

**Information
Regarding
PORSCHE
Vehicles Used
for Sports
Purposes**

911 S 914/6

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INTRODUCTION

With the beginning of the 1972 sports season our vehicles will start in the following groups:

- | | | |
|----|------------|--|
| 1) | Type 911 T | Serial-GT Group 3 |
| 2) | Type 911 E | Serial-GT Group 3 |
| 3) | Type 911 S | Serial-GT Group 3
or with corresponding alterations
Special-GT Group 4 |
| 4) | Type 914/6 | Serial-GT Group 3
or with corresponding alterations
Special-GT Group 4 |

For competition drivers buying a new car and intending to participate in sports events the VW-Porsche Vertriebsgesellschaft mbH offers cars with the following accessories:

	911 T	911 E	911 S	914/6
Koni-shockabsorber (only Coupé)	x	x	x	-
Bilstein-shockabsorber front and rear				x
Bilstein-shockabsorber with ventilated brake discs and sports brake covering front and rear				x
Light alloy rims 6 J x 15 with tires 185/70 VR 15	x	x	S	x
Stabilizers front and rear 14 mm Ø				
914/6 14 mm Ø front, 16 mm Ø rear	x	x	S	x
Recaro competition seat left	x	x	x	-
Recaro competition seat right and left	x	x	x	-
911 S instruments and oiltank	x	S	S	-
Roll bar	x	x	x	-

	911 T	911 E	911 S	914/6
Tow hooks rear	x	x	x	\$
Leather steering wheel	x	x	S	x
5-speed-gearbox	x	x	x	S
90 l tank	x	x	x	-
110 l tank	x	x	x	-
Limited slip differential	x	x	x	x

x = can be delivered optional

S = standard equipment

- = not deliverable

The vehicles type 911 S and 914/6 can be delivered as well in competition version. In this version the vehicles are adequate either for traffic or occasional sports engagement. When participating in rallies the sports version is a good base for a competitive rally car.

Competition equipment 911 S

Limited slip differential

Tachometer up to 10.000 rpm

Leather steering wheel 380 mm Ø

62 l tank with big tank inlet under the lid

Simplified body fitted out for competition purposes:

Attachments for sports security belts

Reinforcement for assembly of the roll bar

Bumpers without overriders front and rear

Instead of decorative and rubber battens fixation of black Tesa-tape on the bumpers front and rear

No covering of the hole for fog headlights under the bumper

Rubber locks for lids front and rear

At the rear stucked Porsche signature

Simplified interior equipment: door paneling trim, door lock operation, carpeting, dashboard

Porsche signature stucked instead of decorative battens under the doors left and right

No stone guard and soundproof matting

Competition equipment 914/6

Fender enlargement in steel front and rear

Light alloy rims 6 J x 15 with tires 185/70 VR 15

Longer wheelhubs front and rear with 21 mm spacers

For pure competition use on circuits and hill climbs the 911 S and 914/6 are prepared ready for races on standard. These vehicles are described as follows:

Porsche 911 S - Racing Version

Price in DM, added value tax included 49680,-- ex factory

Description of the car:

a) Chassis

Serial chassis of type 911 S, lowered
front with 7" rims, racing tires 4.75/10.00-15,
rubber compound 970
rear with 9" rims, racing tires 4.30/11.60-15,
rubber compound 970
interchangeable stabilizers front and rear
sport brake lining and racing brake fluid

b) Body and interior

Front fender with fender enlargement
fender enlargement rear
front bumper, fiberglass, with spoiler
roof and interior lining out of black felt
simplified door paneling
bucket seats
upholstered leather steering wheel 380 mm Ø
tachometer up to 10.000 rpm
110 l tank with big tank inlet under the lid
colour: interior only black
exterior serial 911 S colours upon request

c) Engine

The serial 911 S engine has been modified corresponding to the International Automobile Sports Code and its performance has been increased.

Crankcase

crankshaft and con rods, production 911 S
light alloy cylinders bored to 2.492 cm³

racing pistons

cylinder heads with big valves and carefully
polished intake and exhaust ports

special suction pipes with "Weber" carburetors
46 IDA or upon request "Bosch" fuel injection

racing camshafts

racing exhaust system

competition clutch and transistorized dual
ignition system

Performance: approx. 270 DIN HP at 8000 rpm
max. torque value: approx. 26,5 mkp at 6300 rpm

d) Transmission

5-speed transmission

all gear sets interchangeable

rear axle 7:31 with limited slip differential

gear lubrication with mounted oil pump

VW-Porsche 914/6 - Racing Version

Price in DM, added value tax included 49680,-- ex factory

Description of the car:

a) Chassis

lowered

competition shock absorbers

stabilizers front and rear
brakes with ventilated brake discs
big brake calipers
wheel hubs with long studs and 27 mm spacers
larger rims with racing tires

b) Body and interior

Simplified interior, black, with bucket seats
modified door paneling
combi instrument of type 911 S
oil pressure indicator up to 142,2 psi (10 atü)
oil temperature indicator
fuel indicator for 100 l fuel tank as single
instrument below the dashboard
100 l steel fuel tank
engine compartment cover with large air inlet
fender enlargements front and rear, welded
additional oil cooling system, installed in front

c) Engine

The production 914/6 engine is specially prepared for
higher performance within the regulations of the Inter-
national Automobile Sports Code.

Crank gear, serial
light alloy cylinders, hard-chromed
racing pistons
cylinder heads with carefully polished intake
and exhaust ports
special intake manifolds with carburetors "Weber"
46 IDA
racing camshafts
racing exhaust system
competition clutch and transistorized dual ignition
system

Performance: approx. 210 DIN HP at 8000 rpm

d) Transmission

5-speed transmission with mainshaft which permits the interchangeability of each gear set.

Ring and pinion 7 : 31 with limited slip differential

Sales, guarantee and delivery information etc.

All customer sales will be handled by VW-Porsche Sales Department.

Specific information and care concerning these vehicles will be handled as before directly by the Sports Department of Porsche KG; our dealers are not obligated to provide service for these vehicles and in most cases the necessary equipment is not available.

You will obtain serial parts for these vehicles from the dealer and competition parts directly from the Sports Department of Porsche KG.

Requests about delivery dates can only be set to the dealer.

There is no guarantee for competition-prepared cars.

All cars will be delivered without registration papers.

Due to production tolerances and especially to the mounting of various light weight racing wheels it is possible that the vehicle may weigh less than the homologated weight. We suggest therefore that the car be weighed before its first competition to ensure confirmation with the specified weight.

