

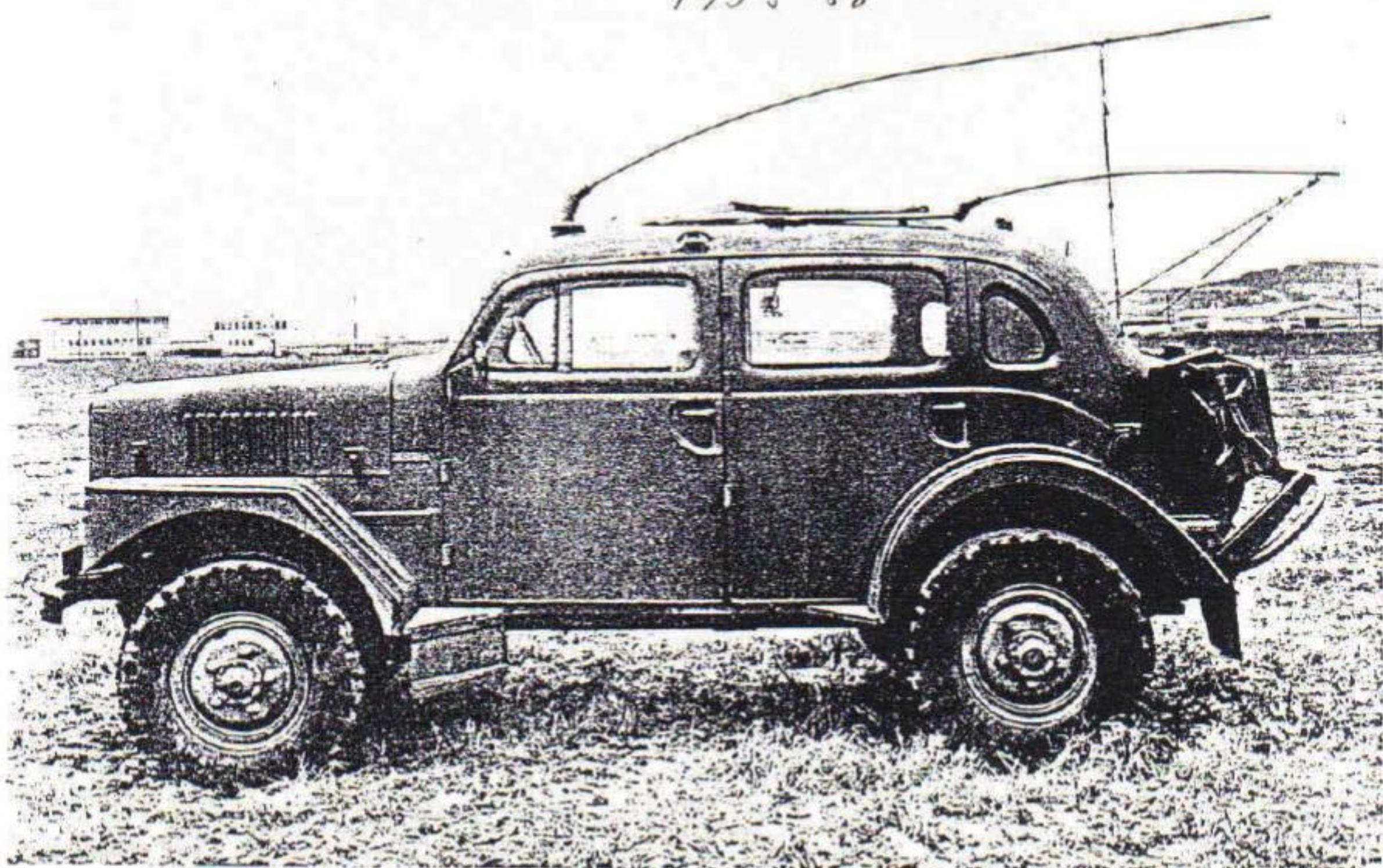


# VOLVO P 2104

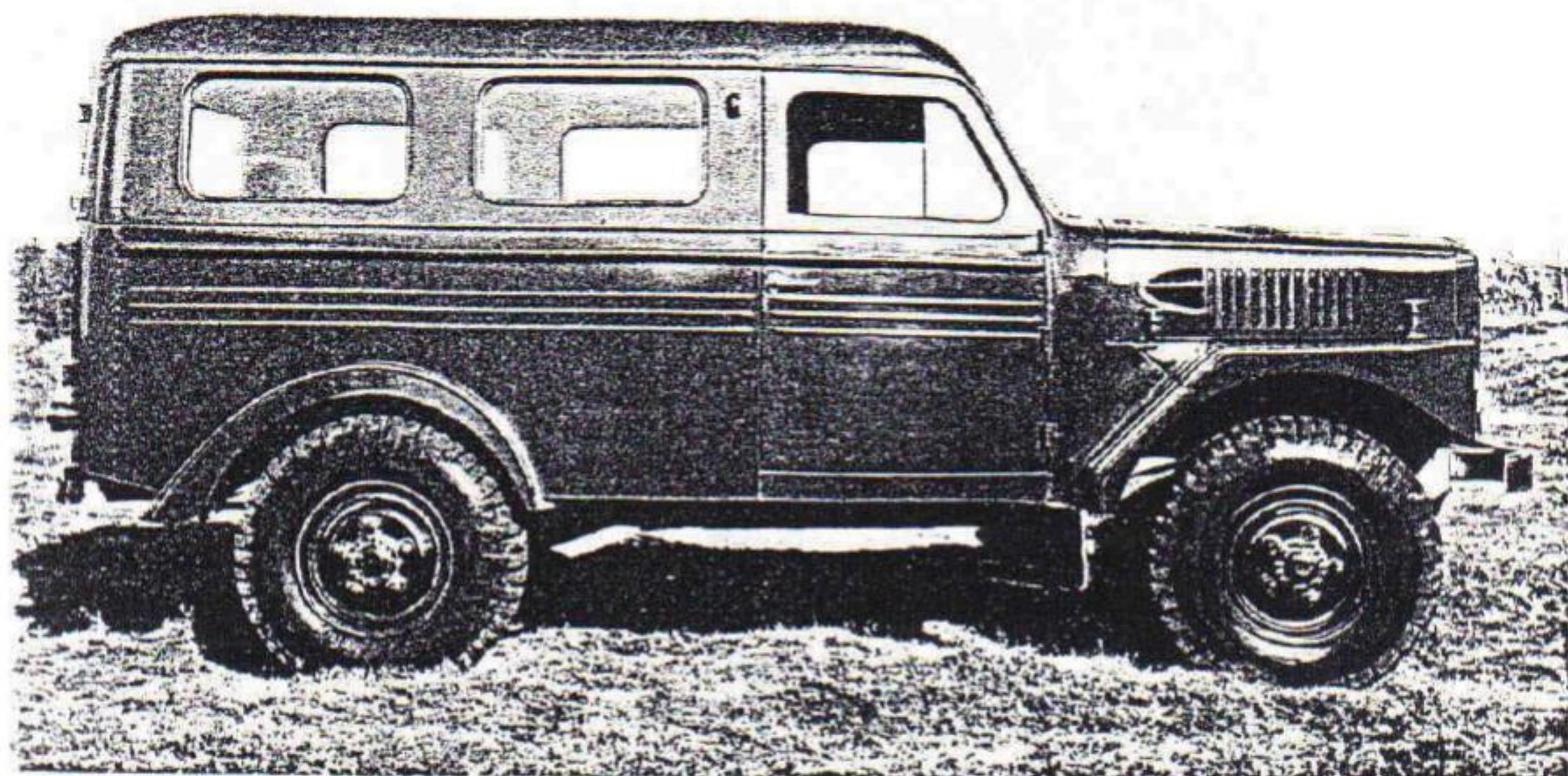
"The Sow"

"Radio Personnel Carrier 915"

1957-58



P 2104 Special







Just one model of this elegant estate car was built on a TP21 chassis under the designation of 'P2104 Special'.

tion of the Defence Forces to the terrain mobility of the TL22:

*"It was an outstanding model in that its mobility was far superior to that of any previous type. It was light, and apart from the fact that its little platform could carry only 1,500 kg, it was the one vehicle which could be relied on not only to get you there, but to get you back again!"*

A twin-axle version of the TL22 was also developed under the designation TL11 (later TL12). Designed as an auxiliary power unit (APU) for starting aircraft, the type was built only in small numbers. Apart from the smaller number of axles, the shorter frame, the open cab and the loading weights fitted to increase the

traction, the model was largely the same as the TL22 with the A6 OHV engine and an unsynchronized gearbox (the latter a challenge to later generations of military personnel who were unaccustomed to this type of unit!).

The new generation of cross-country vehicles also included the TL31, which was regarded as a 'genuine' heavy truck.

This model (which is still in service with the Swedish Army under the designation of 'Cross-country Truck 934') was developed primarily as a tractor for artillery and anti-aircraft pieces, a role in which it is still used today with its 6-wheel drive, powerful 150 bhp, 9.6 litre diesel engine (the same unit as in the Titan) and heavy-duty chassis compo-

