

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

W 351e

911 911 L 911 T 911 S

BOB BIRD MOTORS
8835 CUYAMACA ST.
SANTEE, CALIF. 92071
448-6757 or 287-1707
PRESTIGE NEW & USED CARS

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PORSCHE PRODUCTION COMPETITION CARS 1968

Vehicle types: 911, 911 T, 911 L, 911 S

Engine types: 2000, 2000 T, 2000 S, 2000 R

With the beginning of the 1968 sports season the 911 T has been homologated in Group 3 GT up to 2000 cc. In addition, the modifications on the 68 model have been homologated for the 911 and 911 S.

By virtue of the fact that in 1968 the European Touring Cup has been thrown open to Group 5 - Special Touring Cars, the use of the 911 and 911 L (homologated in Group 2 - Touring Cars) will be of interest in this group, as in practice an engine as fitted in the Carrera 6 and 911 R can be used.

Thus the following categories will apply to our vehicles:

1. Type 911 Touring Car Group 2
 or with corresponding modifications
 Special Touring Cars Group 5
 (up to 2000 cc = 122.05 cu.in.)
2. Type 911 L Touring Car Group 2
 or with corresponding modifications
 Special Touring Cars Group 5
 (up to 2000 cc = 122.05 cu.in.)
3. Type 911 T GT Group 3 up to 2000 cc = 122.05 cu.in.
4. Type 911 S GT Group 3 up to 2000 cc = 122.05 cu.in.

So that competition drivers who are buying a new car will be able to enter this car in accordance with the requirements of the sporting organizations, the 911 L and 911 T are offered for sale with rally equipment and the necessary accessories which can be ordered with the new car, as follows:

For the 911 L: (for use of the vehicle in Group 2)

Kit No. 9552 consisting of:

Recaro competition seat or Recaro bucket seat
in place of standard seat,
Rubber mats instead of carpeting,
Stabilizers front and rear (15/15 mm = 0.591/0.591"),
Koni shock absorbers,
Dunlop SP tires,
Engine type 2000 R (901/30), 150 bhp with flywheel and
clutch for racing use,
Oil level and oil pressure gauge as 911 S,
Front bumper lightened

Price DM 2.100.--
For delivery in W. Germany + Added Value Tax

For the 911 T: (for use of the vehicle in Group 3)

Kit No. 9553 consisting of:

Body fitted out for competition purposes,
No underseal,
Lightened soundproofing,
Front bumper without reinforcement
and without overriders,
Deletion of trim strips from both bumpers as well as
from under door frame,
Interior trim only in synthetic leather, black,
Simplified door trim, door lock operation
and rear seat back rests,
Black instrument panel

The following are deleted:

Ashtray, cigarette lighter, interior light
and sun visor for passenger

Recaro bucket seat (optional Recaro competition seat
at no extra cost),
Leather steering wheel,
Halogen main headlights,
Engine type 2000 S (901/02), 160 bhp,

Lightened flywheel and
 strengthened clutch for racing use,
 Reinforced engine mountings ,
 Oil level and oil pressure gauge,
 Competition Kit I included loose (installation will give
 approx. 10 bhp additional engine power),
 5-speed gearbox with ratios:
 11:34, 18:34, 22:29, 25:26, 29:23
 Rear axle ratio: 7:31

Chassis:

Stabilizers front and rear 15/15 mm (0.591/0.591"),
 Koni shock absorbers,
 Air cooled brake discs,
 Dunlop tires - SP CP 57 "C",
 Lowered chassis,
 Unpolished aluminum rims

Price DM 5.150.--
 For delivery in W. Germany + Added Value Tax

In addition the following parts can be ordered with the new car:

Gearboxes with non-standard ratios: DM 420.--
 These are fitted with sliding shaft (additional
 which permits changing of all pinions. charge)

Kit No.

9591	HILL CLIMB 12:34, 17:34, 20:32, 22:29, 23:28	
9592	AIRFIELD CIRCUIT 12:34, 18:34, 21:31, 23:28, 25:26	
9593	NURBURG RING 14:37, 20:32, 22:29, 25:27, 27:25	
9594	SUSTAINED HIGH SPEED RACING 15:36, 20:32, 23:28, 26:26, 28:23	
		(Additional charge)
9499	100 liter (26.4 US gal. / 22.0 Imp. gal.) tank	DM 270.--
9574	Limited slip differential	DM 340.--
9182	Interior light for passenger	DM 70.--

9210	Spare parts pocket fitted on inside of front partition	(Additional charge) DM 115.--
9521	Rear towing hook	DM 20.--
9561	Front stone guard	DM 60.--
9562	Stone guard for engine and gearbox	DM 150.--
9563	Footrest	DM 20.--
9554	800 watt alternator	DM 40.--
9228	Rear stabilizer 16 mm (0.630") instead of 15 mm (0.591")	
9535	Roll bar	DM 250.--

Prices for delivery in W. Germany + Added Value Tax

Only for 911 L: (with the 911 T included in the Rally kit)

Kit No. 9541 Soundproof undersealing deleted (10 kg = 22 lb)
 Kit No. 9542 Soundproof matting deleted (15 kg = 33 lb)
 (no price increase or reduction)

For vehicles which will be used only for competition purposes
 you will find in the subsequent text instructions regarding parts
 and recommendations for increasing performance.

NOTE

These modifications may put the vehicle outside the licensing
 requirements of the individual local authorities which will mean
 that it can no longer be used in public traffic.

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.

The ideal basic type for competition engines is the Type 2000 engine which is homologated in the 911 S and 911 T in Group 3 - GT Cars up to 2000 cc - and the Type 2000 R engine which is homologated in the 911 L in Group 2 - Touring Class Cars.

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

1. As a general purpose engine which is to be used only now and then in small competitions but will otherwise be used in normal road traffic.
2. As a rally engine.
3. As a racing engine which will be used for racing purposes only.

1. General purpose engine for occasional competition use

Here the limit is set by the fact that the engine will also be used for normal road use and extensive performance increase will be uneconomical.

a) 911 T and 911 S (GT Group 3)

We recommend that the engine be fitted with competition Kit II which is available under Part No. 901.100.907.00 and will give about 15 bhp additional power.

This competition kit can also be fitted for normal use with the standard exhaust system, i.e. the engine is driven normally with the standard exhaust and will be fitted with the racing exhaust included in the kit only for use on closed circuits.

This engine with approx. 170 bhp (standard exhaust) retains the characteristics of the standard 2000 S engine, i.e. the risk of fouling the plugs in town traffic is hardly any greater.

The Competition Kit for this engine is classified in Germany with the standard exhaust for factory installation in the 911 S. In the event of subsequent installation the modification (in Germany) must be reported to the licensing authorities concerned.

b) 911, 911 L (Touring Cars Group 2)

Here we recommend installation of the 150 bhp rally engine which can be used in public traffic.

The engine complies with the requirements of the regulations for Group 2 Touring Cars and differs from the 130 bhp engine of the 911 L in the following respects:

Camshaft of 2000 S engine
Pistons of 2000 S engine (give higher compression)
Competition clutch

Carburetors are Weber 40 IDS 3 C/3 C 1 with the following settings:

Main venturi	34 mm dia.
Main jet	135
Compensating jet	185
Idling jet	55

The valve timing is as with the 2000 S.
Ignition setting: 30° BTDC at 6000 rpm.

Externally the 2000 R engine differs from the 2000 and 2000 S engines in that it has a black air intake and Weber carburetors of type 40 IDS. (The 2000 engine has a black air intake and Weber carburetors of type 40 IDA, the 2000 S engine has a red air intake and Weber carburetors of type 40 IDS.)

For the 2000 R engine there is a competition kit which gives approx. 10 bhp additional power; it may not be used in public traffic.

901.100.923.00

Competition Kit for 150 bhp Rally engine
consisting of:

901.100.978.03	Main jet 145	
901.108.820.00	Cover plate	2
901.107.083.00	Oil collection tank	1
644.628.091.00	Retainer strap	1
901.107.394.00	Breather hose	1
901.107.656.00	Fixing bracket	2
900.075.015.02	Hexagon bolt M 6 x 20	2
900.027.014.01	Spring washer B 6	2
900.076.010.02	Hexagon nut M 6	2
901.111.153.00	Bracket for outlet pipe	1
901.111.193.00	Seal	2
901.111.035.00	Outlet pipe, left	1
901.111.036.00	Outlet pipe, right	1
900.027.015.01	Spring washer	4
900.075.078.02	Hexagon bolt M 8 x 15	4

2. Rally engine

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

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

Because a racing engine cannot 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 basic engine is the 2000 S for Group 3 (911 T/911 S) and the 2000 R for Group 2 (911/911 L) the following work can be carried out:

1. Fitting of a competition clutch with lightened flywheel and thrust plate with increased thrust pressure.
2. Polish and line up inlet manifold.
3. Polish inlet ports in cylinder head.
4. Lower valves.
5. Increase compression ratio to 9.8:1 (on 2000 engine).
6. Fit Competition Kit I.
7. Fit competition exhaust.