A T T E N T I O N:

When exporting these types to countries with special safety and exhaust emission standards, the customer has to submit a certification that the car is not used in normal traffic.

Mentioned below you will find informations about the possibility to reconstruct serial vehicles supplementary for competition use. All required parts are listed in the corresponding spare parts lists for competition vehicles 911 S and 914/6.

1. Increasing engine performance

The operations and suggestions which follow do not constitute instructions for carrying out work to produce the increased performance, but are merely a summary of operations and parts for performance increase.

To carry out this work, a great deal of experience and practice is necessary in addition to technical skill. We should like therefore to expressly point out that this work should only be carried out by the proper engineering personnel.

Before starting work for performance increase one should decide for what purpose the engine is to be used.

1. As a rally engine
2. As a racing engine , used for racing purposes only

1.1 Rally engine

For rallies the most suitable engine is one which has in addition to high power output also a good torque characteristics in the lower engine speed range.

In addition, a rally engine should be impervious to the most varied conditions, heat - cold - damp and dry weather, loose stone surface - concrete road - mountain passes - differences in elevation.

Because a racing engine can not fulfill or can only

partly fulfill these conditions, with the rally engine one should be content to forego a few extra bhp in the interest of long life and imperviousness to conditions.

On the rally engine the following work can be carried out:

a) 911 S - C

1. Fitting of a competition clutch and thrust plate with increased thrust pressure.
2. Polish and line up inlet manifold.
3. Polish inlet and outlet ports in the cylinder head and match to the intake and exhaust manifold flanges respectively. In order to achieve the greatest capacity the valves can be lowered down.
4. To increase the compression the cylinder heads can be cut down to 0,5 mm or the cylinders can be machined down at the same rate.
5. Take out the air-filter cartridge and enrich the injection pump until the CO-value lies on the upper allowance limit.
6. Mounting of sports exhaust. The altered muffler in question has two exhaust pipes.

b) 914/6

On principle an oil cooling system with an additional oil cooler in the front bumper and a larger intake grill at the engine cover has to be build in at a power increase on the engine 914/6 (see sketch, page 22).

1. Crankshaft and connecting rod

The crankshaft has to be exchanged for a sports crankshaft. Also the connecting rods should be exchanged for exactly balanced ones, which are serial connecting rods weighing 727 p. For this weight-group spare part no. 911.103.013.20 was fixed. Please take care, that the weight difference of all connecting rods mounted in an engine does not exceed 3 p. The connecting rods have to be exchanged for such ones which have more free motion. (spare part no. 911.103.141.00)

2. Carburetor and manifolds 911 S, 2 1

The suction pipes have to be possibly worked out in a cylindrical shape, they have to be smoothed and adapted to cylinder heads and carburetors.

3. Pistons and cylinders

To increase the compression ratio the cylinder heads can be cut down to 0,5 mm, or the cylinders can be machined down at the same rate.

4. Cylinder heads

Polish in- and outlet ports and adapt to the suction pipes respectively exhaust flanges.

5. Camshafts (as 911 S 2 1)

Timing see camshaft table page

6. Ignition plug

Bosch W 265 P 21

7. Take out airfilter cartridge or remove airfilter housing. In this case carburetor cover plates should be mounted and the crankcase ventilation has to be conducted into an oil container.

8. Mounting of sports exhaust

The altered muffler in question has two exhaust pipes. If using the vehicle on the road the serial muffler can be used.

A T T E N T I O N :

For these engines no general operating permit is existing. The engine must be registered for public traffic according to § 19 of the Public Traffic Regulations by the licensing authorities, respectively according to the specifications of other countries a special operating permit is obligatory.

Racing engine 911 S and 914/6

This engine, which in its basic form delivers high power output, can only be used for racing purposes.

All engine components are designed to give peak power output or output in the top engine speed range in accordance with the FIA regulations.

The following engine parts can be used for the high performance engine (basic engine 911 S-C respectively 914/6):

1. Injection system respectively carburetor

The injection system consists chiefly of a changed pump, the space cams of which are modulated to the 2,5 l racing engine.

Apart from the pump special throttle valve housings are used. The injection nozzles are leading into the suction channel of the cylinder heads (as on the serial engine).

All other parts f.i. injection lines and tie rods are listed in the competition spare parts catalog.

The engine can be equipped as well with Weber 46 IDA 3 C/3C1 carburetors. In this case manifolds with a bigger suction should be used.

Carburetors and manifolds are not listed in the 911 S parts catalog. These parts are the same used for 914/6 racing engine.

2. Connecting rod

The con rods in question are serial con rods weighing 727 p. For this weight group spare part no. 911.103.015.70 is fixed.

Please take care, that the weight difference of all con rods mounted in an engine does not exceed 3 p.

3. Pistons and cylinders (only 911 S)

Pistons and cylinders can be exchanged completely against such ones with a bore of 86,7 mm . The whole displacement of the engine comes up to 2492 cm³.

4. Cylinder heads

Cylinder heads for the double ignition are proposed for the racing engine. The inlet and outlet ports have to be polished and must be aligned with the inlet manifolds and exhaust flanges.

N O T E:

If the engine has been build up as a carburetor version, the taps for the injection nozzle have to be plugged.

5. Camshaft and valve

As camshafts in group 4 are optional, the camshafts of the Carrera 6 can be build in the engine 911 S-C. Through a bigger intersection angle (more exact timing and a bigger valve hub) a better full scale and more power in the upper speed range can be obtained.

A T T E N T I O N:

The camshaft of the Carrera 6 is lubricated by means of an oil tube through the cover of the chain case, while the camshaft of the 911 S engine is lubricated through the camshaft housing. The valves will be exchanged against valves with a shorter shaft and are machined through the valve rocker without setting screw.

The valve clearance is adjusted by the substitution of varying thickness valve caps.

6. Ignition

The ignition is adapted to a double ignition.
For this engine Bosch X 270 P 21 spark plugs have to be used.

7. Exhaust system

The exhaust system of the racing engine consists of exhaust tubes without heat exchanger and a diffuser on each side of the engine.

This system is modulated to the racing engine and has to be mounted completely.

8. Oil container

For the breather hose an oil container has to be built at the rear corner of the engine compartment.

9. Clutch

The clutch can be exchanged for a more intensified one.

Racing engine 914/6

The rebuild works are on principle the same as on the 911 S racing engine. The 914/6 engine can only be equipped with Weber carburetors 46 IDA 3 C/3 C1 and the corresponding suction pipes. A higher compression of about 10,2 : 1 can be obtained by means of pistons, which increase combustion. The parts are listed in the corresponding spare parts list.