nents. However, the capacity of the TL31 also made it useful in a number of other extremely heavy applications, and the vehicles still in service with the Swedish Army (now approximately 30 years later) are used for a variety of transport duties, although their primary task remains the towing of anti-aircraft guns and howitzers.

As in many other cases, alternative versions of these vehicles were also built in greater or lesser numbers. For example, Volvo produced an estate car known as the P2104 Special on the TP21 chassis. The TL31 has been used both as a tow truck and (equipped with the TD96AS turbo engine) as an emergency airbase fire tender.

Model - Variant	Period of manufacture	Approximate number built	Engine variant(s) (type/rating in bhp)	Approximate GVW			Remarks
				4x4	6x4	6x6	
TL11	1953-54	100	A6/105	3,500			
TL12	1956-57	165	A6/115	4,000			
TP21	1953-58	720	ED/90	2,880			
TL22	1954-59	857	A6/105-115			6,420	
TL31	1956-62	920	D96AS/150 or TD96AS/185			12,500	

**Cooling system.** Centrifugal pump with ball bearings and self-adjusting carbon seal. Distributor pipe in engine block to ensure equal water distribution and effective cooling of exhaust valves. A thermostat ensures that the cooling water normally attains its normal operating temperature. The capacity of the cooling system is 13 litres (3 Imp. gallons.).

