimler-Benz ARW (above) and the Buessing NAG ZRW (below)

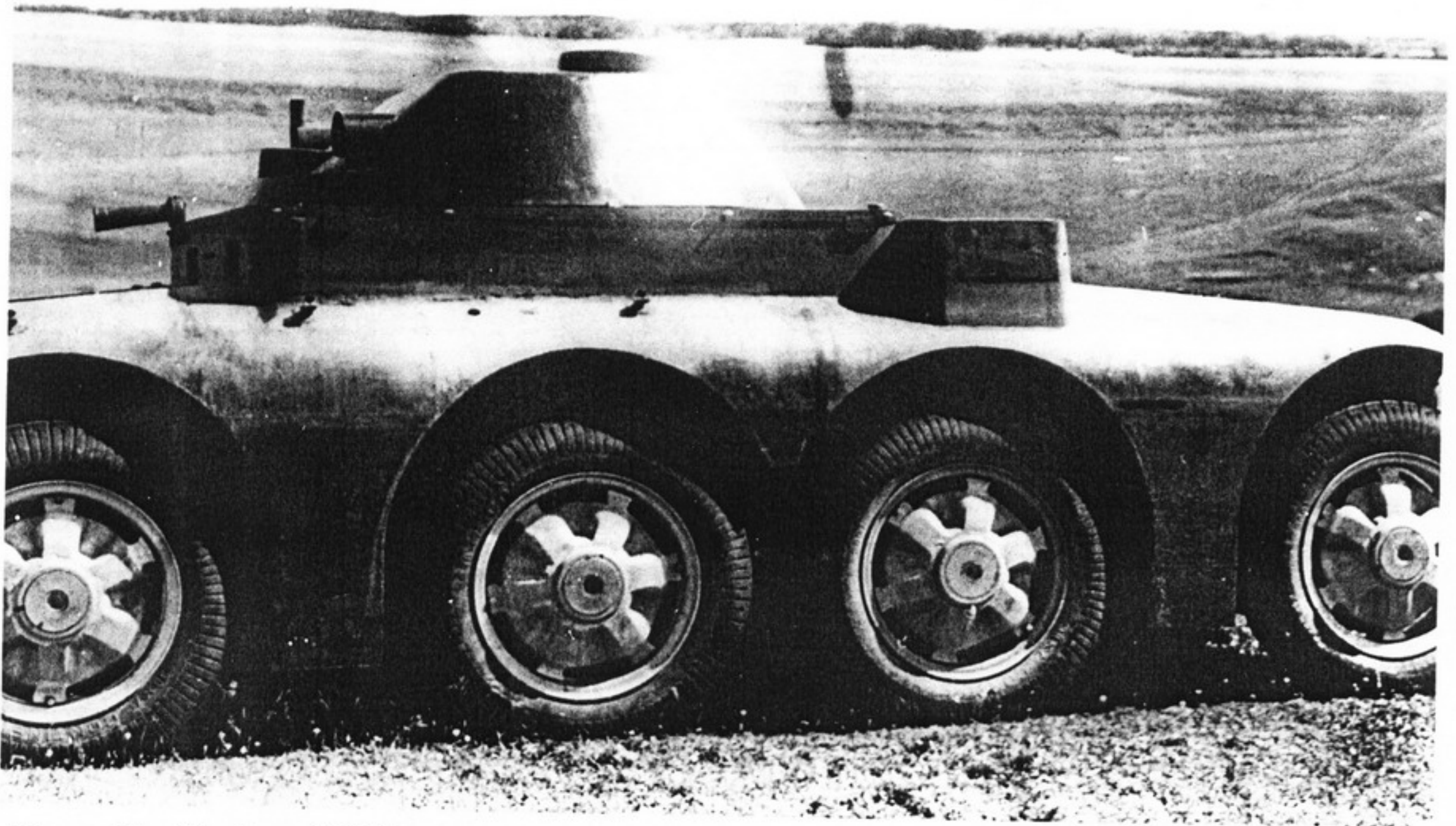




Above: The Daimler-Benz ARW (also known under the code name of Mannschaftstransportwagen - MTW - crew transport vehicle) undergoing field trials in April 1929. (WJS)

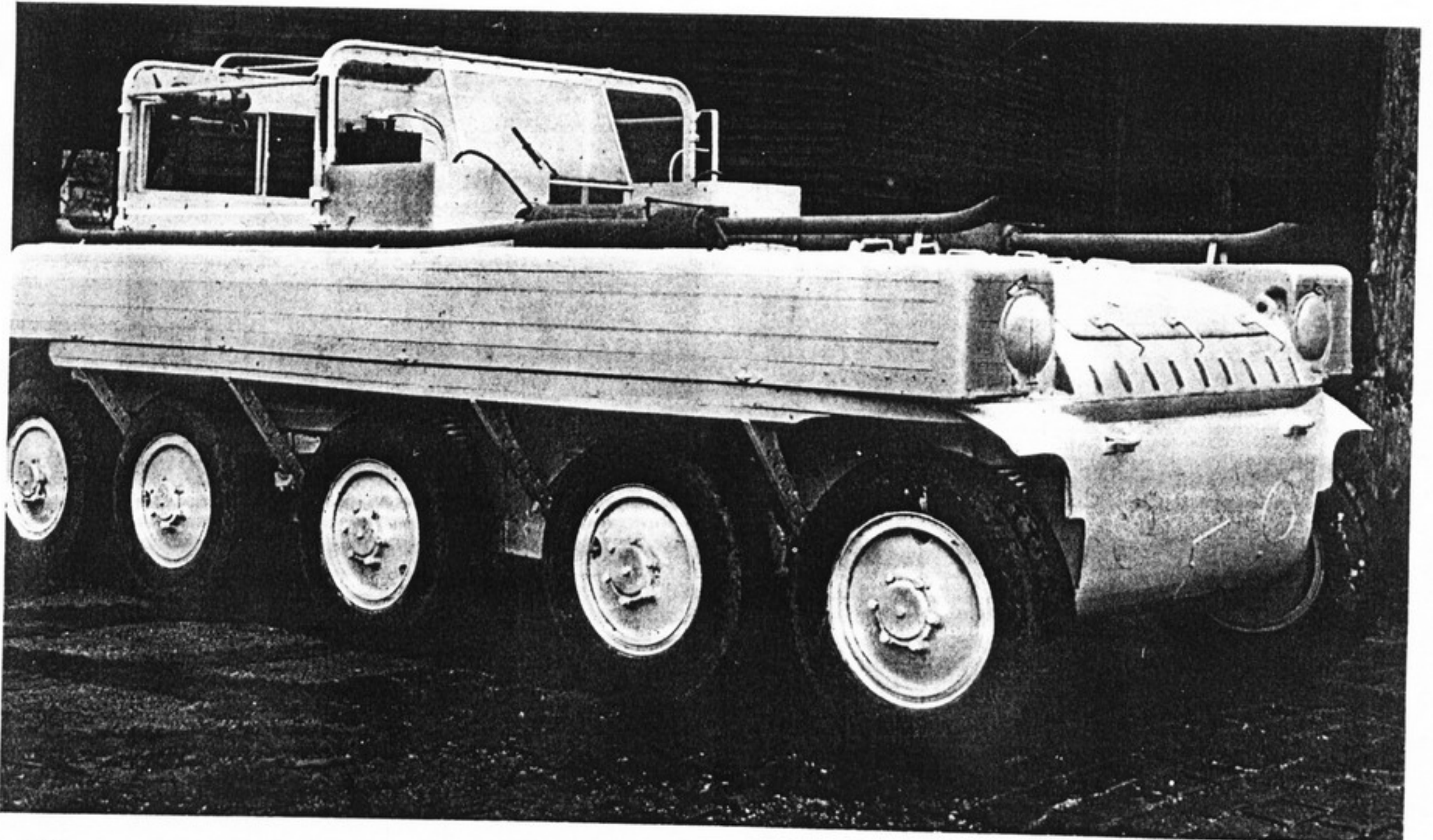
Below: A cork filled overpack on the Daimler-Benz ARW improved its ability to float and aided in its disguise as an MTW. (WJS)





Above: The Magirus ARW (Achtradwalgen - 8-wheel vehicle) had special cast aluminum alloy wheels to keep the weight within specification. (WJS)

Below: The Buessing-NAG ZRW (Zehnradwagen - 10-wheel vehicle) with all-wheel drive (WJS)



gepanzertes Kraftwagen (Sd.Kfz.3)

Weapons Data: None mounted

Crew: 14

Communication: No radio sets

Measurements:

Length, overall: 5.95 m
 Width, overall: 2.20 m
 Height, overall: 2.725 m
 Wheel Base: 1.67 m
 Axle Spacing: 3.75 m
 Combat Loaded: 11.65 metric tons
 Fuel Capacity: 270 Liters

Armor:

Crew Compartment:
 Vertical Sides 12 mm
 Sloped Sides 8 mm
 Horizontal Deck 6 mm
 Horizontal Belly 4 mm
 Motor Compartment:
 Vertical Sides 10 mm
 Sloped Sides 8 mm

Automotive Capabilities:

Maximum Speed: 45 km/hr
 Avg. Road Speed: 20 km/hr
 Cross Country: 0 km/hr
 Range on Road: 270 km
 Grade: 25%
 Ground Clearance: 34 cm
 Ground Pressure: 8 kg/cm²
 Power Ratio: 8.6 HP/ton

Automotive Components:

Chassis: DZVR
 Motor: Daimler M1674 4 cylinder
 water cooled
 12 liter gasoline
 100 HP @ 1200 rpm
 Transmission: 5 R, 1 R
 1.Gear 5.6 km/hr
 2.Gear 10.8 km/hr
 3.Gear 16 km/hr
 4.Gear 27.5 km/hr
 5.Gear 45 km/hr
 Steering: Front wheels
 Drive: 4-wheel
 Tires: Solid rubber 1220x160
 Suspension: Leaf springs



Above: Two gepanzertes Kraftwagen (armored motor vehicles) in Reichswehr service (WJS)

Gepanzerter Kraftwagen (Sd.Kfz.3)

Following World War I, the German Army was allowed to possess gepanzerter Kraftwagen fuer Mannschaftsbefoerderung (armored motorized vehicles for crew transport) which met specifications from the I.M.K.K. (Interallied Military Control Commission). An unknown number (20 to 40, from contemporary sources) of these vehicles had been completed by 1927. They were created by mounting an armored body on converted Artillerie-Kraftzugmaschinen Kp.D. 100 PS (Krupp-Daimler artillery tractors with 100 horsepower engines) that had been used in World War I.

The armor was made out of rolled plates of high chrome-nickel hardened steel. 12 mm of this expensive armor plate on the vertical surfaces was sufficient to keep out S.m.K. (AP bullets) fired by rifles at any range. Angled plates could be thinner and still provide the same protection. A 4 mm thick belly plate provided sufficient protection against hand grenades and explosive charges.

There weren't any weapons or machinegun mounts. Observation and vision ports were present all round at the viewing height for standing and sitting crew members. Access doors were present on both sides. A large opening in the roof was covered by two overlapping hatches that could be braced open for ventilation. Two headlights in armored boxes were mounted on the side of the engine cover. Another light was mounted in the rear wall which was protected by an armor cover. Searchlights in armor boxes,

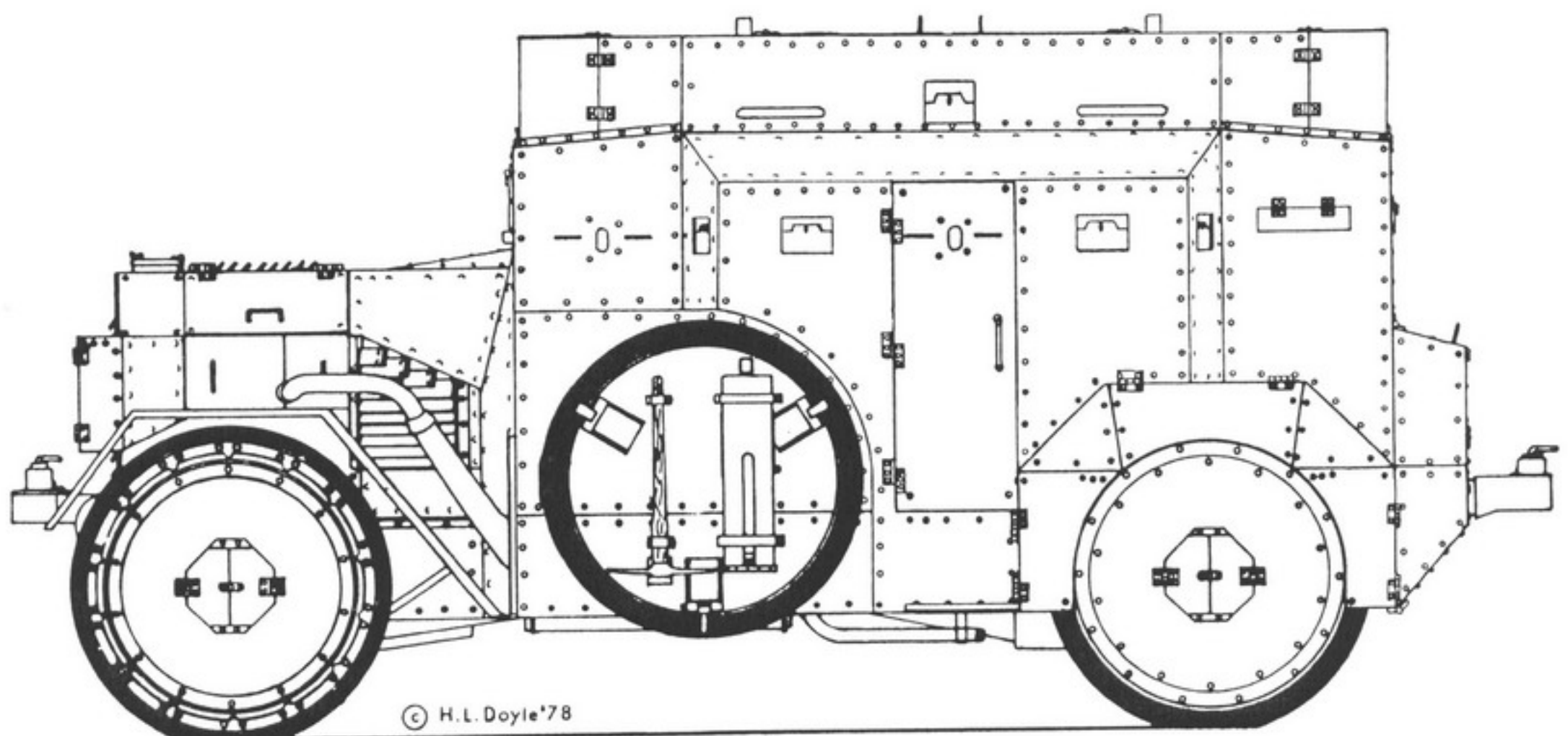
mounted on top of the roof at the front and rear, were designed allow the light to swing through 180 degrees.

The armor body, weighing 5.5 metric tons was mounted on a chassis originally designed to carry 4.5 tons. The 4-wheel drive artillery tractor chassis was modified so that all four wheels were 1220 mm in diameter (as an artillery tractor, the rear wheels had been 1400 mm in diameter), a five-speed transmission replaced the four-speed transmission with transfer case, and the tow coupling and winch were removed.

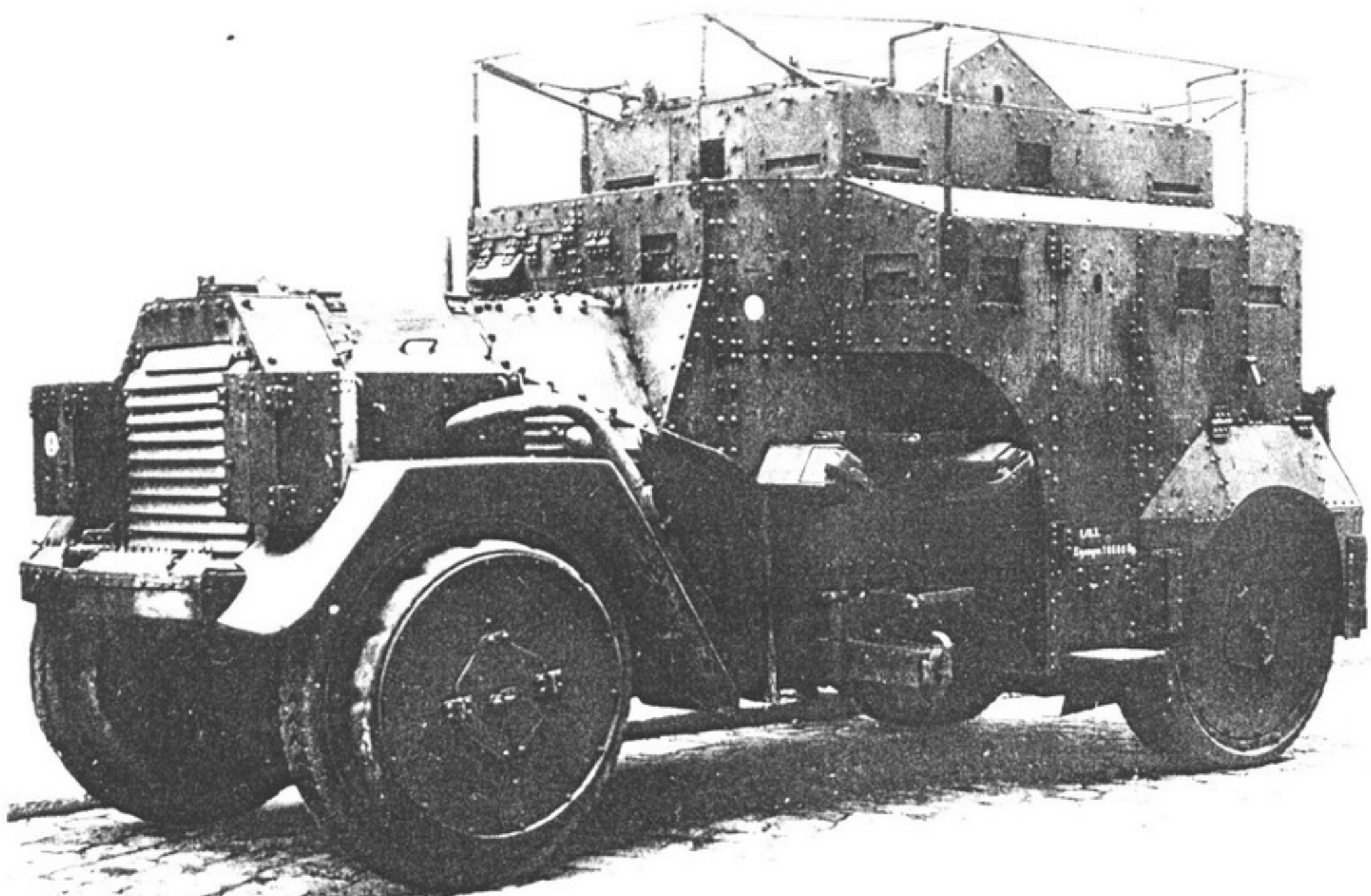
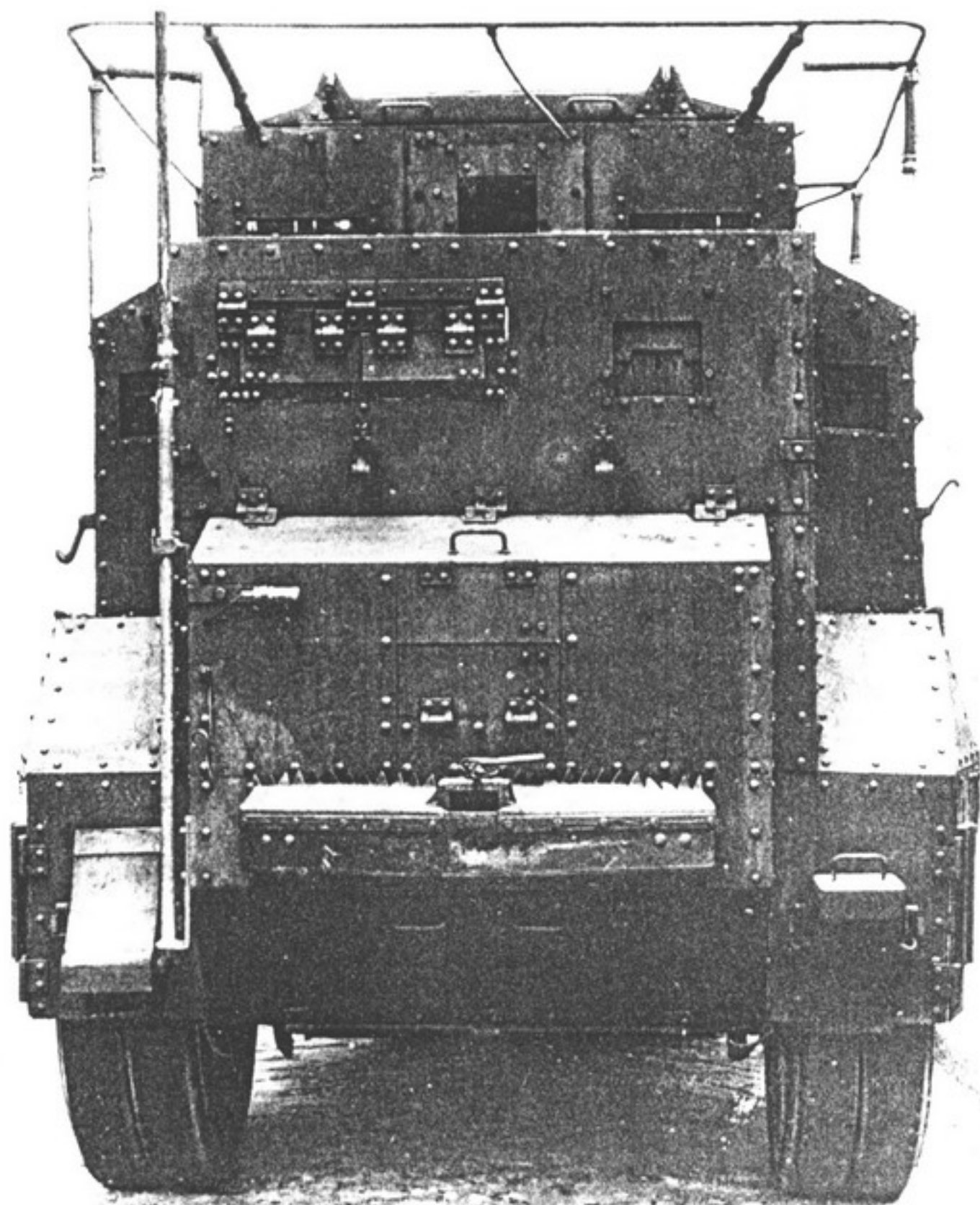
The 12-liter engine, running on a mixture of 60% gasoline and 40% diesel at 1200 rpm, could propel the vehicle at 45 km/hr. 270 liters of fuel in two main and one reserve tank were sufficient for a range of 270 kilometers on normal roads.

The Gp.Kw.D.100 PS was not to be driven at speeds exceeding 40 km/hr and was to remain on roads and trails with hard surfaces. It was especially forbidden to drive through roadside ditches, ram street barricades, or climb over tree stumps or similar obstacles.

Several (two?) of these gp.Kw. were assigned to one company of each of the seven Kraftfahr-Abteilungen (motorized battalions). By April 1933, these vehicles were known as gepanzerter Kraftwagen (Sd.Kfz.3), and at least some had been modified to carry a 20 watt transmitting/receiving radio set with a 8.65 m long roof antenna made out of 21 mm diameter copper tubing. They were no longer in service with the Pz.Sp.Kp. in the Fall of 1936.



Right and Below:
This gepanzerter Kraftwagen
(Sd.Kfz.3), outfitted with a radio set
and a frame antenna, belonged to
1.Kompanie/Kraftfahrabteilung 3
(NA)



Maschinengewehrkraftwagen (Kfz.13) & Funkkraftwagen (Kfz.14)

Needing to rapidly outfit newly created armored car companies, the Waffenamt resorted to conversion of commercial automobile chassis which had been accepted by the army as m.Pkw.(o) (open-topped medium automobiles). Both the Daimler-Benz Personenwagen-Fahrgestell 10/50 PS and the Adler Personenwagen-Fahrgestell 12/55 PS were used for this purpose. The chassis were modified by strengthening the axles and suspension, changing to a synchronized 4-speed transmission, increasing cooling capacity, upgrading the electrical generator to 90 watts for the radio sets, and using 6.00-20 cross-country tires.

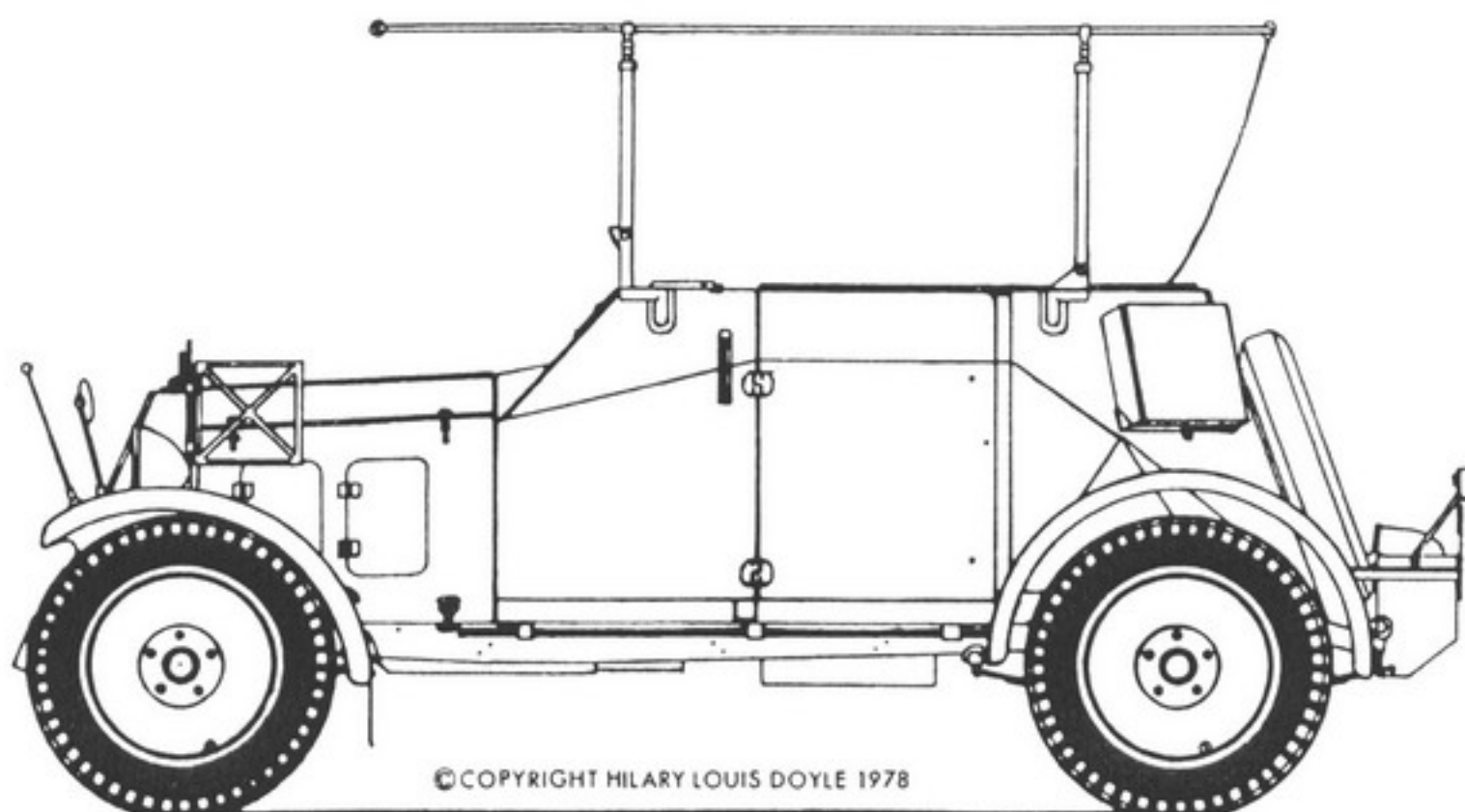
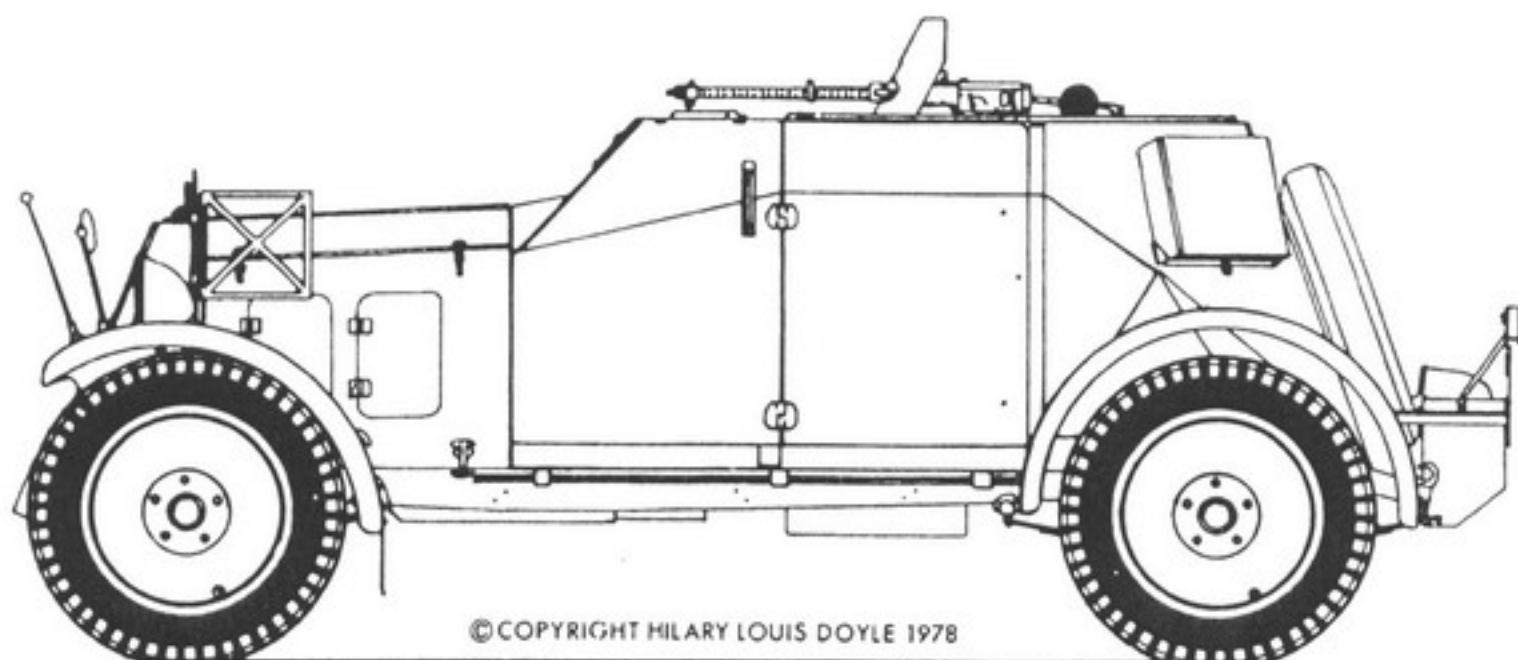
Frontal armor including the machinegun shield was sufficient to protect the crew against hits from 7.92 mm S.m.K. (AP bullets), but the sides were proof only against 7.92 mm s.S. (normal bullets).