NOTE:

No general operating permit is available for these engines; they must be approved for use in public traffic under Art. 19 of the Road Traffic Law by the Technical Examination Institute or a special operating permit according to the requirements of other countries must be obtained.

3. Racing engine

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 2000 S):

a) 911 S and 911 T GT Group 3

1. Carburetors type 46 IDA 3 C/3 C 1 -

These carburetors give better cylinder filling in conjunction with the following parts.
(Standard equipment on 911 R and Carrera 6).

2. Larger cross-section inlet manifolds -

These inlet manifolds are homologated and are necessary for the above mentioned carburetors.

3. Carrera 6 camshafts -

As the camshafts in Groups 2 and 3 are not restricted, these Carrera 6 shafts can be fitted to the 2000 S engine. They give, by virtue of increased overlap ("wilder" valve timing) and increased valve lift, improved filling and increased power in the upper engine speed range.

(For comparison, see Table of Camshafts, p.15)

NOTE:

The Carrera 6 camshaft is lubricated by an oil hose through the chain case, while the camshaft of the 2000 S engine is lubricated via the camshaft housing.
Conversion is possible.

4. Titanium con rods -

These con rods are lighter in comparison with the steel con rods and are much tougher. They give therefore lower loading on the bearings and the crankshaft. In addition the acceleration masses are reduced.

NOTE:

The titanium con rods are only homologated in the 911 T, not in the 911 S.

5. Carrera 6 pistons

These pistons give a higher compression and in addition have larger recesses for the valves, which is necessary when using the Carrera 6 camshafts.

CAUTION:

These pistons should only be fitted in conjunction with light alloy cylinders and are therefore only available as spares together with the corresponding cylinders.

6. Exhaust system

For the racing engine the most suitable exhaust system is the complete one fitted to the 911 R. Installation is basically possible, but some modifications must be made.

7. Plugs

BOSCH W 265 P 21 spark plugs must be used for this engine.

8. Oil collection tank

An oil collection tank must be fitted in the right rear corner of the engine compartment to take the breather hose.

9. Clutch

A reinforced clutch must be fitted for the increased engine power; this is available as a replacement part with a lightened flywheel.

10. Cylinder head

The inlet and exhaust ducts must be aligned with the inlet manifolds and exhaust flanges and polished.

To achieve as large an intake and exhaust cross-sectional area as possible, the valves can be set lower in their seats.

To raise the compression to about 10.4:1 the cylinder heads must be planed by 0.8 mm (0.0315"). Another possibility is to turn 0.8 mm (0.0315") off the cylinders. (This is the maximum, otherwise there is the risk of the valves hitting the piston.)

NOTE:

Modified parts cannot be accepted in exchange.

b) 911, 911 L Touring Car Group 2 (Basic engine 2000 R)

1. 40 IDS 3 C/3 C 1 Carburetors

These carburetors are fitted as standard equipment on the 2000 R and 2000 S engines and should be set as follows:

Venturi	34 mm dia.
Compensating jet	185
Main jet	145
Idling jet	55

Install carburetor screen plates in place of the air filter.

2. Intake manifolds -

Machine these to cylindrical cross section as far as possible, polish and match up to cylinder heads and carburetors.

3. Camshaft

The camshaft (as with 911 S) can be left in its existing form.

4. Cylinder heads

The intake and exhaust ducts must be matched up to the intake manifolds and the exhaust flanges and polished.

To achieve the maximum possible intake and exhaust cross sectional area the valves can be set lower in their seats.

5. Cylinders

To raise the compression to about 10.2:1, the cylinder heads must be lowered by 1.0 mm (0.0394") or the cylinders must have 1 mm (0.0394") machined off.

NOTE:

Modified parts cannot be accepted for exchange.

6. Exhaust system

For the racing engine of the 911/911 L, cone-shaped pipes must be fitted in place of the standard muffler.

7. Plugs

BOSCH W 265 P 21 spark plugs must be used with this engine.

8. Oil collection tank

An oil collection tank must be fitted in the right rear corner of the engine compartment to take the breather hose.

9. Clutch

A competition clutch is fitted to the 2000 R engine as standard.

General (All Models):

Engine support

A strengthened engine support must be fitted to all vehicles whose engine performance has been increased.

Generator

For competition purposes there is a generator with increased output (900 W). It offers special advantages for rally vehicles because these are usually fitted with several extra lights and additional electrical accessories.

Carrera 6 clutch in the 911/911 S

During the course of the 1967 racing season it was found that the Carrera 6 clutch in the 911 and 911 S has no advantages over the 911 and 911 S competition clutch. In addition the Carrera 6 clutch has been found from experience not to be as hard wearing.

We recommend therefore that the Carrera 6 clutch should no longer be used in the 911 and 911 S vehicles for the following reasons:

1. The Carrera 6 clutch has the same contact pressure (about 600 kg = 1325 lb) as the 911 S competition clutch.
2. The drive plate of the Carrera 6 has been matched to the considerably lower weight of the Carrera 6 as compared with the 911 and 911 S and therefore has a lining with a lower coefficient of friction.
3. The Carrera 6 clutch (complete with flywheel) is only about 1 kg (2.2 lb) lighter than the competition clutch of the 911 and 911 S.

When working on the clutch it should be noted that the Carrera 6 clutch cannot be fitted to the 911/911 S flywheel and vice versa.

Engine oil

The general recommendation for the 2000 S engine is SAE 20 brand-name HD oil. For the racing engine however we recommend that Valvoline Racing Motor Oil SAE 40 be used. This oil can be used for racing purposes in all the other 911 engines.

Oil cooling

An additional oil heat exchanger must be installed on racing engines for cooling the engine oil.

1. 911 Group 5

Here an oil cooling system must be fitted as on the 911 R.

2. 911 T, 911 S

For circuit and long distance racing an oil cooling system as on the 911 R must likewise be installed.

3. For rallies and hill climbs

An additional oil heat exchanger can be installed on all types under the front fender.

Winter use of engines equipped with Sports Kit

On all engines equipped with the Sports Kit or without an air filter which are driven in cold weather conditions, a pre-heater must be fitted to prevent icing up of the carburetors.

Another alternative is to use the filter housing without the element and to connect the original pre-heating system to it.

C a m s h a f t s :

Type:	LH Camshaft:	RH Camshaft:	Inlet valve lift at overlap TDC with 0, 10 mm (0, 004") valve clearance:	Cam lift:	Timing:
Engine 901/01 with central lubrication up to engine No. 903 069	901.105.109.01	901.105.110.01	4, 2 - 4, 6 mm (0, 1654 - 0, 1811")	Inlet 37, 2 mm (1, 4646") Exhaust 36, 5 mm (1, 4370")	Inlet opens 29° BTDC Inlet closes 39° ABDC Exhaust opens 39° BBDC Exhaust closes 19° ATDC
Engine 901/01 with splash lubrication from engine No. 903 070 - 907 000	901.105.109.04	901.105.110.04	4, 2 - 4, 6 mm (0, 1654 - 0, 1811")	Inlet 37, 2 mm (1, 4646") Exhaust 36, 5 mm (1, 4370")	Inlet opens 29° BTDC Inlet closes 39° ABDC Exhaust opens 39° BBDC Exhaust closes 19° ATDC
Engine 901/02 for 911 S from engine No. 960 001 onwards	901.105.123.00	901.105.124.00	5, 0 - 5, 4 mm (0, 1969 - 0, 2126")	Inlet 37, 2 mm (1, 4646") Exhaust 36, 3 mm (1, 4291")	Inlet opens 38° BTDC Inlet closes 50° ABDC Exhaust opens 40° BBDC Exhaust closes 20° ATDC
Engine 901/03 for 911 T from engine No. 208 0001 onwards	901.105.133.00	901.105.134.00	2, 3 - 2, 7 mm (0, 0906 - 0, 1063")	Inlet 36, 25 mm (1, 4227") Exhaust 35, 51 mm (1, 3978")	Inlet opens 15° BTDC Inlet closes 29° ABDC Exhaust opens 41° BBDC Exhaust closes 5° ATDC
Engine 901/05 for 911 with Weber carburetor from engine No. 907 001 - 909 927	See engine 901/01 splash lubrication	See engine 901/01 splash lubrication	4, 2 - 4, 6 mm (0, 1654 - 0, 1811")	Inlet 37, 2 mm (1, 4646") Exhaust 36, 5 mm (1, 4370")	Inlet opens 29° BTDC Inlet closes 39° ABDC Exhaust opens 39° BBDC Exhaust closes 19° ATDC
Engine 901/06 with new heat exchangers from engine No. 911 001 onwards	901.105.109.05	901.105.110.05	3, 0 - 3, 3 mm (0, 1181 - 0, 1299")	Inlet 36, 5 mm (1, 4370") Exhaust 36, 2 mm (1, 4252")	Inlet opens 20° BTDC Inlet closes 34° ABDC Exhaust opens 40° BBDC Exhaust closes 6° ATDC
Engine 901/07 for 911 L with Sportomatic	See engine 901/06 * NOTE	See engine 901/06	3, 0 - 3, 3 mm (0, 1181 - 0, 1299")	Inlet 36, 5 mm (1, 4370") Exhaust 36, 2 mm (1, 4252")	Inlet opens 20° BTDC Inlet closes 34° ABDC Exhaust opens 40° BBDC Exhaust closes 6° ATDC
Engine 901/08 for 911 S with Sportomatic	See engine 901/02 * NOTE	See engine 901/02	5, 0 - 5, 4 mm (0, 1060 - 0, 2126")	Inlet 37, 2 mm (1, 4646") Exhaust 36, 3 mm (1, 4291")	Inlet opens 38° BTDC Inlet closes 50° ABDC Exhaust opens 40° BBDC Exhaust closes 20° ATDC
Engine 901/17 for 911 L (USA) with exhaust gas emission control and Sportomatic	901.105.139.00 * NOTE	See engine 901/06	3, 0 - 3, 3 mm (0, 1181 - 0, 1299")	Inlet 36, 5 mm (1, 4370") Exhaust 36, 2 mm (1, 4252")	Inlet opens 20° BTDC Inlet closes 34° ABDC Exhaust opens 40° BBDC Exhaust closes 6° ATDC