TYPE INDEX OF THE COMPETITION ENGINES

Type (internal)

911/20	911 S competition engine	2247 cm ³	fuel injection
911/21	"	2380 cm ³	"
911/22	"	2247 cm ³	carburetor
911/70	"	2492 cm ³	fuel injection

901/25	914/6 competition engine	1991 cm ³	carburetor
901/26	914/6 rallye engine	1991 cm ³	"

On the following pages we have listed technical and the most important setting data.

TECHNICAL DATA OF THE COMPETITION ENGINE 911 S + 914/6

Engine Type	911/21	911/70	901/25	901/26
Number of cylinders	6	6	6	6
Bore (mm)	87,5	86,7	80	80
Stroke (mm)	66	70,4	66	66
Displacement (cm ³)	2380	2492	1991	1991
Compression ratio	10,3	10,3	10,3	9,9
Engine power HP (DIN) approx.	250	270	210	approx. 180
at rpm	7800	8000	7800	6800
max. torque mkg (DIN) approx.	26	26,5	21	18,2
at rpm approx.	6200	6300	6200	5200
Camshaft	see camshaft table			
Valve clearance (mm) with cold engine	0,1	0,1	0,1	0,1
<u>Carburetor</u> (911/22)	Weber			
Type	-	-	46 IDA 3 C	40 IDS 3 C
Main jet	-	-	175 - 180	140 - 145
Idling jet	-	-	70	55
Idling air jet	-	-	80	110

Engine Type	911/21	911/70	901/25	901/26
Air funnel Ø mm	-	-	42	34
Air correction jet	-	-	140 - 145	180
Float needle valve	-	-	1,75	1,75
Floatweight	-	-	25,5	25,5
Fuel level (mm)	-	-	21	20,75 + 1
Injection quantity ₃ per stroke and bore cm	-	-	0,6	0,8 - 0,2
<u>Injection pump</u>	Bosch	Bosch	-	-
<u>Designation</u>	PED 6 KL 60 A RO 2 V 1668 14° BDC	PED 6 KL 60 A RO 2 V 1668 14° BDC	-	-
<u>Regulation/cam position at end of delivery</u>	-	-	-	-
<u>Distributor</u>	Marelli	Marelli	Marelli	Bosch
<u>Make</u>	S 121 AA 610 121 25	S 121 AA 610 121 25	S 121 AA 610 121 25	30° BDC at 6000 rpm
<u>Designation</u>	28° BDC at 7800 rpm+	28° BDC at 7800 rpm+	28° BDC at 7800 rpm+	Bosch
<u>Ignition timing</u>	Bosch X 270 P 21	Bosch X 270 P 21	Bosch X 270 P 21	W 265 P 21 Serial
<u>Spark plugs</u>	-	-	-	-
<u>Type</u>	1 wheel-case right	1 wheel-case right	1 engine 1 front	1 engine 1 front
<u>Air filter system</u>	1 "	1 wheel-case left	1 wheel-case left	1 wheel-case left
<u>Oil cooler</u>	-	-	-	-

+ engine under load
engine without load 6000 rpm

CAMSHAFT TABLE FOR 914/6 and 911 S COMPETITION ENGINES

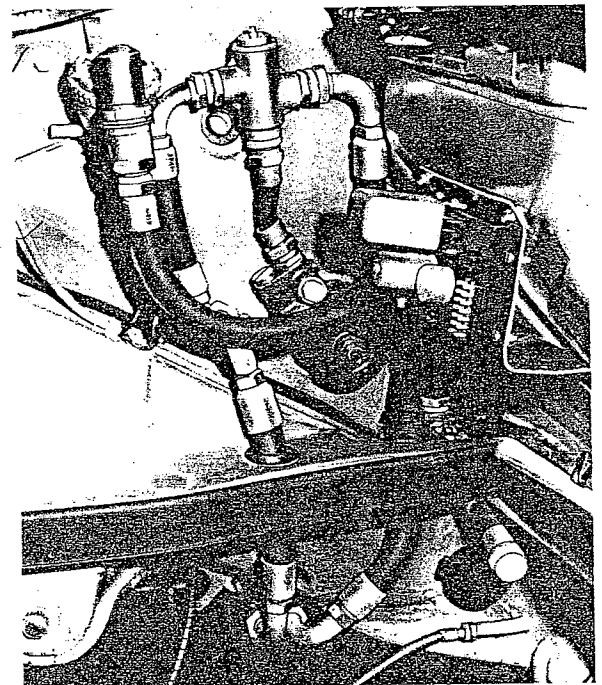
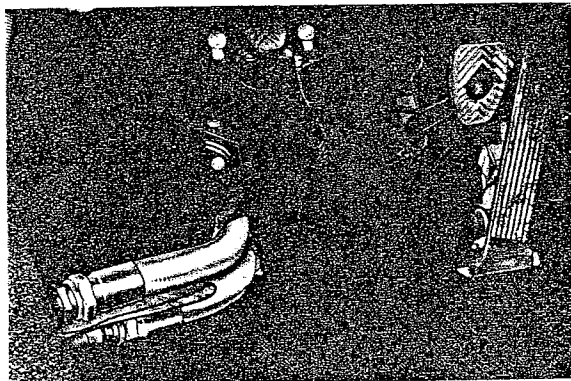
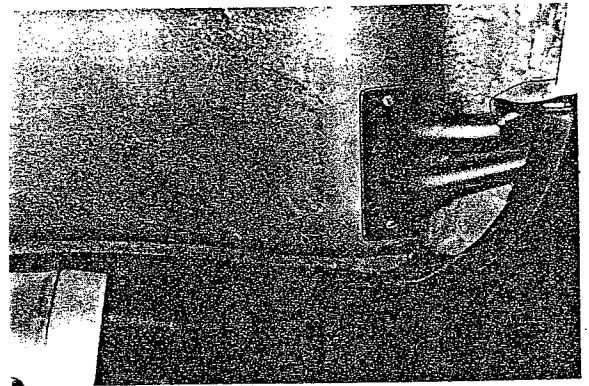
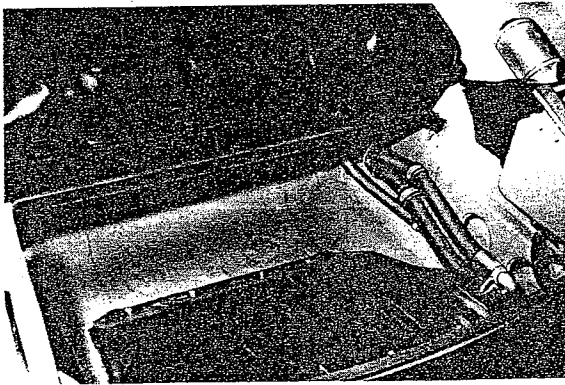
Type	LH Camshaft	RH Camshaft	Inlet valve lift at overlap TDC with 0.10 mm (0.004") valve clearance:	Cam lift	Timing
911 S-C serial	901.105.167.00	901.105.168.00	5,0 mm-5,4 mm	Inlet 37,20 Exhaust 36,30	Inlet opens 38° BDC Inlet closes 50° ABDC Exhaust opens 40° BBDC Exhaust closes 20° ATDC
911 S-C racing engine	901.105.103.23	901.105.104.00	6,8 mm+0,1 mm	Inlet 37,61 Exhaust 36,59	Inlet opens 104° BDC Inlet closes 104° ABDC Exhaust opens 100° BBDC Exhaust closes 80° ATDC
911/20	resp. 901.104.103.00 +				
911/21					
911/22					
914/6 serial	901.105.133.00	901.105.134.00	2,3-2,7 mm	Inlet 36,25 Exhaust 35,51	Inlet opens 15° BDC Inlet closes 29° ABDC Exhaust opens 41° BBDC Exhaust closes 5° ATDC
901/36					
914/6 rally	901.105.123.00	901.105.124.00	5,0-5,4 mm	Inlet 37,2 Exhaust 36,3	Inlet opens 38° BDC Inlet closes 50° ABDC Exhaust opens 40° BBDC Exhaust closes 20° ATDC
901/26					
914/6 racing engine	901.105.103.00	901.105.104.00	6,8± 0,1 mm	Inlet 37,61 Exhaust 36,59	Inlet opens 104° BDC Inlet closes 104° ABDC Exhaust opens 100° BBDC Exhaust closes 80° ATDC
see 911 S-C racing engine					