**Engine suspension.** Four well-dimensioned rubber blocks insulate the engine from the chassis.

#### CHASSIS

Clutch. 10" single dry-plate clutch. Springs between hub and clutch plate.

**Gearbox.** Four-speed gearbox with cover over power take-off.

Gear ratios:	1st. speed	6.65:1
	2nd. speed	3.72:1
	3rd. speed	1.82:1
	4th. speed	1:1
	Reverse	7.98:1

**Auxiliary gearbox.** Two-speed. The carrier can be run with the front wheel drive engaged or disengaged. The low gear can be engaged independent of front-wheel drive.

Gear ratios:	high	1:1
	low	1.44:1

**Speeds at 3400 r.p.m.**

		I	II	III	IV
In high	km.p.h.	16	28	58	105
	m.p.h.	10	17½	36	65
In low	km.p.h.	11	20	40	73
	m.p.h.	7	12½	25	46

**Front and rear axle gears.** Hypoid gears with alternative ratios 7:36 or 6:35. The pinion lies above the centre of the crown wheel ensuring good ground clearance for the propeller shaft. The ground clearance of the gear casings is also satisfactory since the use of a hypoid gear permits the use of a crown wheel of small outer diameter.

**Front axle joints.** Power transmission to the front wheels is taken through the Rzeppa joints which allow large steering angles.

**Differential lock.** Mechanical, vacuum-operated on front and rear axles. Individual engagement of front/rear axle differential locks.

**Universal joints.** Fitted with needle bearings which reduce friction and wear to a minimum.

**Propeller shafts.** Wide-angle joint tubular type.

**Frame.** All-welded with three U-profile cross members and a box-section centre cross member.

Frame member height	160 mm (6")
Flange width	55 mm (2 3/16")
Material thickness	4 mm (5/32")

**Steering gear.** Twin-lever Ross type. Adjustable by means of set screw. Ratio 22:18:22 to one. 18" steering wheel.

**Springs.** Front springs

Type	Semi-elliptical
Length	1025 mm (40 23/32")
Width	50 mm (1 21/32")

Rear springs

Type	Semi-elliptical
Length	1200 mm (47 1/4")
Width	50 mm (1 21/32")

**Shock absorbers.** Double-action, hydraulic shock absorbers of the telescopic type on both front and rear axles.

#### Brakes.

##### Foot brakes

Lockheed hydraulic four-wheel brakes with double wheel unit cylinders. Brake drums of chrome-alloy cast-iron with reinforcement flanges. Rubber collars round the brake drums prevent dirt and water from getting into the brakes. The brake drums are easy to dismantle. Wheel brake unit cylinders, diam. 1 1/4"

Master cylinder diam. 1 1/4"

##### Brake drums

Internal diam. 12"

Width of linings. 2 1/2"

##### Handbrake

Standard transmission brake

**Wheels.** 16×6.50

Tyres 9.00×16"

**Fuel tank.** Capacity 80 litres (17 1/2 Imp. gallons.).

#### Electrical equipment.

Voltage: 12 volts

Batteries: Two 6-volt, 190 Ah batteries connected in series

Dynamo: 600 watts

Starter motor: 1.8 b.h.p.

The electrical system is completely screened to avoid radio disturbance. When the carrier is not being used as a mobile radio unit, a 6-volt system can be fitted with a battery of 114 Ah capacity, a 200-watt dynamo and a 1 b.h.p. starter motor. The battery is warmed up during operation which ensures that is fully charged even in extremely cold weather. Extra plugs for the connection of extra batteries or to enable the battery on the truck to be used to start other vehicles.

**Standard chassis equipment.** The instrument panel is fitted with a speedometer and distance recorder, a combined instrument containing fuel gauge, oil pressure gauge and water temperature gauge, a charging control lamp, ignition switch with key and switch for instrument lighting. Tapping point for inspection lamp. The instruments are indirectly lighted and both the instrument lighting and the charging control lamp can be fitted with black-out screens. The instrument panel also contains a starting button, hand throttle, lighting switch, direction indicator switch with indicator lamp and there is a locker on the right-hand side. The foot-dipper switch is on the toe-plate. There is a defroster and heater unit. Built-in headlights with parking lights. Two combined stop and tail lights.

Mudguards, bumpers. Windscreen wipers.

Spare wheel. Tool kit and powerful hydraulic jack.

#### DIMENSIONS AND WEIGHTS

Chassis weight .....	about 2000 kg (4409 lb.)
Weight with 5-seater body .....	about 2600 kg (5732 lb.)
Weight with 2-man cab and platform .....	about 2500 kg (5511 lb.)
Gross laden weight .....	3200 kg (7055 lb.)
Load .....	700 kg (1543 lb.)
Wheelbase .....	2685 mm (105 3/4")
Track, front .....	1550 mm (61")
Track, rear .....	1600 mm (63")
Overall width .....	1900 mm (75")
Overall height at cab .....	about 1950 mm (77")
Overall length .....	about 4500 mm (177")
Turning circle diameter ..	about 12000 mm (471 1/2")
Max. tow hook tractive effort .....	about 2000 kg (4409 lb.)