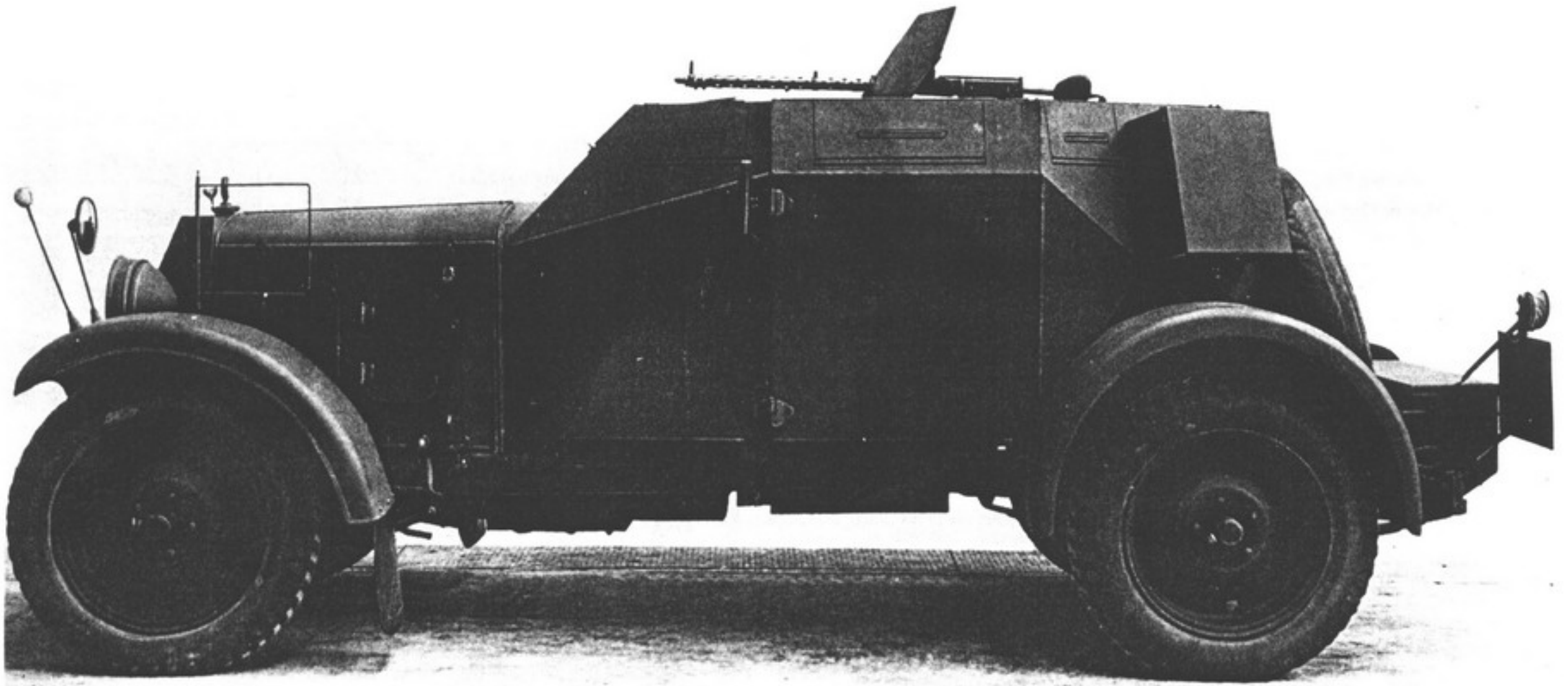
The M.G.13 in the Kfz.13 was mounted on a pedestal and could be traversed through 360 degrees at all elevations. The machinegun mount along with the gunner's seat could be raised by a spring and lowered by the gunner's body weight.

A 5 watt transmitting/receiving radio set replaced the machinegun pedestal mount to create the Funkkraftwagen. This radio set had a voice transmission range of 6 to 8 kilometers when stationary and 3 to 4 kilometers on the move. Key transmission was up to 30 kilometers when stationary and 20 kilometers on the move.

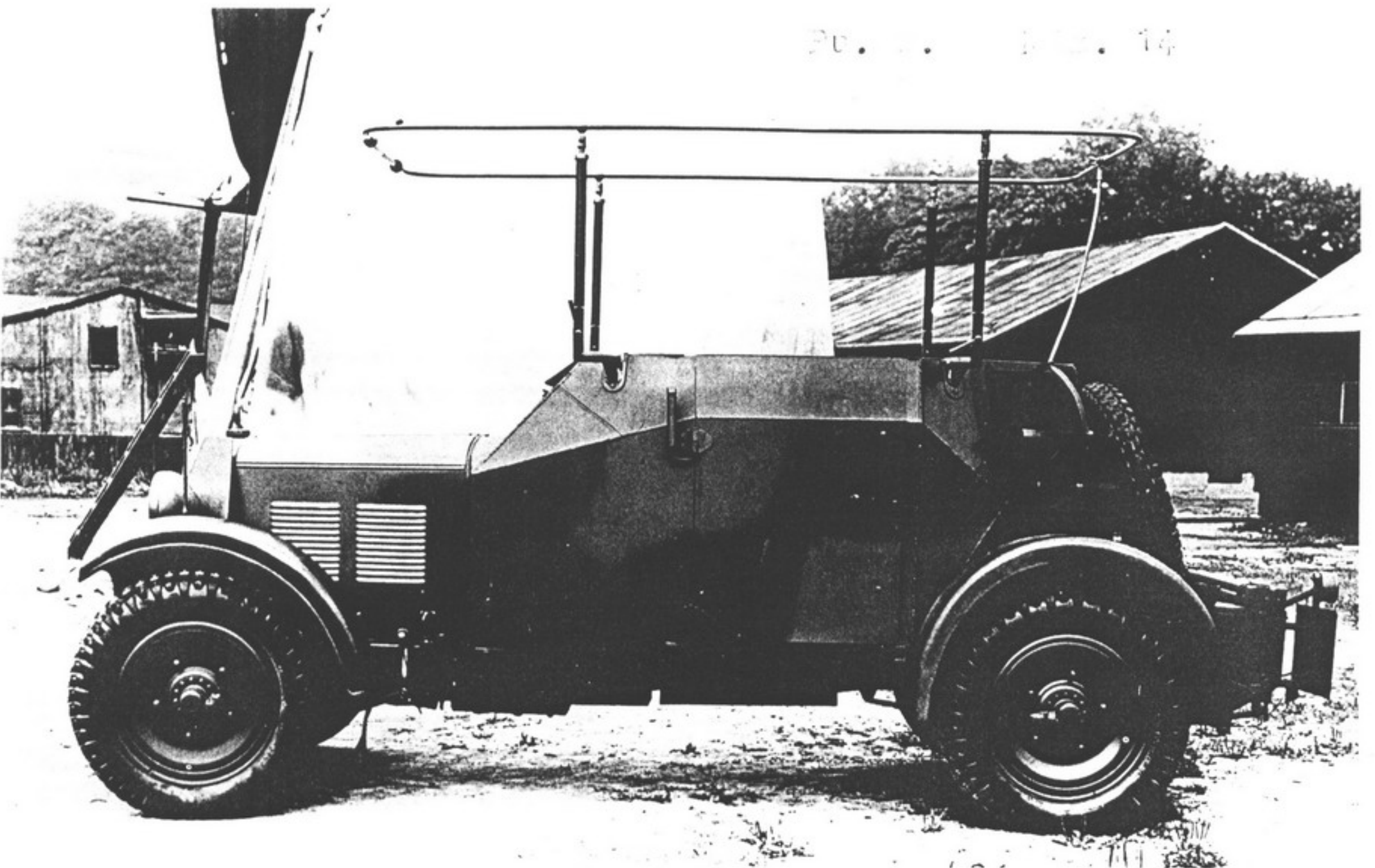
Daimler-Benz started assembling these provisional armored cars in the Spring of 1933 and had delivered 116 Erkundungswagen and 30 Erkundungsfunkwagen (of which 14 and 4 respectively, had Daimler-Benz chassis) by the end of August 1935.

In October 1935, the Kraftfahr-Abteilungen were ordered to transfer 28 Kfz.13 and 14 Kfz.14 to outfit all the Reiter-Regiment with 2 M.G.Kw. and 1 Fu.Kw. In September 1936, an additional 56 Kfz.13 and 26 Kfz.14 were transferred from the Aufklaerungs-Abteilungen to Reiter- and Kavallerie-Regiments, leaving 58 Kfz.13 in the nine Aufkl.Abt. The last Kfz.13 in the Aufkl.Abt. should have been replaced by Sd.Kfz.221 before the start of the war.





The Maschinengewehrkraftwagen (Kfz.13) (above) and Funkkraftwagen (Kfz.14) (below) photographed when Daimler-Benz started production in 1933 (NA)



Maschinengewehrkraftwagen (Kfz.13) Funkkraftwagen (Kfz.14)

Weapons Data: 1 - M.G.13 in Kfz.13
Elevation: -35°, +65°
Traverse: 360°

Secondary: 1 - 9 mm M.P.

Ammunition: 1000 - 7.92 mm S.m.K.
640 - 9 mm

Crew: Commander
Driver

Communication: Fu9 SE 5 in Kfz.14

Measurements:	<u>D.B.</u>	<u>Adler</u>
Length, overall:	4.20 m	4.13 m
Width, overall:	1.70 m	1.65 m
Height, overall:	1.46 m	1.50 m
Wheel Base:	1.43 m	1.35 m
Axle Spacing:	2.81 m	2.84 m
Combat Loaded:	2.1 tons	2.05 tons
Fuel Capacity:	45 Liters	50 Liters

Armor:

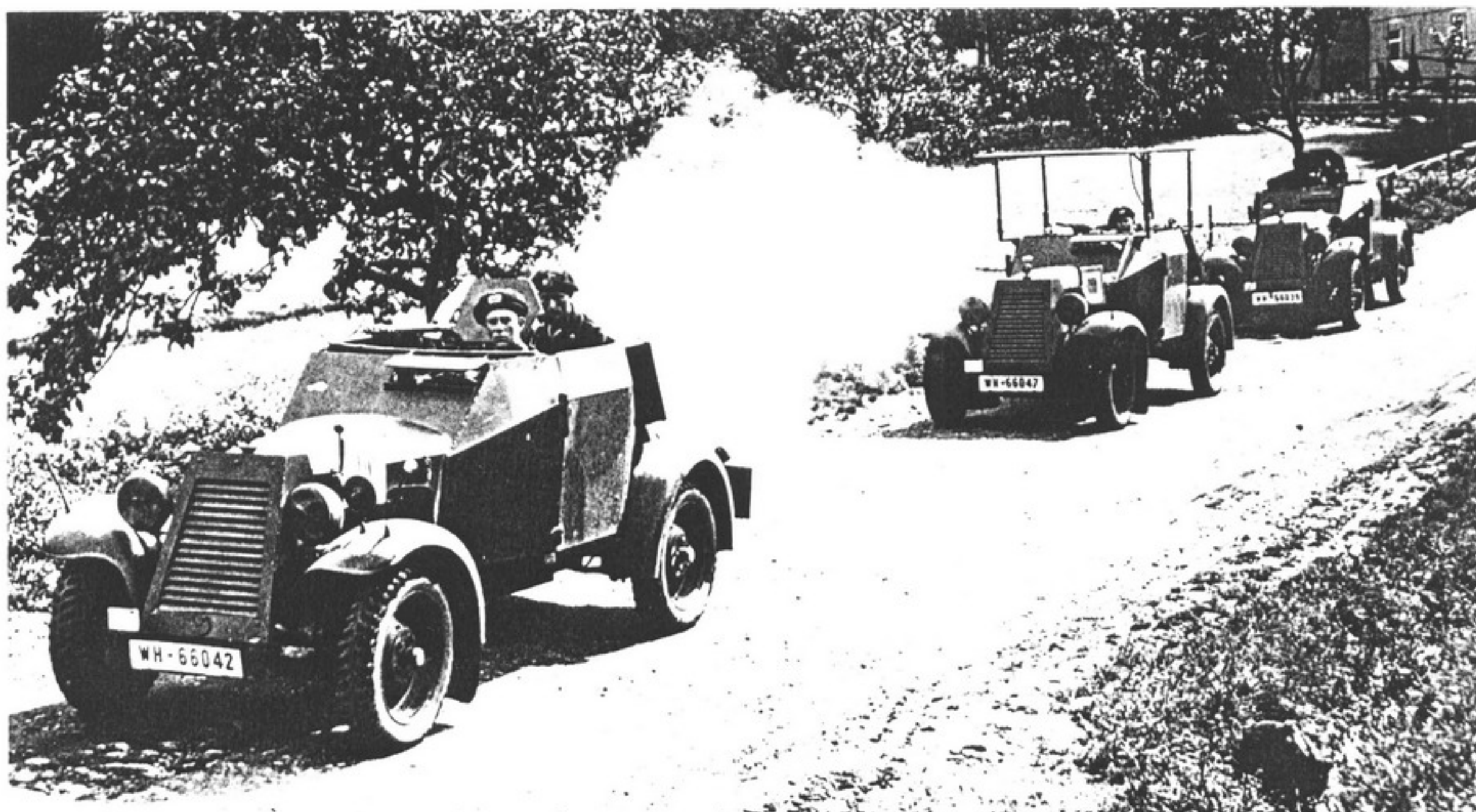
Frontal armor protects the crew from S.m.K. (7.92 mm AP); side and rear armor protects the crew from s.S. (7.92 mm Ball) fired from all ranges.

Automotive Capabilities:

Maximum Speed: 70 km/hr
Avg. Road Speed: 40 km/hr
Cross Country: 20-25 km/hr
Range on Road: 250-300 km
Cross Country: 150-200 km
Grade: 15°
Ground Clearance: 20 cm D.B.
24 cm Adler
Turning Circle: 12 m dia.

Automotive Components:

Chassis:	<u>D.B.</u>	<u>Adler</u>
	m.Pkw.	m.Pkw.
		Standard 6A
Motor:	D.B. 6 cyl	Adler 6 cyl
	water cooled	
	2.6 liter	2.9 liter
	gasoline	
	10/50 HP	12/50 HP
Transmission:	4 F, 1 R	
Steering:	Front wheels	
Drive:	Rear wheels	
Tires:	Rubber 6.00-20	
Suspension:	Leaf springs	



Above: Two M.G.Kw. and a Fu.Kw. made up a reconnaissance platoon for the Kavallerie. (APG)

leichter Panzerspaechwagen (M.G.)
 (Sd.Kfz.221)
 Fgst.Nr.Serie 810001-810817

Weapons Data:

In Turret: 1 - 7.92 mm M.G.34
 Elevation: -30°, +70°
 Traverse: 360°
 Secondary: 1 - 9 mm M.P.
 Ammunition: 1000 - 7.92 mm S.m.K.
 192 - 9 mm
 Crew: Commander/Gunner
 Driver

Automotive Capabilities:

Maximum Speed: 80 km/hr
 Avg. Road Speed: 45 km/hr
 Range on Road: 320 km
 Cross Country: 200 km
 Grade: 22°
 Step: 25 cm
 Fording Depth: 60 cm
 Ground Clearance: 24 cm
 Power Ratio: 18.7 HP/ton
 Turning circle: 10 m dia.

Automotive Components:

Chassis: Einheitsfahrgestell I
 fuer s.Pkw. (Horch 801)
 Motor: Horch V-8 cylinder
 water cooled
 3.517 liter gasoline
 75 HP @ 3600 rpm
 Transmission: 5 F, 1 R
 Reverse 15 km/hr
 C.C.Gear 13 km/hr
 1.Gear 20 km/hr
 2.Gear 34 km/hr
 3.Gear 54 km/hr
 4.Gear 80 km/hr
 Steering: 4-wheel (or 2)
 Drive: 4-wheel
 Tires: Rubber 210-18 gel.
 Suspension: 2 coil springs & 2
 shock absorbers per
 wheel

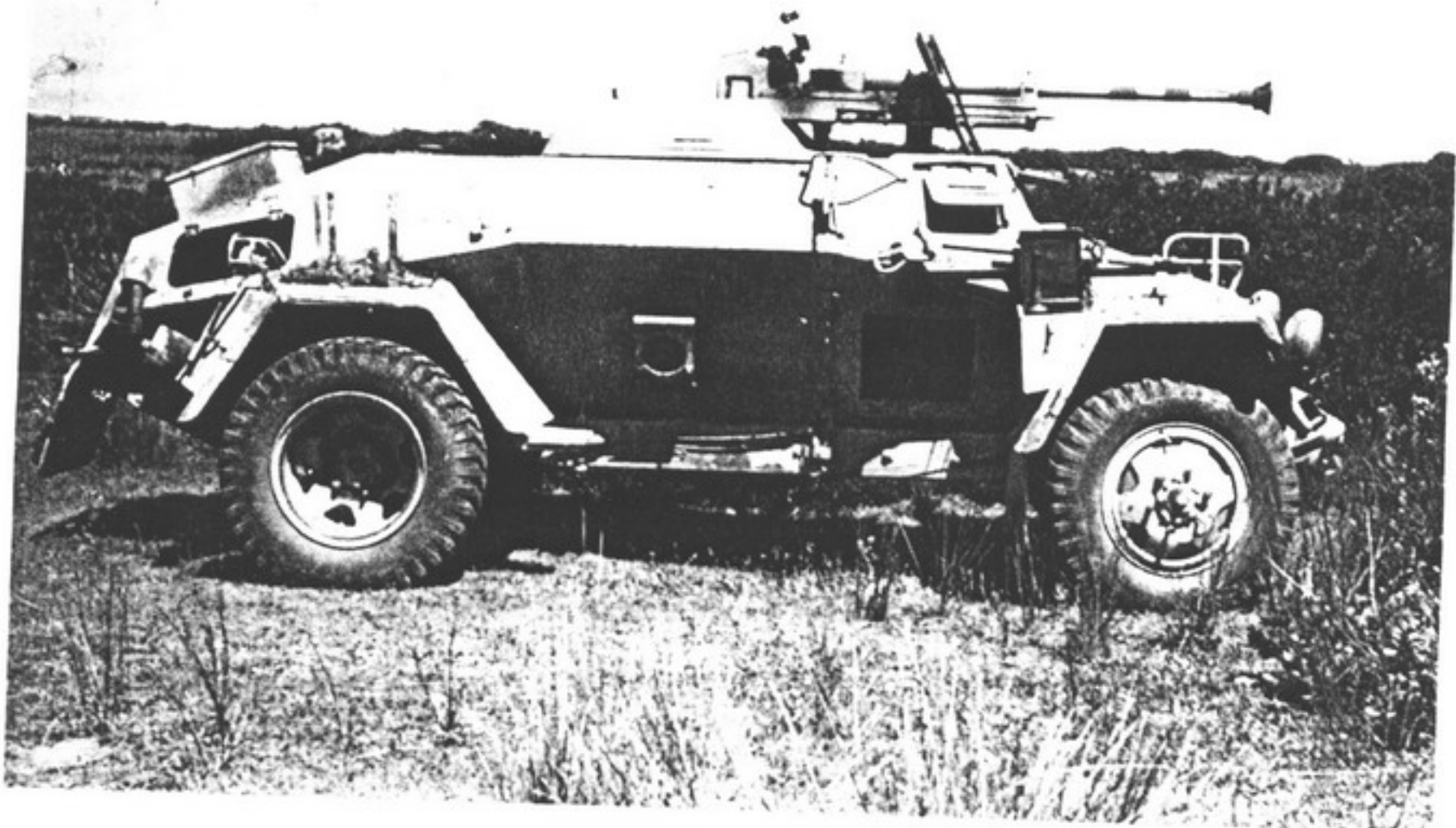
Communication: No radio sets

Measurements:

Length, overall: 4.80 m
 Width, overall: 1.95 m
 Height, overall: 1.70 m
 Firing Height: 1.65 m
 Wheel Base: 1.61 m
 Axle Spacing: 2.80 m
 Combat Loaded: 4.0 metric tons
 Fuel Capacity: 110 Liters

Armor:

Sloped to prevent penetration by S.m.K.
 (7.92 mm AP) fired at ranges over 30 m.



light:
 le.Pz.Sp.Wg.
 (Sd.Kfz.221) modified to
 mount a 2.8 cm s.Pz.B.41
 ordered in 1942.
 (C)

Leichter Panzerspaehwagen (M.G.) (Sd.Kfz.221) Fgst.Nr. Serie 810001 to 810817

This was the first production series light armored car built on a standardized chassis specifically designed for military applications. It had good ground clearance and short chassis overhang for crossing uneven terrain, 4-wheel drive for better pulling and climbing ability, and 4-wheel steering for improved maneuverability. However, with only four wheels it could not cross even narrow ditches or trenches unassisted.

The 8 mm thick armor plates were angled at 35 degrees to defeat 7.92 mm S.m.K. (AP rounds) fired by rifles or machineguns. Even the welds were proof against single shots.

Armament consisted of a single M.G.13 mounted on a pivot on a pedestal. The pivoting arm could be raised above the height of the surrounding armor shield. This allowed a greater degree of freedom for engaging aircraft.

The armor shield for the machinegun was not an actual turret with a ball bearing race. Attached to the central pivoting arm by rods, the shield was guided on the hull roof by rollers. This short-sided shield did not fully protect the machine gunner, whose steel helmet protruded through the opening at the rear of the shield behind the folding screens.

The 4.0 metric ton armored car had a maximum speed of 80 km/hr on roads at an engine speed of 3600 rpm. A water-cooled Horch V-8 gasoline engine producing 75 horsepower provided a relatively high

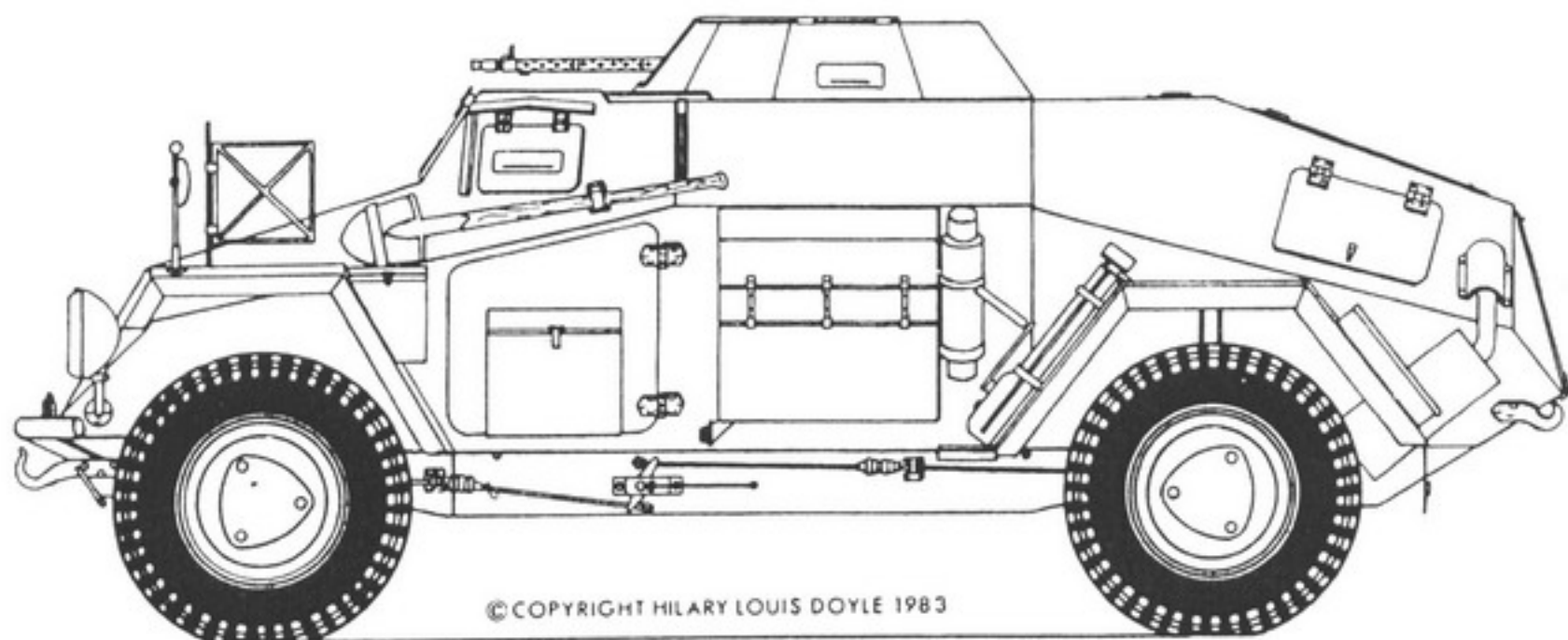
power-to-weight ratio of 18.75 HP/ton for adequate acceleration.

This light armored car was manned by a crew of only two, a commander/machine gunner and a driver. No radio sets were mounted during the production run. Therefore, its primary method of communication with other armored cars was by flag and hand signals.

Initially known as the Pz.Sp.Wg.35 (M.G.), the name was changed to l.Pz.Sp.Wg. (M.G.) (Sd.Kfz. 221) in July 1935. Production started in 1935, with a total of 339 completed for the Heer by September 1940. A few more were produced for the SS and for export to China.

Modifications made during the production run included introducing the 7.92 mm M.G.34 in 1938, and increasing frontal armor to 14.5 mm and changing to standard cast vision ports in 1939. Back-fitted modifications included mounting a Funksprechgeraet a (radio set with a rod antenna) starting in 1941 and rearming with a 2.8 cm s.Pz.B.41 starting early in 1942.

Each Pz.Sp.Kp. was authorized to possess 10 Sd.Kfz.221 in accordance with K.St.N.1162 dated 1936 to February 1941 (and authorized as substitutes for Sd.Kfz.222 after November 1941). Three Sd.Kfz.221 were authorized in a l.Pz.Sp.Zug (for SS-Standarten) in the Fall of 1936, and two Sd.Kfz.221 were authorized in a Kav.Pz.Sp.Zug in 1938.





Above: A column of le.Pz.Sp.Wg. (M.G.) (Sd.Kfz.221) crossing Champagne, France in June 1940 (PK)

Right: An Sd.Kfz.221 with "Das Reich" attacking the Soviets in July 1941 (PK)



Leichter Panzerspähwagen (2 cm) (Sd.Kfz.222)

Ausf.A und B

Fgst.Nr. Serie 810001 - 8101414 & 8110001 - 8111000

Following the Sd.Kfz.221 and Sd.Kfz.223, this was the third light armored car variant built on a standardized chassis specifically designed for military applications. It had good ground clearance and short chassis overhang for crossing uneven terrain, 4-wheel drive for better pulling and climbing ability, and 4-wheel steering for improved maneuverability.

The 8 mm thick armor plates were angled at 35 degrees to defeat 7.92 mm S.m.K. (AP rounds) fired by rifles or machineguns. Even the welds were proof against single shots.

Armament consisted of a 2 cm Kw.K.30 and M.G.13 mounted on a pivot on a pedestal. This mount was designed for rapidly engaging aircraft as well as ground targets. The armor shield for the machinegun was attached to the central pivot by an arm and mounted on the hull roof by a support ring with four ball bearing races. The top of the short sided shield was covered with screens, which were folded back for engaging aircraft targets.

At 4.8 metric tons this armored car had reached the maximum weight sustainable on this light chassis. It was capable of a maximum speed of 80 km/hr on roads at an engine speed of 3600 rpm. A water-cooled Horch V-8 gasoline engine producing 75 horsepower provided a relatively high power-to-weight ratio of 16HP/ton for adequate acceleration.

This light armored car was manned by a crew

of three - a commander/loader, a gunner, and a driver. No radio sets were mounted during the initial production run. Therefore, its primary method of communication with other armored cars was by flag and hand signals.

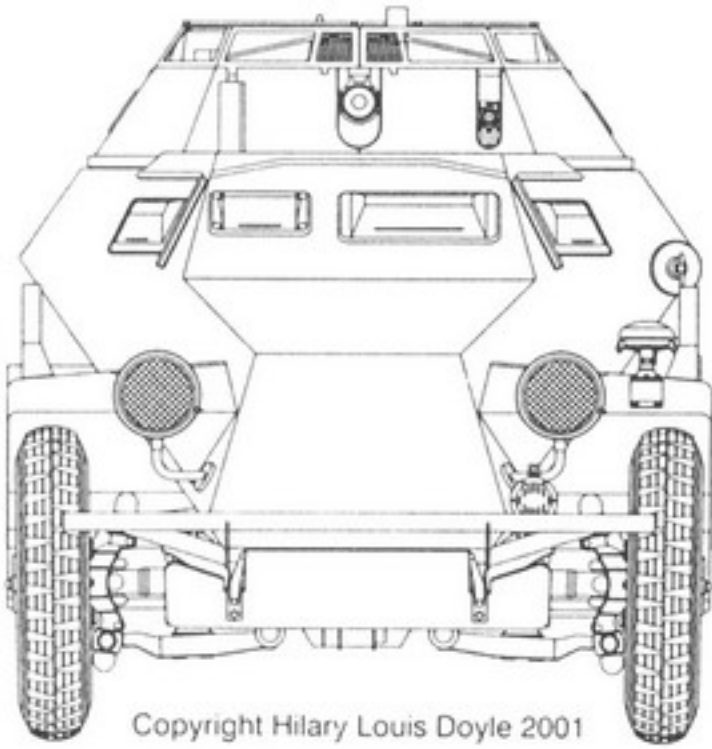
Initially known as the Pz.Sp.Wg.35 (2 cm), the name was changed to le.Pz.Sp.Wg. (2 cm) (Sd.Kfz.222) in July 1935. Production started in 1937, with a total of 990 completed for the Heer by February 1944. A few more were produced for the SS and for export to China.

Modifications made during the production run included introducing the 7.92 mm M.G.34 in 1938; increasing frontal armor to 14.5 mm and changing to standard cast vision ports in 1939; increasing frontal armor to 30 mm with a new chassis, changing to the 2 cm Kw.K.38, and adding a short range radio set in 1942; and dropping bulletproof tires in 1943. Backfitted modifications included mounting a short range radio set in the field in 1941 and rearming with the 2 cm Kw.K.38 and changing the M.G.34 to belt feed in 1942.

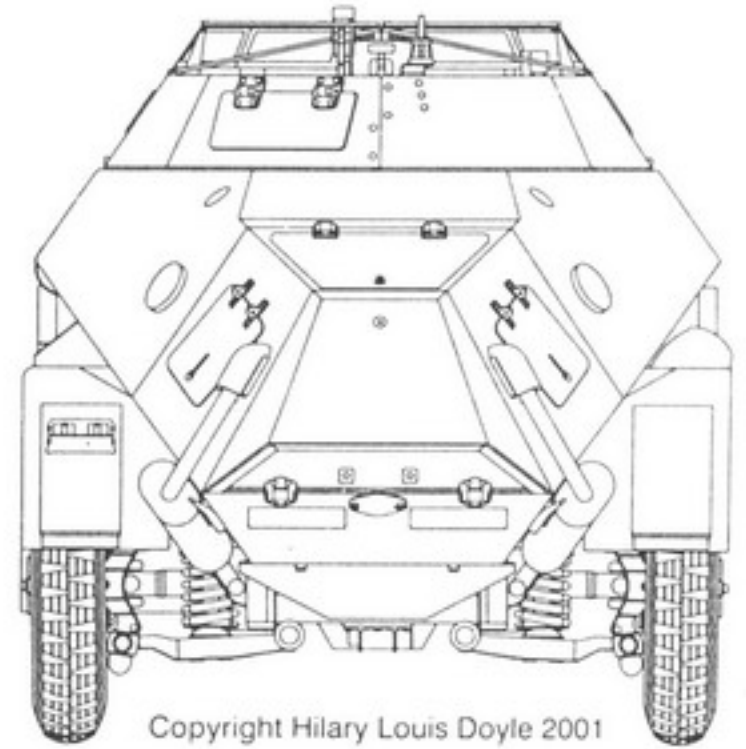
Each Pz.Sp.Kp. was authorized to possess four Sd.Kfz.222 in accordance with K.St.N.1162 dated 1936 to February 1941 (and then 12 Sd.Kfz.222 after November 1941). Four Sd.Kfz.222 were authorized in a l.Pz.Sp.Zug (for SS-Standarten) starting in the Fall of 1936.