Type:	LH Camshaft:	RH Camshaft:	Inlet valve lift at overlap TDC with 0.10 mm (0.004") valve clearance:	Cam lift:	Timing:
Engine 901/14 for 911 (USA) with exhaust gas emission control	901.105.139.00	See engine 901/06	3.0 ± 3.3 mm (0.1181 ± 0.1299")	Inlet 36.5 mm (1.4370") Exhaust 36.2 mm (1.4252")	Inlet opens 20° BTDC Inlet closes 34° ABDC Exhaust opens 40° BBDC Exhaust closes 6° ATDC
Engine 901/20 for "Carrera 6"	901.105.103.00	901.105.104.00	6.8 ± 0.1 mm (0.2677 ± 0.0039")	Inlet 37.61 mm (1.4805") Exhaust 36.59 mm (1.4407")	Inlet opens 104° BTDC Inlet closes 104° ABDC Exhaust opens 100° BBDC Exhaust closes 80° ATDC
Engine 901/22 for 911 R	See engine 901/20	See engine 901/20	6.8 mm ± 0.1 mm (0.2677 ± 0.0039")	Inlet 37.61 mm (1.4805") Exhaust 36.59 mm (1.4407")	Inlet opens 104° BTDC Inlet closes 104° ABDC Exhaust opens 100° BBDC Exhaust closes 80° ATDC
Engine 901/30 for 911 L Rally	See engine 901/02	See engine 901/02	5.0 ± 5.4 mm (0.1969 ± 0.2126")	Inlet 37.2 mm (1.4646") Exhaust 36.3 mm (1.4291")	Inlet opens 38° BTDC Inlet closes 50° ABDC Exhaust opens 40° BBDC Exhaust closes 20° ATDC

* NOTE:

On engines for Sportomatic 2 adaptor sleeves (Part No. 900.095.017.00) should be driven into the front of the LH camshaft. These serve as dogs for the torque converter oil pump.

2. GEARBOX

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

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

NOTE:

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

We recommend therefore in the case of the gearboxes which are to be used for competition purposes that a drive shaft (for Part No. see summary) with interchangeable 2nd gear should be fitted.

P i n i o n s e t s :

1st 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
2nd 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
3rd 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

4th and 5th gear	22:29	i = 1.318
(interchangeable)	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 smooth transitions between all gears.

AIRFIELD CIRCUIT RATIOS (911, 911 S) Rear axle 7:31

1st gear	pinion set	12:34
2nd gear	"	18:34
3rd gear	"	21:31
4th gear	"	23:28
5th gear	"	25:26

HILL CLIMB RATIOS (911, 911 S) Rear axle 7:31

1st gear	pinion set	12:34
2nd gear	"	17:34
3rd gear	"	20:31
4th gear	"	22:29
5th gear	"	23:28

NURBURG RING RATIOS (911, 911 S) Rear axle 7:31

1st gear	pinion set	14:37
2nd gear	"	20:32
3rd gear	"	22:29
4th gear	"	25:27
5th gear	"	27:25

RATIOS FOR HIGH SPEED CIRCUITS (911, 911 S) Rear axle 7:31

1st gear	pinion set	15:36
2nd gear	"	20:32
3rd gear	"	23:28
4th gear	"	26:26
5th gear	"	28:23

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 5th 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. If it is found in the course of trial runs that with a gearbox so made up 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.

Crown wheel 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:

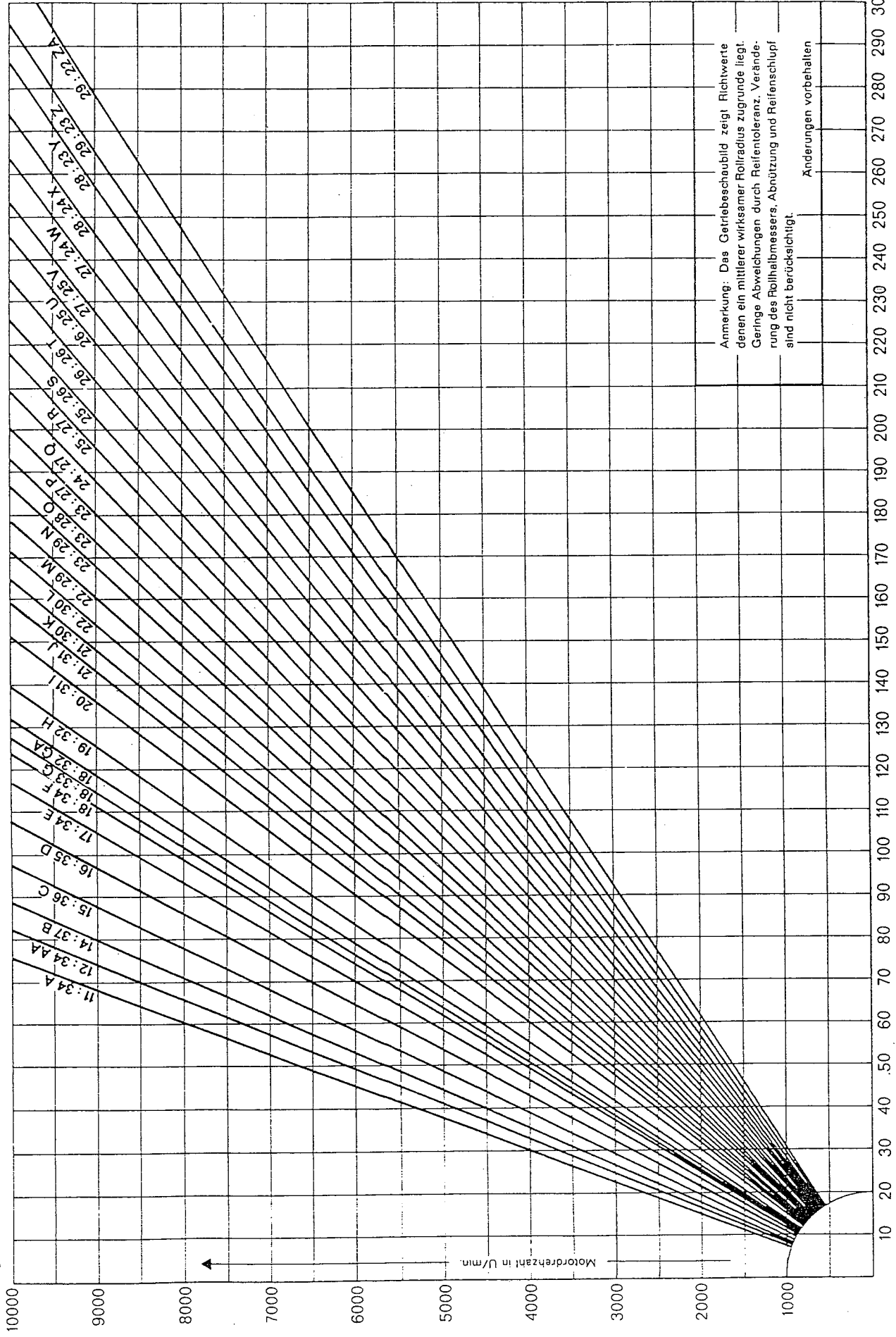
By virtue of the greater rear axle reduction, the speed of the axle shafts and thus the road speed is reduced. This means that a higher 5th gear can be fitted which in turn gives greater scope for variation in the other gears.