The factory reserves the right to alter the design and equipment.

**A K T I E B O L A G E T V O L Y O**  
**E X P O R T D E P A R T M E N T**  
**G O T H E N B U R G - S W E D E N**

# Raptgbil 915

Detaljerade anvisningar ingår i beskrivning del I (F 570-1);  
där angivna intervaller gäller dock icke.

Mekaniker hänvisas till beskrivning del II (F 570-2).

Nr	Smörjställe	An- tal	Vor 150 mil*	Vor 300 mil*	Vor 1500 mil**	*Dock minst en gång var 6:e månad		**Dock minst en gång varannan 6:e		Smörjställe	Nr								
			Vor 1500 mil**	Vor 300 mil*	An- tal														
<i>Nr inom ring anger smörjställe som skall smörjas året efter körföring i terräng eller i blött vägslag samt efter spänning</i>																			
<i>Mer omring anger smörjställe som skall smörjas året efter körföring i terräng eller i blött vägslag samt efter spänning</i>																			
⑦	Styrslag	2	◐	—	—					1	Styrväxelhus	16							
⑧	Parallelslag	2	◐	—	—					1	Kylväskepump Två pumpslag	17							
13	Framhjulsled Ann 3	2	△	—	—					1	Framaxelväxel	18							
11	Fördelare Ann 2	1	△	—	—					1	Luftrenare Gör ren	19							
10	Oljerenare Ann 1	1	△	—	—					1	Motor	20							
9	Pedalaxel	1	◐	—	—					1	Urtimpnings- läger Två pumpslag	21							
8	Bromsvärska- hetslådor	3	◐	—	—					1	Hundbromslådor	22							
7	Kopplingsväxel Två pumpslag	2	◐	—	—					1	Växellåda	23							
6	Kordonknut med glidskorv	7	◐	—	—					1	Fördelnings- växellåda	24							
5	Fjäderbult	4	◐	—	—					1	Hastighets- mätarmätare	25							
4	Kordonknut utan glidskorv	3	◐	—	—					2	Drogkrok	26							
2	Bakaxelväxel	1	◐	—	—						Leder, bänkor, gängjärn, klä- mmor	27							
1	Fjäderhänke	8	◐	—	—														

## Teckenförklaringar

- Motorolja DG 10W/20 vid alla temperaturer  
DG 20W/30 ned till ca -10°C
- Transmissionsolja MP 80 vid alla temperaturer  
MP 90 ned till ca -10°C
- Fordonsfett MP, trycklufts- eller handfettspruta
- Fordonsfett MP, handfettspruta
- Tunn motorolja, oljekanna
- Bromsvärska 430
- Övrigt, se anmärkning
- Kontroll av nivå
- Byte av olja

## Rymduppgifter

Motor (värvhus och oljerenare)	7	1
Växellåda	4	1
Fördelningsväxellåda	3	1
Framaxelväxel	3,25	1
Bakaxelväxel		
t.o.m chassinummer 220	3,25	1
fr.o.m chassinummer 221	5,5	1
Styrväxelhus	0,5	1

## Anmärkningar

- Vor 150:e mil, töppa ur för-  
reningsar (t.o.m chassinummer  
220). Vor 3:e oljebyte, byt  
filter.
- Gönga in smörjkoppen hem-  
mutter 1/2 varv. Fyll på spe-  
cialfett, Bosch eller likvärdigt,  
vid behov. Smörj krytarkam-  
mens centrumhål med ett par  
droppar motorolja.
- Kontrollera oljelockning.

# Volvo P 2104

The Volvo P 2104 is a light four-wheel driven chassis, to be fitted with a 4-5 seater body. It can also be fitted with a special body for seven passengers or with a two man cab and short platform.

## SPECIFICATIONS

### ENGINE

Carburettor engine ED

Number of cylinders .....	6
Valves .....	Side
Output .....	90 b.h.p. at 5600 r.p.m.
Bore .....	84.14 mm
Stroke .....	110 mm
Cylinder capacity .....	3.65 litres
Compression ratio .....	6.5: 1
Torque .....	22 kgm (159 lb. ft.)

Cylinder block of special-alloy cast-iron. Cast integrally with crankcase.

Cylinder head. Specially designed combustion chambers for high compression.

Pistons of chill-cast light-alloy, fitted with three compression rings and one oil control ring. The upper ring is chromed to reduce cylinder wear.

Connecting rods. I-section, forged and toughened, drilled longitudinally for gudgeon pin lubrication.

Crankshaft. Drop-forged, statically and dynamically

balanced. Seven main bearings. Total bearing surface 136 cm (21 sq. ins.).

Bearing shells. The connecting rod bearings and the main bearings are fitted with replaceable, babbitt-lined steel shells.