+ fuel injection version

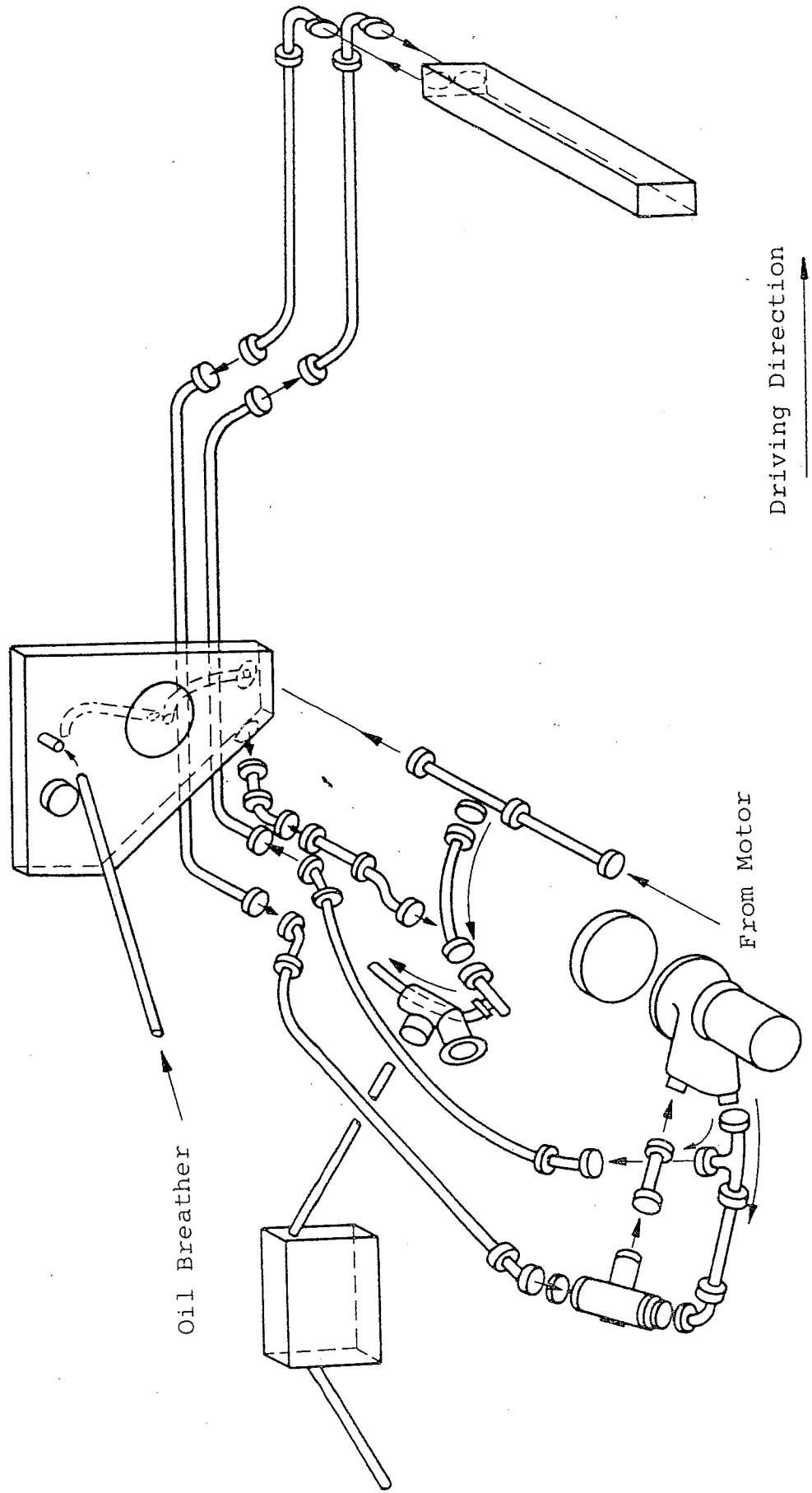
OIL COOLING SYSTEM 914/6

The photographs show the assembly of the oil tubes in the vehicle.

Please find a diagram of the whole oil cycle on the next page.



OIL SYSTEM DIAGRAM 914/6



Oil Breather

From Motor

Driving Direction

2. Gearbox (911 S until model 71, 914/6 all models)

On 911 S from model 1972 a modified gearbox is mounted.

Different pinion sets can be installed to suit the ratios to special racing circuits.