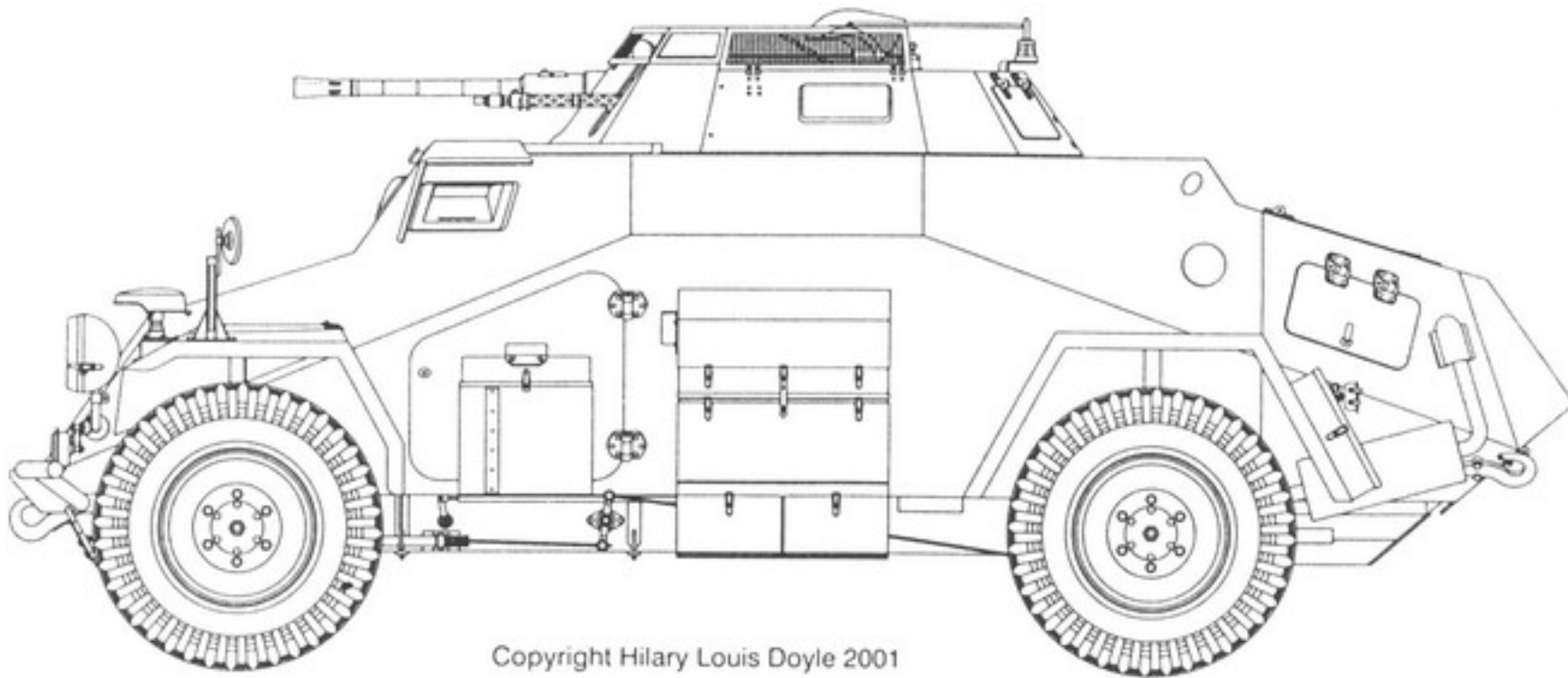
Left:
The mount for the 20 mm gun in the le.Pz.Sp.Wg. (2 cm) (Sd.Kfz.222) was designed for the dual role of engaging aircraft and ground targets. (BA 58/1785/23)



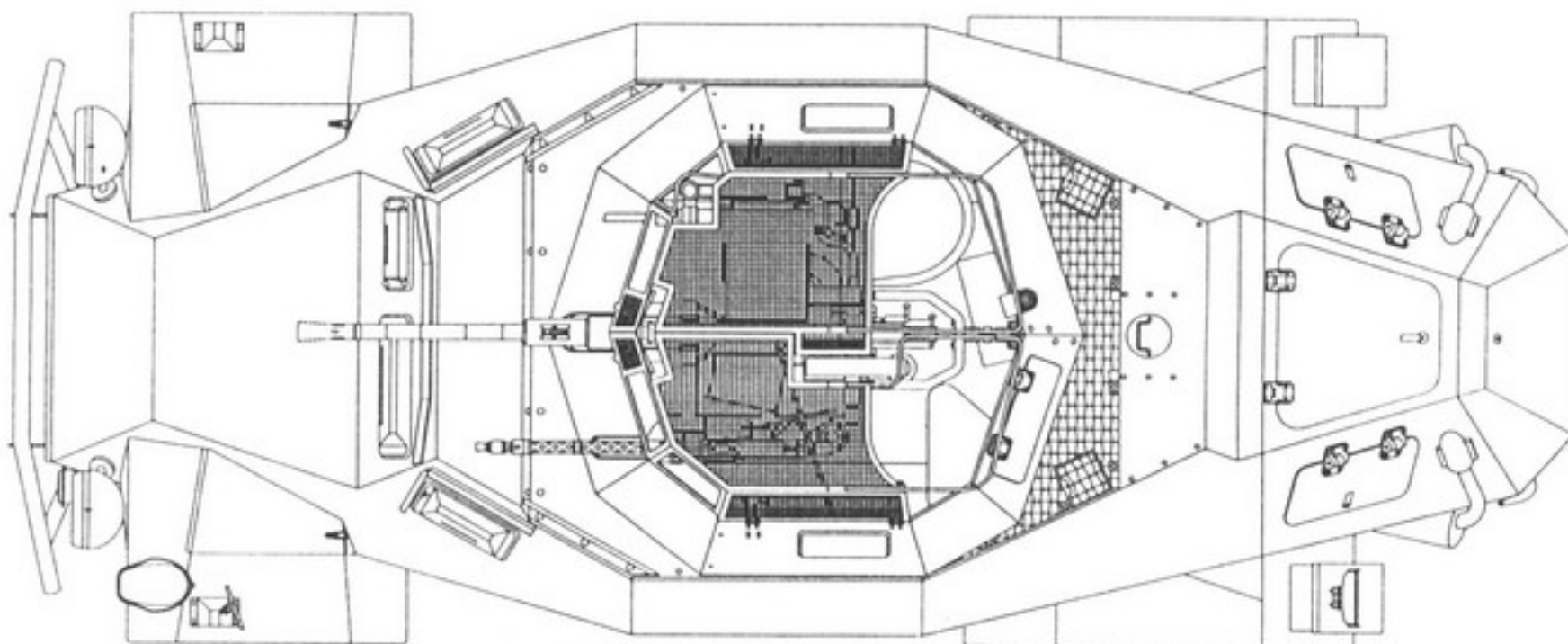
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Left:
A le.Pz.Sp.Wg. (2 cm)
(Sd.Kfz.222) with
Rommel's forces in
North Africa (APG)

Left Below:
A Sd.Kfz.222 Ausf.B in
Tunisia in February
1943 (PK)



**leichter Panzerspæhswagen (2 cm)
(Sd.Kfz.222)**

Fgst.Nr.Serie 810001-8101414 & 8110001-8111000

Weapons Data:

In Turret: 1 - 2 cm Kw.K.30/38
 1 - 7.92 mm M.G.34
 Elevation: -7°, +80°
 Traverse: 360°
 Gun Sight: T.Z.F.3a (2.5x 18°)
 Graduated to: 1200 meters

Secondary: 1 - 9 mm M.P.

Ammunition: 180 - 2 cm
 1050 - 7.92 mm S.m.K.
 (1100 - 7.92 mm S.m.K.)
 192 - 9 mm

Crew: Commander/Loader
 Gunner
 Driver

Communication: No radio sets
 (Fu.Spr.Ger."a")

Measurements:

Length, overall: 4.80 m
 Width, overall: 1.95 m
 Height, overall: 2.00 m
 Firing Height: 1.75 m
 Wheel Base: 1.61 m
 Axle Spacing: 2.80 m
 Combat Loaded: 4.8 metric tons
 Fuel Capacity: 100 Liters

Armor:

Sloped to prevent penetration by S.m.K.
 (7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 70 km/hr
 Avg. Road Speed: 40 km/hr
 Range on Road: 300 km (250*)
 Cross Country: 180 km
 Grade: 20°
 Step: 25 cm
 Fording Depth: 60 cm
 Ground Clearance: 24 cm (25.5*)
 Power Ratio: 15.6 HP/ton (18.7*)
 Turning Circle: 10 m dia. (9.5*)

Automotive Components:

Chassis: Einheitsfahrgestell I f.s.Pkw.
 Motor: Horch 801 Typ v*
 Horch V-8 cylinder
 water cooled
 3.517 liter 3.823
 gasoline
 75 HP 90 HP
 @ 3600 rpm =

Transmission: 5 F, 1 R
 Reverse 15 km/hr 12 km/hr
 C.C.Gear 13 km/hr 12 km/hr
 1.Gear 20 km/hr 21 km/hr
 2.Gear 34 km/hr 32 km/hr
 3.Gear 54 km/hr 54 km/hr
 4.Gear 80 km/hr 90 km/hr

Steering: 4-wheel (or 2)
 Drive: 4-wheel
 Tires: Rubber 210-18 gel.
 Suspension: 2 coil springs & 2
 shock absorbers per
 wheel



Right:
 A Sd.Kfz.222 Ausf.B
 produced near the end of
 the production run in
 1943. (NA)

Leichter Panzerspawagen (Fu) (Sd.Kfz.223)

Ausf.A und B

Fgst.Nr. Serie 810001 - 8101414 & 8110001 - 8111000

This was the second light armored car variant built on a standardized chassis specifically designed for military applications. It had good ground clearance and short chassis overhang for crossing uneven terrain, 4-wheel drive for better pulling and climbing ability, and 4-wheel steering for improved maneuverability.

The 8 mm thick armor plates were angled at 35 degrees to defeat 7.92 mm S.m.K. (AP rounds) fired by rifles or machineguns. Even the welds were proof against single shots.

Armament consisted of a single M.G.13 mounted on a pivot on a pedestal. The pivoting arm could be raised above the height of the surrounding armor shield. This allowed a greater degree of freedom for engaging aircraft.

The armor shield for the machinegun was not an actual turret with a ball bearing race. Attached to the central pivoting arm by rods, the shield was guided on the hull roof by rollers. This short-sided shield did not fully protect the machine gunner, whose steel helmet protruded through the opening at the rear of the shield behind the folding screens.

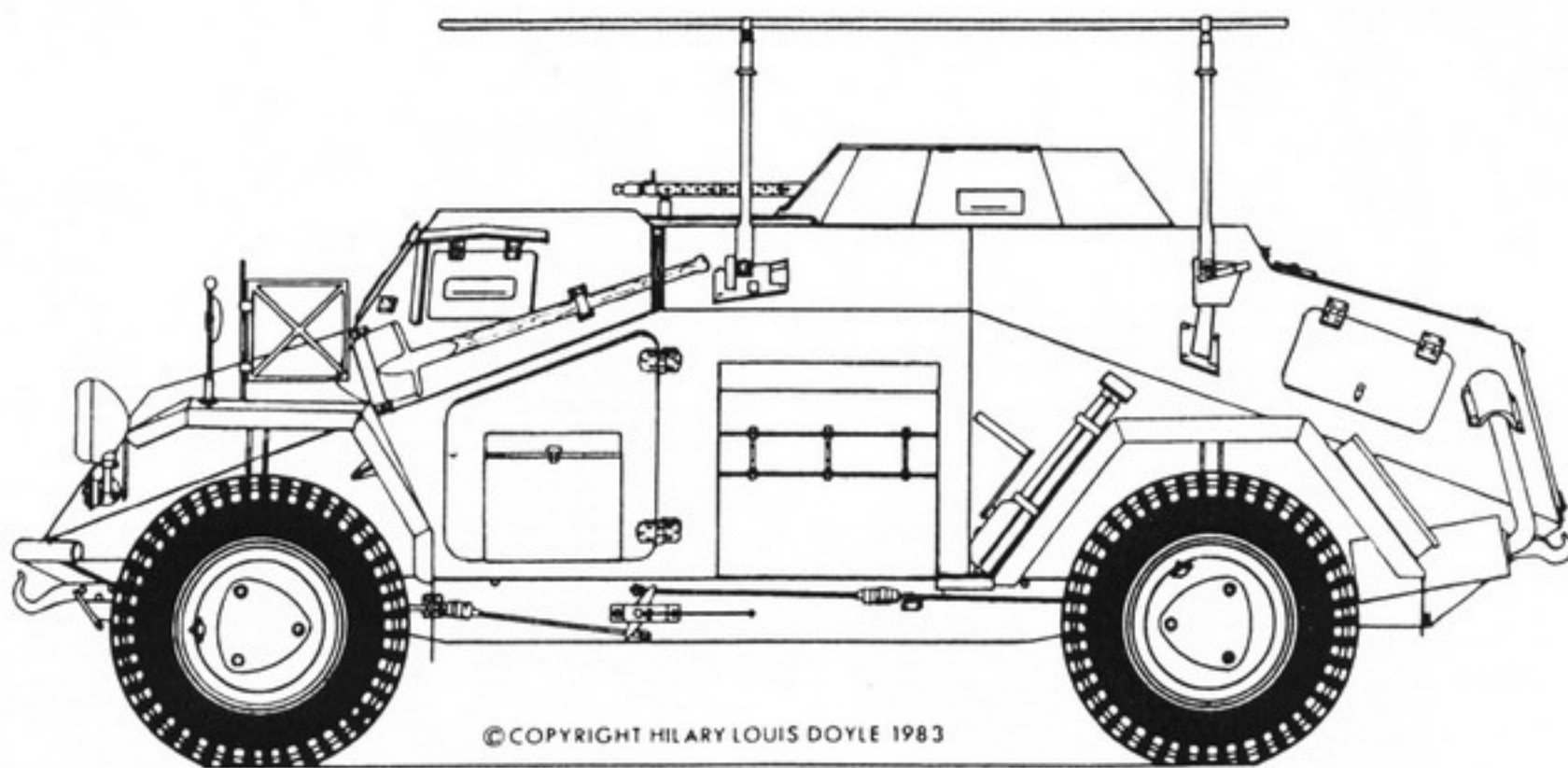
The 4.56 metric ton armored car had a maximum speed of 80 km/hr on roads at an engine speed of 3600 rpm. A water-cooled Horch V-8 gasoline engine producing 75 horsepower provided a relatively high power to weight ratio of 17HP/ton for adequate acceleration.

This light armored car was manned by a crew of three - a commander/machine gunner, a radio operator, and a driver. Originally, a 30 watt transmitting/receiving radio set was provided with a frame antenna which could be raised and lowered.

Initially known as the Pz.Sp.Wg.35 (Fu), the name was changed to le.Pz.Sp.Wg. (Fu) (Sd.Kfz. 223) in July 1935. Production started in 1936, with a total of 567 completed for the Heer by February 1944. A few more were produced for the SS and for export to China.

Modifications made during the production run included introducing the 7.92 mm M.G.34 in 1938, increasing frontal armor to 14.5 mm and changing to standard cast vision ports in 1939, increasing frontal armor to 30 mm with a new chassis in 1942, and dropping bulletproof tires in 1943. Back-fitted modifications included changing the M.G.34 to belt feed and upgrading radio sets to a long range 80 watt transmitter/receiver along with a short range radio set in 1942.

Each Pz.Sp.Kp. was authorized to possess four Sd.Kfz.223 in accordance with K.St.N.1162 dated 1936 to February 1941 (and then six Sd.Kfz.223 after November 1941). One Sd.Kfz.223 was authorized in a l.Pz.Sp.Zug (for SS-Standarten) in the Fall of 1936 (increased to three in February 1941) and one Sd.Kfz.223 was authorized in a Kav.Pz.Sp.Zug in 1938.

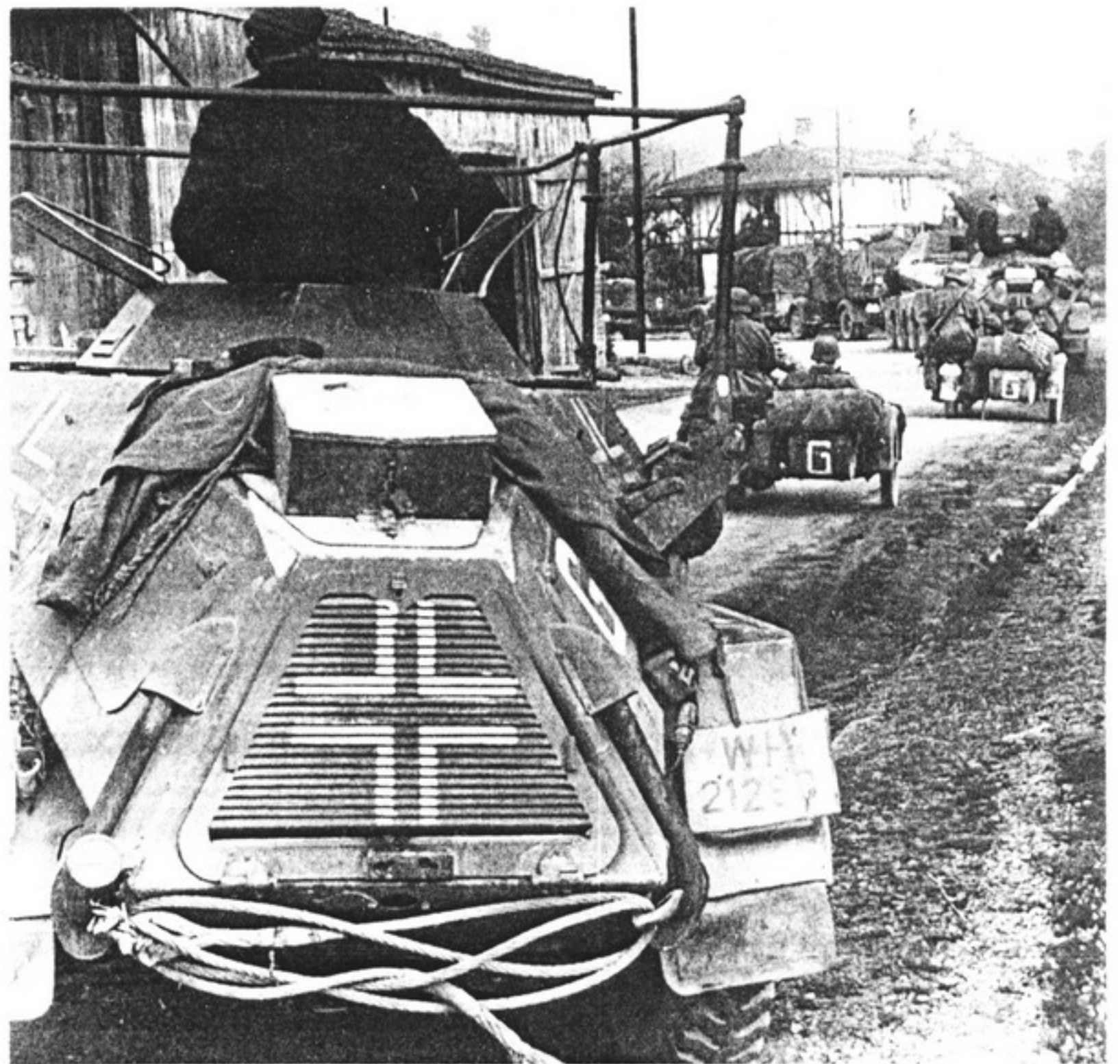


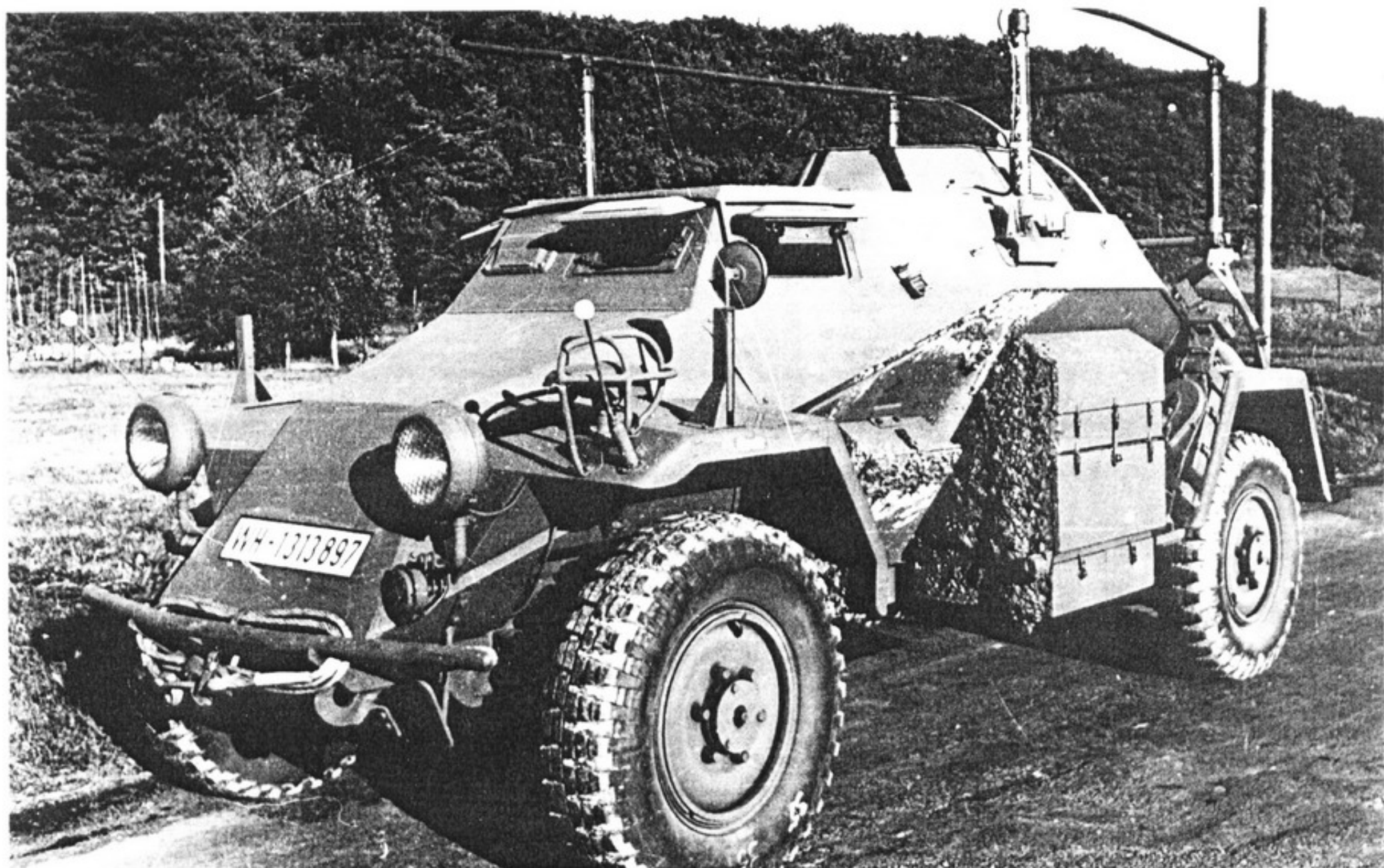
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Above: One of the first production series Sd.Kfz.223 (Fgst.Nr.810338) was sold to China. (TTM)

Right: These earlier le.Pz.Sp.Wg. (Fu) (Sd.Kfz.223) didn't have an armor cowling over the rear to protect the engine cooling air louvres. (BA 55/1568/2a)





Above and Left:
A 1e.Pz.Sp.Wg. (Fu)
(Sd.Kfz.223) Ausf.B
assembled by Wegmann,
Kassel in 1942.
(WJS)



**leichter Panzerspawagen (Fu)
(Sd.Kfz.223)**

Fgst.Nr.Serie 810001-8101414 & 8110001-8111000

Weapons Data:

In Turret: 1 - 7.92 mm M.G.34
 Elevation: -30°, +70°
 Traverse: 360°

Secondary: 1 - 9 mm M.P.

Ammunition: 1050 - 7.92 mm S.m.K.
 (1100 - 7.92 mm S.m.K.)
 192 - 9 mm

Crew:

Commander/Gunner
 Radio Operator
 Driver

Communication:

Fu.10 SE 30
 (Fu.12 SE 80 &
 Fu.Spr.Ger."a")

Measurements:

Length, overall: 4.56 m (4.80*)
 Width, overall: 1.95 m
 Height, overall: 1.75 m
 Firing Height: 1.65 m
 Wheel Base: 1.61 m
 Axle Spacing: 2.80 m
 Combat Loaded: 4.4 tons (4.475*)
 Fuel Capacity: 100 Liters

Armor:

Sloped to prevent penetration by S.m.K.
 (7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 75 km/hr
 Avg. Road Speed: 45 km/hr
 Range on Road: 300 km (250*)
 Cross Country: 200 km
 Grade: 20°
 Step: 25 cm
 Fording Depth: 60 cm
 Ground Clearance: 24 cm (25.5*)
 Power Ratio: 17.0 HP/ton (20.1*)
 Turning Circle: 10 m dia. (9.5*)

Automotive Components:

Chassis: Einheitsfahrgestell I f.s.Pkw.
 Horch 801 Typ v*

Motor: Horch V-8 cylinder
 water cooled =
 3.517 liter 3.823
 gasoline =
 75 HP 90 HP
 @ 3600 rpm =

Transmission: 5 F, 1 R =

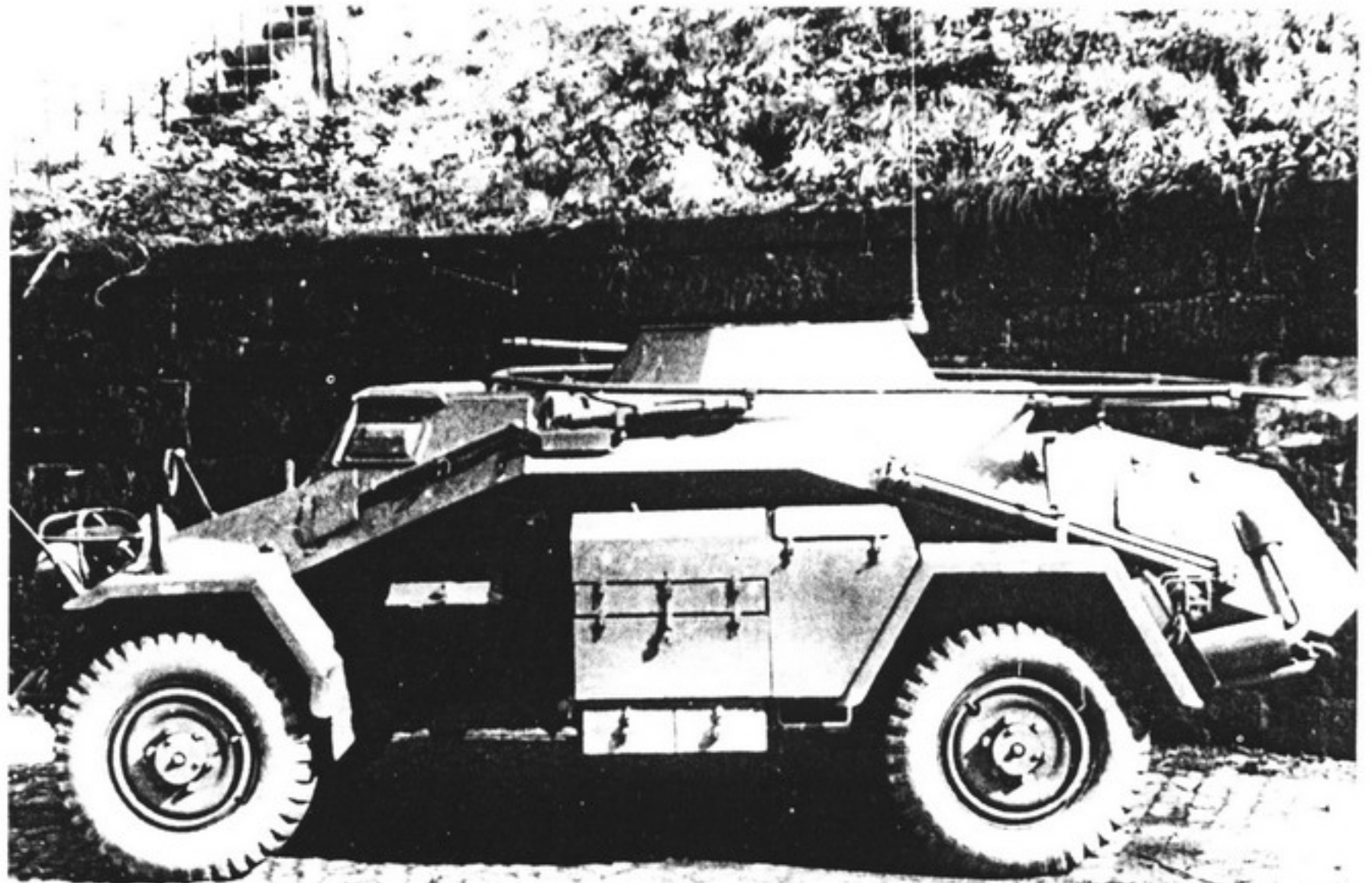
Reverse	15 km/hr	12 km/hr
C.C.Gear	13 km/hr	12 km/hr
1.Gear	20 km/hr	21 km/hr
2.Gear	34 km/hr	32 km/hr
3.Gear	54 km/hr	54 km/hr
4.Gear	80 km/hr	90 km/hr

Steering: 4-wheel (or 2)
 Drive: 4-wheel
 Tires: Rubber 210-18 gel.
 Suspension: 2 coil springs & 2 shock absorbers per wheel

Right:

A le.Pz.Sp.Wg. (Fu)
 (Sd.Kfz.223) Ausf. B
 completed in 1943 with
 an additional stowage
 box.

(WJS)



Schwerer Panzerspaechwagen (Sd.Kfz.231) (6 Rad) Schwerer Panzerspaechwagen (Fu) (Sd.Kfz.232) (6 Rad) formerly gepanzerten Kraftwagen (Kfz.67) & (Fu)(Kfz.67a)

In early 1930, Wa Prw 6 began preliminary investigations on the feasibility of mounting a 2.3 metric ton armored body on a lengthened 6-wheel cross-country truck chassis to create a cheaper armored car weighing about 4.5 tons. A Daimler-Benz G3 chassis and two Buessing-NAG G31P chassis were used. The chassis were modified to create a second driver's position in the rear, strengthen the suspension, and alter the engine cooling. The off-road capability of these vehicles was limited to trails and relatively flat terrain. Soft and marshy ground was to be avoided.

A fully traversable enclosed turret was designed for a 2 cm gun and an M.G.13. Armor protection was designed to withstand single hits from 7.92 mm S.m.K. (AP bullets) at ranges exceeding 30 meters.

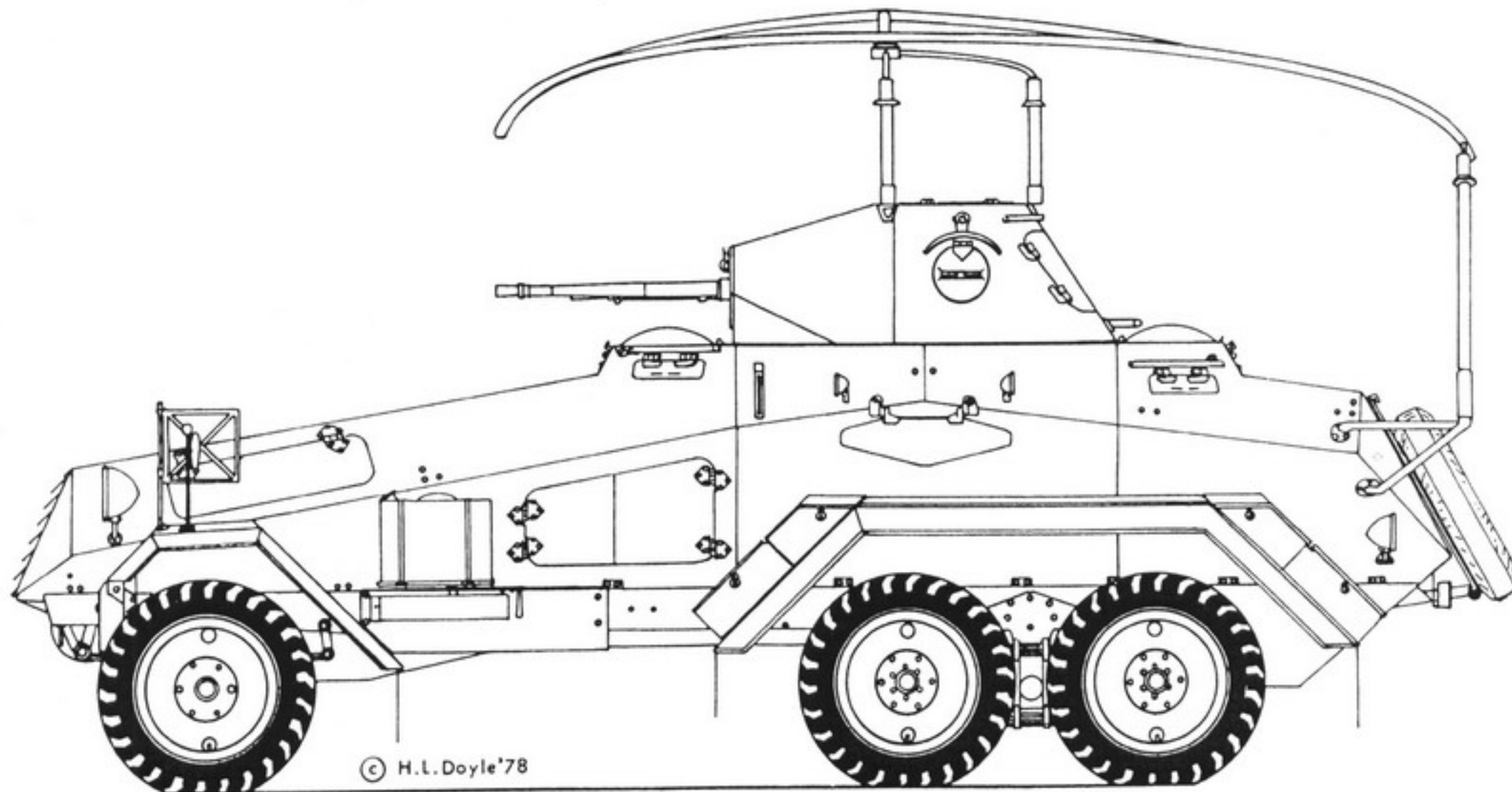
Three G3A chassis from Daimler-Benz and three G31P chassis from Buessing-NAG were acquired for a trial series in early 1932, followed by orders for six G3A (half with a larger electric generator for radio sets) and 12 G31P for Pzkw. in December 1932. Buessing-NAG provided an additional 30 G31P chassis, but the majority of these armored cars were completed by using 68 Magirus M206A chassis that were delivered from June 1934 through September 1936. Daimler-Benz completed assembly of 19

Pz.Sp.Wg. on Buessing-NAG chassis. Their own, the Magirus chassis, and the rest of the Daimler-Benz chassis were sent to Schichau, Elbing or Deutsche Werke, Kiel for final assembly.