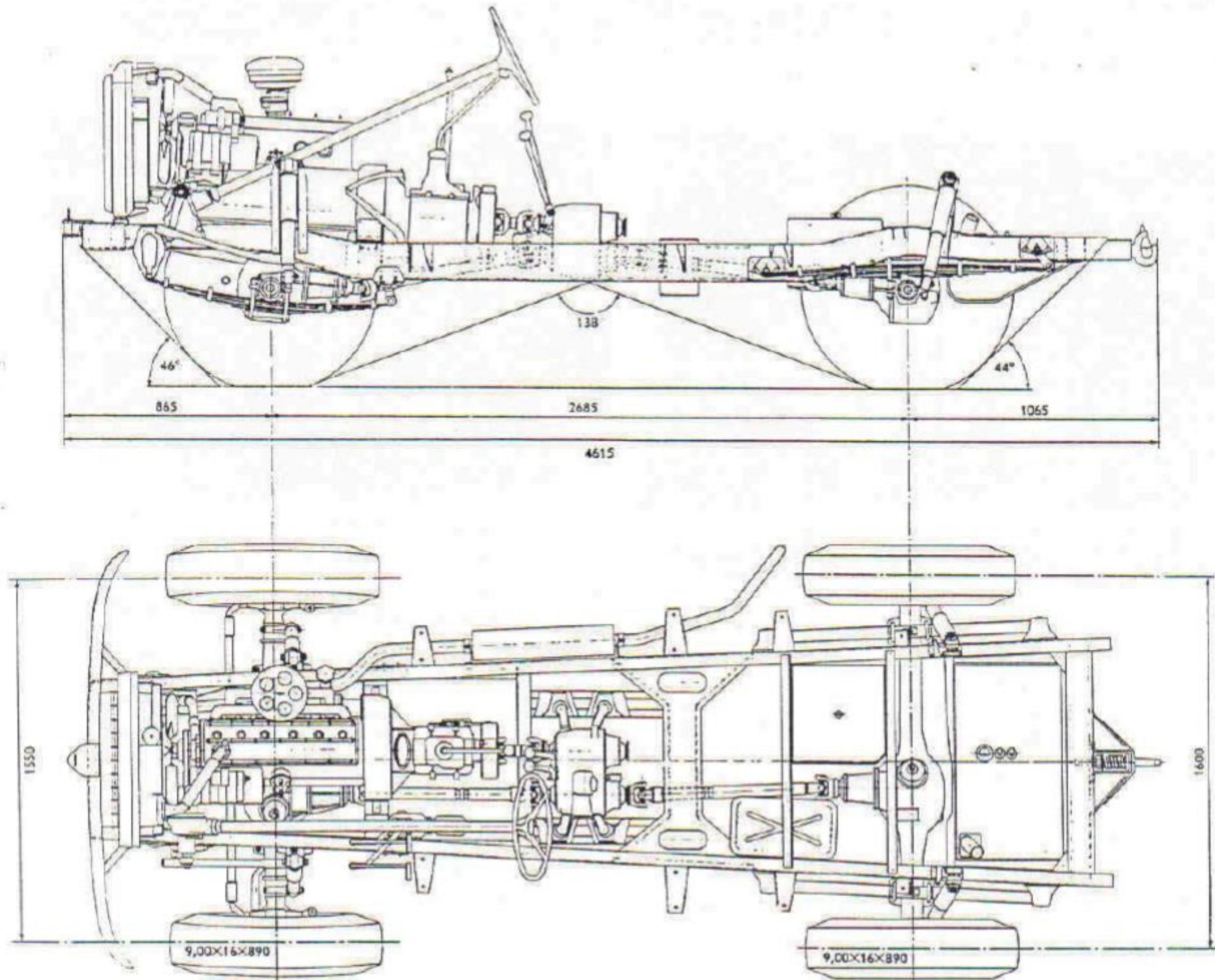
Camshaft. Drop-forged with case-hardened, ground cams and bearings. Supported in babbitt-lined steel bushings. Driven by a toothed chain for silent running. Guided axially by a spring-loaded support pin.