POFFSCHNE

Getriebeschaubild

Kegel-Teillerrad-Übersetzung 6 : 32 I - 5.3333333

Reifengröße 5.50-15 r_{dyn} = 332 mm



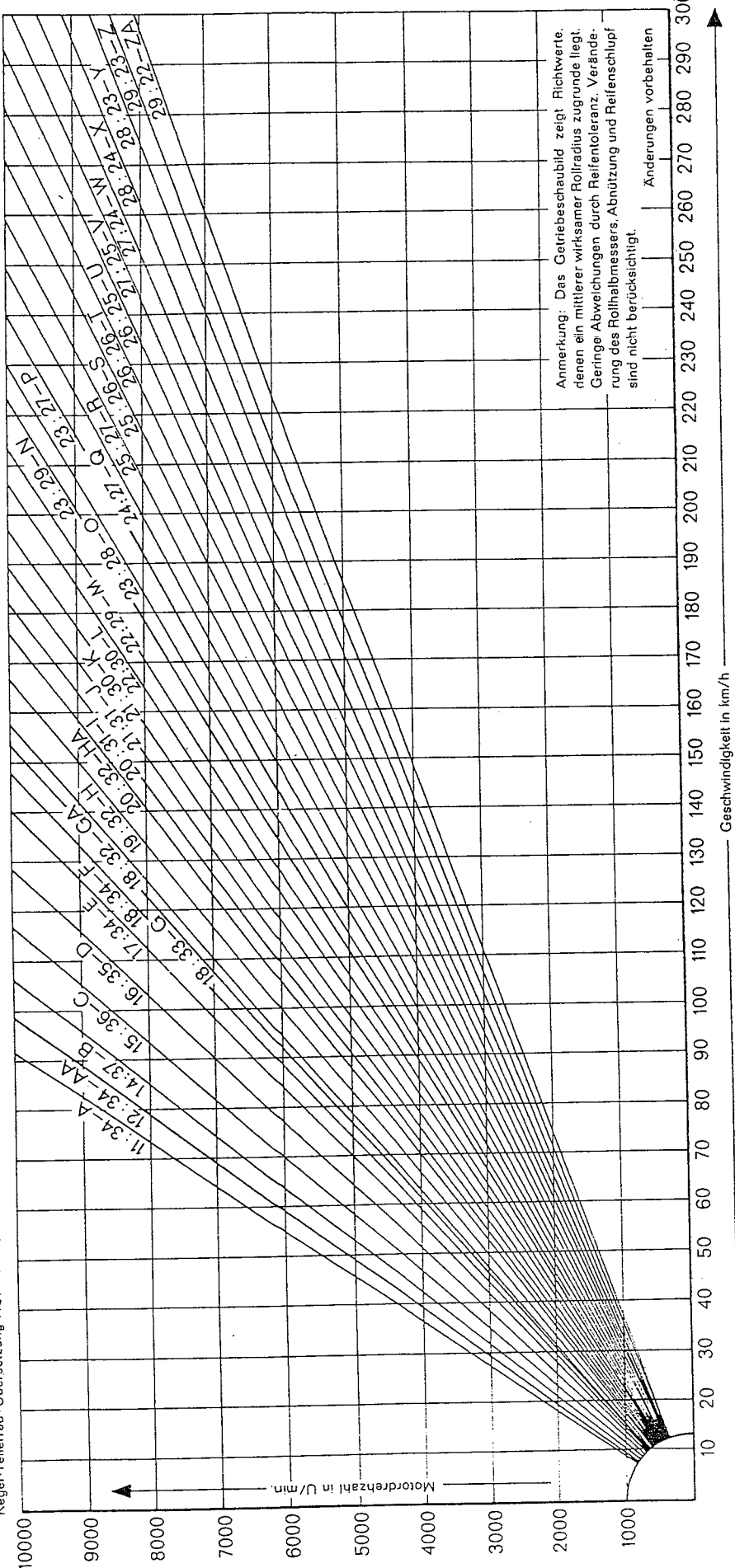
Anmerkung: Das Getriebeschaubild zeigt Richtwerte denen ein mittlerer wirksamer Rollradius zugrunde liegt. Geringe Abweichungen durch Reifentoleranz, Veränderung des Rollhalbmessers, Abnutzung und Reifenschlupf sind nicht berücksichtigt.
Änderungen vorbehalten

Getriebeschaubild



Reifengröße: 5.50 - 15 r_{dyn} - 332 mm

Kegel-Teilerrad-Übersetzung 7:31 | - 4.42857



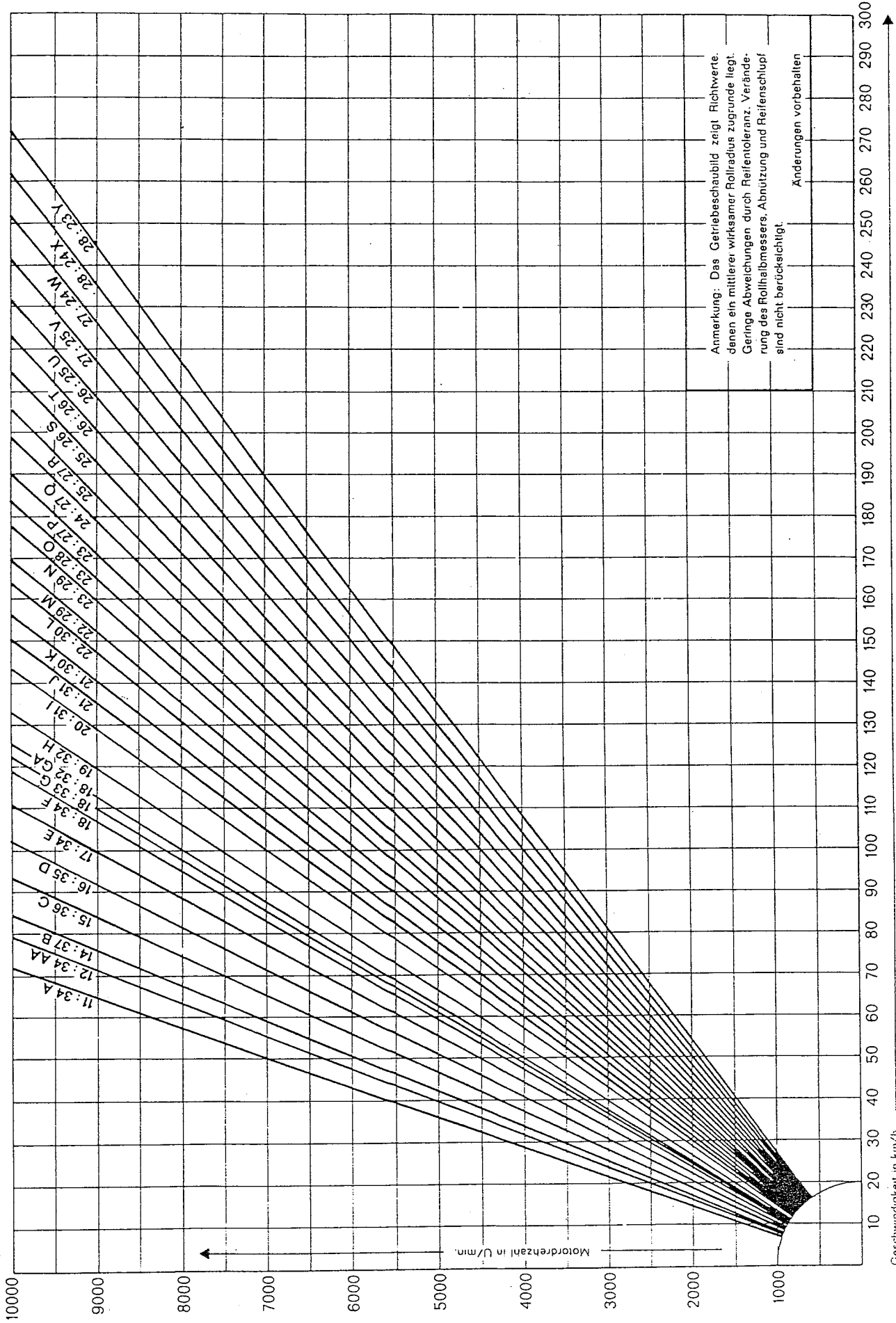
Anmerkung: Das Getriebeschaubild zeigt Richtwerte.
 denen ein mittlerer wirksamer Rollradius zugrunde liegt.
 Geringe Abweichungen durch Reifentoleranz, Veränderung
 des Rollhalbmessers, Abnutzung und Reifenschlupf
 sind nicht berücksichtigt.
 Änderungen vorbehalten