Produced in secrecy, these armored cars were accepted initially by the army as gepanzerten Kraftwagen. The basic version was designated Kfz.67 and the version with a radio set and frame antenna (Fu) Kfz.67a. The names were officially changed to schwerer Panzerspaechwagen (Sd.Kfz.231) and schwere Panzerspaechwagen (Fu) (Sd.Kfz.232) in April 1936.

Numerous modifications were introduced during the production run, including adding an anti-aircraft machinegun mount onto the turret of the Kfz.67 in early 1935, and mounting a spare wheel on the rear and adding a 20 liter reserve fuel can in late 1935. Post-production backfitted modifications included replacing the T.Z.F.3 gunsight with a T.Z.F.6 in 1938 and mounting the Notek headlight and convoy taillight in early 1940.

A total of six schwere Panzerspaechwagen with 2 cm guns were authorized for each Pz.Sp.Kp. by K.St.N.1162 in 1935. Three Sd.Kfz.231 and three Sd.Kfz.232 were to be allotted to each Pz.Sp.Kp. organized in accordance with K.St.N.1162 dated 1936 to 1Nov43.

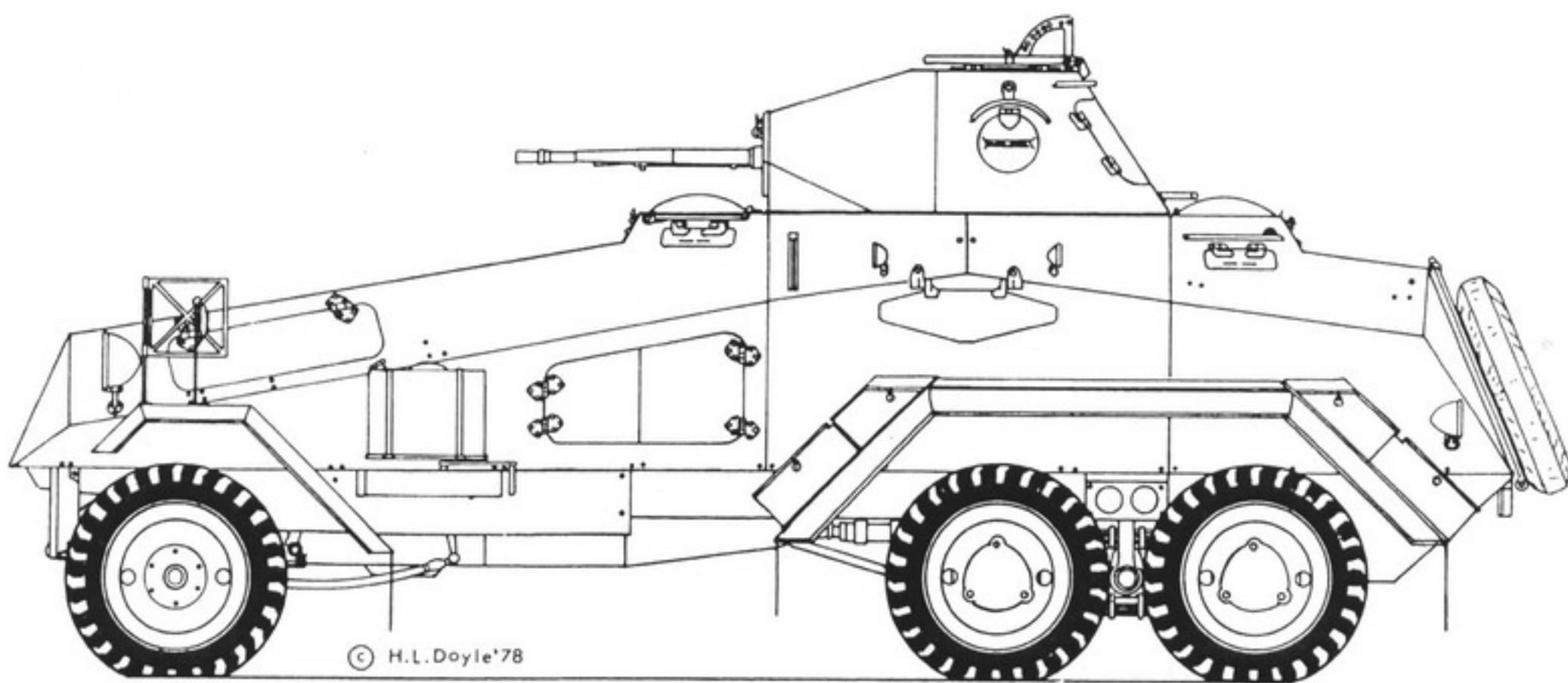
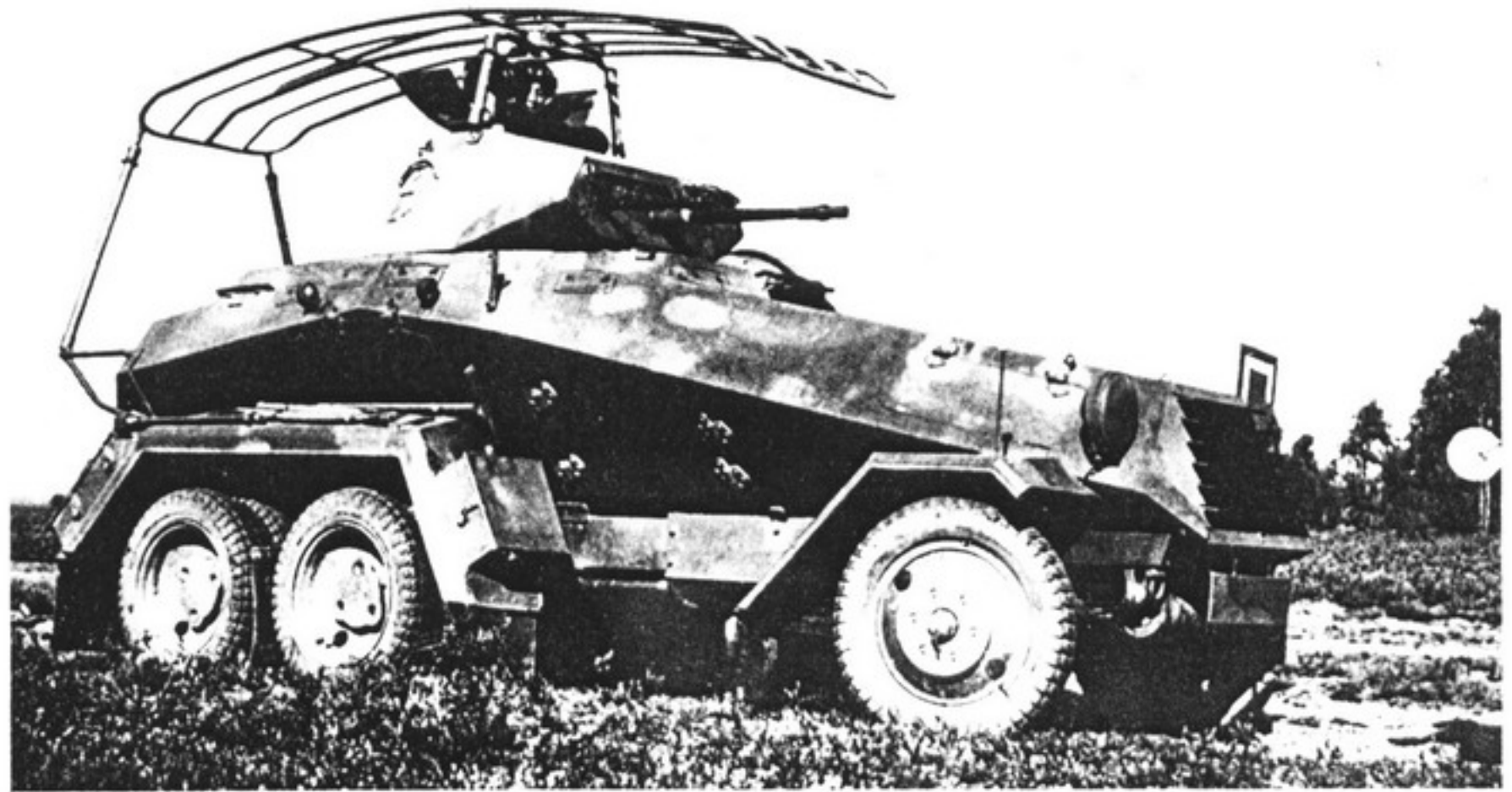


s.Pz.Sp.Wg. (Fu) (Sd.Kfz.232) (6 Rad) with a Buessing-NAG G31p chassis

Right Above:
This s.Pz.Sp.Wg.
(Sd.Kfz.231) with long
front fenders was
completed on a chassis
produced by Magirus.
(WJS)



Right:
This s.Pz.Sp.Wg. (Fu)
(Sd.Kfz.232), completed
on a Buessing-NAG
chassis, has fake vision
ports painted on to divert
enemy fire away from the
real vision ports. (WJS)



s.Pz.Sp.Wg. (Sd.Kfz.231) (6 Rad) with a Daimler-Benz G3a chassis



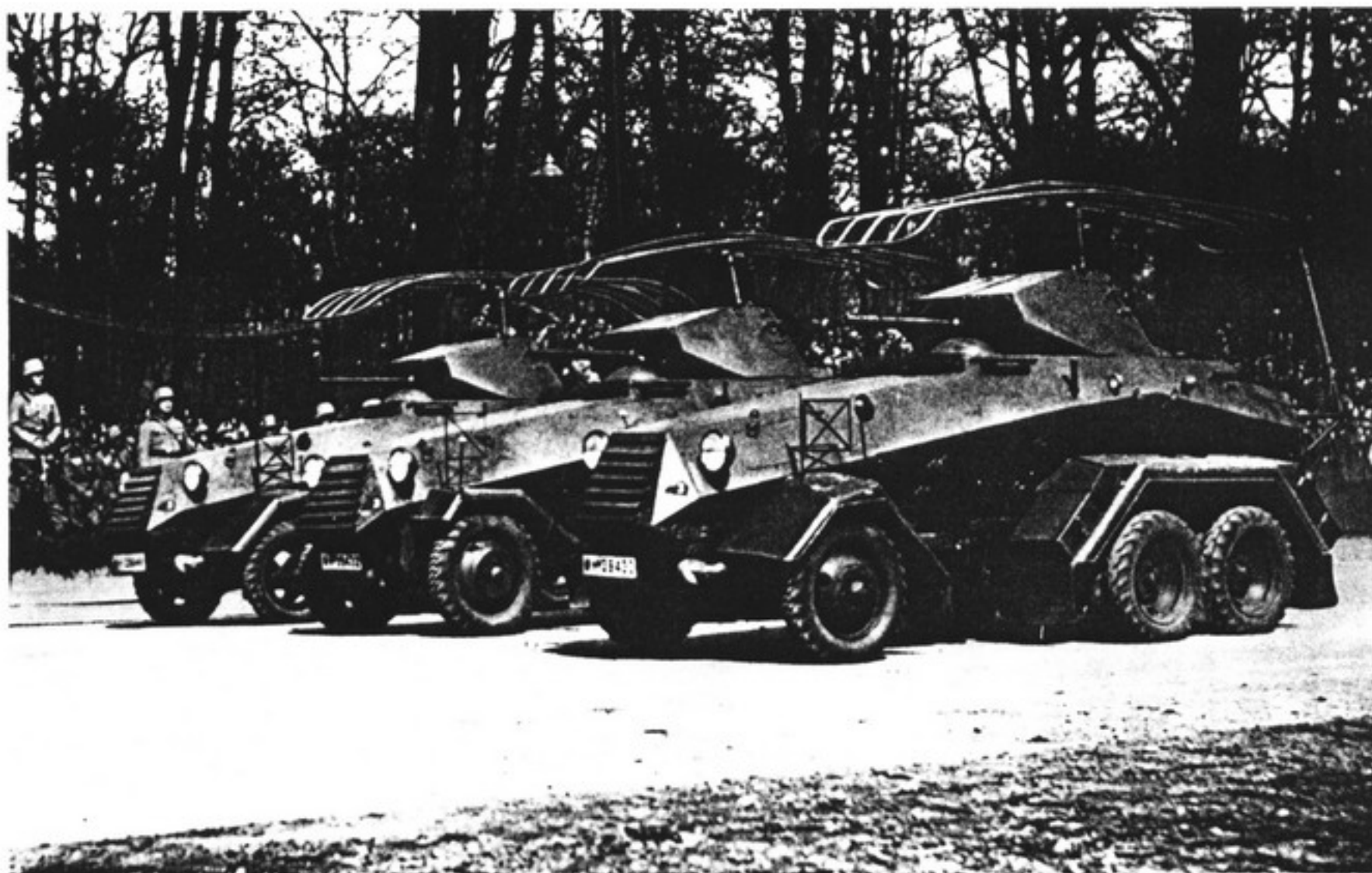
Above: S.Pz.Sp.Wg. (Sd.Kfz.231) were modified to mount an anti-aircraft machinegun on the turret with an external seat for the commander. (WJS) Below: A s.Pz.Sp.Wg. (Fu) (Sd.Kfz.232) on maneuvers in the Summer of 1935 before being modified to carry a spare tire on the rear. (APG)



Schwerer Panzerspaehwagen (Sd.Kfz.231) (6 Rad)
Schwerer Panzerspaehwagen (Fu) (Sd.Kfz.232) (6 Rad)

	<u>Buessing-NAG</u> <u>Typ G31P</u>	<u>Daimler-Benz</u> <u>Typ G3A als Pzkw.</u>	<u>Magirus</u> <u>Typ M206a</u>
Weapons Data:			
In Turret:	1 - 2 cm Kw.K.30 1 - 7.92 mm M.G.13 1 - 9 mm M.P.18	1 - 2 cm Kw.K.30 1 - 7.92 mm M.G.13 1 - 9 mm M.P.18	1 - 2 cm Kw.K.30 1 - 7.92 mm M.G.13 1 - 9 mm M.P.18
Elevation:	-12°, +20°	-12°, +20°	-12°, +20°
Traverse:	360° hand	360° hand	360° hand
Gun Sight:	T.Z.F.3	T.Z.F.3	T.Z.F.3
Ammunition:	200 - 2 cm Pzgr. 1500 - 7.92 mm	200 - 2 cm Pzgr. 1500 - 7.92 mm	200 - 2 cm Pzgr. 1500 - 7.92 mm
Armor:	4-13 mm	4-13 mm	4-13 mm
Crew:	4	4	4
Measurements:			
Length, overall:	5.57 m	5.57 m	5.57 m
Width, overall:	1.82 m	1.82 m	1.82 m
Height, overall:	2.25 m	2.25 m	2.25 m
Sd.Kfz.232	2.87 m w/antenne	2.87 m w/antenne	2.87 m w/antenne
Wheel Base:	1.55 m F 1.37+1.81 R	1.60 m F 1.38+1.82 R	1.69 m F 1.44+1.84 R
Axle Spacing:	2.70 m/0.95 m	3.00 m/0.95 m	2.50 m/0.90 m
Weight:	5.35 metric tons	5.70 metric tons	6.00 metric tons
Fuel Capacity:	90 liters	105 liters	110 liters
Automotive Capabilities:			
Maximum Speed:			
Forward:	70 km/hr	70 km/hr	62 km/hr
Reverse:	32 km/hr	32 km/hr	62 km/hr
Sustained Speed:	35 km/hr	35 km/hr	35 km/hr
Range:	250-300 km	250-300 km	250 km
Ground Clearance:	28.5 cm	30 cm	24 cm
Power Ratio:	16.2 HP/ton	15.2 HP/ton	15.6 HP/ton
Turning Circle	16 m	14 m	13 m
Automotive Components:			
Motor:	4 cylinder 3.9 liter gasoline 60 HP @ rpm	6 cylinder 3.7 liter gasoline 65 HP @ rpm	6 cylinder 4.6 liter gasoline 70 HP @ rpm
Transmission:	6 F, 2 R	8 F, 2 R	8 F, 2 R
Tires	6.00-20 (150 mm)	6.00-20 (150 mm)	6.00-20 (150 mm)

Right:
 Three s.Pz.Sp.Wg. (Fu)
 (Sd.Kfz.232) from
 Aufklaerungs-Abteilung 3
 on parade. (APG)



Schwerer Panzerspaehwagen (Sd.Kfz.231) (8 Rad)
Schwerer Panzerspaehwagen (Fu) (Sd.Kfz.232) (8 Rad)
formerly (Sd.Kfz.233) & (Sd.Kfz.234)
Fgst.Nr. Serie 59902 - 87317

Desiring a schwerer Panzerspaehwagen (heavy armored car) capable of limited cross-country performance, Wa Prw 6 contracted with the firm of Buessing NAG to design a new heavy armored car with: eight wheels on axles spaced at 1.35-1.4-1.35 meter intervals, all-wheel drive and all-wheel steering, capability of speeds up to 90 km/hr, controls at both ends of the vehicle so that it could be steered either forward or in reverse at full speed, sufficient armor to protect it against hits from S.m.K. (armor piercing bullets) from 7.92 mm rifles or machine-guns fired from the ground at any range, and armament consisting of a 2 cm fully automatic gun and a 7.92 mm machinegun mounted in a turret with all-round traverse.

Instead of a converted truck chassis, this eight-wheel version was specifically designed from the ground up as an armored car. The drive train consisting of a Büssing NAG L8V/G.S.36, 8 cylinder motor delivering 150 metric HP at 3000 rpm, through the 6 speed (forward and reverse) transmission and differentials for driving all eight wheels. Each wheel was independently mounted on a short axle with leaf spring and rubber bearing suspension. The combat weight was distributed over eight pneumatic (210 x 18) tires, each bearing a load of about 1 metric ton. Inner tubes were designed to be self-sealing when punctured.

Armor protection varied with the slope of the plates. The gun mantlet was 14.5 mm thick. The sides

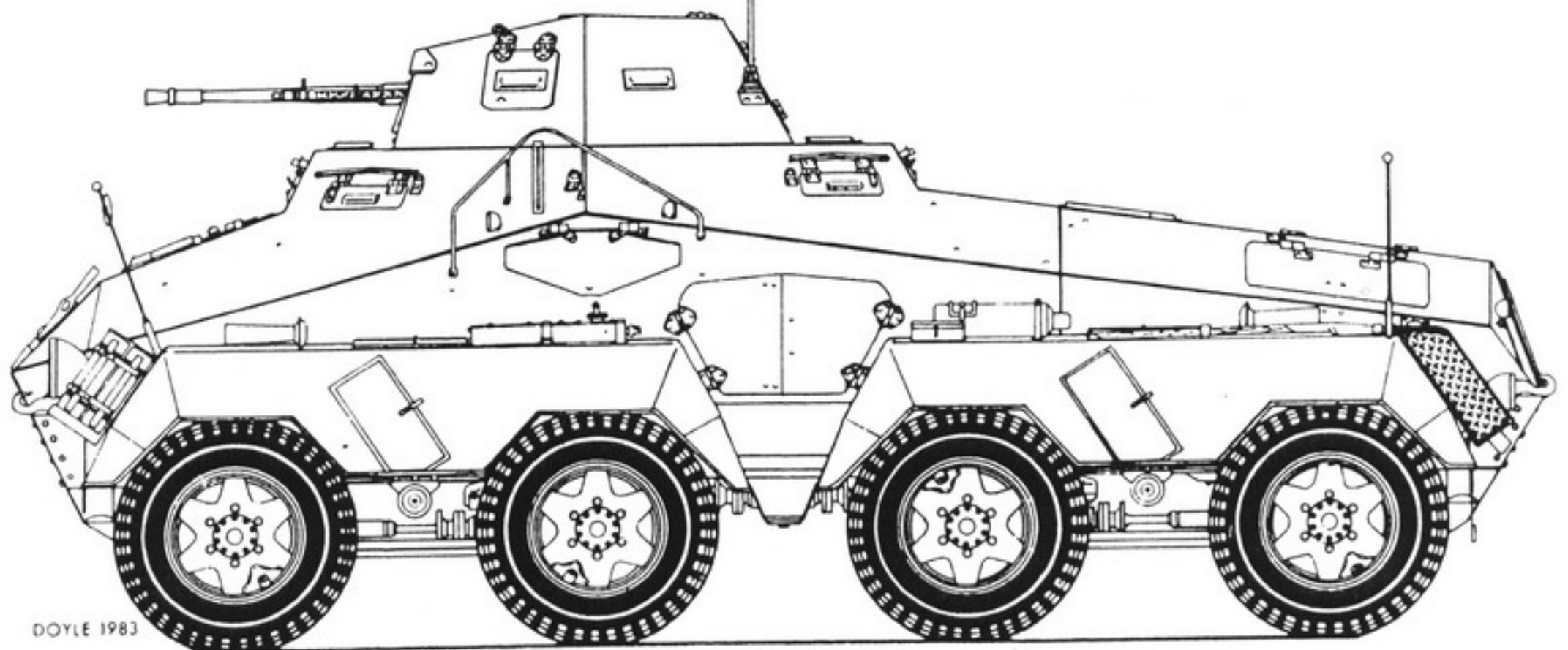
and rear of the engine compartment were 10 mm thick. The rest of the front, side, and rear plates were 8 mm thick. The glacis, hull roof, turret roof, and rear deck were 5.5 mm thick.

During design and testing, these armored cars were officially named schwerer Panzerspaehwagen (Vskfz.623) and schwerer Panzerspaehwagen (Fu) (Vskfz.624). Upon official acceptance in March 1937, the designation was changed to Sd.Kfz.233 and 234. Their final designations Sd.Kfz.231 (8 rad) and Sd.Kfz.232 (8 rad) were officially assigned in September 1940. A total of about 610 Sd.Kfz.231 and 232 (8 rad) were completed from late 1936 to 1943.

Originally, the Sd.Kfz.231 was not outfitted with a radio set. Only the Sd.Kfz.232 had a powerful transmitter/receiver radio set with a frame antenna for long range communication.

Modifications introduced during the production run included: dropping the pivoting mount for an AA machinegun in 1937, changing to standard cast vision ports in 1938/39, adding an armor cowl on the rear in 1939, mounting Zusatzpanzer on a frame at the front in 1940 (until the basic frontal armor was increased to 30 mm in 1942), upgrading to an 180 hp engine in 1941, changing to a 2 cm Kw.K.38 and Fu 12 radio set in 1942, and dropping the forward visors on the turret sides in 1943.

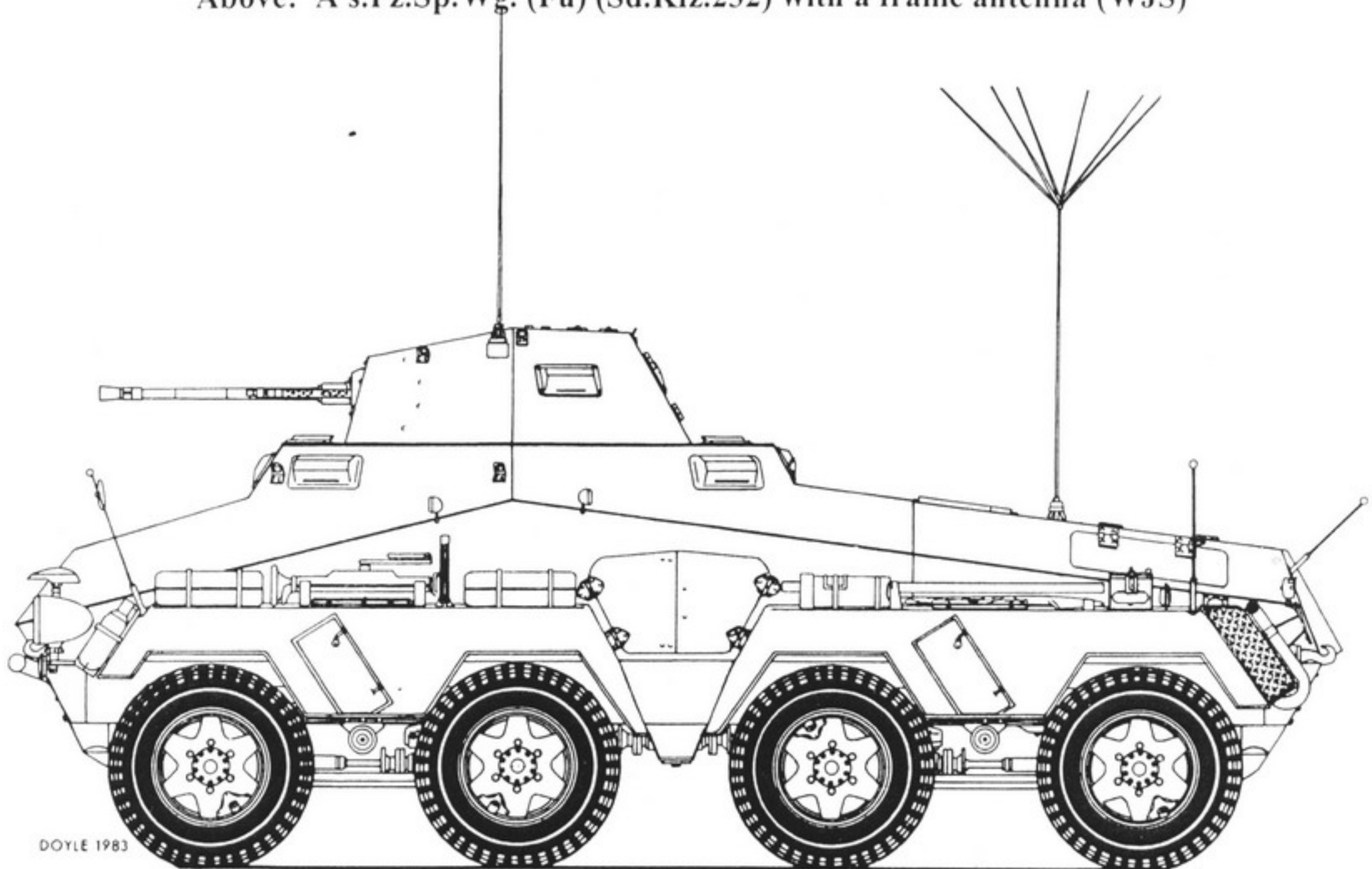
Three Sd.Kfz.231 and three Sd.Kfz.232 were authorized in each Pz.Sp.Kp. in accordance with K.St.N.1162 dated from 1936 to November 1943.



S.Pz.Sp.Wg. (Sd.Kfz.231) (8 Rad) modified to carry a radio set



Above: A s.Pz.Sp.Wg. (Fu) (Sd.Kfz.232) with a frame antenna (WJS)



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S.Pz.Sp.Wg. (Fu) (Sd.Kfz.232) (8 Rad) with a Sternantenna (star aerial) replacing the frame antenna



Left Above & Below:
This s.Pz.Sp.Wg.
(Sd.Kfz.233), completed
in 1938 or early 1939, still
has flat plate visors.
(WJS)





Right Above & Below:
Factory photographs of a
s.Pz.Sp.Wg. (Fu) (Sd.Kfz.234)
completed in 1939 with cast
visors on the turret sides and
flat visors on the hull.
(WJS)



schwerer Panzerspaehwagen (Sd.Kfz.231) (8 Rad)
schwerer Panzerspaehwagen (Fu) (Sd.Kfz.232) (8 Rad)
Fgst.Nr.Serie 59902-87317

Weapons Data:

In Turret: 1 - 2 cm Kw.K.30/38
 1 - 7.92 mm M.G.34
 Elevation: -10°, +20°
 Traverse: 360°
 Gun Sight: T.Z.F.6 (2.5x 24°)
 Graduated to: 1200 meters
 Secondary: 1 - 9 mm M.P.
 Ammunition: 180 - 2 cm
 2100 - 7.92 mm S.m.K.
 192 - 9 mm

Crew:

Commander
 Gunner
 2 Drivers

Communication: No radios in Sd.Kfz.231
 Fu 11 SE 100 in Sd.Kfz.232
 (Fu 12 SE 80 & Fu.Spr.Ger."a")

Measurements:

Length, overall: 5.85 m
 Width, overall: 2.20 m
 Height, overall: 2.35 m
 Height, Antenne: 2.90 m f.Sd.Kfz.232
 Firing Height: 2.08 m
 Wheel Base: 1.60 m
 Axle Spacing: 1.35/1.40/1.35 m
 Combat Loaded: 8.30 tons/8.50 tons
 (9.10 tons f.Sd.Kfz.232)
 Fuel Capacity: 180 Liters

Armor:

Sloped to prevent penetration by S.m.K.
 (7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 85 km/hr
 Range on Road: 300 km
 Cross Country: 170 km (150)
 Grade: 30°
 Trench Crossing: ?? m
 Step: 50 cm
 Fording Depth: 100 cm
 Ground Clearance: 27 cm
 Power Ratio: 18.7 HP/ton (19.8)
 Turning Circle: 10.5 m dia.