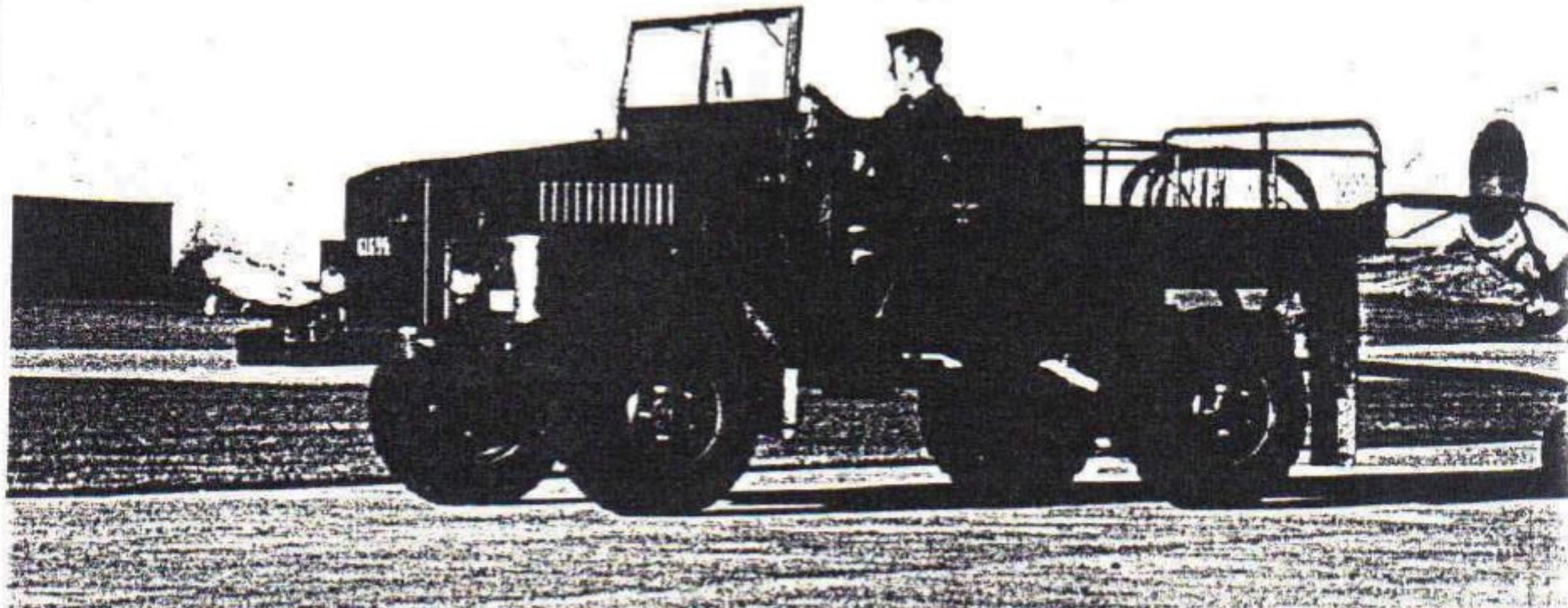
Valves. Inlet valves of nickel-steel. Exhaust valves of chrome-nickel alloy-steel for protection against lead-tetraethyl fuel.

Ignition. Battery ignition with high-output ignition coil.

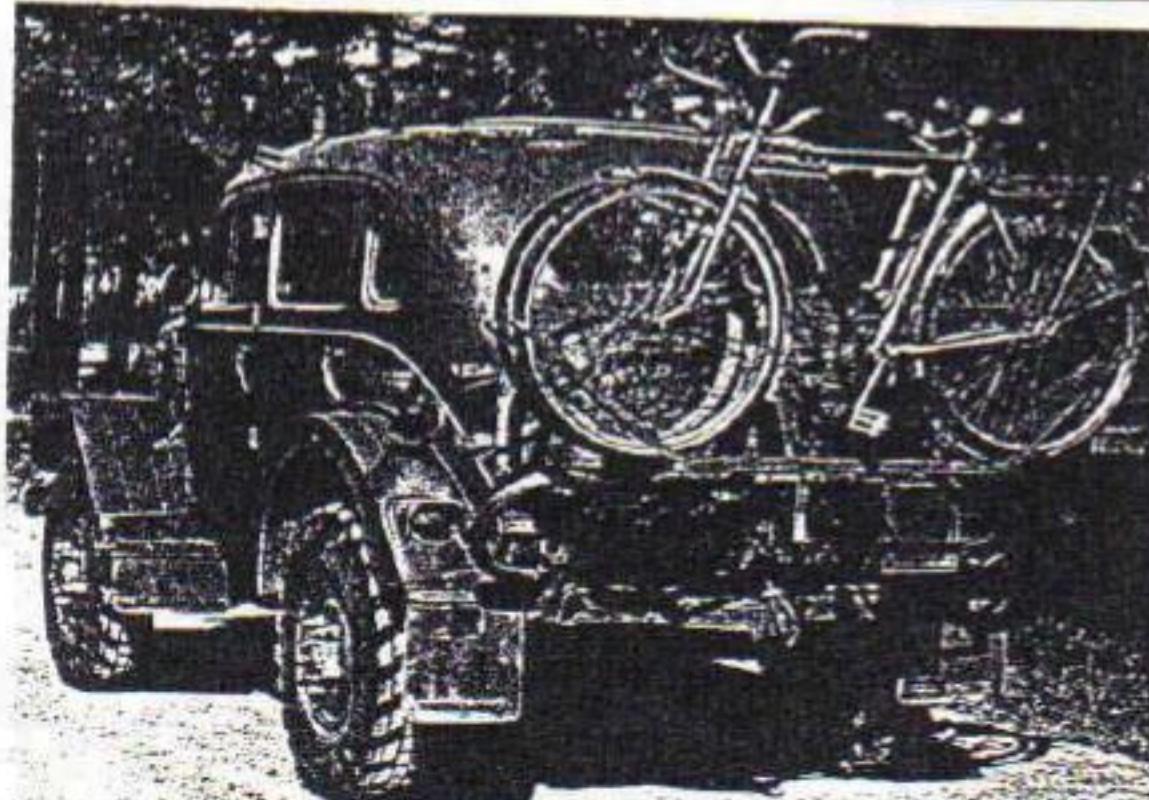
Fuel system. Rochester down-draught carburettor with manual choke, set for good fuel economy when the throttle is partially open and excellent output when the throttle is fully open. Thermostatically-controlled pre-heating of the fuel-air mixture. Mechanical fuel pump of A.C. manufacture. Air filter of the oil bath type with splash protector for cross-country operation.