POPSCHIE

Getriebeschaubild

Kegel-Tellerrad-Übersetzung 6 : 32 | = 5.3333333

Reifengröße 4.75/10.00 - 15 r_{dyn} = 315 mm



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

Änderungen vorbehalten

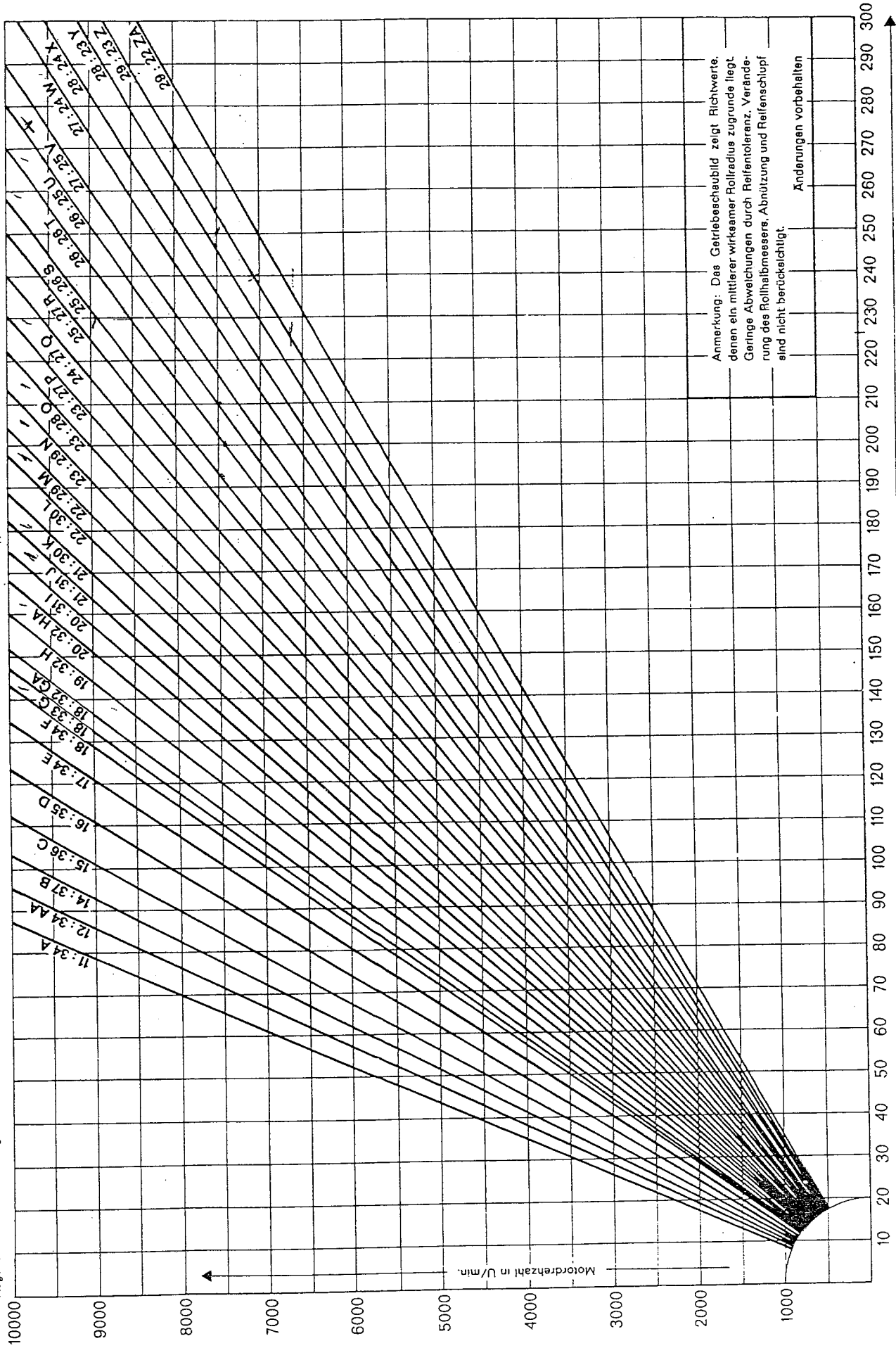
Geschwindigkeit in km/h

POFFSCHNE

Getriebeschaubild

Kegel-Tellerrad-Übersetzung 7:31 $i = 4.42857$

Reifengröße 4.75/10.00-15 $r_{dyn} = 315 \text{ mm}$



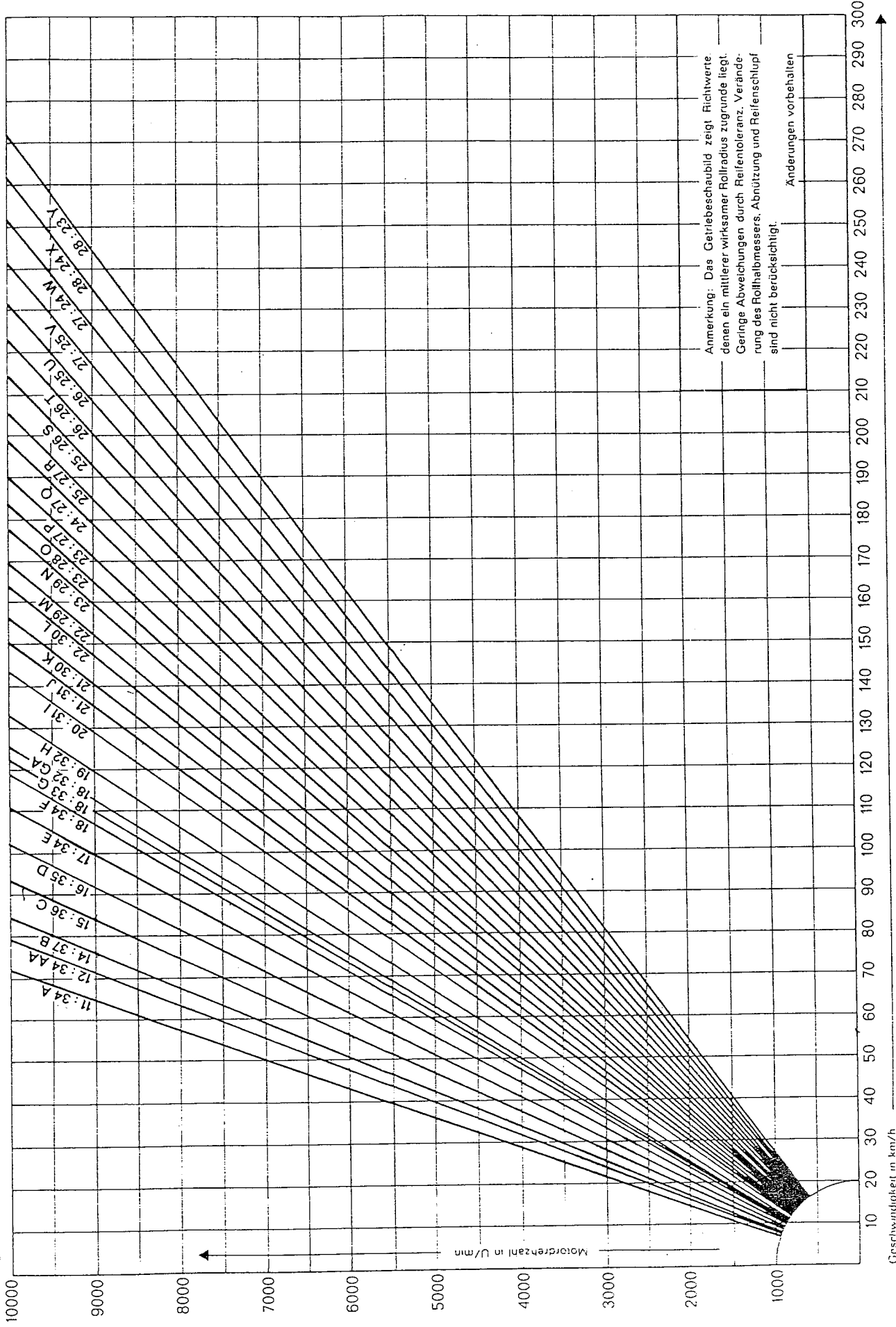
Anmerkung: Das Getriebeschaubild zeigt Richtwerte, denen ein mittlerer wirksamer Rollradius zugrunde liegt. Geringe Abweichungen durch Reifentoleranz, Veränderung des Rollhalbmessers, Abnutzung und Reifenschlupf sind nicht berücksichtigt.
Änderungen vorbehalten