Automotive Components:

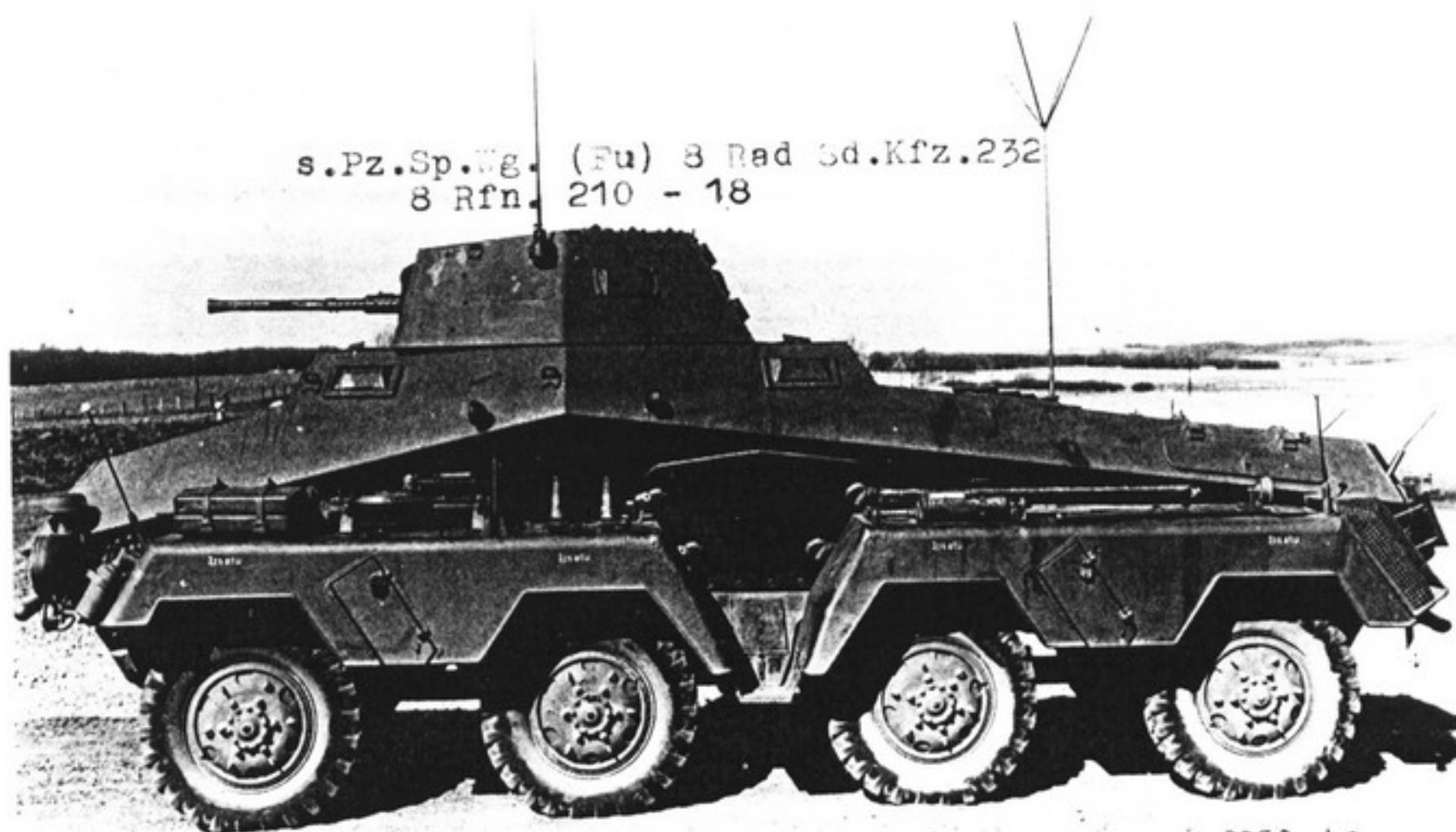
Chassis: Buessing NAG Typ GS
 Motor: Buessing NAG L8V/GS
 water cooled
 7.91 liter (8.363)
 gasoline
 155 HP (180)
 @ 3000 rpm

Transmission:

6 F, 6 R
 1.Gear 9.3 km/hr
 2.Gear 16.7 km/hr
 3.Gear 24.6 km/hr
 4.Gear 32.4 km/hr
 5.Gear 57.9 km/hr
 6.Gear 85.3 km/hr

Steering:

All 8 wheels
 Drive: All 8 wheels
 Tires: Rubber 210-18 gel.
 Suspension: Leaf springs



s.Pz.Sp.Wg. (Fu) 8 Rad Sd.Kfz.232
 8 Rfn. 210 - 18

Left:

A s.Pz.Sp.Wg. (Fu)
 (Sd.Kfz.232) (8 Rad)
 with a Sternantenna
 completed in 1942
 (NA)

2358. 42

schwerer Panzerspaehwagen (7.5 cm)
(Sd.Kfz.233)
Fgst.Nr.Serie 59902-87317

Weapons Data:

In Hull: 1 - 7.5 cm Kanone 37
 1 - 7.92 mm M.G.42
 Elevation: -4°, +20°
 Traverse: 12° R, 9° L
 Gun Sight: Sfl.Z.F.1 (5x 8°)
 Graduated to: meters for

Secondary: 1 - 9 mm M.P.38

Ammunition: 32 - 7.5 cm
 1500 - 7.92 mm
 192 - 9 mm

Crew: Commander
 Gunner
 Driver

Communication: Fu.Spr.Ger."a"

Measurements:

Length, overall: 5.85 m
 Width, overall: 2.20 m
 Height, overall: 2.25 m
 Firing Height: 1.85 m
 Wheel Base: 1.60 m
 Axle Spacing: 1.35/1.40/1.35 m
 Combat Loaded: 8.7 metric tons
 Fuel Capacity: 150 Liters

Armor:

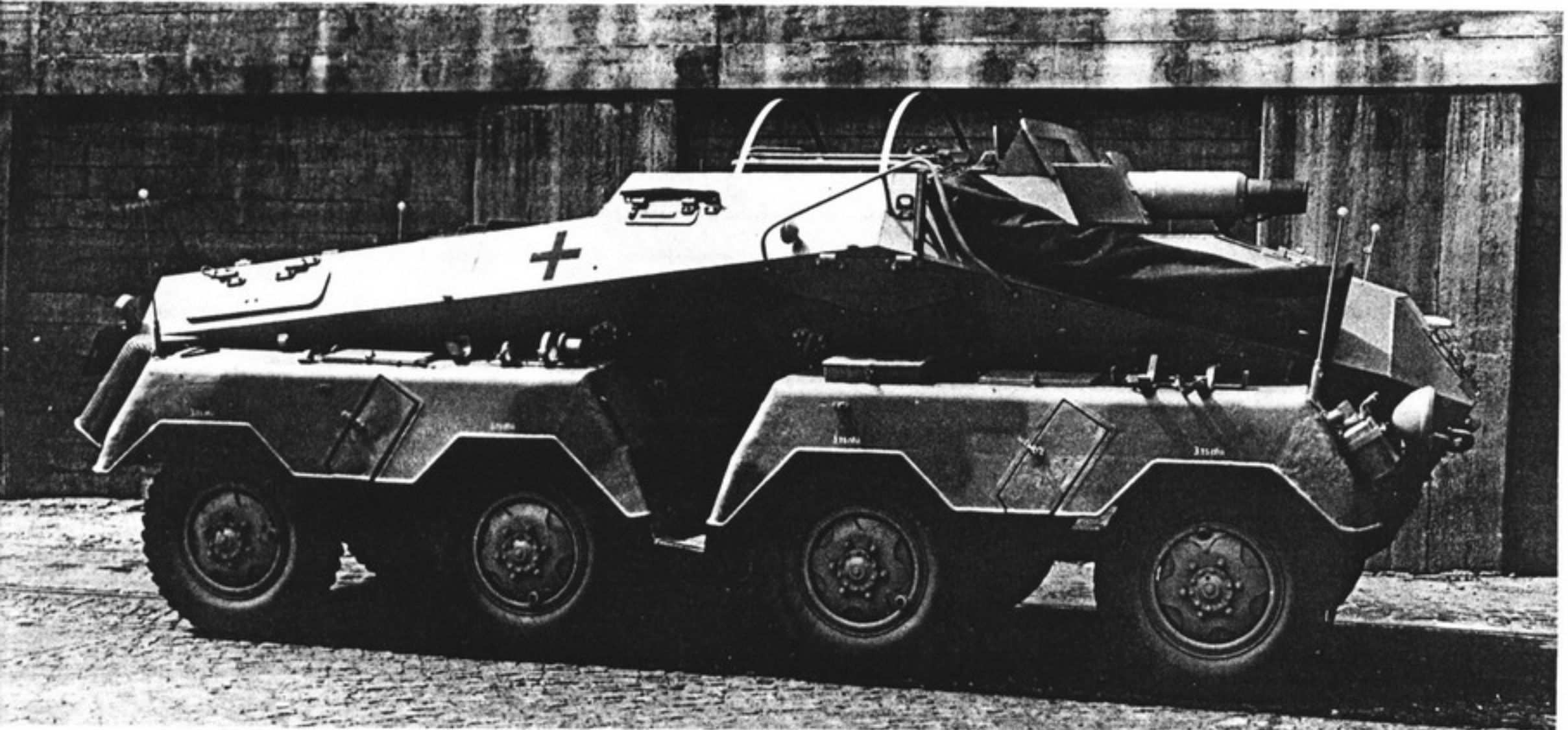
Sloped to prevent penetration by S.m.K.
 (7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 85 km/hr
 Avg. Road Speed: ?? km/hr
 Cross Country: ?? km/hr
 Range on Road: 300 km
 Cross Country: 170 km (150)
 Grade: 30°
 Trench Crossing: ?? m
 Step: 50 cm
 Fording Depth: 100 cm
 Ground Clearance: 27 cm
 Power Ratio: 20.7 HP/ton
 Turning Circle: 10.5 m dia.

Automotive Components:

Chassis: Buessing NAG Typ GS
 Motor: Buessing NAG L8V/GS
 water cooled
 7.91 liter (8.363)
 gasoline
 155 HP (180)
 @ 3000 rpm
 Transmission: 6 F, 6 R
 1.Gear 9.3 km/hr
 2.Gear 16.7 km/hr
 3.Gear 24.6 km/hr
 4.Gear 32.4 km/hr
 5.Gear 57.9 km/hr
 6.Gear 85.3 km/hr
 Steering: All 8 wheels
 Drive: All 8 wheels
 Tires: Rubber 210-18 gel.
 Suspension: Leaf springs



A Sd.Kfz.233 with the camouflage pattern for hot climates completed in 1942 (NA)

Schwerer Panzerspaehwagen (7.5 cm)

(Sd.Kfz.233)

Fgst.Nr.Serie 59902 -87317

The Waffenamt was left with many 7.5 cm StuK L/24 which had already been produced prior to quickly rearming the Sturmgeschuetz with the 7.5 cm StuK40 L/43 in March 1942. These left-over guns were fitted into a new mount and named 7.5 cm Kanone 37 (Sfl.) for mounting on the schwere Panzerspaehwagen als Sfl.1 fuer 7.5 cm K.37 (Sd.Kfz.233) and the mittlerer Schuetzenpanzerwagen als Sfl.2 fuer 7.5 cm K.37 (Sd.Kfz.251/9). When mounted on the Pz.Sp.Wg., the 7.5 cm Kanone could be traversed 9 degrees to the left and 12 degrees to the right and elevated through an arc from minus 4 to plus 20 degrees. The gunner aimed the gun with an Sfl.Z.F.1 periscopic dial sight with 5x magnification and an 8 degree field of view.

The Sd.Kfz.233 was created by mounting the 7.5 cm K.37 forward in the cut-down superstructure designed for the schwere Panzerfunkwagen Sd.Kfz.263. In fact, some of the first Sd.Kfz.233 produced were converted Sd.Kfz.263 which had been overhauled. There was sufficient space for the crew of three - commander, gunner, and loader in the open-topped hull. Only 32 rounds of 7.5 cm ammunition

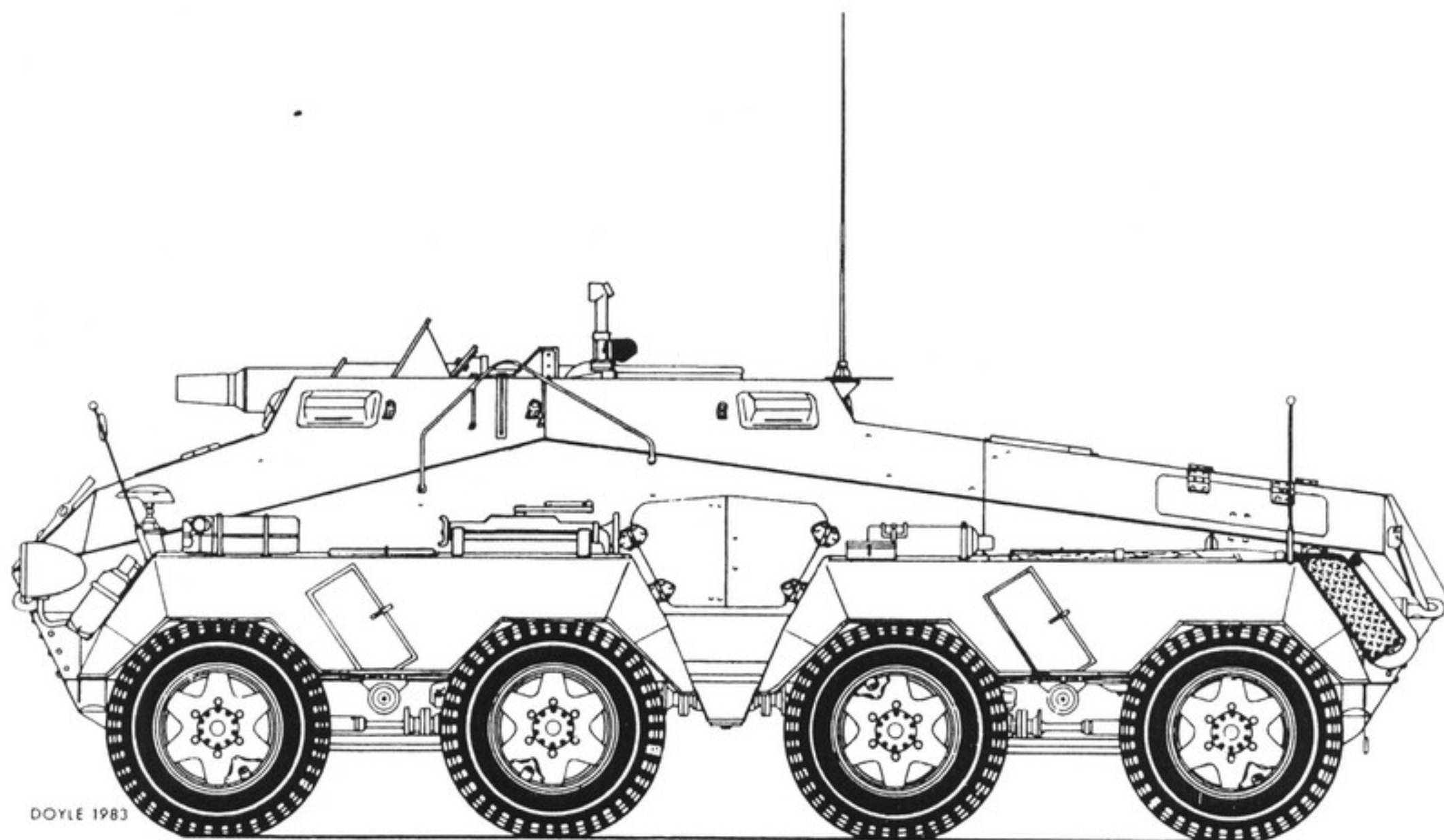
were stowed, because the vehicle was already overloaded at 8.7 metric tons.

To keep down weight, armor protection was provided by 8 mm thick plates that were positioned at angles to prevent penetration of 7.92 mm S.m.K. (AP bullets).

Automotively, the Sd.Kfz.233 was identical to its predecessor Sd.Kfz.231, 232, and 263 with 8-wheel drive and 8-wheel steering. Maximum speed was 85 km/hr at an engine speed of 3000 rpm. Most of the Sd.Kfz.233 were built on new chassis with the more powerful 180 horsepower engine.

A total of 129 were reported as having been completed and accepted by inspectors from July 1942 through October 1943.

Six Sd.Kfz.233 were authorized in each Pz.Sp.Zug (7.5 cm) in accordance with K.St.N.1138 dated November 1942 and 1943. They were first sent into action in Tunisia. Twelve Sd.Kfz.233 landed with Aufkl.Kp."T" on 16 November 1942, followed by six Sd.Kfz.233 with Pz.Sp.Kp.220 on 27 November 1942. Most of the rest were sent to the Eastern Front.





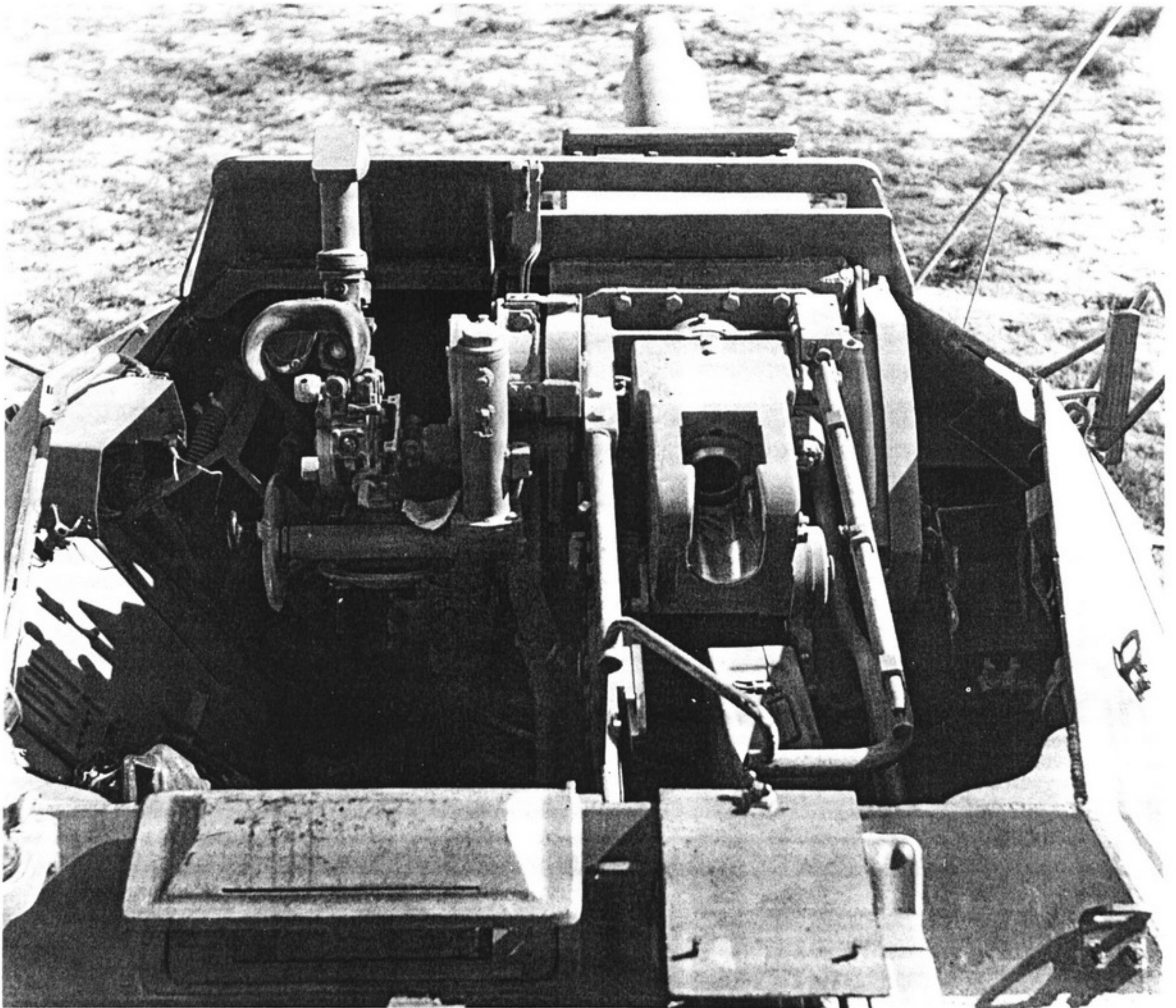
Above: A Sd.Kfz.233 with cast visors, completed in 1943, still has the Tropen (hot climate) camouflage pattern (NA)

Right:
A Sd.Kfz.233 in service in Russia with a M.G.42 on a pivoting mount (BA 205/1800/34a)





Above: One of the 18 Sd.Kfz.233 sent to Tunisia in November 1942. (BA 49/8/21)
Below: A Sd.Kfz.233 with cast visors captured in Tunisia in 1943 (TTM)



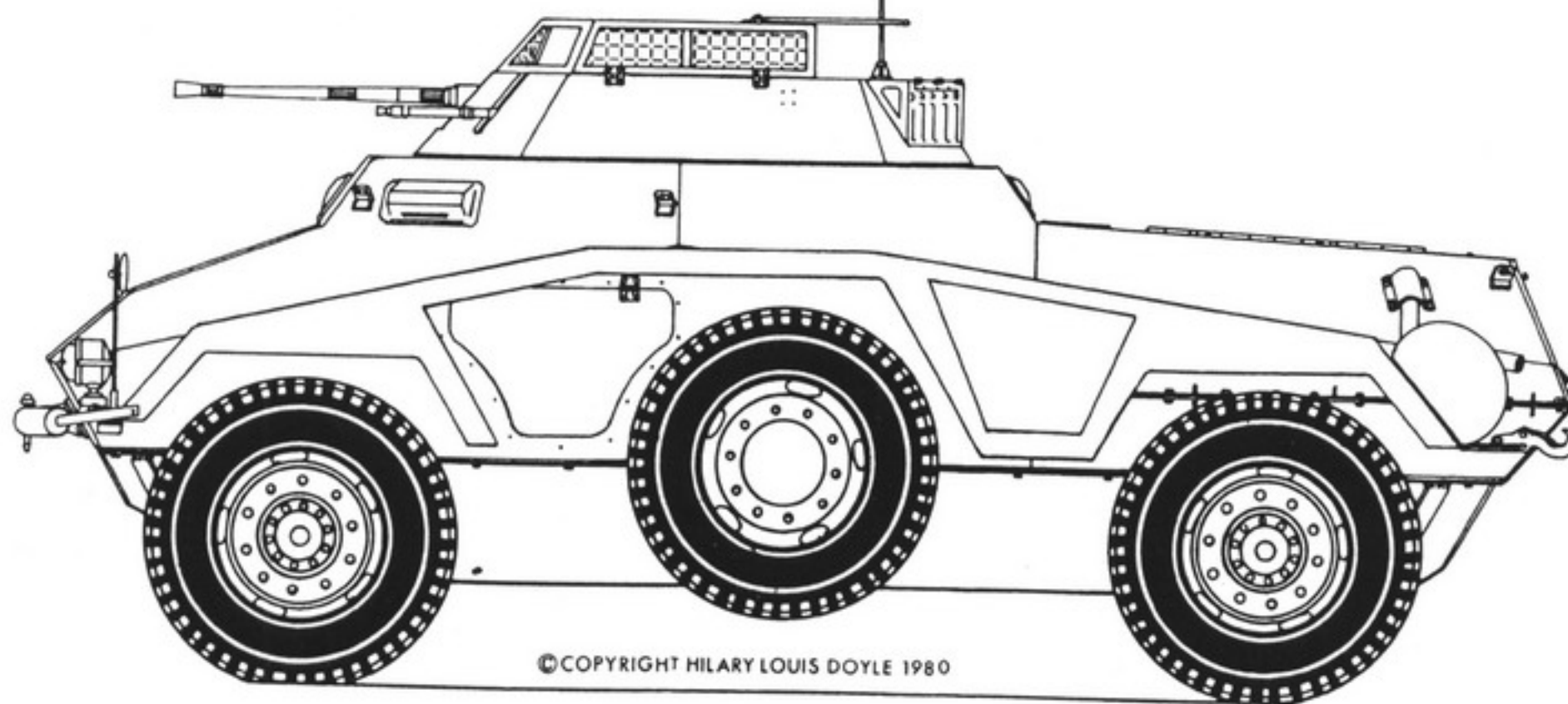
leichter Panzerspachwagen 4 Rad Tropen

On 21 July 1941, In 6 requested that the Waffenamts design a four-wheeled light armored car based on the 8 Rad Tp already being developed (Refer to Sd.Kfz.234). With the exception of the engine, transmission, springs, and shortened rear armor section, as many parts as possible were to be used from the 8-Rad Tp. Rated at 125 horsepower, an air-cooled 6-cylinder Tatra V910 engine was to propel this 7 metric ton armored car at speeds up to 85 km/hr. Air-cooled diesel engines were considered to be better suited for use in the Tropen (hot climates) than water-cooled gasoline engines.

Frontal armor protection was to consist of face-hardened 30 mm plates which could defeat hits from 2 cm Pzgr. (20 mm AP). The rest of the armor was to be designed to withstand hits from 7.92 mm SmK (AP bullets).

The superstructure and turret were the same as for the 8-Rad Tp. The 2 cm Kw.K.38 along with a 7.92 mm M.G.42 was to be mounted in a Haengelafette (suspended mount) designed by the firm of Appel. It was to be manned by a crew of four - commander, gunner, forward driver, and rearward driver.

Buessing NAG, Berlin was awarded contracts to design the 4-Rad Tp chassis and produce two trial chassis by the Spring of 1943. By July 1942, a contract had been awarded to Buessing NAG, Leipzig for the production of 1000 4-Rad Tp. Delivery of the first five in the production series was planned to occur in October 1943, followed by a steady increase to a maximum output of 80 per month. Series production was canceled. Only one or two trial chassis were completed and tested.



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Right:
A 4 Rad Tropen trial
chassis completed by
Buessing NAG. Contracts
for the production series
were cancelled.
(WJS)



Schwerer Panzerspachwagen (5 cm)

(Sd.Kfz.234)

Fgst.Nr. Serie 5001 - 5100

On 5 August 1940, In 6 gave Wa Pruef 6 an order to design a new Panzerspachwagen fuer Kolonialzwecke (armored car for use in undeveloped areas). Basic design requirements established by In 6 included: a chassis similar to the s.Pz.Sp.Wg. (8-Rad) (Sd.Kfz.231) but with an air-cooled diesel motor; increased fording ability; an armored hull serving as the chassis instead of a frame; a superstructure like that on the Sd.Kfz.231 but with stronger armor (30 mm thick front plates); and ventilation for the crew compartment. Wa Pruef 6 selected Buessing NAG for the detailed design of the chassis and superstructure and Tatra-Werke for the diesel motor.

This project was known as the "Achtradwagen (ARK)" and as "8RTp" (eight-wheeled tropical). With a weight of 12 metric tons, it was to be capable of a maximum speed of 80 to 90 kilometers per hour. Frontal armor was to be 30 mm thick, while the sides were to be proof against S.m.K. (7.92 mm armor piercing bullets fired from machineguns or rifles). Manned by a crew of four, armament was to consist of a 2 cm Kw.K.38 with Flakrohr (1.4 meter long barrel) and an 7.92 mm M.G.34.

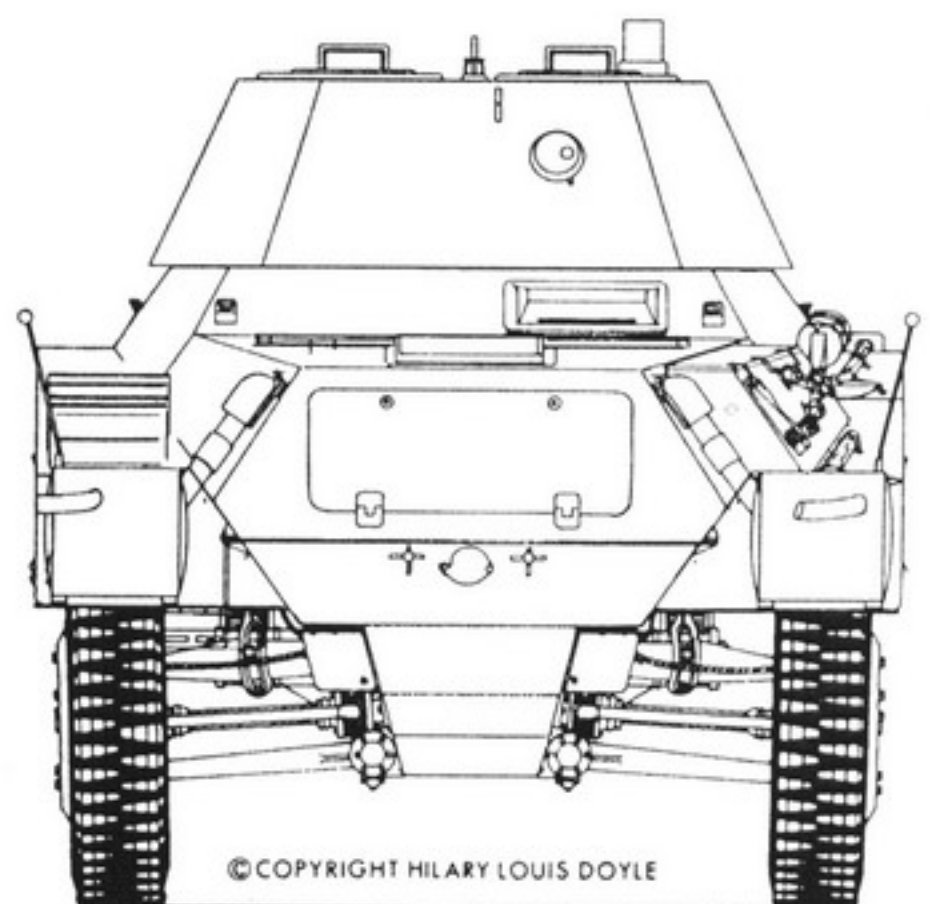
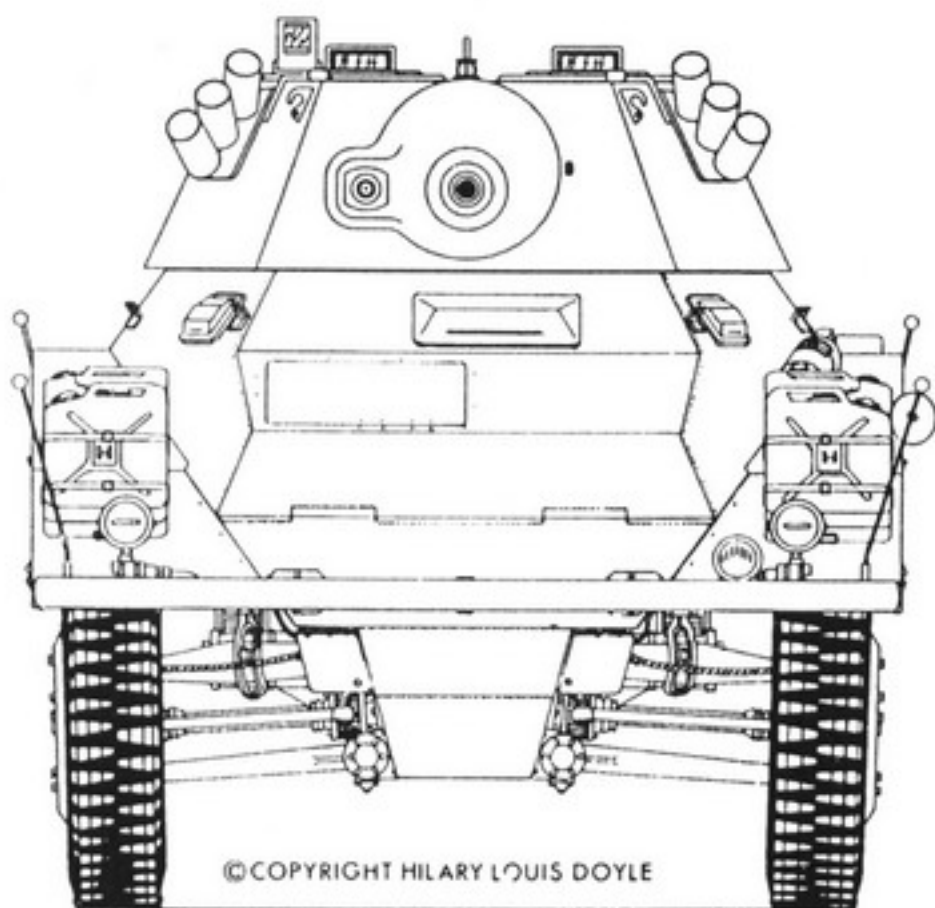
The armored hull consisted of a 5.5 mm horizontal roof plate, 30 mm thick driver's front plate set at 35 degrees to vertical, 15 mm glacis plate at 70 degrees, 30 mm thick front hull plates at 50 and 30 degrees, 8 mm hull side plates at 35 degrees, 10 mm

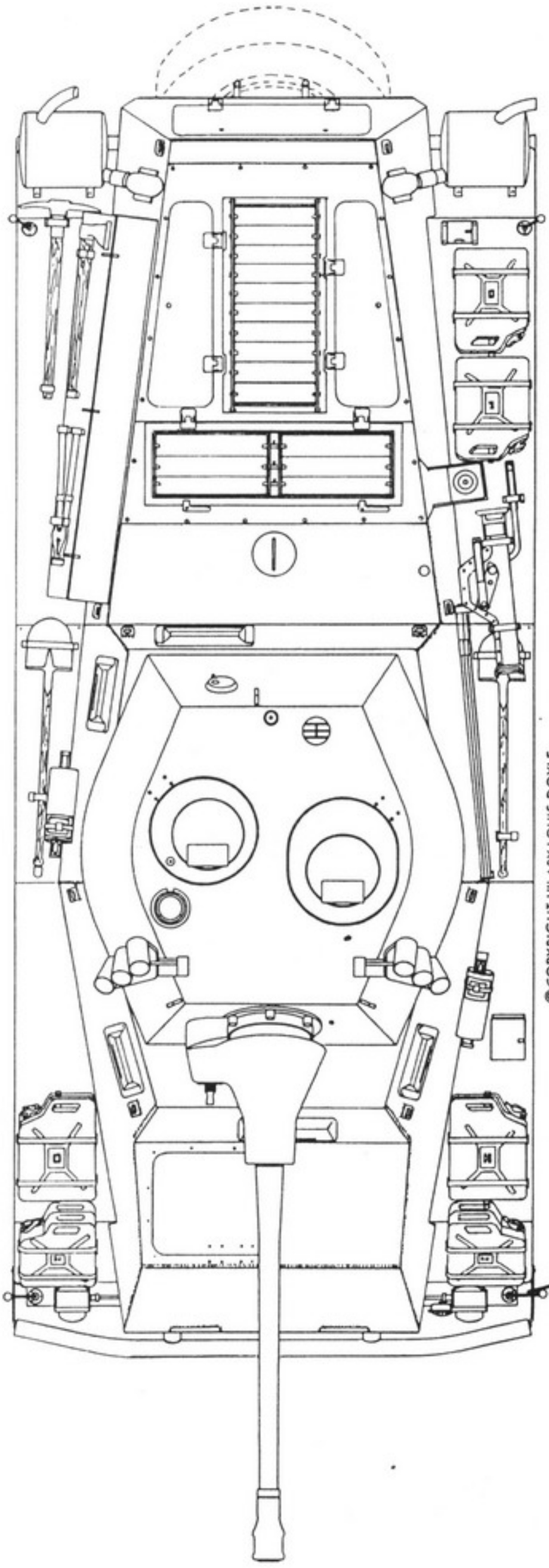
hull rear plates at 22 and 40 degrees, 5.5 mm rear deck plates at 88 degrees, and 5 mm horizontal belly plates. The front face-hardened armor was designed to be proof against attack from 2 cm Pzgr. and the side and rear armor against 7.92 mm S.m.K. armor piercing projectiles.

The first announcement of a change in armament appears in a report card on the development of the schwere Panzerspachwagen Tp (8-Rad) dated 1 July 1942. The report stated that this heavy armored car was to be armed with a 5 cm Kw.K.39/1 and a 7.92 mm M.G.42. On 3 November 1943, WaJRue announced that a total of 100 8RTp 234 were to be produced with the 5 cm Kw.K.39/1 (L/60). The first Sd.Kfz.234 from the production series with a 5 cm Kw.K.39/1 were completed in December 1943 and the last in June 1944.