Lubricating system. Crankshaft and camshaft bearings and gudgeon pins are pressure lubricated by a generously dimensioned, gear type pump. The pump, which has a built-in relief valve, is accessible from the outside. Floating-type oil strainer. Highly-efficient oil filter helps the oil maintain its self-cleaning properties. Lubricating system capacity 7 litres (12 1/4 Imp. pints). Deep wet-type oil sump.





Contrasting products of the 1950s. The Volvo TL11 is towing a Saab J29 'Flying Barrel'. (The aircraft was also equipped with a Volvo engine built by Volvo Flygnotor in Trollhättan.)



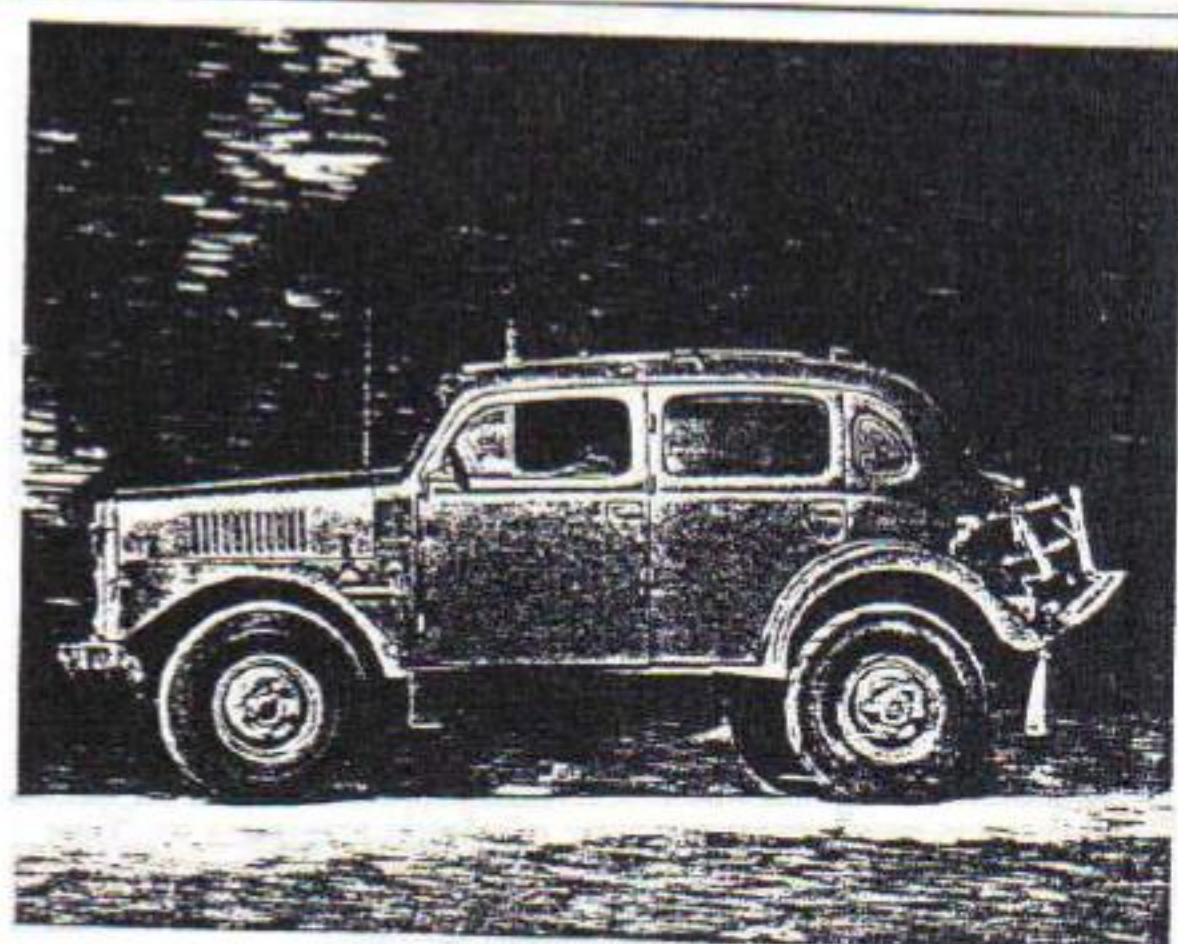
The TP21 was usually known as the 'Sow', a nickname which reflected the resemblance of the rear end to a pig! In this photograph, it is seen transporting one of the commonest means of transport then used by the Swedish military - bicycles.

comfortable staff transport. However, as a relatively exclusive and expensive model which was produced only in small numbers, the TP21 (or 'Radio Personnel Carrier 915' as it was known by the military) proved unsuitable for export to countries requiring a simpler type of vehicle.

Equipped with the Volvo 90 bhp, side-valve, 6-cylinder, ED engine, the TP21 was of an extremely straightforward

mechanical design.

The next of the new generation was the TL22 (or TL21 as the prototypes were known). This was the first of the true, light cross-country vehicles built by Volvo - models which were later developed into the small, forward-control, all-wheel drive military trucks. The TL22 (military designation 'Cross-country Vehicle 912') was actually a fairly small model capable of carrying only about



1,500 kg on its metal platform, despite its three driven axles and its massive appearance. Its outward resemblance to the TP21 (at least at the front) was its only similarity with its predecessor. Equipped with an extremely rugged frame, a 105 (later 115) bhp OHV engine and a service weight of 4,200 kg, the model was ideal for cross-country and troop-carrying operations.