PORSCHÉ

Getriebeschaubild

Kegel-Teilrad-Übersetzung 6 : 32 | 5.333333

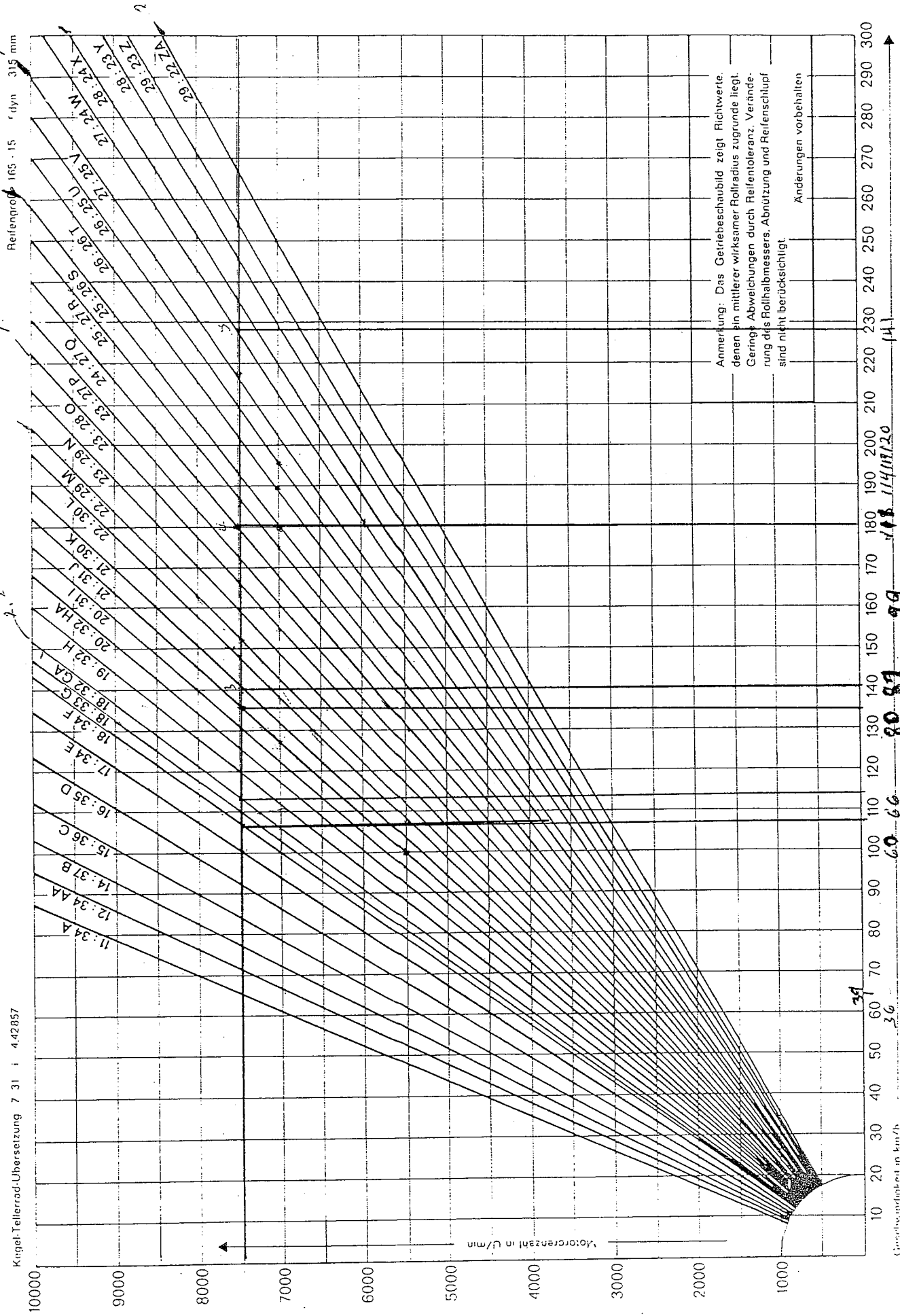
Reifengröße 165 - 15 r dyn : 315 mm



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

Geschwindigkeit in km/h

Kugel-Tellerrad-Übersetzung 7 31 i 4.42857



Motorzahl in U/min

Getriebschwindigkeit in km/h

36 60 66 80 89 99 114 120

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 50% limiting action. This value 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.

Disadvantages in normal use:

Increased tire wear when driving fast.

NOTE:

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

Instructions for subsequent installation:

1. The limited-slip differential can only be installed in conjunction with Nadella universal-joint half shafts.
2. Different flanges must be fitted for attachment of these half-shafts to the limited-slip differential.

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.

NOTE:

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:

Reinforced Nadella universal-joint shafts are available as a replacement part for competition use.

The half-shafts must be removed each time after intensive competition use or at least every 10000 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 we recommend for safety and weight saving reasons the mounting of forged alloy rims. They are available in the following sizes:

4 1/2"
5 1/2"
6"
7"

NOTE:

To maintain the homologated track only front hubs with widths 40 mm (1.575") (up to the '68 model) and 47 mm (1.850") (starting with the '68 model) can be used (measured from the outside of the brake disc to the rim seating).

Utilization

1. 4 1/2" rims

The 4 1/2" rim is not recommended for use with racing tires. It is therefore not used by the factory in competition, but is suitable for use with studded tires (standard equipment up to 1968 model).

2. 5 1/2" rims

The 5 1/2" is fitted as standard, starting with the 1968 model. It is suitable for racing tires up to 5.50 L-15 size and can also be used on models prior to 1968.

With the 5 1/2" rim a track of 1367 mm (53.82") at the front and 1339 mm (52.72") at the rear has been type-standardized and homologated.

Vehicles starting with the '68 model have a hub 7 mm (0.276") wider at the front than the previous 911 models and a 7 mm (0.276") spacer at the rear.

For this reason, on vehicles before the '68 model which are to be fitted with 5 1/2" rims, 7 mm (0.276") spacers as well as longer wheel bolts should be fitted front and rear.

3. 6" rims

Racing tires up to size 5.50 M-15 can be mounted on the 6" rim.

When fitting these rims one should make certain that there is at least 10 mm (0.394") clearance in all positions between wheel and wheel arch. (Check steering lock at the front and compression of springs!)

For the 6" rim a track of 1379 mm (54.29") at the front and 1351 mm (53.19") at the rear is homologated.

When installing, longer wheel bolts must be used.

Spacer: For vehicles starting with Model A - mm front
- mm rear

For vehicles up to Model A	7 mm front (0.276")
	7 mm rear (0.276")

NOTE:

The 6" rim is not type-standardized and is therefore not approved for use in public traffic.

4. 7" rims

For the 911 T, 911 S and 911 L (in Group 5) the 7" rim has been homologated and approved for use on the rear wheels. With this equipment the vehicles have a rear track of 1365 mm (53.74").

For the 7" rim, 27 mm (1.063") spacers and longer wheel bolts must be used.

Use of rims of different widths:

As the German text of the Appendix J of the International Sports Motoring Law is unclear in contrast to the French and the English original text, a decision was obtained on the basis of an enquiry as follows:

In clarification of Art. 260, Sect. g, it is stated that all the rims used on a vehicle must be the same size (diameter and rim width).

Example: One may not therefore fit 5 1/2" rims on the front and 6" rims on the rear.

An exception is made in respect of the 7" rim which is homologated at the rear on the 911 T and 911 S in conjunction with wider fenders, and can also be used on the 911/911 L in Group 5.

Use of alloy wheels

In competition considerably higher temperatures occur at the brake disc and the wheel hub in normal driving. 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.

Tires:

All Type 911 vehicles are fitted with tires of size 165 VR x 15 or 165 HR x 15 as standard. For racing use, racing tires of the following sizes can be mounted:

- 5.00 M-15 front and rear on 6" rims
- 5.00 L-15 front and rear on 5 1/2" or 6" rims
- 5.50 M-15 only at the rear on 6" or 7" rims

NOTE:

The use of racing tires is only recommended if corresponding modifications are carried out on the running gear.

Inflation pressures: (guide values for standard tires)

For rally and normal use front 1.8 atm (26 psi), rear 2.0 atm (28 psi)
For racing use front 2.2 atm (31 psi), rear 2.4 atm (34 psi)

Brakes:

The disc brakes on the 911 models 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, that is to say for the solid disc the Ferodo DS 11 pad and for the ventilated brake disc the Textar 1431 G pad. These pads are more resistant to wear, but require slightly higher pedal pressure.

Brake fluid

For racing use we recommend the use of high boiling point brake fluid, such as Girling Amber Brake Fluid or ATE Racing brake fluid in place of the standard 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.

CAUTION:

For this reason the brake fluid must 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 modification 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
rear: 1/4 turn up to stop)

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.

NOTE:

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 as regards 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:

For circuit racing: front 16 mm (0.630") dia.
rear 16 mm (0.630") dia.

For hill climbs: front 14 mm (0.551") dia.
rear 16 mm (0.630") dia.

For rallies: front 15 mm (0.591") dia.
rear 16 mm (0.630") dia.

(With 23 mm (0.906") torsion bars at the rear)

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 aims according to the type of roads and the application 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 (31.496 x 31.496 ") and having a height of 100 mm (3.937")."

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 value obtained from the table.
8. Reassembly should take place in the reverse order.

NOTE:

The radius arm gauge VW 245a 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 front

Place the vehicle on a level surface (optical alignment ramp) and measure the height setting of the rear wheels. (For dimension b see the accompanying setting table or Repair Guide.)

The difference obtained here will give the amount in mm by which the rear of the vehicle is lower and by how many mm the front end must therefore be lowered.

By unscrewing the setscrew on the torsion bar the vehicle can be lowered at the front by the difference measured at the rear. The distance should be measured with the aid of the accompanying setting table.

c) Optical alignment check

The vehicle can then be adjusted in accordance with the accompanying dimension chart.

Instructions for the use of the setting diagram that follows:

Working from the known degree of axle loading (marked off along the horizontal axis) move vertically upwards until the intersection with one of the lines running from bottom left to top right is reached (depending on type of course). Move upwards from this point of intersection to the next radius arm setting figure in degrees.