The pinion sets shown below can be installed without modifications in the 911 gearbox.

N O T E :

The 2 nd gear pinion is made in one piece with the mainshaft for the standard gearbox.

Therefore we recommend for use in the competition gearbox, that a drive shaft (for part no. see spare part list 911 S respectively 914/6) with interchangeable 2 nd gear should be fitted.

Pinion sets

1 st gear	11 : 34	i = 3,091
	12 : 34	i = 2,833
	14 : 37	i = 2,643
	15 : 36	i = 2,4
	16 : 35	i = 2,188
2 nd gear	17 : 34	i = 2,0
	18 : 34	i = 1,889
	18 : 33	i = 1,833
	18 : 32	i = 1,778
	19 : 32	i = 1,684
	20 : 32	i = 1,600
	20 : 31	i = 1,550

3 rd gear	20 : 31	i = 1,550
	21 : 31	i = 1,476
	21 : 30	i = 1,429
	22 : 30	i = 1,364
	22 : 29	i = 1,318
	23 : 28	i = 1,217
	24 : 27	i = 1,125

4 th and 5 th gear
(interchangeable)

22 : 29	i = 1,318
23 : 29	i = 1,261
23 : 28	i = 1,217
23 : 27	i = 1,174
24 : 27	i = 1,125
25 : 27	i = 1,080
25 : 26	i = 1,040
26 : 26	i = 1,0
26 : 25	i = 0,9615
27 : 25	i = 0,9259
27 : 24	i = 0,8888
28 : 24	i = 0,8571
28 : 23	i = 0,8214
29 : 23	i = 0,7931
29 : 22	i = 0,7586

Suggestions for transmission ratios

The gearboxes listed below have been suited to specific applications. The individual ratios have been selected to ensure a smooth transition between all gears.

Airfield circuit ratios

Rear axle 6 : 32

1. gear pinion set 14 : 37

2. gear	pinion set	18 : 32
3. gear	pinion set	22 : 29
4. gear	pinion set	26 : 26
5. gear	pinion set	28 : 23

Hill climb ratios

Rear axle 7 : 31

1. gear	pinion set	12 : 34
2. gear	pinion set	18 : 34
3. gear	pinion set	21 : 31
4. gear	pinion set	23 : 28
5. gear	pinion set	25 : 26

Ratios for high speed circuits

Rear axle 7 : 31

1. gear	pinion set	15 : 36
2. gear	pinion set	20 : 32
3. gear	pinion set	23 : 28
4. gear	pinion set	26 : 26
5. gear	pinion set	28 : 23

Nurburgring ratios

Rear axle 7 : 31

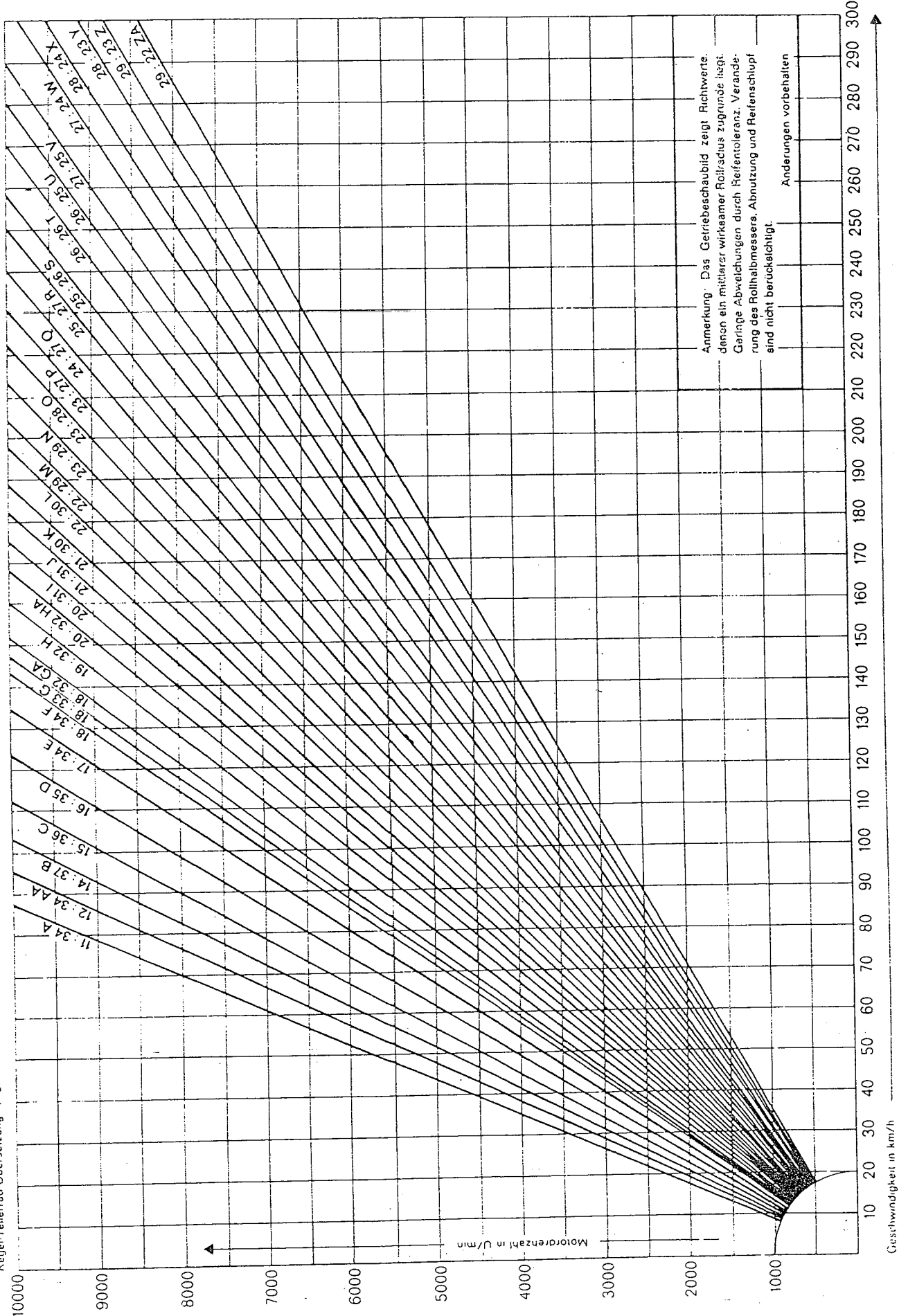
1. gear	pinion set	14 : 37
2. gear	pinion set	20 : 32
3. gear	pinion set	22 : 29
4. gear	pinion set	25 : 27
5. gear	pinion set	27 : 25