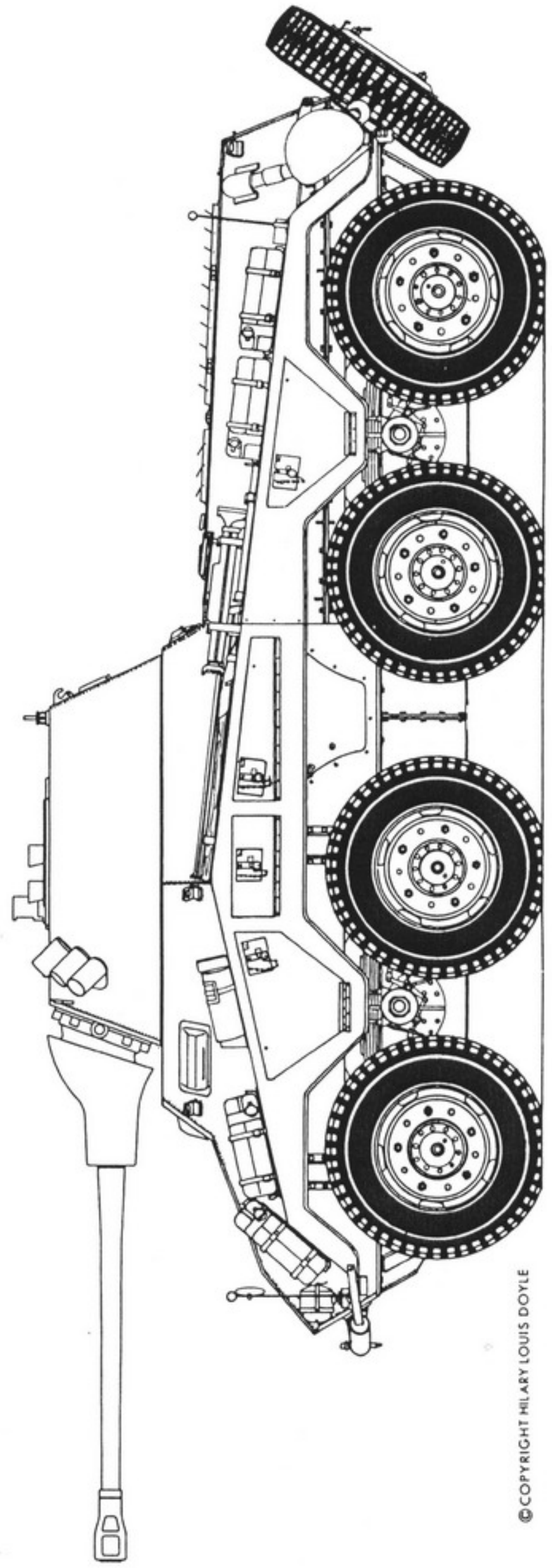
While all were outfitted with an intercom set, radio racks, antenna mounts, and Funksprechgeraet "F", only 13 of the 25 Sd.Kfz.234 in Pz.Sp.Kp.a (K.St.N.1162a) were authorized to be outfitted with the Fu 12 with its 80 watt transmitter capable of voice transmissions of 25 kilometers and key transmissions of 80 kilometers while on the move.

Its designation wasn't officially changed to Sd.Kfz.234/2 until March 1944. This heavy armored car was never officially known as the Puma.





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Above: One of the Sd.Kfz.234/2 from the production series of 100 completed by Buessing NAG (PK)
Below: A Sd.Kfz.234/2 with the four crew members on a training exercise (RN)



schwerer Panzerspaehwagen (5 cm)
(Sd.Kfz.234/2)
Fgst.Nr.Serie 5001-5100

Weapons Data:

In Turret: 1-5 cm Kw.K.39/1 (L/60)
 1-7.92 mm M.G.42
 Elevation: -10°, +20°
 Traverse: 360°
 Gun Sight: T.Z.F.4b (2.5x 24°)
 Graduated to: meters

Secondary: 1 - 9 mm M.P.38

Ammunition: 55 - 5 cm
 2850 - 7.92 mm
 192 - 9 mm

Crew: Commander/Loader
 Gunner
 2 Drivers

Communication: Fu.Spr.Ger."f"

Measurements:

Length, overall: 6.80 m
 Length, w/o gun: 5.86 m
 Width, overall: 2.33 m
 Height, overall: 2.38 m
 Firing Height: 1.93 m
 Wheel Base: 1.95 m
 Axle Spacing: 1.30/1.40/1.30 m
 Combat Loaded: 11.7 metric tons
 Fuel Capacity: 360 Liters

Armor:

Sloped to prevent penetration by S.m.K.
 (7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 80 km/hr
 Avg. Road Speed: ?? km/hr
 Cross Country: ?? km/hr
 Range on Road: 1000 km
 Cross Country: 600 km
 Grade: 30°
 Trench Crossing: 2.0 m
 Step: ?? cm
 Fording Depth: 120 cm
 Ground Clearance: 35 cm
 Power Ratio: 18.8 HP/ton
 Turning Circle: 14.5 m

Automotive Components:

Chassis: Buessing NAG 8RadTP
 Motor: Tatra 12 cylinder
 air cooled
 14.825 liter diesel
 220 HP @ 2250 rpm

Transmission: 6 F, 6 R
 1.Gear 7 km/hr
 2.Gear 12 km/hr
 3.Gear 20 km/hr
 4.Gear 27 km/hr
 5.Gear 49 km/hr
 6.Gear 80 km/hr

Steering: All 8 wheels
 Drive: All 8 wheels
 Tires: Rubber 270-20
 Suspension: Leaf springs



One of the first Sd.Kfz.234 with different pattern stowage bins completed in 1943 (NA)

Schwerer Panzerspaechwagen (2 cm) (Sd.Kfz.234/1) Fgst.Nr. Series 5101 -

From the very start of the project in August 1940, the 2 cm Kw.K. was intended to be the main armament for the "8RTp". The design of a new mount for the 2 cm Kw.K., known as the "Haengelafette" (suspended mount), had already been initiated in April 1940.

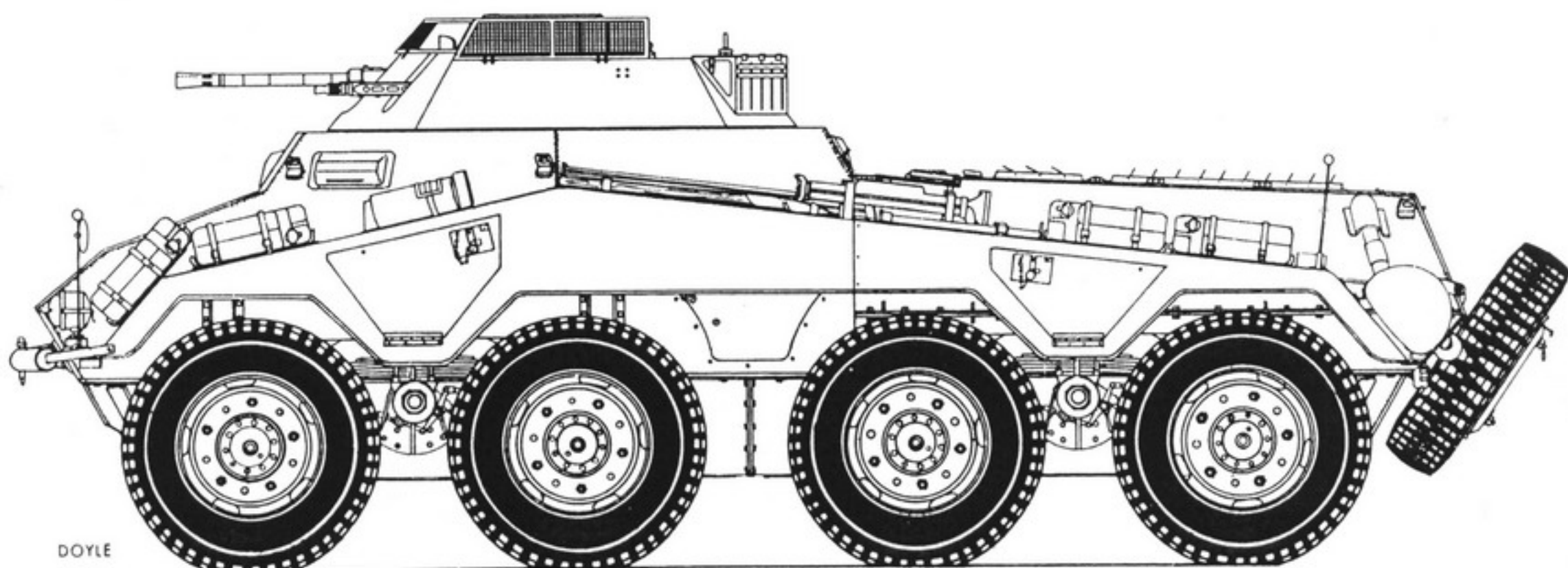
The Sd.Kfz.234/1 had the same chassis as the Sd.Kfz.234. Without the gun overhang and with a lower profile turret, the Sd.Kfz.234/1 was only 5.86 meters long, 2.33 meters wide, and 2.10 meters high. The 2 cm Kw.K.38 with a coaxial M.G.42 was mounted in a 2 cm Hangelafette 38. Armor protection on the open-top turret was 30 mm on the front at 35 degrees, 10 mm on the gun shield, 8 mm on the sides at 35 degrees, and 8 mm on the rear at 32 degrees. With its ball bearing race, the turret was traversable by hand through 360 degrees. Elevation of the weapons was limited to an arc of -4 to +70 degrees. The crew of two sat on seats suspended from the turret ring with the gunner on the right and the commander/loader on the left. A T.Z.F.3a sighting telescope (2.5x, 18 degree field of view, graduated to 1200 meters) was used by the gunner to engage ground targets. Stowage was provided for 250 rounds for the 2 cm Kw.K.38 in ten-round magazines, 2400 rounds for the 7.92 mm M.G.42, and 192 rounds for the 9 mm M.P. The loaded combat weight of 11.5 metric tons was slightly less than that of the Sd.Kfz.234/2.

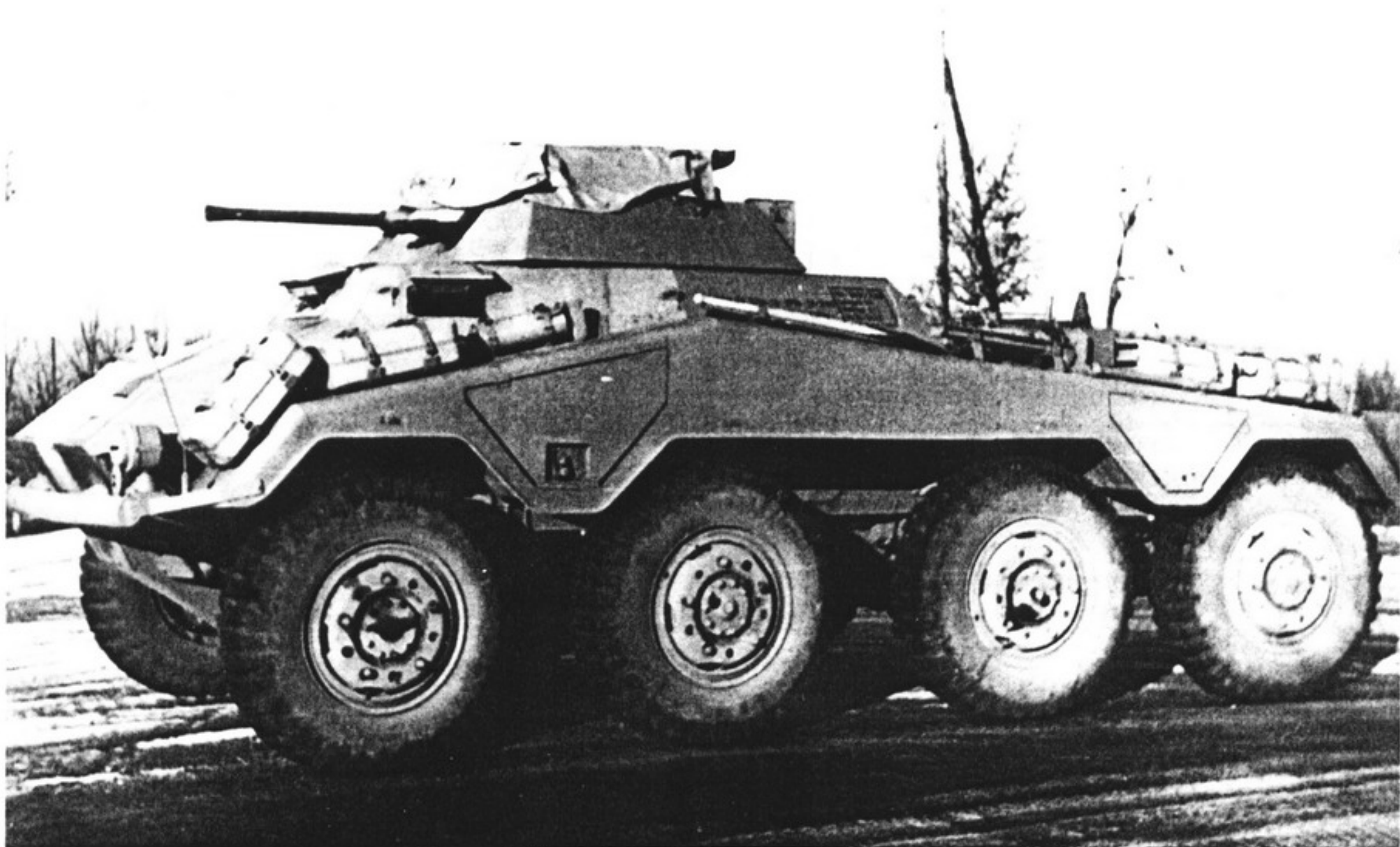
While all Sd.Kfz.234/1 were outfitted with the

intercom set and Funksprechgeraet "f", only those to be issued to the unit commander or section leaders were outfitted with the Fu 12 long range radio sets.

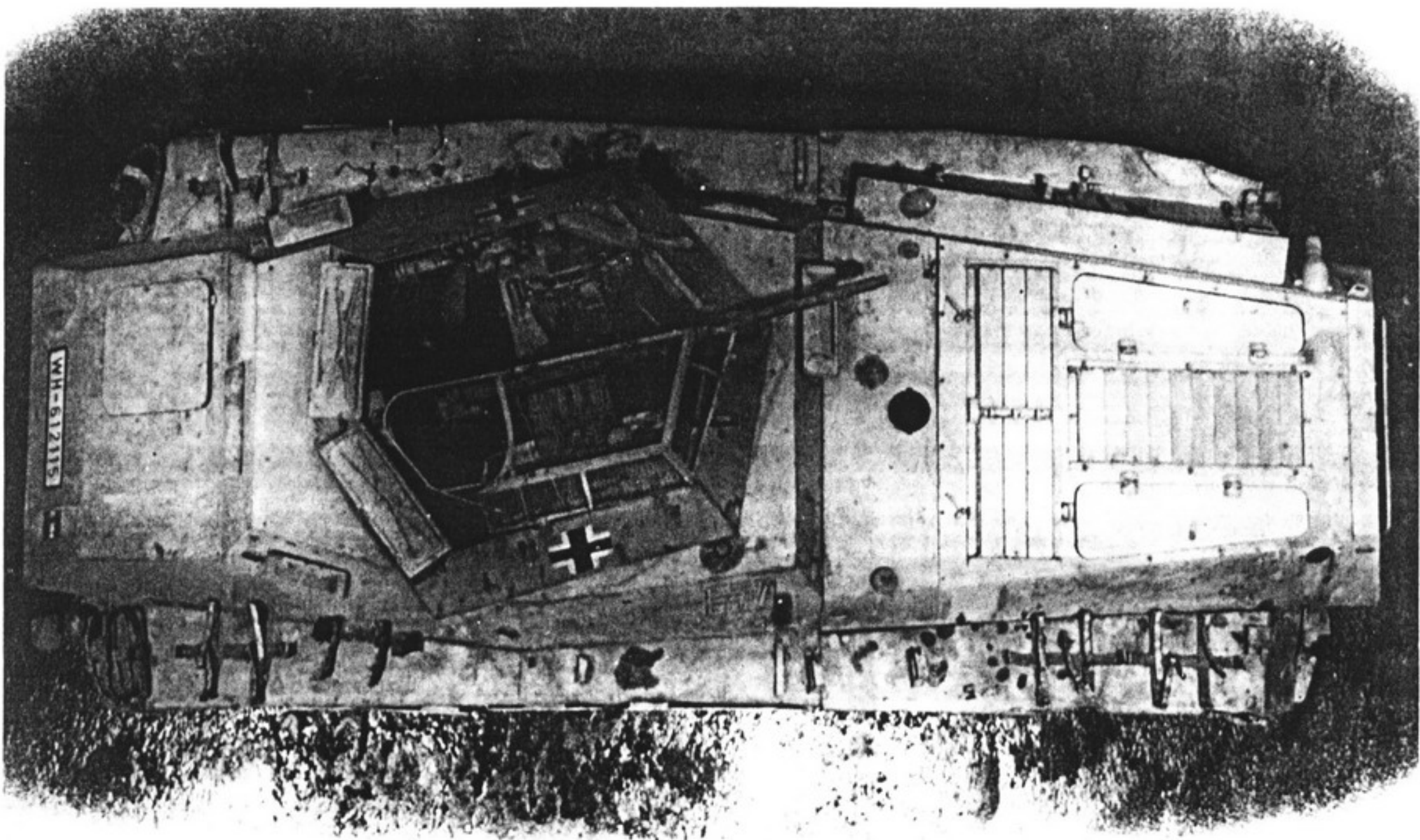
On 3 November 1943, WaJRue announced that a total of 100 8RTp 234 were to be produced with the 5 cm Kw.K.39/1 (L/60). Then starting in April, 50 percent were to be completed with the 2 cm Kw.K.38 as the Sd.Kfz.234/1 and 50 percent with the 7.5 cm K51 as the Sd.Kfz.234/3. By March 1944, a decision had been made to change the production ratio to 13 Sd.Kfz.234/1 for each 3 Sd.Kfz.234/3. Further delays had driven the start of deliveries of the Sd.Kfz.234/1 and Sd.Kfz.234/3 back to June 1944. Again in October 1944 the production ratio was changed to 9 Sd.Kfz.234/1 for each 7 Sd.Kfz.234/3. Production of the Sd.Kfz.234/1 continued to the very end, with a total of about 230 completed by the end of March 1945.

Starting in June 1944, 13 s.Pz.Sp.Wg. (2 cm) (Sd.Kfz.234/1) were issued to the Stab und Stabskompanie of the Panzer-Auklaerung-Abteilung in eight Pz.Div. and one Pz.Gren.Div. Most of the rest were issued piecemeal as replacements. The ability of the 2 cm Kw.K.38 to effectively engage strafing aircraft was considered such an important asset that 9 out of 16 Pz.Sp.Wg. in the Panzer-Aufklaerung-Abteilung were still to be s.Pz.Sp.Wg. (2 cm) (Sd.Kfz.234/1) in the K.St.N. dated 1 November 1944 and 1 April 1945.





Above: A Sd.Kfz.234/1 with only two side stowage bins produced in the Fall of 1944 (RN)
Below: This Sd.Kfz.234/1 was captured in Northwest Europe (TTM)



**schwerer Panzerspaehwagen (2 cm)
(Sd.Kfz.234/1)
Fgst.Nr.Serie 5101-**

Weapons Data:

In Turret: 1 - 2 cm Kw.K.38
1 - 7.92 mm M.G.42
Elevation: -4°, +70°
Traverse: 360°
Gun Sight: T.Z.F.3a (2.5x 18°)
Graduated to: 1200 meters

Secondary: 1 - 9 mm M.P.

Ammunition: 250 - 2 cm
2400 - 7.92 mm
192 - 9 mm

Crew: Commander/Loader
Gunner
2 Drivers

Communication: Fu.12 SE 80 &
Fu.Spr.Ger."f"

Measurements:

Length, overall: 5.86 m
Width, overall: 2.33 m
Height, overall: 2.10 m
Firing Height: ?? m
Wheel Base: 1.95 m
Axle Spacing: 1.30/1.40/1.30 m
Combat Loaded: 11.5 metric tons
Fuel Capacity: 360 Liters

Armor:

Sloped to prevent penetration by S.m.K.
(7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 80 km/hr
Avg. Road Speed: ?? km/hr
Cross Country: ?? km/hr
Range on Road: 1000 km
Cross Country: 600 km
Grade: 30°
Trench Crossing: 2.0 m
Step: ?? cm
Fording Depth: 120 cm
Ground Clearance: 35 cm
Power Ratio: 19.1 HP/ton
Turning Circle: 14.5 m

Automotive Components:

Chassis: Buessing NAG 8RadTP
Motor: Tatra 12 cylinder
air cooled
14.825 liter diesel
220 HP @ 2250 rpm
Transmission: 6 F, 6 R
1.Gear 7 km/hr
2.Gear 12 km/hr
3.Gear 20 km/hr
4.Gear 27 km/hr
5.Gear 49 km/hr
6.Gear 80 km/hr
Steering: All 8 wheels
Drive: All 8 wheels
Tires: Rubber 270-20
Suspension: Leaf springs



This Sd.Kfz.234/1, captured in Northwest Europe, had four stowage bins along the side (TTM)

schwerer Panzerspahwagen (7.5 cm)
(Sd.Kfz.234/3)
Fgst.Nr.Serie 5101-

Weapons Data:

In Hull: 1 - 7.5 cm K51 (L/24)
 1 - 7.92 mm M.G.42
 Elevation: -10°, +16°
 Traverse: 20° R, 20° L
 Gun Sight: Sfl.Z.F.1b (5x 8°)
 Graduated to: 2200 meters for Sprgr.

Secondary: 1 - 9 mm M.P.

Ammunition: 50 - 7.5 cm
 1950 - 7.92 mm
 192 - 9 mm

Crew: Commander
 Gunner
 Loader
 Driver

Communication: Fu.Spr.Ger."f"

Measurements:

Length, overall: 5.86 m
 Width, overall: 2.33 m
 Height, overall: 2.213 m
 Firing Height: ?? m
 Wheel Base: 1.95 m
 Axle Spacing: 1.30/1.40/1.30 m
 Combat Loaded: 11.5 metric tons
 Fuel Capacity: 360 Liters

Armor:

Sloped to prevent penetration by S.m.K.
 (7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 80 km/hr
 Avg. Road Speed: ?? km/hr
 Cross Country: ?? km/hr
 Range on Road: 1000 km
 Cross Country: 600 km
 Grade: 30°
 Trench Crossing: 2.0 m
 Step: ?? cm
 Fording Depth: 120 cm
 Ground Clearance: 35 cm
 Power Ratio: 19.1 HP/ton
 Turning Circle: 14.5 m

Automotive Components:

Chassis: Buessing NAG 8RadTP
 Motor: Tatra 12 cylinder
 air cooled
 14.825 liter diesel
 220 HP @ 2250 rpm

Transmission:

6 F, 6 R
 1.Gear 7 km/hr
 2.Gear 12 km/hr
 3.Gear 20 km/hr
 4.Gear 27 km/hr
 5.Gear 49 km/hr
 6.Gear 80 km/hr

Steering: All 8 wheels
 Drive: All 8 wheels
 Tires: Rubber 270-20
 Suspension: Leaf springs

Light:
 Sd.Kfz.234/3 being
 used to train drivers in
 the Fall of 1944.
 (VJS)



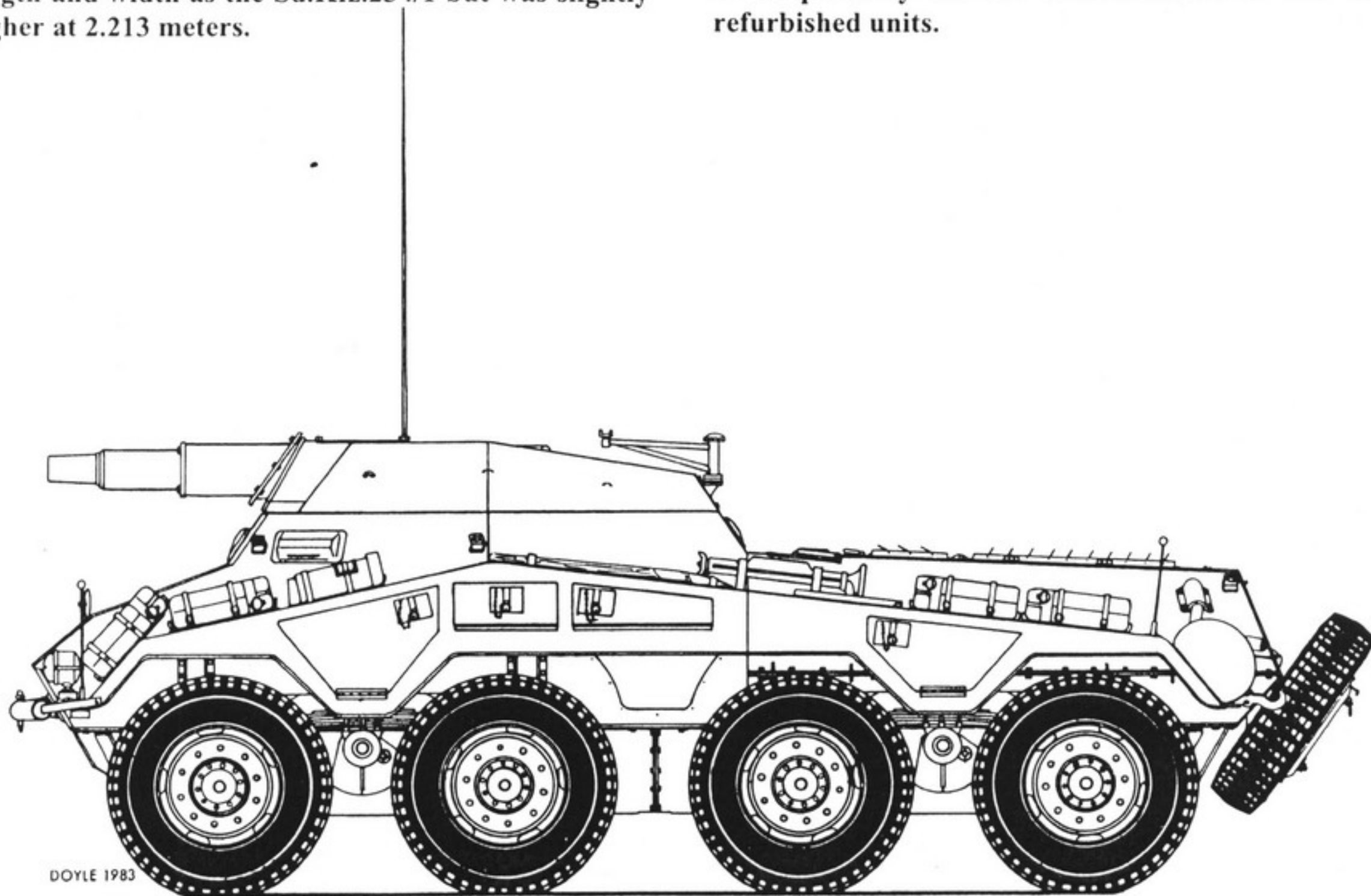
Schwerer Panzerspaehwagen (7.5 cm) (Sd.Kfz.234/3) Fgst.Nr. Serie 5101 -

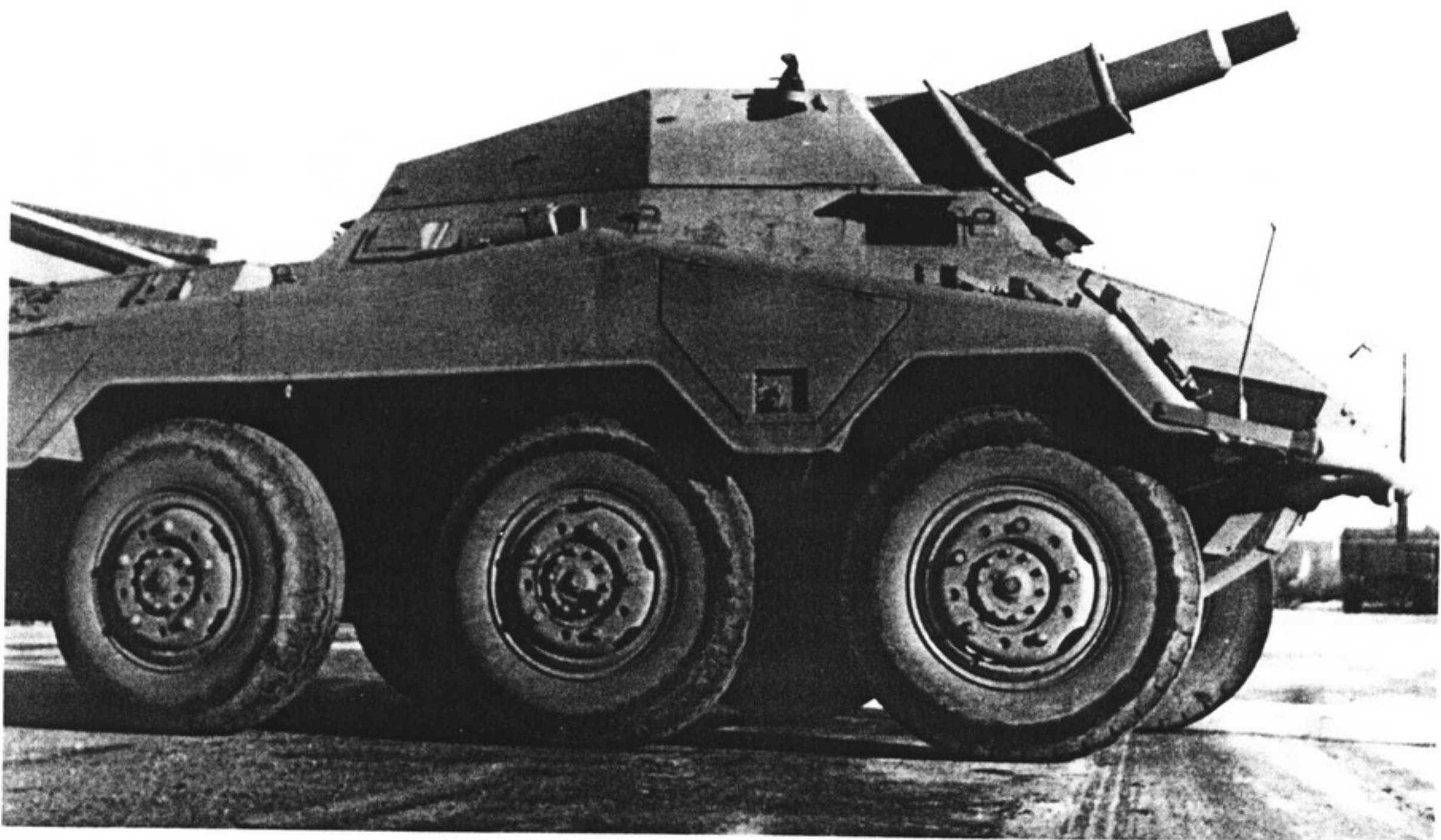
The 7.5 cm Kanone 37 on the Sd.Kfz.233 had proven to be successful in its role as a close support weapon escorting other armored cars. This design was then upgraded to create the new standardized 7.5 cm Kanone 51 (L/24) to be mounted on both the Sd.Kfz.234 and Sd.Kfz.251. Alongside the 7.5 cm Kanone 51, a M.G.42 was mounted for anti-aircraft defense of the Sd.Kfz.234/3. Only a low 14.5-mm-thick shield was mounted around the open-top fighting compartment. Traverse was limited to an arc of 20 degrees left and 20 degrees right, elevation to an arc of -10 to +16 degrees. An Sfl.Z.F.1b periscopic sight was graduated in 200 meter increments out to a range of 2200 meters for 7.5 cm shells and out to 1000 meters for the machinegun. Stowage was provided for 50 rounds of 7.5 cm, 1950 rounds of 7.92 mm, and 192 rounds of 9 mm ammunition.

A speaking tube was provided for internal and a Funksprechgeraet "F" radio set for external communication. Still manned by a crew of four, the Sd.Kfz.234/3 weighed the same and had the same length and width as the Sd.Kfz.234/1 but was slightly higher at 2.213 meters.