FRONT AND REAR AXLE HEIGHT ADJUSTMENT
WITH RADIUS ARM ADJUSTMENT ANGLES

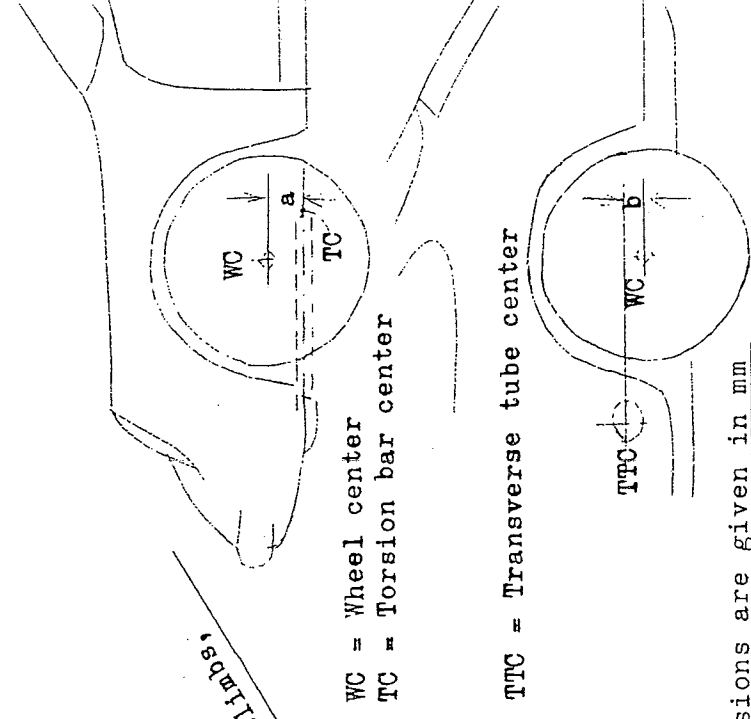
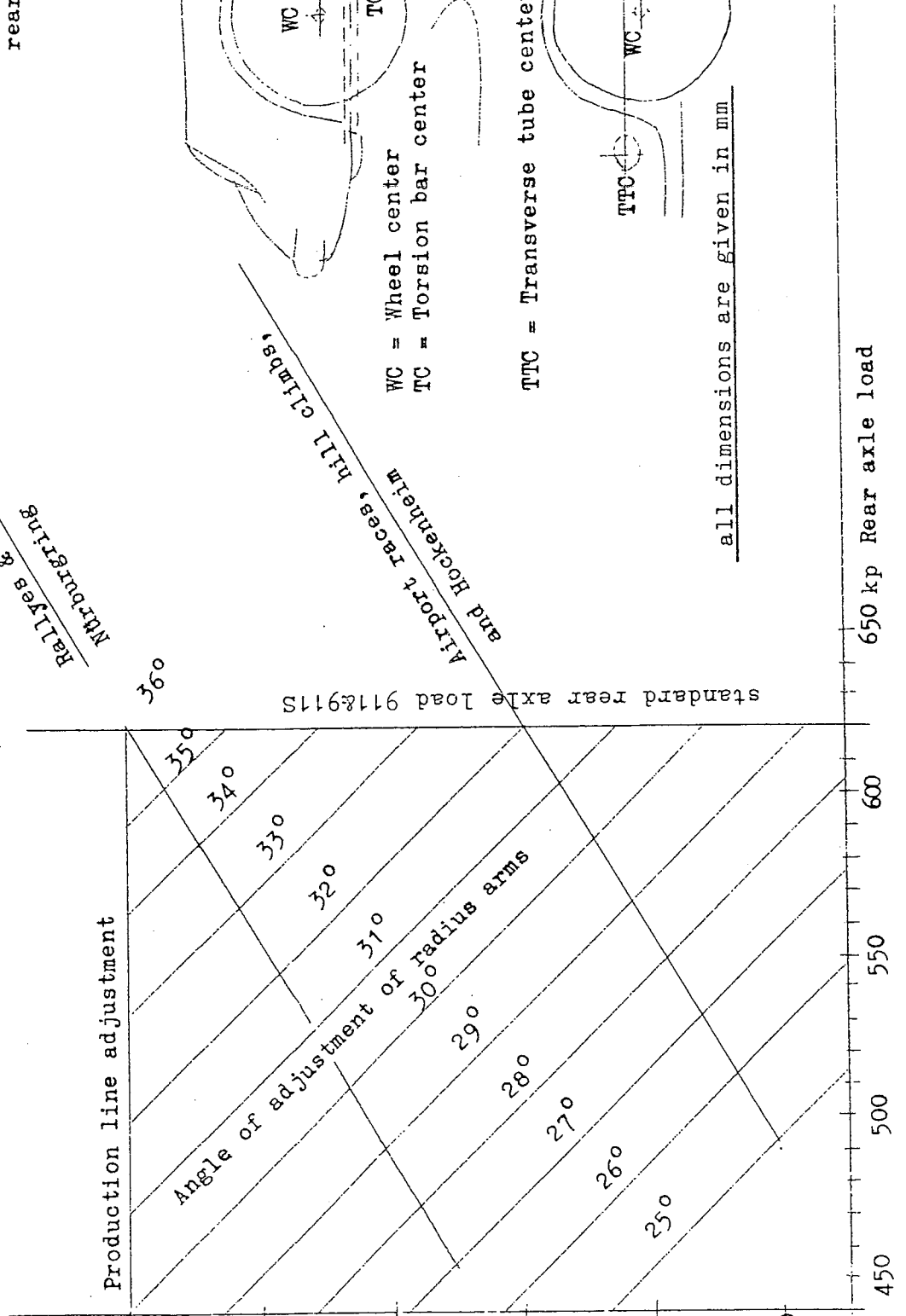
TYPE 911 and 911S

Standard torsion bars, front 18.8 dia.
rear 23.0 dia.

Front axle a = TC to WC
108 12 above
118 2 above
128 8 below
138 18 below
148 28 below
158 38 below

Rear axle b = TTC to WC
12 12 above
2 2 above
8 8 below
18 18 below
28 28 below
38 38 below

Lower, in mm



WC = Wheel center
TC = Torsion bar center
TTC = Transverse tube center

all dimensions are given in mm

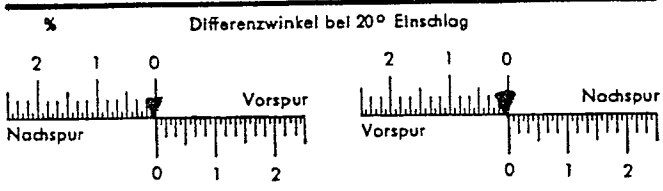
650 kp Rear axle load

Name: Fahrzeug: PORSCHE Typ 911 und 912
 Fg. Nr.: Pol. Kennz.: km:
 Datum: vermessen durch:

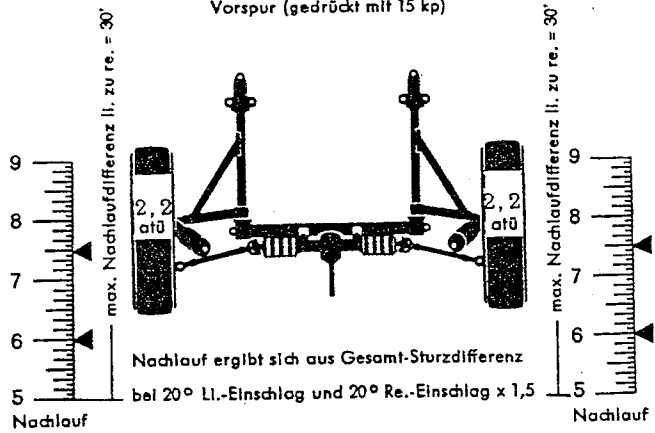
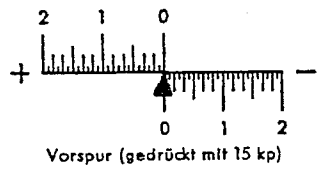
FAHRZEUG-MESSKARTE

Reifen:
 Fabrikat:
 Zustand:

Es gilt:
 15" Felge:
 10' = 1,2 mm
 1° = 7,2 mm

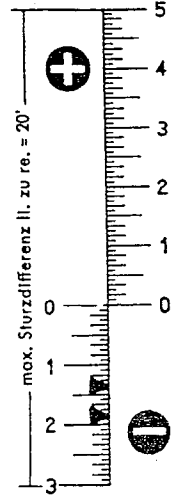
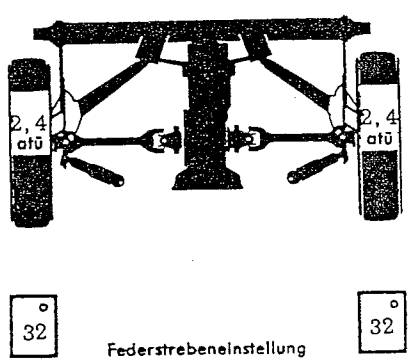
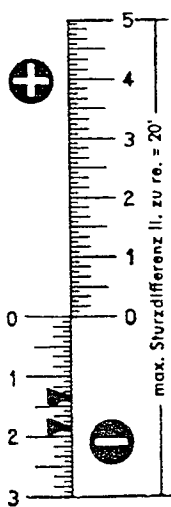


Fahrzeug i.
 Leergewicht
 n. DIN 70020
 Stoßdämpferbein
 Verstell-Richtwert:
 1 mm = 6'



Sturz

Sturz



5. ACCESSORIES

Fuel tank

In place of the standard fuel tank, one with a capacity of 100 liters (26.4 US gal./22.0 Imp.gal.) can be fitted. The 100 liter tank will fit onto the mountings for the standard tank, but it will be necessary to install a different transmitter unit and fuel gauge as well as a different front compartment mat. The capacity of the trunk will be somewhat reduced by this modification.