Reifengrößen 185/70 VR 15
 4,75/10.00 - 15
 4,75/11.30 - 15

Getriebechaubild



Kegel-Tellerad-Übersetzung 7 31 | 442857



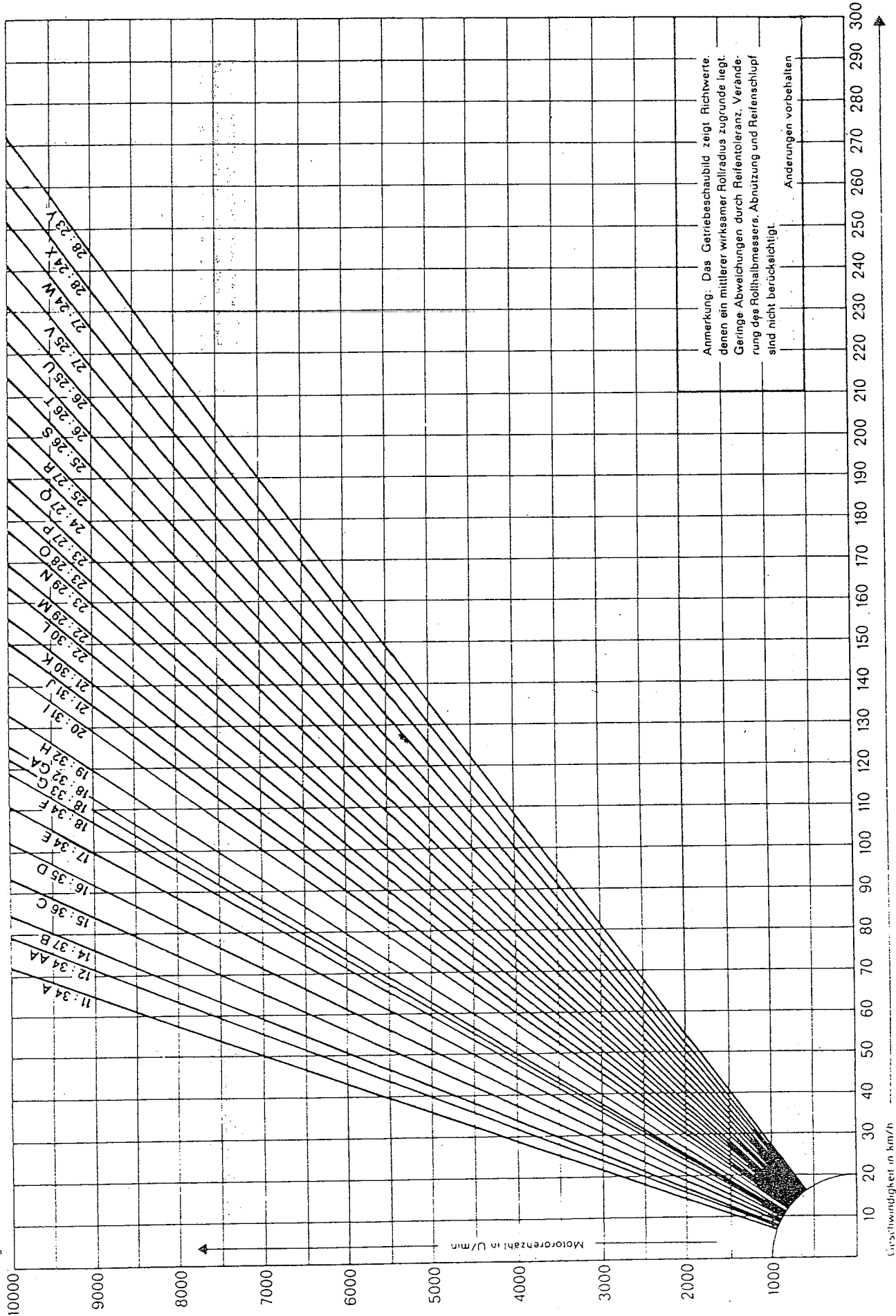
Anmerkung: Das Getriebechaubild zeigt Richtwerte. Geringe Abweichungen durch Fertolanz, Verandring des Rollhalbmessers, Abnutzung und Reifenschlupf sind nicht berücksichtigt.
 Änderungen vorbehalten

Reifengrößen 185/70 VR 15
 4,75/10.00 - 15
 4,75/11.30 - 15

Getriebschaubild



Kegel-Tellerad-Übersetzung 6 32 : 5.333333



Anmerkung: Das Getriebschaubild zeigt Richtwerte, denen ein mittlerer wirksamer Rollradius zugrunde liegt. Geringe Abweichungen durch Reifentoleranz, Veränderung des Rollhalbmessers, Abnutzung und Reifenschlupf sind nicht berücksichtigt.
 Änderungen vorbehalten

On 911 S from model 1972 a new transmission has to be mounted. Please find listed below the gear sets which are available for this transmission. Also note that first gear can only be exchanged together with the drive shaft. The rear axle ratios available are:

7 : 31
7 : 37

	No. of teeth	Spare parts no.
1 st gear	12 : 34	915.302.901.10
	14 : 37	915.302.901.15
	14 : 31	915.302.901.20
	15 : 36	915.302.901.25
2 nd gear	17 : 35	915.302.902.00
	15 : 30	915.302.902.05
	15 : 29	915.302.902.10
	18 : 34	915.302.902.15
	19 : 32	915.302.902.25
	20 : 32	915.302.902.30
3 rd gear	16 : 35	915.302.902.40
	21 : 31	915.302.903.00
	21 : 30	915.302.903.05
	21 : 29	915.302.903.10
	22 : 29	915.302.903.15
4 th gear	20 : 32	915.302.903.25
	23 : 28	915.302.904.00
	24 : 28	915.302.904.05
	25 : 27	915.302.904.15
	27 : 24	915.302.904.30
	25 : 26	915.302.904.20
	26 : 26	915.302.904.25
	27 : 25	915.302.904.40
28 : 22	915.302.904.45	
	29 : 22	915.302.904.50

	No. of teeth	Spare parts no.
5 th gear	26 : 26	915.302.905.00
	27 : 25	915.302.905.05
	27 : 24	915.302.905.10
	28 : 24	915.302.905.15
	28 : 23	915.302.905.20
	28 : 22	915.302.905.25
	25 : 26	915.302.905.35

NOTE

Please find gear ratio charts for the 915 gearbox included at the conclusion of this booklet.