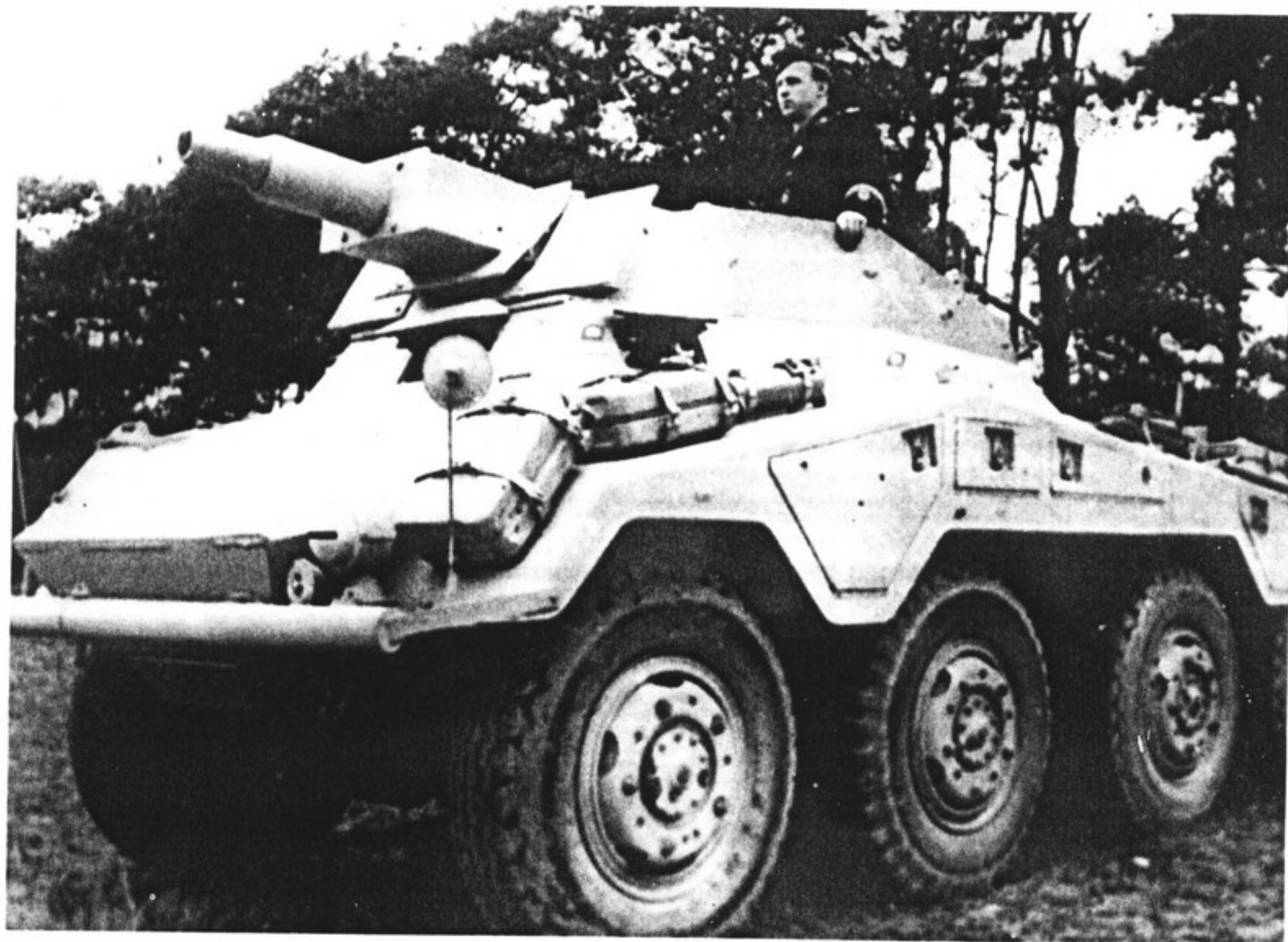
On 3 November 1943, WaJRue announced that starting in April, 50 percent were to be completed with the 2 cm Kw.K.38 as the Sd.Kfz.234/1 and 50 percent with the 7.5 cm K51 as the Sd.Kfz.234/3. By March 1944, a decision had been made to change the production ratio to 13 Sd.Kfz.234/1 for each 3 Sd.Kfz.234/3. Further delays had driven the start of deliveries of the Sd.Kfz.234/1 and Sd.Kfz.234/3 back to June 1944. Again in October 1944 the production ratio was changed to 9 Sd.Kfz.234/1 for each 7 Sd.Kfz.234/3. After completion of about 90 Sd.Kfz.234/3 with the 7.5 cm K51, production was abruptly halted in December 1944. Their chassis were then used to mount the 7.5 cm Pak40 as the Sd.Kfz.234/4.

Starting in June 1944, as authorized to fill K.St.N.1109 (f.G.) dated 1 April 1944, three s.Pz.Sp.Wg. (7.5 cm) (Sd.Kfz.234/3) were issued to the Stab und Stabskompanie of the Panzer-Auklaerungs-Abteilung in eight Panzer-Divisions. The rest of the Sd.Kfz.234/3 were issued piecemeal as replacements or to partially fill the establishment of new and refurbished units.





Above: A Sd.Kfz.234/3 with only two side stowage bins completed in the Fall of 1944 (RN)
Below: A Sd.Kfz.234/3 with four side stowage bins on display at a demonstration in 1944 (WJS)



Schwerer Panzerspähwagen (7.5 cm Pak 40)

(Sd.Kfz.234/4)

Fgst.Nr. Serie 5101 -

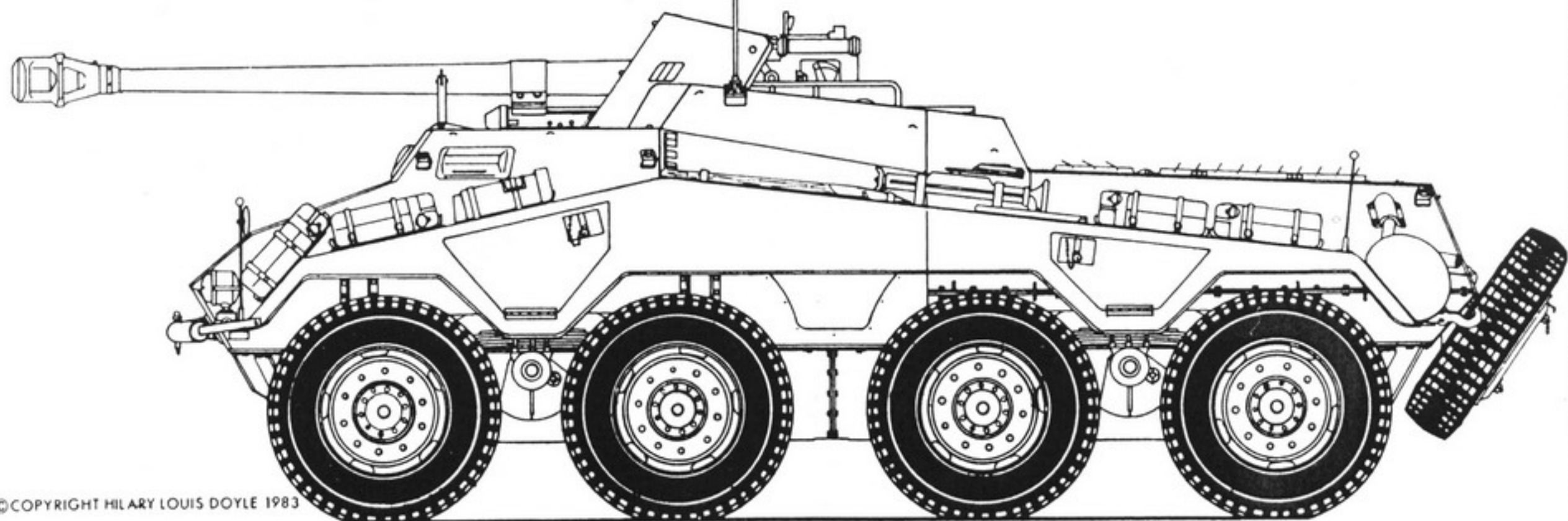
The first mention of a proposal to mount a long 7.5 cm on the Sd.Kfz.234 was found in the notes of the Generalinspekteur der Panzertruppen on a meeting with Hitler on 28 October 1944: Installing the 7.5 L/48 in the m.SPW (Sd.Kfz.251) and 8-Rad (Tp) (Sd.Kfz.234) brings with it a significant increase in the load on the vehicle. It is doubtful that the vehicle can carry such an increase in weight. Thorough testing in troop trials must proceed its acceptance. The advantage of the same type of ammunition will not be underrated.

By 9 November 1944, Buessing-NAG had created a drawing for mounting the 7.5 cm Pak 40 L/46 on the Sd.Kfz.234 chassis.

Further advances in mounting the long 7.5 were recorded during Speer's conference with Hitler on 27 November 1944. Hitler ordered that development of the Pak 40 on the 8-Radwagen be accelerated so that, if possible, the new armament could be mounted during the December production run. During a conference on 28/29 November 1944, Hitler again emphasized that he laid decisive value on the immediate start of series production of the Pak 40 on the 3-ton SPW and the 8-Rad-SPW [sic]. Then on 5 December 1944, after having viewed the demonstration of new weapons and equipment, Hitler called the Panzer-Grenadierwagen with the Pak 40 and the 8-Radwagen with the Pak 40 one of the best technical solutions of this war.

Starting in December 1944, the 7.5 cm Pak 40 was mounted on Sd.Kfz.234 chassis which had originally been prepared for mounting the 7.5 cm Kanone 51. A girder frame with side plates formed the base for mounting a modified Pak 40 carriage at the front of the open crew compartment. Traverse was limited to about 20 degrees left and 20 degrees right, elevation to about -5 to +22 degrees. The lower outer edges of the gun shield were cut out to prevent fouling the vehicle during its limited traverse. Armor protection was provided by the normal doubled 4 mm spaced armor on the original Pak 40 gun shield and the 14.5-mm-thick shield mounted around the open-top fighting compartment. The gunner aimed the Pak 40 with the normal Pak-Zielfernrohr (3x magnification, 8 degree field of view) telescopic sight with Pak-Zieleinrichtung 38A graduated to 3000 meters for Pzgr.39 armor-piercing shells and 5200 meters for Sprgr.34 high-explosive shells. Stowage racks for 36 rounds of 7.5 cm ammunition were installed below and to the lower right of the gun.

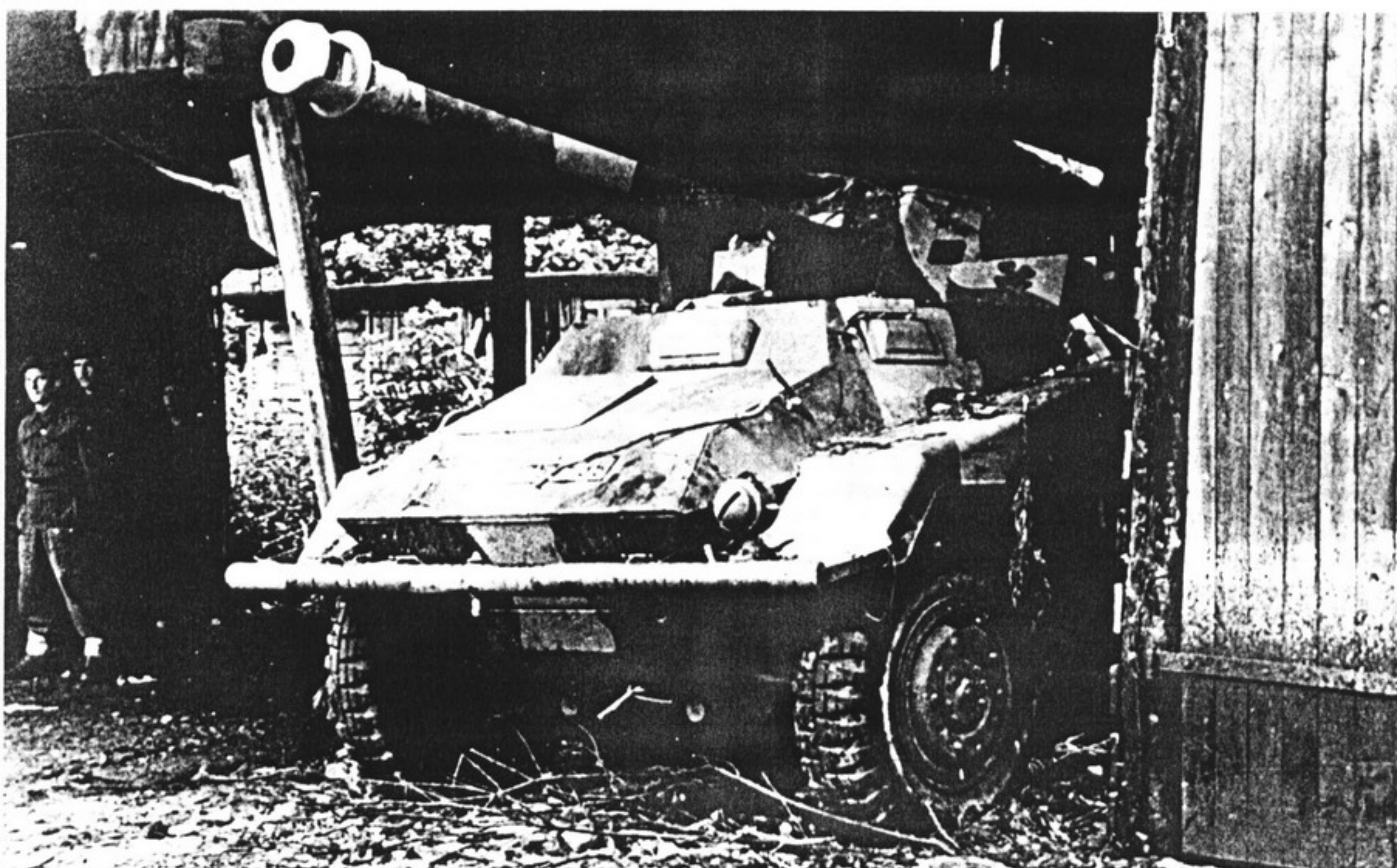
About 90 Sd.Kfz.234/4 were completed from December 1944 to April 1945. These Sd.Kfz.234/3 were issued piecemeal as replacements or to partially fill the establishment of new and refurbished units. Seven Sd.Kfz.234/4 per unit were authorized by K.St.N.1162f(f.G.) dated 1 April 1945, but this document was issued too late in the war to be implemented.



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Above: A Sd.Kfz.234/4 with camouflage paint only partially covering the base coat of red primer (RN)
Below: This Sd.Kfz.234/4 was captured in Germany by British forces in 1945 (TTM)



schwerer Panzerspaehwagen (7.5 cm Pak 40)
(Sd.Kfz.234/4)
Fgst.Nr.Serie 5101-

Weapons Data:

In Hull: 1 - 7.5 cm Pak 40
 Elevation: -5°, +22°
 Traverse: 20° R, 20° L
 Gun Sight: Pak-Z.F. (3x 8°)
 Graduated to: 3000 meters for Pzgr.39
 5200 meters for Sprgr.34

Secondary: 1 - 9 mm M.P.

Ammunition: 36 - 7.5 cm
 192 - 9 mm

Crew: Commander
 Gunner
 Loader
 Driver

Communication: Fu.Spr.Ger."f"

Measurements:

Length, overall: ?? m
 Length, w/o gun: 5.86 m
 Width, overall: 2.33 m
 Height, overall: 2.38 m
 Firing Height: ?? m
 Wheel Base: 1.95 m
 Axle Spacing: 1.30/1.40/1.30 m
 Combat Loaded: ~12 metric tons
 Fuel Capacity: 360 Liters

Armor:

Sloped to prevent penetration by S.m.K.
 (7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

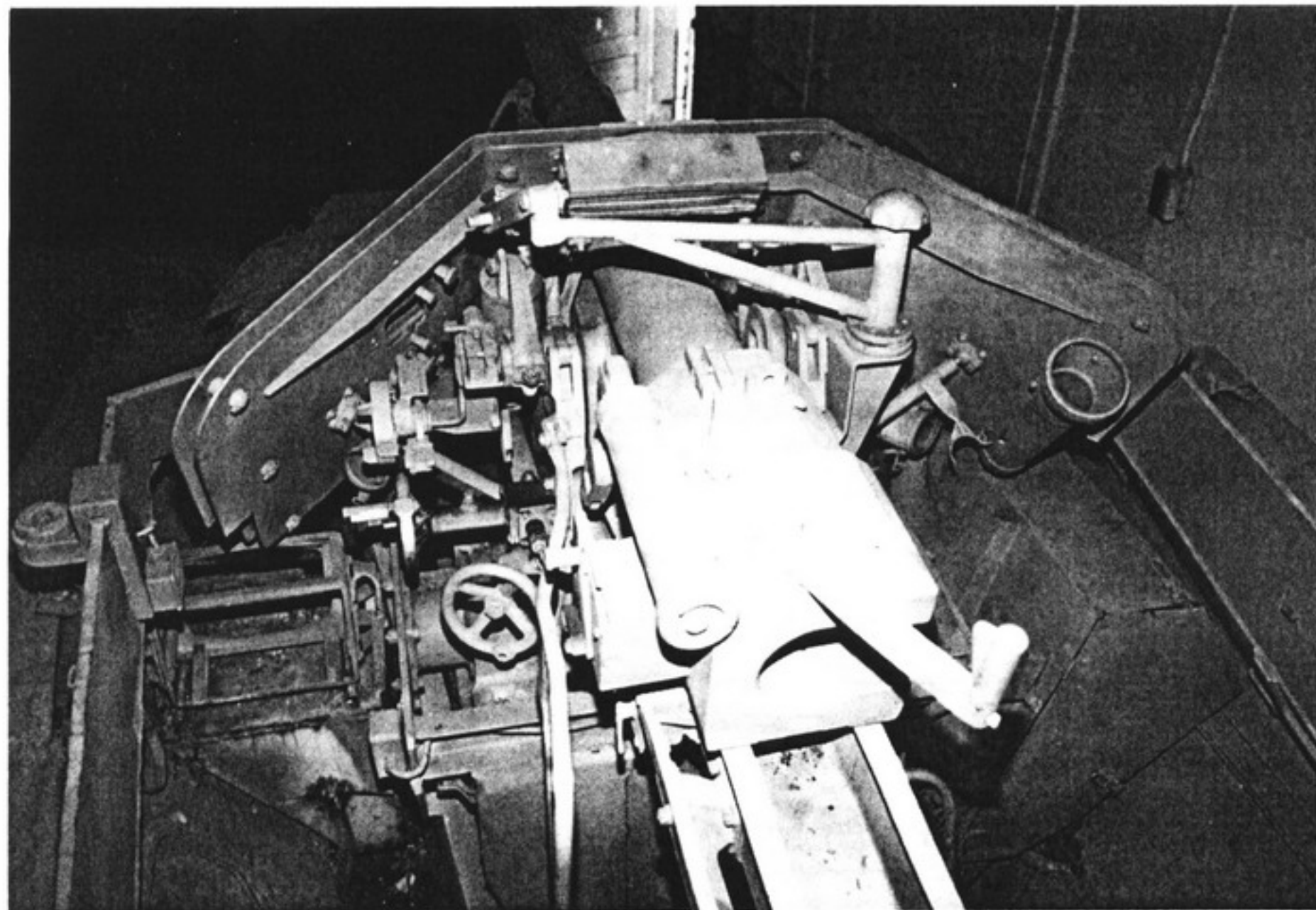
Maximum Speed: 80 km/hr
 Avg. Road Speed: ?? km/hr
 Cross Country: ?? km/hr
 Range on Road: 1000 km
 Cross Country: 600 km
 Grade: 30°
 Trench Crossing: 2.0 m
 Step: ?? cm
 Fording Depth: 120 cm
 Ground Clearance: 35 cm
 Power Ratio: 18.3 HP/ton
 Turning Circle: 14.5 m

Automotive Components:

Chassis: Buessing NAG 8RadTP
 Motor: Tatra 12 cylinder
 air cooled
 14.825 liter diesel
 220 HP @ 2250 rpm

Transmission: 6 F, 6 R
 1.Gear 7 km/hr
 2.Gear 12 km/hr
 3.Gear 20 km/hr
 4.Gear 27 km/hr
 5.Gear 49 km/hr
 6.Gear 80 km/hr

Steering: All 8 wheels
 Drive: All 8 wheels
 Tires: Rubber 270-20
 Suspension: Leaf springs



Left:
 The 7.5 cm Pak 40
 mounted on the
 Sd.Kfz.234/4 at the
 Patton Museum
 (JM)

**schwerer gelandegaengiger gepanzerter Personenkraftwagen
(Sd.Kfz.247) (6 Rad)**

Weapons Data: None Mounted

Secondary: 1 - 9 mm M.P.

Ammunition: 192 - 9 mm

Crew: Driver
5 Passengers

Communication: No radio sets

Measurements:

Length, overall: 5.20 m
Width, overall: 1.96 m
Height, overall: 1.70 m
Wheel Base: 1.58 m F, 1.565 R
Axle Spacing: 2.445/0.900 m
Combat Loaded: 5.2 metric tons
Fuel Capacity: 110 Liters

Armor:

Sloped to prevent penetration by S.m.K.
(7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 70 km/hr
Range on Road: 350 km
Cross Country: 220 km
Grade: 20°
Fording Depth: 60 cm
Ground Clearance: 22 cm
Power Ratio: 12.5 HP/ton
Turning Circle: 16 m

Automotive Components:

Chassis: Krupp L2H143
Motor: Krupp 4 cylinder
water-cooled
3.5 liter gasoline
65 HP @ 2500 rpm

Transmission:

	Road	C.C.
Reverse	11 km/hr	5.0 km/hr
1.Gear	14 km/hr	6.5 km/hr
2.Gear	27 km/hr	12 km/hr
3.Gear	47 km/hr	21 km/hr
4.Gear	70 km/hr	31 km/hr

Steering: 2 front wheels

Drive: 4 rear wheels

Tires: Rubber 7.50-17 extra

Suspension: Leaf springs front,
coil springs shared by
rear axles

**schwerer gelandegaengiger gepanzerter Personenkraftwagen
(Sd.Kfz.247) (4 Rad)**

Fgst.Nr.Serie 140001-140058

Weapons Data: None Mounted

Secondary: 1 - 9 mm M.P.

Ammunition: 192 - 9 mm

Crew: Driver
5 Passengers

Communication: No radio sets

Measurements:

Length, overall: 5.00 m
Width, overall: 2.00 m
Height, overall: 1.80 m
Wheel Base: 1.646 m
Axle Spacing: 3.00 m
Combat Loaded: 4.46 metric tons
Fuel Capacity: 160 Liters

Armor:

Sloped to prevent penetration by S.m.K.
(7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 80 km/hr
Range on Road: 400 km
Cross Country: 270 km
Grade: 21°
Trench Crossing: 1 m
Step: 25 cm
Fording Depth: 60 cm
Ground Clearance: 23 cm
Power Ratio: 18.1 HP/ton
Turning Circle: 13.5 m dia

Automotive Components:

Chassis: Einheitsfahrgestell II
f. s.Pkw. Typ 1c
Motor: Horch V-8 cylinder
water cooled
3.823 liter gasoline
81 HP @ 3600 rpm

Transmission: 5 F, 1 R

Steering: 2 front wheels

Drive: All 4 wheels

Tires: Rubber 210-18 gel.

Suspension: 2 coil springs & 2 shock
absorbers per wheel

schwerer gelandegaengiger gepanzerter Personenkraftwagen (6 Rad) & (4 Rad) (Sd.Kfz.247)

The first s.gl.gp.Pkw. (heavy cross-country armored staff cars) were assembled using a Krupp L2H143 chassis which had been specifically designed for the army as an off-road vehicle. However, as with all of these 4 and 6 wheel armored vehicles, its obstacle-crossing ability was very limited. Drivers were advised to stay on roads and trails. A 65 horsepower Krupp 4-cylinder engine was used to propel this 5.2 metric ton vehicle at a maximum speed of 70 km/hr.

The armor protection was designed to prevent penetration by 7.92 mm S.m.K. (AP bullets) fired at ranges over 30 meters.

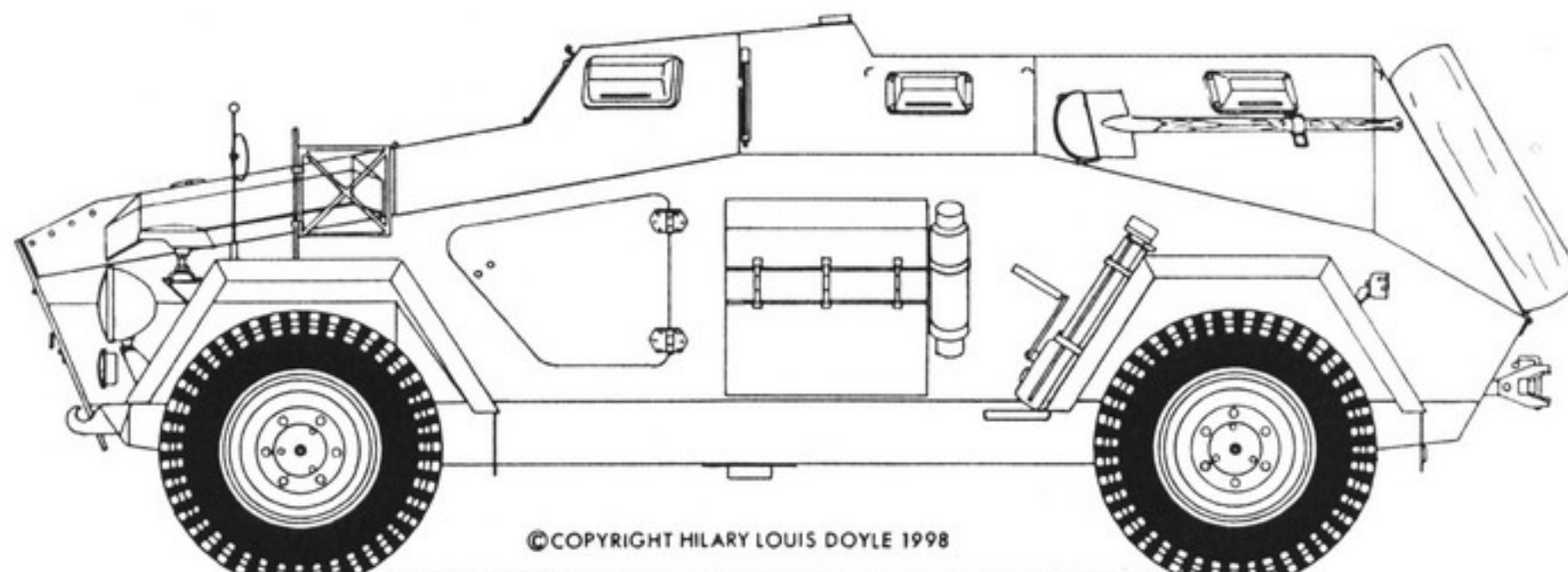
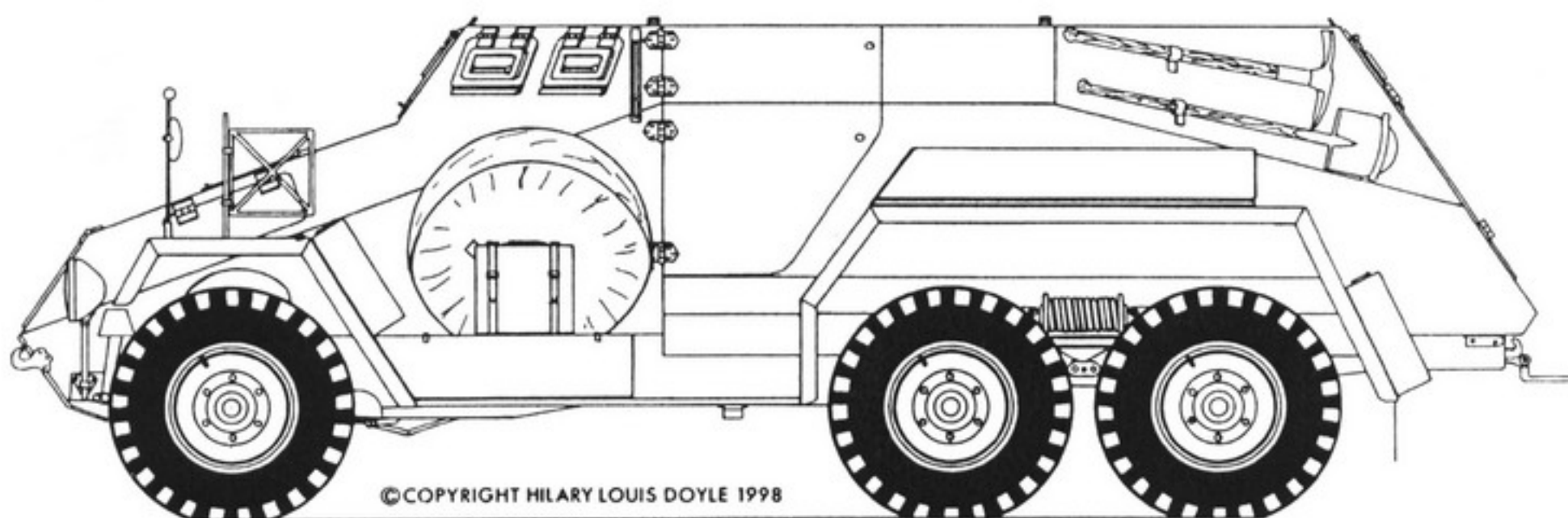
Five passengers were seated along with the driver in the armored staff car. There weren't any mounted weapons; only a submachinegun was carried. In addition, no radio sets were mounted. Communication on the move was primarily conducted with hand and flag signals.

A total of 10 s.gl.gp.Pkw. (6 rad) (Sd.Kfz.247) had been produced by 1 January 1938. One was to be assigned to each Aufklaerungs-Abteilung and Regiment Stab (headquarters).

An additional 58 armored staff cars were ordered in 1938 to provide one to each Pz.Sp.Kp. (armored car company). These were to have an Einheitsfahrgestell (standard chassis) with four-wheel drive. Delivery was to begin in October 1939 but was initially delayed due to difficulties encountered in designing the chassis. Instead of sharing the same standard chassis as the other four-wheel armored cars, it was built on an Einheitsfahrgestell II fuer s.Pkw. Typ Ic with two-wheel steering.

Like its predecessor, this armored staff car seated six (including the driver), did not have any mounted armament or radio set, and the armor protection was designed to prevent penetration by 7.92 mm S.m.K. (AP bullets).

Following further delays, the 58 were completed at Daimler-Benz from July 1941 to January 1942. K.St.N.1162 for a Pz.Sp.Kp. dated November 1941 no longer called for a Sd.Kfz.247 and the 58 were assigned to headquarters of Aufklaerungs-Abteilung and Kradschuetzen-Bataillon in accordance with K.St.N.1109.