Måns Hartelius has described the reac-

## DATA

TYPE MILITARY	RATCAR 915
TYPE VOLVO	TP 21
Length overall	4,70 m
Width	1,90 m
Height (antennas down)	3,00 m
(roof top)	2,15 m
Clearance	0,25 m
Turndiameter.	12,00 m
Axle base	2,73 m
Track gauge (front)	1,57 m
(rear)	1,60 m
Overhang (front)	0,86 m
(rear)	1,06 m
Tyres	9,00-16 in. 10 plies
Tyrepress.	2,4 kg/cm <sup>2</sup>
Vehicle id number	Front left side of chassisframe
Engine number	Left side of engine
Gearbox number	Left side of gearbox
Dist.gearbox number	Top side of dist. gearbox
Rev. and Fwd. gear number	On gearhousing
Max nr of passengers (except driver)	3 pieces

27X

## DATA CONT.

Dutyweight with driver and equipment	2880 kg
Max press. on rear axle	1470 kg
<b>ENGINE.</b>	
Type	ED
Output at 3600 rpm	22 kgm
Number of cylinders	6
Cylinders diameter	84,14 mm
Stroke	110 mm
Cylinder vol.	3670 cc/223 cu.in.
Valve arrangement	Sidevalves
Firing order	1-5-3-6-2-4
Timing	0-2 degrees before tdc.
Fuel pump type	AC diaphragmpump
Carburator type	ROCHESTER-B7004475
<b>ELECTRIC EQUIPMENT</b>	
Coil	BOSCH-ZS/KAM 12/1
Distributor	BOSCH-ZV/JAM 6 AL 1
Spark plug	AC 45 or equivalent
Battery type	M 2672-010010
Voltage	12 V
Kapacity	190 Ah
Ground pole	Negative
Generator	600 W BOSCH

30K

Electrical equipment cont.

Starting engine		1,8 hp 12V
Charging regulator (early models)		BOSCH-RS/KK 600/12/1
(late models)		BOSCH-RS/WAK600/12/1

Fuse 80 amp BOSCH-WSG 512/7X

Electrical bulbs	nr. of	Watt
------------------	--------	------

Headlights	2	45/40
Parkinglights	2	2
Blackoutlights	1	15
Pos. lights	1	8
Map light	1	15
Turn signals	2	15
Back-up light	2	15
Brake light	2	15
Rear searchlight	1	25
Reg. plate light	1	5
Pos.rear light	2	3
Diff. lock controllamp	2	2
Turn sign. controllamp	1	2
Charging controllamp	2	2
Rear searchlight controllamp	1	2

Fuse box is located on left side of firewall in enginecompartment

Fuses 8A, BOSCH-WSG 501/1

Fuse box index are stamped on the fuse box lid.

## CAPACITIES.

Fueltank (main tank)	76 liter
(aux. tank)	10 liter
Cooling system	13 liter
Engine with oilfilter	7,0 liter
Gearbox	4.0 liter
Dist. gearbox	3.0 liter
Front axle	3.25 liter
Rear axle (until vehicle id. nr. 220)	3.25 liter
(later than 220)	5.50 liter
Steering gear	0.50 liter

## MAX SPEEDS.

## LOW GEAR

## HIGH GEAR

1 st gear	10 km/h	15 km/h
2 nd gear	15 km/h	25 km/h
3 rd gear	35 km/h	50 km/h
4 th gear	65 km/h	90 km/h

INSTRUMENTATION.

- |   |                                |
|---|--------------------------------|
| 1. Instrument light dimmer              | 22. Turn signal switch         |
| 2. Rear light control lamp              | 23. Headlight switch           |
| 3. Rear light switch                    | 24. Hand gas regulator         |
| 4. Fuel gauge                           | 25. Choker handle              |
| 5. Long beam control lamp               | 26. Start switch               |
| 6. Speedometer                          | 27. Chain for radiator curtain |
| 7. Oil pressure gauge                   | 28. Footswitch for headlights  |
| 8. Fresh air intake button              | 29. Brake pedal                |
| 9. Turn signal control lamp             | 30. Clutch pedal               |
| 10. Light separator                     | 31. Steering wheel             |
| 11. Blackout light switch               | 32. Gear shifter               |
| 12. Defroster control                   | 33. Parking brake handle       |
| 13. Heater engine switch                | 34. Speeder                    |
| 14. Diff. lock handle, front axle       | 35. Hi/lo gear shifter         |
| 15. Diff. lock control lamp, front axle | 36. 2/4 wheel drive shifter    |
| 16. Diff. lock control lamp, rear axle  | 37. Voltage gauge              |
| 17. Diff. lock handle, rear axle        | 38. Hand gas regulator         |
| 18. Temperature gauge                   | 39. Charging control lamp      |
| 19. Signal horn                         | 40. 12V output                 |
| 20. Ignition switch                     | 41. Wireless main switch       |
| 21. Charging control lamp               |                                |

6  
P.S.