From the gear ratio charts that follow, the theoretical speeds can be determined for various tire sizes and individual gears. In addition it is possible to tell the engine speeds required when shifting gears.

Instructions for use of the gear ratio charts that follow:

If a gearbox is made up for a special course, the following points should be kept in mind:

- 1) The 5 th gear ratio should be selected so that the engine speed at the maximum attainable speed is about 300 rpm below the maximum engine speed.
- 2) The individual gears must be assembled so that the shift point engine speeds are within the optimum torque output of the engine and the shift point revs for the next higher gear should always be higher than for the next lower gear.
- 3) It has been found out in the course of trial runs, that with a gearbox so assembled, one gear is not right for a particular section of the course, fit another tire size (e.g. 5.50 M 15 instead of 5.00 M 15) and then in place of this gear fit the next higher or next lower gear. In any case the instructions under 2 (above) must be taken into account.

CROWNWHEEL AND PINION

The standard crownwheel and pinion installed has a ratio of 7 : 31. This can be replaced, with gearboxes intended only for use on hill climbs, by a crownwheel and pinion set with a 6 : 32 ratio.

Advantages:

By virtue of the greater rear axle reduction, the speed of the axle shafts and thus the road speed is reduced. This means that a higher 5th gear can be fitted which in turn gives greater scope for variation in the other gears.

Limited-slip differential

For participation in sports events we recommend that the normal differential be replaced by a limited-slip differential. The limited slip differential is adjustable and is set at the factory for 80% limiting action. A value of 40 % has been found to be the most suitable after exhaustive tests by our Research Department.

Advantages:

1. No wheelspin on one wheel if there are differences in road surface.
2. When cornering fast, no slip on the inside wheel.

The effects of the limited-slip differential on driving:

The limited-slip differential makes for sharper cornering than with the standard differential (this means that the angle of drift increases). But it has the advantage that the slip on the inside wheel is reduced and thus a higher cornering speed is possible.

Disadvantage in normal use:

Increased tire wear when driving fast.

N O T E :

Newly installed limited-slip differentials can be noisy (rattling); this will pass after a short period of use.

Transmission with limited slip differential

Only Shell gear oil S 17 47 A may be used in transmissions with the limited-slip differential. This oil is only available in 20 liter (5 1/4 US gal. - 4 1/2 Imp. gal.) drums or in larger containers.

N O T E:

This gear oil is marketed:

- in Australia as Shell SCL Gear Oil 90
- in Canada as Shell HDR Gear Oil 90
- in the USA as Shell HDR Gear Oil 90 E.P.

Half-shafts:

The half-shafts must be removed each time after intensive competition use or at least every 10 000 km (6000 miles approx.) for safety reasons, and examined for cracks and play in the universal joints.

3. WHEELS AND TIRES

Rims:

For use in competition light alloy rims at the size of

6 "

7 "

9 "

are available.

Utilization

6 " rim This rim is mounted on 911 S on stan-
dard and on 914/6 for rally purposes +

7 " rim used on 911 S at the front and on
914/6 on all four wheels only in
competition +

9 " rim used on 911 S at the rear axle only
in competition +

+ only in connection with fender enlargements

Mounting of light alloy wheels

In competition considerably higher temperature than in normal driving occurs at the brake disc and at the wheel hub. It can therefore happen that alloy nuts seize up.

We recommend therefore that when fitting alloy wheels for competition use, only steel nuts should be used.

Distance discs and wheel bolts

To compensate different offset depths of the rims, distance discs have to be used.

The following index shows the required thickness of the distance discs when using different rims.

Type	Rim	Distance discs	Wheel bolt
911 S	6 "	front -	48 mm
		rear -	48 mm
	7 "	front 21 mm	72 mm
		rear 21 mm	72 mm
	9 "	rear -	67 mm
914/6	6 "	front 21 mm	72 mm
		rear 21 mm	72 mm
	7 "	front 27 mm	72 mm
		rear 35 mm	85 mm

N O T E :

From production May 1971 no distance discs for 7 " and 9 " rims are necessary.

Tires:

Type 911 S is fitted with tires of size 185/70 VR 15 as standard. On rallies with adequate road conditions these tires can be used on the original rim. The 914/6 can be delivered on standard with tires 165 HR 15 on steel rims 5 1/2 J x 15 or with tire size 185 HR 14 on alloy rims 5 1/2 J x 14.

For competition use the following tire sizes can be used:

<u>Tires</u>	<u>Rim</u>	<u>Assembly</u>
185/70 VR 15 Radial	6 "	911 S fr.+ rear, serial rally 914/6 fr.+ rear, rally
5.00 M 15 Racing	6 "	911 S fr.+ rear 914/6 fr.+ rear
4.75/10.00-15 Racing	7 "	911 S fr.+ rear 914/6 fr.+ rear
4.75/11.30-15 Racing	9 "	911 S rear

Brakes:

The disc brakes on the 911 S model are also adequate for competition use.

We recommend however that for pure competition vehicles and for circuit and long distance racing, competition brake pads should be fitted such as Textar 1431 G. This type of pad is more resistant to wear, but requires a slightly higher pedal pressure.

Furthermore front brake discs constructed out of more resistant material are available under spare part no. 911.351.041.05.

On 914/6 the front wheel brake is completely changed to 911 S. At the rear axle brake discs with corresponding brake callipers are also used.

Brake fluid:

For racing we recommend the use of high boiling brake fluid, such as Girling Amber Brake Fluid or ATE racing brake fluid. These brake fluids have a higher boiling point than the standard ones and are more suitable for the high temperatures occurring in racing. They do have the disadvantage however that rubber components in the braking system are corroded more rapidly; they are also more hygroscopic than normal brake fluids.

N O T E:

For this reason the brake fluid has to be changed more frequently.

4. ADJUSTMENTS TO RUNNING GEAR ON COMPETITION VEHICLES

Before modifying the standard settings of a vehicle one should decide for what purpose the vehicle will be used.

Here, as with increasing the power output of the engine, one should decide as follows:

1. occasional minor competitions
2. rallies
3. hill climbs (pure competition vehicle)
4. circuit racing (pure competition vehicle)

In addition one must take into account the sacrifices in comfort involved in modifications of the running gear for competition purposes.

Any modifications to improve the running gear for the purpose in question will only be justified if a variety of operations are carried out, simultaneously and are carefully matched together.