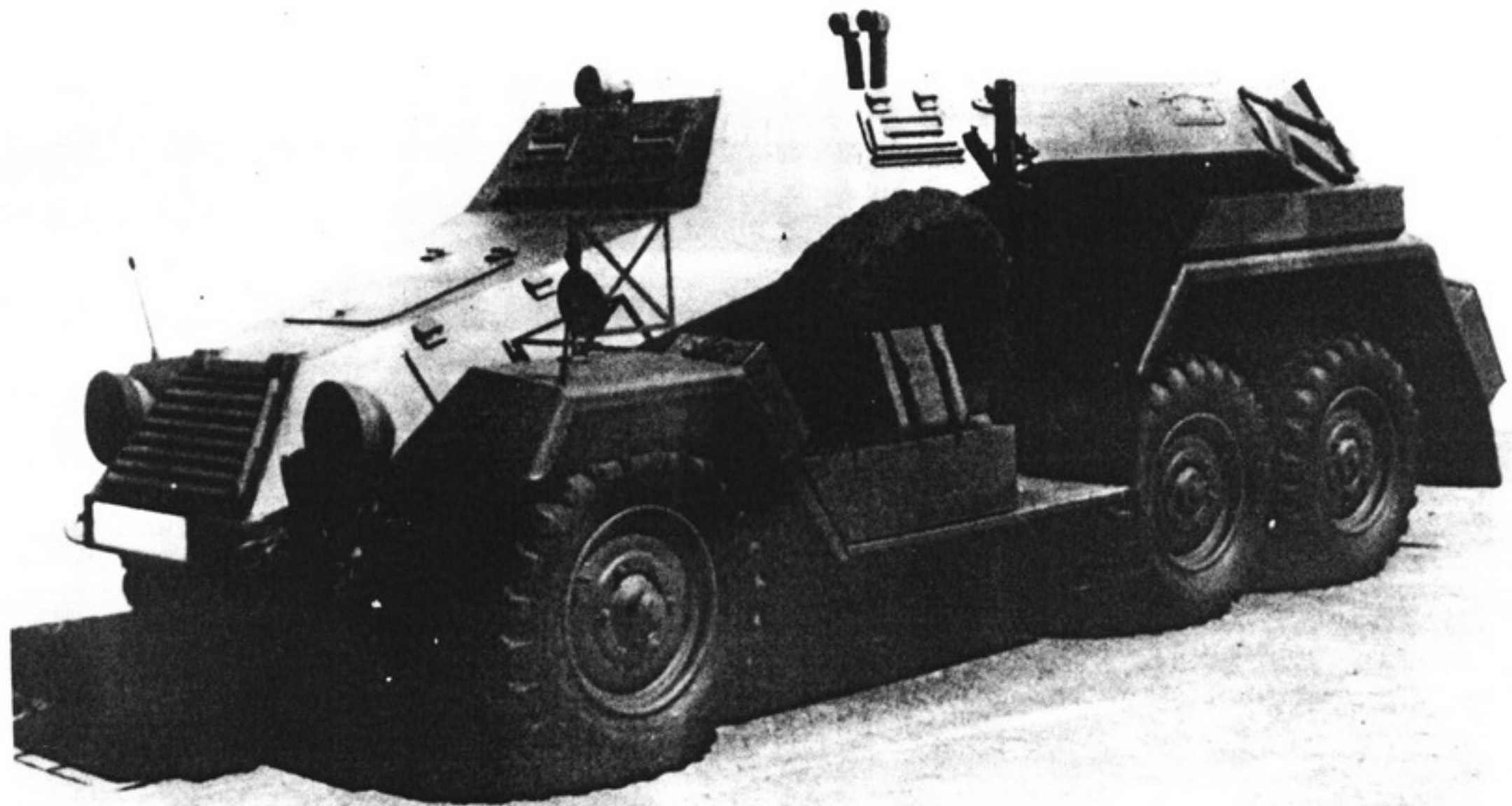




Above: A s.gl.gp.Pkw. (6 Räd) (Sd.Kfz.247) with the I.Abt./Aufkl.Rgt.6 of the 1.le.Brig. in 1938 (GF)

Right:
This 6-wheel armored
staff car was built on a
Krupp L2H143 chassis
(GF)





Above:
Fake visors are painted on the side of
this s.gl.gp.Pkw. (Sd.Kfz.247) (6 Rad)
(NA)



Left:
A s.gl.gp.Pkw. (Sd.Kfz.247) (4 Rad)
with the Kradschuetzen-Bataillon
(motorcycle infantry battalion) of
"Grossdeutschland" in the Summer
of 1942.
(WJS)



Left:
A s.gl.gp.Pkw.
(Sd.Kfz.247) (4 Rad)
loaded with extra horns
(RN)



Right:
The 4-wheel version of the
Sd.Kfz.247 armored staff car,
assembled by Daimler-Benz on
a standard chassis, had a crew
hatch on the right side.
(KHM)

Kleiner Panzerfunkwagen (Sd.Kfz.260 & 261)

Ausf.A und B

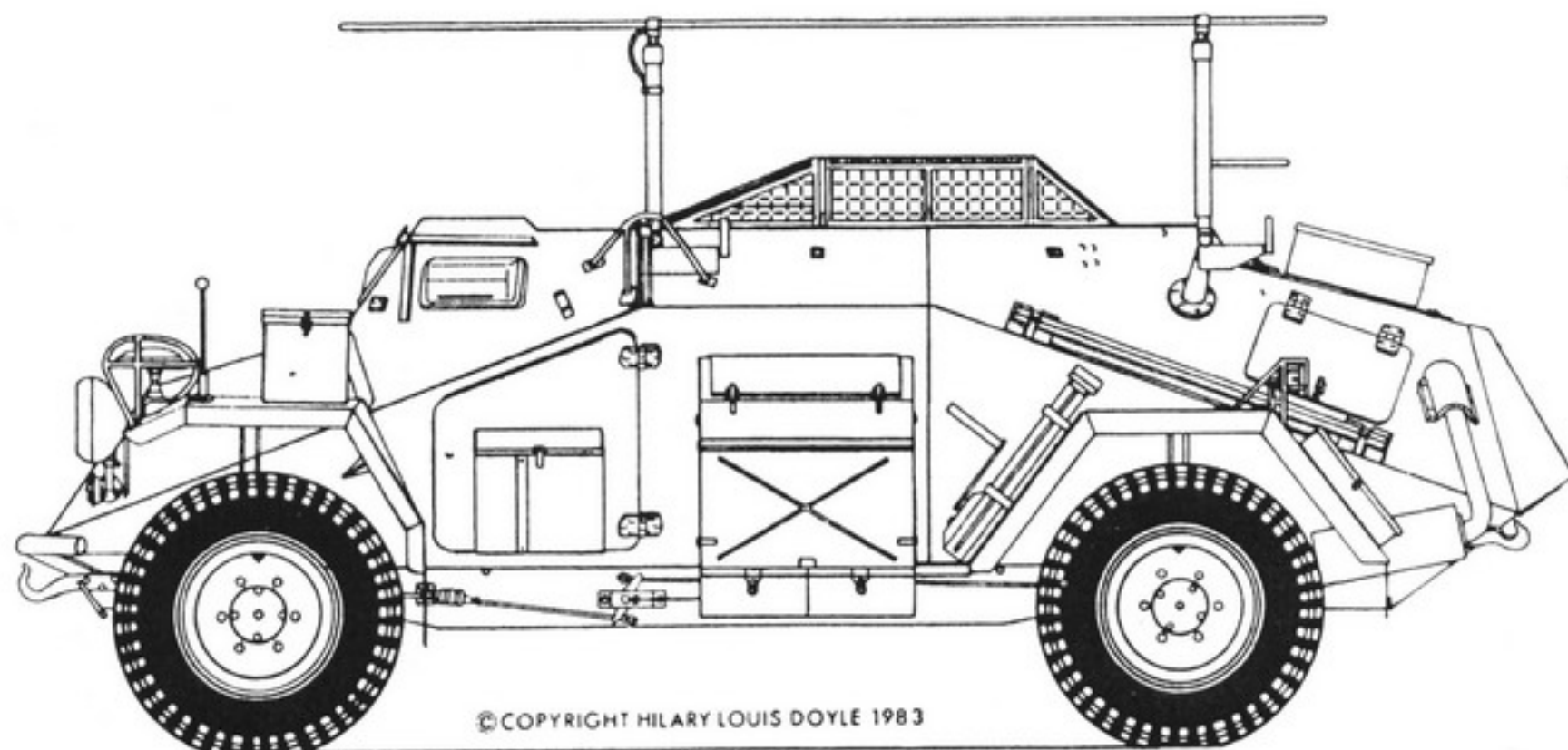
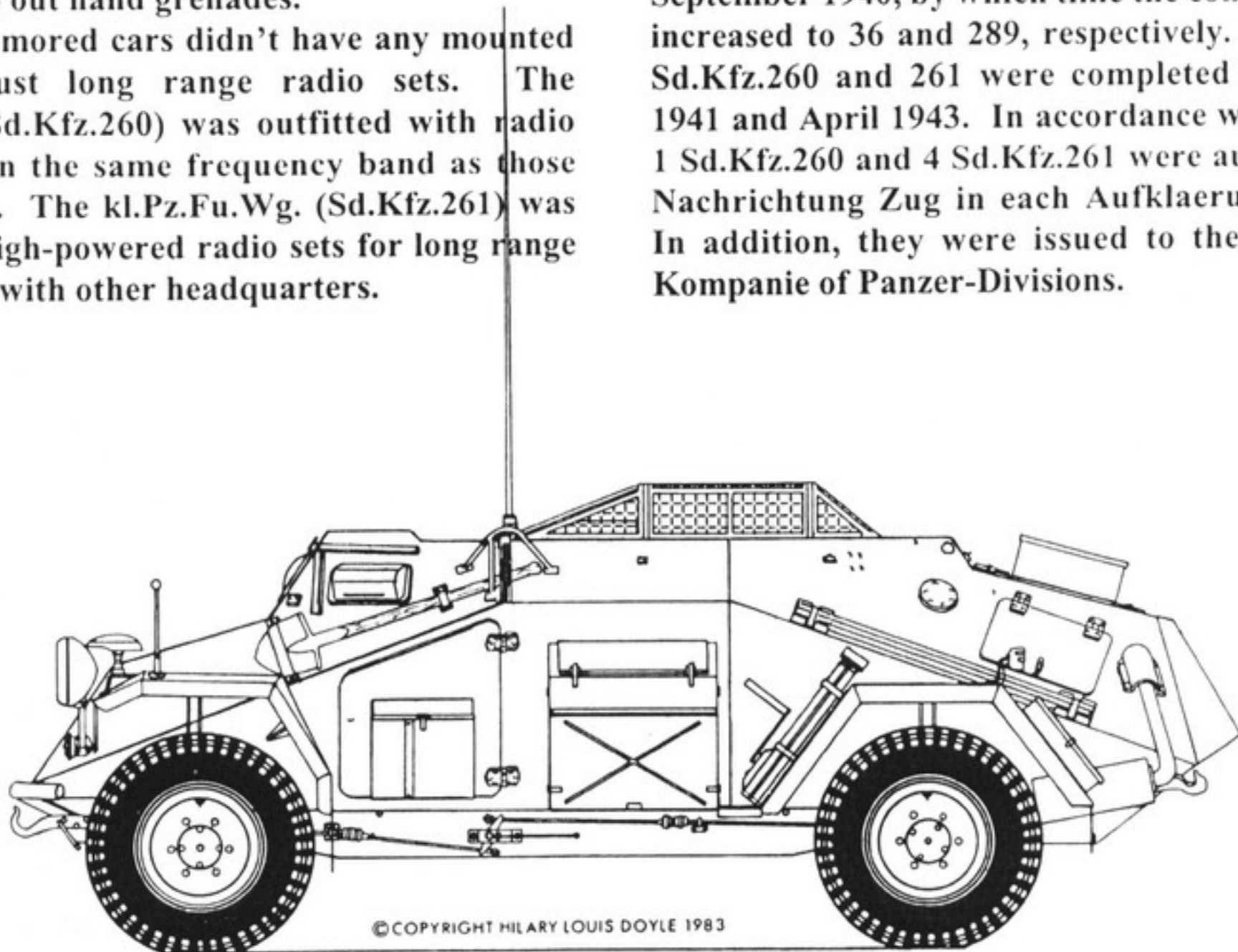
Fgst.Nr. Serie 810818 - 8101414 & 8110001 - 8111000

The Sd.Kfz.260 and 261 were the fourth and fifth types of armored cars produced on the Einheits-fahrgestell I f. s.Pkw. (standard chassis for heavy passenger cars). Like their predecessors the Sd.Kfz. 221, 222, 223, they had 4-wheel steering, 4-wheel drive, and armor designed to prevent penetration by 7.92 mm S.m.K. (AP bullets). Screens on top were intended to keep out hand grenades.

These armored cars didn't have any mounted armament - just long range radio sets. The kl.Pz.Fu.Wg. (Sd.Kfz.260) was outfitted with radio sets operating in the same frequency band as those used in aircraft. The kl.Pz.Fu.Wg. (Sd.Kfz.261) was outfitted with high-powered radio sets for long range communication with other headquarters.

The Ausf.A had a Horch 801 chassis with a 75 horsepower engine, and the Ausf.B had a Typ v chassis with a 90 horsepower engine.

A total of 22 Sd.Kfz.260 and 145 Sd.Kfz.261 had been ordered for delivery starting in 1937. Due to priorities for production of other armored vehicles, only two trial vehicles had been produced by 1 September 1940, by which time the contracts had been increased to 36 and 289, respectively. A total of 483 Sd.Kfz.260 and 261 were completed between April 1941 and April 1943. In accordance with the K.St.N., 1 Sd.Kfz.260 and 4 Sd.Kfz.261 were authorized in the Nachrichtung Zug in each Aufklaerungs-Abteilung. In addition, they were issued to the Panzer-Funk-Kompanie of Panzer-Divisions.





Above:
This kl.Pz.Fu.Wg. (Sd.Kfz.260)
Ausf.A was completed as a trial
vehicle by April 1940
(NA)



Right:
A kl.Pz.Fu.Wg. (Sd.Kfz.261)
Ausf.B with a stronger
90 horsepower engine
(BA 206/1868/19)

**kleiner Panzerfunkwagen
(Sd.Kfz.260) & (Sd.Kfz.261)
Fgst.Nr.Serie 810818-8101414 & 8110001-8111000**

Weapons Data: None mounted

Secondary: 1 - 9 mm M.P.38

Ammunition: 192 - 9 mm

Crew: Commander
2 Radio Operators
Driver

Communication:

Sd.Kfz.260: kl.Pz.Fu.Tr.c with
Fu 7 SE 20 &
Fu.Spr.Ger."a"

Sd.Kfz.261: kl.Pz.Fu.Tr.d with
Fu 10 SE 30 &
Fu.Spr.Ger."a"
(Fu 12 SE 80)

Measurements:

Length, overall: 4.83 m (4.80)

Width, overall: 1.99 m (1.95)

Height, overall: 1.78 m (1.75)

Wheel Base: 1.61 m

Axle Spacing: 2.80 m

Combat Loaded: 4.3 tons (4.4)

Fuel Capacity: 100 Liters

Armor:
Sloped to prevent penetration by S.m.K.
(7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 75 km/hr (85*)

Avg. Road Speed: 45 km/hr

Range on Road: 320 km

Cross Country: 200 km

Grade: 22°

Step: 25 cm

Fording Depth: 60 cm

Ground Clearance: 24 cm (25.5*)

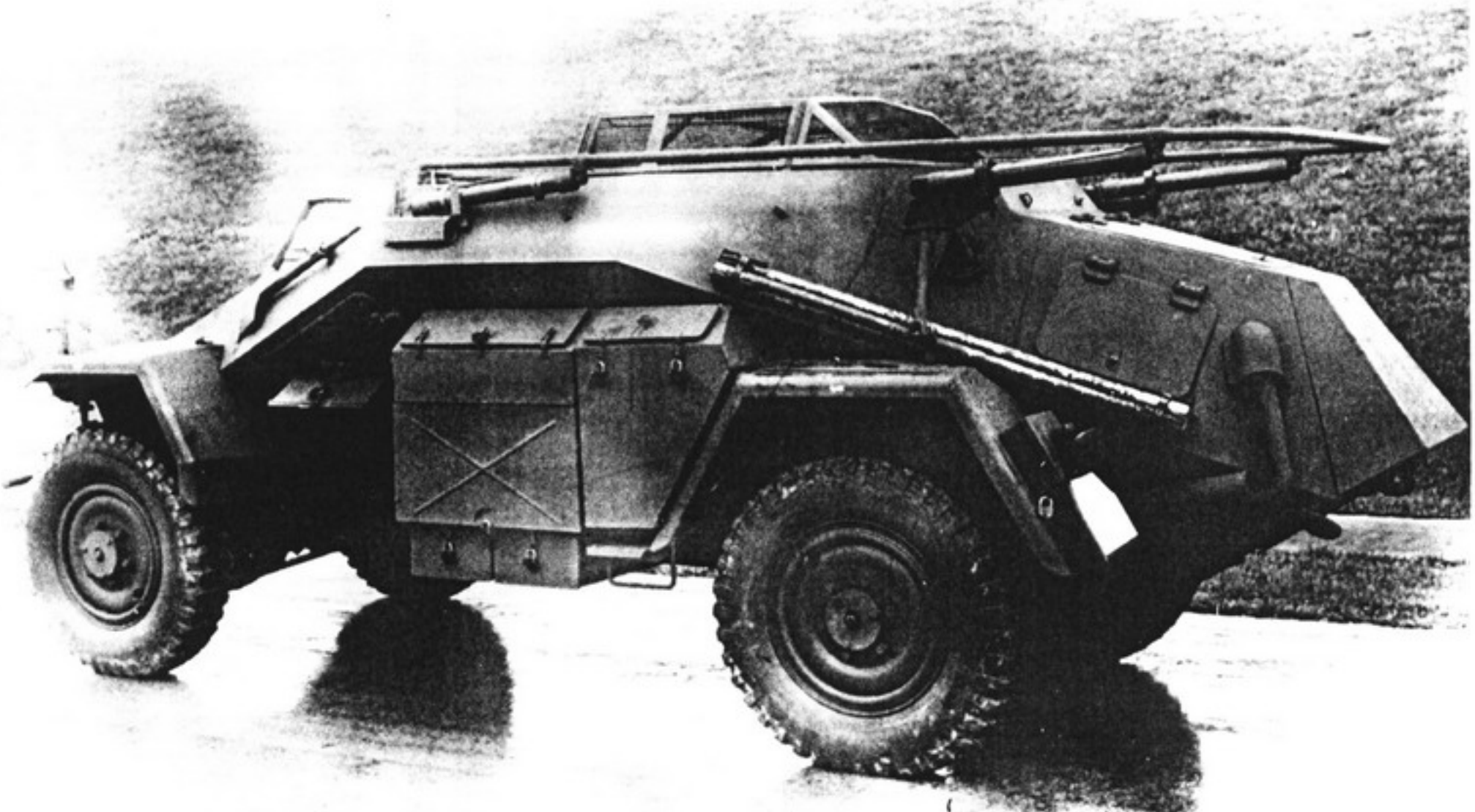
Power Ratio: 17.6 HP/ton (20.6)

Turning Circle: 10 m dia. (9.5*)

Automotive Components:

Chassis: Einheitsfahrgestell I f.s.Pkw.

	<u>Horch 801</u>	<u>Typ v*</u>
Motor:	Horch V-8 cylinder	
	water cooled =	
	3.517 liter	3.823
	gasoline =	
	75 HP	90 HP
	@ 3600 rpm =	
Transmission:	5 F, 1 R	=
	Reverse	15 km/hr 12 km/hr
	C.C.Gear	13 km/hr 12 km/hr
	1.Gear	20 km/hr 21 km/hr
	2.Gear	34 km/hr 32 km/hr
	3.Gear	54 km/hr 54 km/hr
	4.Gear	80 km/hr 90 km/hr
Steering:	4-wheel (or 2)	
Drive:	4-wheel	
Tires:	Rubber 210-18 gel.	
Suspension:	2 coil springs & 2 shock absorbers per wheel	

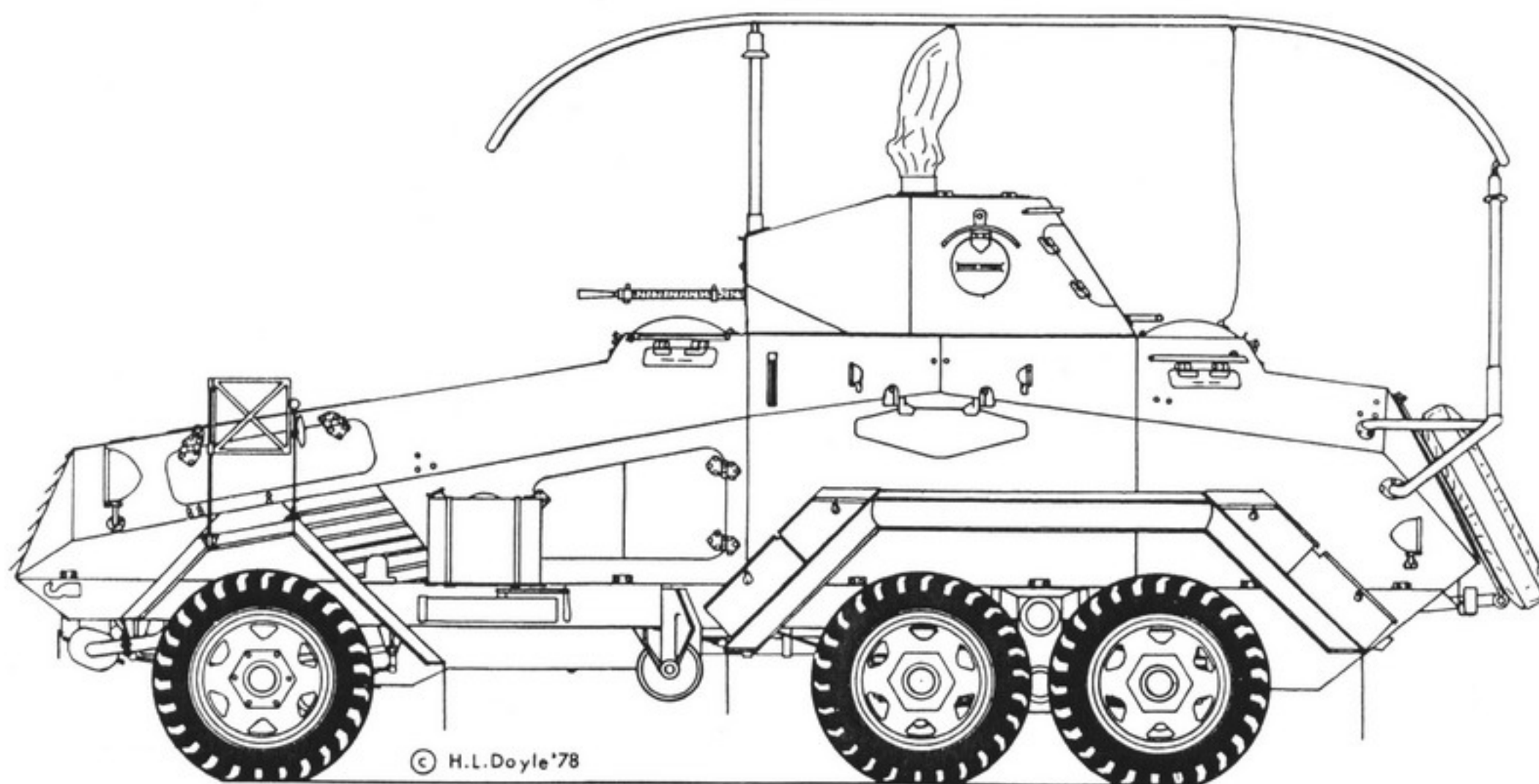


A Sd.Kfz.261 Ausf.B with frame antenna and anti-grenade screen (NA)

Panzerfunkwagen (Sd.Kfz.263) (6 Rad) formerly Kfz.67b

On 29 November 1935, In 6 determined the armored equipment that would be needed to outfit the Panzer-Divisions-Nachrichten-Abteilung (signals battalion). A total of 12 Kfz.67b were to be created by modifying Kfz.67a. Only a vision port and a ball mount for an M.G.13 were let into the flat plate covering the face of the turret. Each Kfz.67b was

equipped with a 100 watt transmitter/receiver radio set, a frame antenna, and a telescoping mast for raising an antenna. The 6-wheel M206a chassis for these Kfz.67b were delivered by Magirus on 17 April 1936. (Refer to page 13-25 for technical details.) By May 1937, the Kfz.67b had been renamed Panzerfunkwagen (Sd.Kfz.263) (6 Rad).



Right:
One of the 12
Pz.Fu.Wg. (Sd.Kfz.263)
(6 Rad) produced on
Magirus M206a chassis.
(WJS)

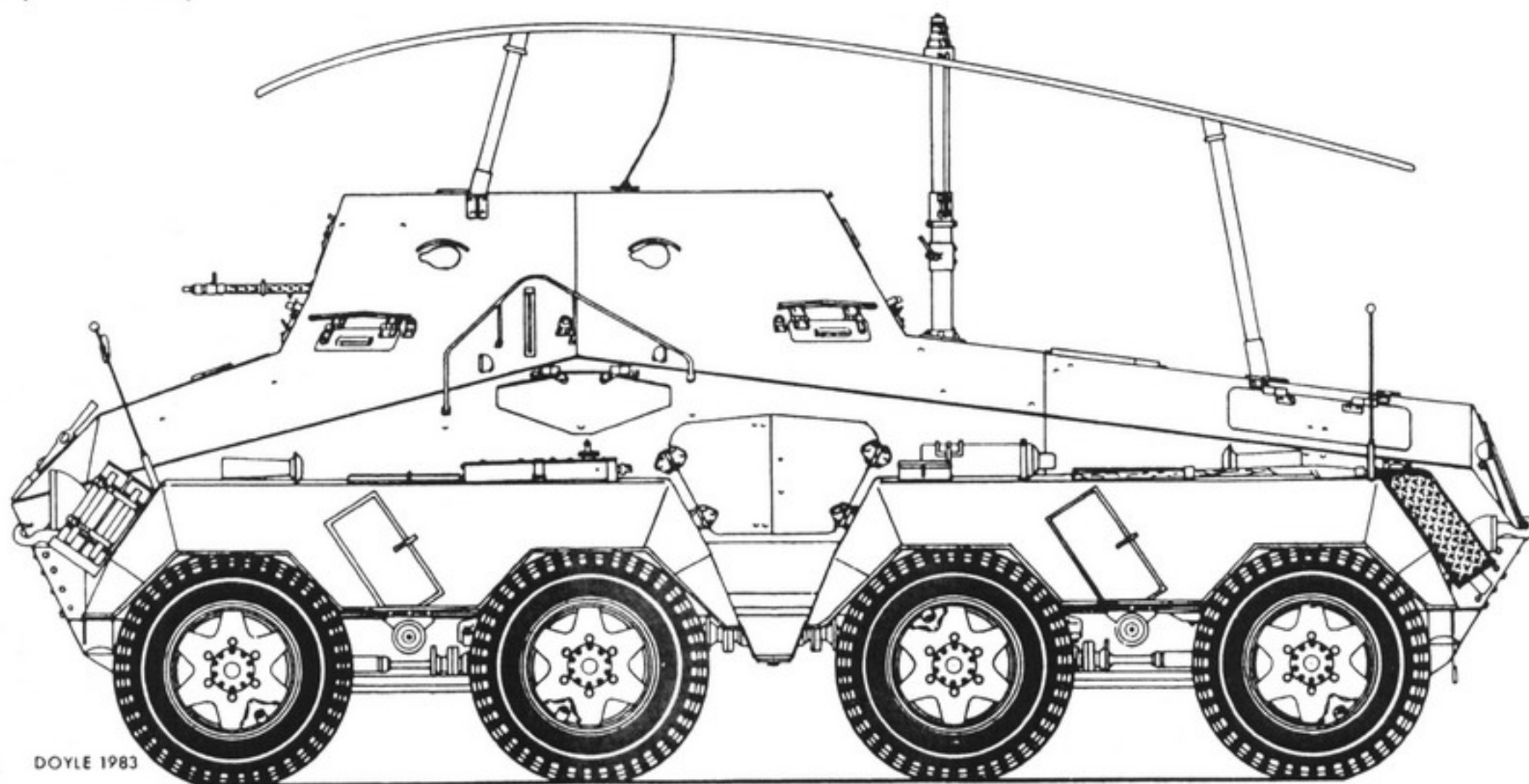


Panzerfunkwagen (Sd.Kfz.263) (8 Rad) Fgst.Nr. Serie 59902 - 87317

The 8-wheeled Buessing-NAG GS chassis was also utilized as the basis for a large Panzerfunkwagen. Instead of a turret, the sides of the superstructure were raised higher to create a larger crew compartment. It was equipped with a high-powered radio set with a large frame antenna mounted on the roof and a long telescoping mast mounted on the engine deck for long range communication. A single machinegun was located in a ball mount in the superstructure front. High-hardness 8 mm plates were used for most of the armor body to hold down weight while meeting the requirement of resisting penetration by 7.92 mm S.m.K. (AP bullets).

64 Sd.Kfz.263 had been ordered by May 1937, with 100 completed by the start of World War II. An additional 107 were completed from May 1941 to January 1943. The remainder of the Sd.Kfz.263 contract were converted into Sd.Kfz.233.

A single Sd.Kfz.263 was authorized for each Pz.Sp.Kp. in accordance with K.St.N.1162 dated 1936 to 1941. The single Sd.Kfz.263 authorized for the Nachrichten Zug of the Aufklaerungs-Abteilung in 1936 was increased to three in November 1941. Starting in October 1937, a total of six Sd.Kfz.263 were authorized for the Panzer-Funk-Kompanie in a Panzer-Division.



Left:
A Pz.Fu.Wg. (Sd.Kfz.263)
in service in 1940
named "Ilse-Anne"
(GF)



Right Above
and Below:
The two-tone
camouflage
pattern
Dunkelbraun
(dark brown)
patches on a
Bunkelgrau
(dark grey) base
can clearly be seen
on this Pz.Fu.Wg.
(Sd.Kfz.263),
assembled by
Deutsche Werke,
Kiel for a 1939
contract.
(WJS)

Panzerfunkwagen (8-Rad)
(Sd.Kfz.263)
Fgst.Nr.Serie 59902-87317

Weapons Data:

In Hull: 1 - 7.92 mm M.G.34
 Elevation: -??°, +??°
 Traverse: ??° R, ??° L

Secondary: 1 - 9 mm M.P.

Ammunition: 1050 - 7.92 mm S.m.K.
 (1100)
 192 - 9 mm

Crew:

Commander
 2 Radio Operators
 2 Drivers

Communication:

m.Pz.Fu.Tr.b with
 Fu 11 SE 100
 (m.Pz.Fu.Tr.a(mot))

Measurements:

Length, overall: 5.85 m
 Width, overall: 2.20 m
 Height, overall: 2.90 m
 Firing Height: 1.88 m
 Wheel Base: 1.60 m
 Axle Spacing: 1.35/1.40/1.35 m
 Combat Loaded: 8.10 tons (8.68)
 Fuel Capacity: 150 Liters

Armor:

Sloped to prevent penetration by S.m.K.
 (7.92 mm AP) fired at ranges over 30 m.

Automotive Capabilities:

Maximum Speed: 85 km/hr
 Range on Road: 300 km
 Cross Country: 170 km (150)
 Grade: 30°
 Trench Crossing: 1.80 m
 Step: 50 cm
 Fording Depth: 100 cm
 Ground Clearance: 27 cm
 Power Ratio: 19.1 HP/ton (20.7)
 Turning Circle: 10.5 m dia.

Automotive Components:

Chassis: Buessing NAG Typ GS
 Motor: Buessing NAG L8V/GS
 water cooled
 7.91 liter (8.363)
 gasoline
 155 HP (180)
 @ 3000 rpm

Transmission:

6 F, 6 R
 1.Gear 9.3 km/hr
 2.Gear 16.7 km/hr
 3.Gear 24.6 km/hr
 4.Gear 32.4 km/hr
 5.Gear 57.9 km/hr
 6.Gear 85.3 km/hr

Steering:

All 8 wheels
 Drive: All 8 wheels
 Tires: Rubber 210-18 gel.
 Suspension: Leaf springs



Two Sd.Kfz.263 with the 2.Pz.Fu.Kp./Nachr.Abt.39 of the 3.Pz.Div (WJS)

GLOSSARY OF GERMAN MILITARY TERMS

Aufklaerung	reconnaissance
Ausfuehrung	Ausf. - model designation
Einheit	standard
Entwicklung	development
Erkundung	Erk. - scouting
Fgst.	Fahrgestell - chassis
Fahrzeuge	vehicles
Funk	Fu. - radio
Funksprechgeraet	Fu.Spr.Ger. - radio set
Gelandegaengiger	gl. - cross-country
Gepanzerter	gep. - armored
Haengelafette	suspended mount
Heer	army
In 6	inspectorate for motorized and armored units
Kanone	gun
Kleine	small
Kradschuetzen	motorcycle infantry
Kraftwagen	Kw. - motor vehicle
Kraftfahrzeug	Kfz. - motor vehicle
Kw.K.	Kampfwagenkanone - tank gun
leichte	le. - light
Mannschaftstransportwagen	MTW - crew transport vehicle
Maschinenpistole	M.P. - submachine gun
Nachrichtung	Nachr. - signals
Pak	Panzerabwehrkanone - anti-tank gun
Panzergranate	Pzgr. - armor piercing shell
Panzer-Grenadier	armored infantry
Panzerspaehwagen	armored cars
Personenkraftwagen	Pkw. - car
Rad	wheel
Reiter	cavalry
Schuetzenpanzerwagen	SPW - armored infantry vehicle
Schwere	s. - heavy
Sd.Kfz.	special vehicle
Selbstfahrlafette	Sfl. - self-propelled carriage
Stab	headquarters
Sturmgeschuetz	Stu.G. - assault gun
StuK	assault gun
Sfl.Z.F.	periscopic gun sight
T.Z.F.	telescopic gun sight
Tropen	Tp. - hot climate
Versuchskraftfahrzeug	Vskfz. - experimental vehicle
Waffenamt	ordnance department
Wa J Rue	ordnance production department
Wa Prw 6 & Wa Pruef 6	automotive design office under the Waffenamt
Zielfernrohr	telescopic gun sight
Zug	platoon
Zusatzpanzer	supplemental armor

PANZER TRACTS

No.1	Panzerkampfwagen I	Kl.Tr. to VK 18.01
No.2	Panzerkampfwagen II	La.S.100 to VK 16.01
No.3	Panzerkampfwagen III	Le.Tr. to Pz.Bef.Wg.Ausf.K
No.4	Panzerkampfwagen IV	Gr.Tr. to Pz.Bef.Wg.IV Ausf.J
No.5	Panzerkampfwagen Panther	VK 30.01 to Panther Ausf.F
No.6	Schwere Panzerkampfwagen	D.W. to E 100
No.7	Panzerjaeger	3.7 cm Tak to 8.8 cm Waffentraeger
No.8	Sturmgeschuetz	s.Pak to Sturmmoerser
No.9	Jagdpanzer	Jagdpanzer 38 to Jagdtiger
No.10	Artillerie Sfl.	15 cm sIG to 60 cm Karl
No.11	Panzerbeobachtungswagen	Sd.Kfz.253 to Pz.Beob.Wg.Panther
No.12	Flak Sfl. and Flakpanzer	Sd.Kfz.10/4 to 8.8 cm VFW
No.13	Panzerspaehwagen	Sd.Kfz.3 to Sd.Kfz.263
No.14	Gepanzerte Pionier Fahrzeuge	Goliath to Raeumer S
No.15	Schuetzenpanzerwagen	Sd.Kfz.250 to Kaetzchen
No.16	Bergepanzerwagen	Bergepanzer 38 to Bergepanther
No.17	Gepanzerte Nachschub Fahrzeuge ...	VK 3.01 to schwere Wehrmacht-Schlepper
No.18	Panzerkampfwagen 35(t)/38(t)	L.T.Sk. to Pz.Kpfw.38(t) Ausf.G
No.19	Beute-Panzerkampfwagen	Polish TK to Russian KW II
No.20-1	Paper Panzers	Pz.Kpfw., Stu.G., & Jagdpz.

Includes data on over 350 German armored vehicles from 1925 to 1945

Illustrated with scale prints drawn by Hilary Louis Doyle and photographs selected for clarity of detail and rarity of model.

Development history, unique characteristics, major modifications, data sheets, and armor specifications all based solely on original documents and existing vehicles.

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