Shock absorbers

The first requisite for good roadholding is shock absorbers that function properly.

We recommend for competition purposes that adjustable shock absorbers, for example Koni (fitted as standard on the 911 S) should be used. They have the advantage that they can be adjusted for any course involved.

Recommendations for shock absorber adjustment (Koni):

(NOTE: Shock absorbers must be run in for at least 500 km = 300 miles!)

1. For occasional minor competitions we recommend that the factory setting be retained.
2. Rallies - here it is not possible to lay down general value as the road conditions differ too widely at the different meetings.

We would however point out that a car that sits too low and shock absorbers adjusted to too hard a setting are unsuitable for bad roads and snow.

3. Hill climbs (vehicle set lower) - the shock absorbers may be adjusted to harder settings.

For properly surfaced concrete or tarmac roads:

front : 1/2 turn up (shock absorber previously screwed back to stop)

rear : 1/4 turn up

For roads with occasional unevenness:

front : 3/4 turn up

rear : 1/2 turn up

4. Circuit courses (vehicle to sit lower) -

For concrete tracks, for example Hockenheim

- front : 1/4 turn up
rear : 1/4 turn up

For courses with uneven surfaces, as for example Nurburg Ring, individual setting is necessary; this can be determined during practice.

N O T E :

Here it is best to start with a fairly soft setting and gradually progress to harder settings.

Recommendation : front approx. 3/4 turn up
rear approx. 1/2 turn up

Stabilizers

Stabilizers influence the cornering characteristics with regard to oversteer or understeer.

This makes it possible to adjust the cornering characteristics according to tires and other requirements by means of various combinations of stabilizers. (When using racing tires , understeer on the 911 is greater than with radial tires).

The following combinations of stabilizers have been established by our Research Department for all 911 vehicles:

	911 S	914/6
front:	15 Ø	15 Ø
rear	16 Ø	14 Ø

The following is a guide for other combinations of stabilizers:

larger stabilizer at the front	= increased understeer
smaller stabilizer at the front	= reduced understeer
larger stabilizer at the rear	= increased oversteer
smaller stabilizer at the rear	= reduced oversteer

Changing a stabilizer will of course have an effect on both axles, that is to say on the cornering characteristics of the whole vehicle and not only on the self-steering effect of one axle.

Lowering the vehicle

The factory setting of the torsion bars has been selected to give the best possible compromise between long spring travel (softer springing, better driving comfort) and lowered center of gravity.

For a competition vehicle a center of gravity as low as possible is more important than actual physical driving comfort. For this reason one must take into consideration the type of roads and the desire to go as low as is technically possible and is permitted by the rules. The regulation in question here reads as follows:

(Article 253 of Appendix J of the International Automobile Sport Regulations)

" The car, filled with the quantity of fuel required for the competition and with all other liquid containers full - driven by engine power and steered by the driver in the driving seat - must be able to clear a gauge measuring 80 x 80 cm and having a height of 100 mm. "

In addition to this requirement of the Automobile Sport Regulations the limit in lowering the vehicle is set by the fact that a certain spring travel must always be present. For this reason one should not lower a vehicle further than recommended in the table which follows.

a) Lowering the rear:

1. Jack up car and remove rear wheels.
2. Disconnect shock absorbers at the rear axle trailing arm, after first taking the load off with a jack.
3. Disconnect stabilizer from the rear axle trailing arm.
4. Lower the jack (first unscrew the rear bottom bolt, looking in direction of travel) from the cover of the torsion bar, as otherwise the radius arm will rest on this bolt).
5. Remove cover from torsion bar.
6. Disconnect radius arm from rear axle guiding arm.
7. Adjust radius arm to the new value.
8. As approximate value for lowering a vehicle the following values can be used:

Torsion bar	height of the vehicle	setting angle of the struts
23 mm Ø	2 - 3 cm lower	33° +
23 mm Ø	5 - 6 cm lower	30° ++

+ for road and occasional competition use

++ only for competition use

9. Reassembly should take place in the reverse order.

N O T E :

The radius arm gauge VW 245 a must be extended for this purpose to cover a range of adjustment of 40° . The setting of the radius arm should be based on the horizontal axis of the vehicle; any inclination of the vehicle when jacked up or any departure from horizontal in the floor must be taken into account.

After the vehicle has been lowered at the rear, drive a few miles before adjusting the front axle to allow the rubber bushes of the radius arms to seat properly.

b) Lowering the rear 914/6

On Bilstein- and Koni shock absorbers the spring plates are hold by means of security rings. For these security rings grooves are turned in an interval of 15 mm in the shock absorbers. For adjusting the vehicle height the security rings are fixed in the corresponding groove.

The Koni shock absorbers of an earlier production are delivered with spacers of 30, 20 and 15 mm. These spacers are placed below the spring plate. With a distance disc of 30 mm the height movement corresponds the standard.

When using thinner spacers the vehicle can be lowered correspondingly. As approximate value 15 mm can be accepted.

On rallies and on bad roads the vehicle can be set higher by means of a 15 or 20 mm spacer.

c) Lowering the front 911 S

Set the vehicle on plane surface (optical measurement device) and measure the height adjustment at the rear wheels. (Measure b (rear axle crosstube center to wheel center) see workshop manual).

By turning out the adjusting screw for the torsion bar the vehicle can be lowered at the front for the rear measured amount.

d) Lowering the front 914/6

The displacement of the front axle takes place in the same way as for 911 S with 60 l fuel in the tank.

Technical data chassis

	911 S	914/6
camber front	0 to 30'	- 20 ' to 30 '
rear	- 1°10 ' to 1°30 '	- 30 ' to 40 '
toe-in front	0 ± 10 '	0 ± 10 '
rear	0 ± 10 '	0 ± 10 '
castor	6° to 7° 30 '	6° to 7°

EPILOG

Warranty

When using vehicles for competition purposes the extract of the warranty specifications is valid which says that for all damages which occur as a result of overstressing in practice or because of participation in sports events of any kind, warranty is then out of question.

In addition the guarantee is inapplicable to any damage occurring or premature wear the cause of which can be attributed to subsequent modification and conversion of the vehicle in question.

Warning:

Parts for competition equipment are special production items and are therefore in limited supply.

Important note:

None of the data in this brochure overrules the provisions of the licensing authorities.

Each vehicle owner is himself responsible for the fact that his vehicle when used in public traffic, complies with the requirements of the country in question.

Printed in Germany

Stuttgart - Zuffenhausen

DR.ING.H.C.F.Porsche KG

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