NOTE:

Make sure that the tank breather pipe is installed free of kinks as otherwise rapid filling will not be possible (this is very important on long distance events).

Driver and passenger seats

The driver and passenger seats can be replaced by competition or bucket seats. Make sure that the seats are not lighter than permitted by the homologation sheet.

Vehicle weight

Vehicles participating in competitions must have the following vehicle weights as prescribed by the FIA Homologation Sheet:

974 kg (2147 lb) for the 911, 911 L and 911 S

923 kg (2035 lb) for the 911 T

To take into account production tolerances it is necessary for each vehicle to be checked before use in competitions for any variation from the homologation weight, and if necessary adjusted by the following means:

- a) Weight increase by installation of accessories.
- b) Weight reduction by removal of underseal and soundproof coating, bumper reinforcements, additional petrol/electrical heating units.

Roll bars

For competition and racing use of the 911 T, 911 L and 911 S there is a roll bar which can be ordered on the vehicle as a production option under M-No. 9535 and is obtainable for subsequent installation under Part No. 901.803.021.21.

The following parts are necessary for subsequent installation:

Qty.	Description	Part No.
1	Roll bar	901.803.021.21
1	Plate, drilled and tapped, left	901.803.231.21
1	Plate, drilled and tapped, right	901.803.232.21
8	Hexagon bolts M 10 x 15, DIN 933, galvanised	900.075.035.02
8	Spring washers B 10 DIN 127, phosphor bronze	900.027.016.01
2	Washers A 8.4 DIN 9021-St galvanised	900.151.004.02
2	Locking plate 8.4 DIN 93-St	900.020.004.01
2	Hexagon bolts M 8 x 20 DIN 933-8G	900.075.085.02

NOTE:

Subsequent installation is only possible starting with the following chassis Nos:

305 796	(911, 911 S)
354 436	(912 Porsche body)
459 161	(912 Karmann body)

Instructions for subsequent installation:

1. Remove back rests.
2. Remove carpet, floor covering and soundproofing strips on left and right body members behind door frame.
3. Screw drilled and tapped plates onto roll bar.
4. Insert roll bar and bolt on the stays pointing to the rear (looking in the direction of travel) at the back rest fixing points.
5. Line up roll bar with threaded plates on the side members and position threaded plates on the side members with oxyacetylene welds.

6. Remove roll bar; oxyacetylene weld threaded plates. (Caution when welding: paint, soundproofing material and carpets are highly inflammable!)
7. Cut out carpets at the point of attachment of the threaded plates so that the roll bar can rest directly on the threaded plate.
8. Replace soundproofing strips, floor covering and carpets, and cement in place.
9. Bolt roll bar to the threaded plates and back rest attachment points.

Widening rear fenders

(Homologated for 911 T, 911 L and 911 S)

When adding wider rims it is advisable to extend the wheel cutouts at the rear.

For this purpose there are shields under Part No. 901.325./326.00 which can be fitted in the right and left wheel arches.

Stoneguards

For rallies we recommend that the front end of the car as well as the engine and gearbox should be protected against scraping of the underbody and stones being thrown up.

Front end stone guard

To protect the steering, front axle and fuel tank a stone guard is available under Part No. 901.201.081.00 (size about 600 x 600 mm = 23.6 x 23.6").

Engine and gearbox stone guard

A stone guard is available under Part No. 901.385.035.00 for engine and gearbox.

NOTE:

The stone guard will fit existing attachment points front and rear. Oil change on gearboxes and engine are possible without removal of the stoneguard.

Co-pilot's interior light M-No. 9182

This is a rally-tested light with a flexible connection. The light can be bent to any desired angle and position and is a considerable help on night drives for map-reading, etc. (can be fitted as a production option).

Installation instructions

The light is screwed onto the right windshield pillar directly over the instrument panel. A holder for the flexible arm when not in use is bolted under the light fixing; this is also fitted on the windshield pillar.

Quartz-iodine foglights

Foglights are a great help for clearer vision not only in sports events but in bad weather generally. We recommend use of quartz-iodine foglights. (Can be fitted as a standard production option)

Additional headlights and spotlights (Types and use)

In addition to the standard lighting equipment there are also various lights for subsequent installation.

1. Quartz-iodine headlights (With low and high beam)

They give a better light output than the normal headlights and are fitted as standard on the 911 S and the 911 T in rally trim.

2. Wide beam spotlights

They function in a similar way to foglights but serve mainly to illuminate the right or left side of the road as well as the road surface itself for a short distance to help distinguish potholes and sudden changes in road surface more easily.

3. Long range lights

Lights of this type have the same function as the high beams of the headlight. They cast a pencil beam over a slightly longer distance.

Recommendations for the installation of additional lights

For daylight racing events we do not recommend the installation of any additional lights.

For rallies and long distance races which are carried out by day and night we recommend that two wide beam and two long-range lights be installed (this will necessitate an 800 W generator).

NOTE:

1. Where the events take place on public roads, the Police and Road Traffic Regulations of the country concerned must be observed.
2. Article 260a of the International Automobile Sport Regulations contains the following requirement for vehicles of Groups 2 and 3 in respect of lighting equipment:
"Additional lights are permitted provided that a total of 6 is not exceeded (parking lights not included). They may be attached to the front of the body or the front structure, but the apertures provided for the lights must be completely filled."

Rear partition with tool and spares pocket, 911/911 S

For the handy carrying of tools there is a tool and spares pocket that can be mounted on the rear panel of the driving compartment. (Can be supplied as standard production option)

Foot rest for driver's left foot (911/911 S)

To support the driver's left foot a plate can be fitted on the left wheel arch next to the clutch pedal which provides sufficient support for the left foot. The foot rest can be ordered under Part No. 901.501.825.00.

HOMOLOGATION

To avoid frequent questions regarding the classification of our vehicles, we give below an extract from Appendix J of the International Automobile Sport Regulations:

1. Touring Cars Group 2

Article 258 - Definitions:

Cars in limited production which can be improved with the intention of making them more suitable for competition. The permitted modifications and additions are listed in Art. 260.

This group also includes cars of Group 1 which have modifications or additions over and above the permitted limits for Group 1. These cars will then enjoy all concessions granted to Group 2.

Article 259 - Minimum number and number of seats:

With Touring Cars at least 1000 completely identical cars must have been produced in 12 consecutive months. They must have at least 4 seats; cars with a total displacement of less than 700 cc (42.72 cu.in.) may also be supplied by the maker as a 2-seater.

Article 260 - Permitted modifications and additions:

Apart from the modifications allowed for cars of Group 1, the following are additionally permitted for cars of Group 2:

a) Lighting equipment:

Additional lights are permitted if the total number of 6 is not exceeded (parking lights not included). They can be mounted on the front of the body or the front structure, but the apertures provided for them must be completely filled by the lights.

b) Ignition:

Exchange of the generator for an alternator is permissible on condition that the method of attachment and drive remain unaltered.

c) Boring out cylinders:

Cylinders may be bored out by up to 1.2 mm (0.0472") over the original diameter, but the total displacement for the Class may not be exceeded. This oversize bore dimension will apply to engines with and without cylinder liners.

d) Stabilizers:

The fitment of a stabilizer is permitted.

e) Fan:

No restrictions.

f) Air filters:

May be removed or changed.

g) Fuel pump:

A mechanically driven pump may be replaced by an electrically driven one and vice versa.

h) Oil filter and oil cooler:

Oil filters and/or oil coolers may be installed or, if already installed, may be modified.

i) Carburetors:

The carburetor(s) fitted by the maker may be replaced by one or more of different bore on condition that the number remains the same as provided by the maker, it or they can be attached directly to the connecting flanges of the engine, without amendment or deformation, without the use of any connecting piece and using the original bracket components.

j) Springs (valves, clutch, wheel suspension, etc.):

May be replaced by others regardless of make, but still maintaining the number of springs provided by the car manufacturer. They must however be capable of installation without modification of the original supports provided by the maker.

k) Transmission:

Any gearbox with manual or automatic shifting and every axle ratio designed and supplied by the maker for the type in question, permitted for homologation and mentioned on the test sheet, may be used.

The replacement of clutch control (foot pedal) or foot control by an automatic device, regardless of the working principle, is permissible.

l) Differential:

May have a device to restrict or limit its normal function. This device must be shown on an additional sheet to the test sheet (Alternative versions).

The use of a device for the total locking of the differential (locking differential) is not permitted as a pure alternative. To be so it must be used in all the cars in the minimum series necessary for homologation.

m) Pistons and camshafts:

Pistons may be lightened, modified in shape or replaced by others supplied by the maker or another firm.

Camshafts may also be modified or exchanged regardless of origin or maker.

n) Modification to the compression:

Modification to the compression by machining the corresponding engine components or the use of different thicknesses of head gaskets or the omission of gaskets is permitted.

o) Exhaust system and mufflers:

No restriction as to make and type. The original exhaust manifold or the exhaust pipes of the individual cylinders as far as their junction and in particular the shape of the manifold flanges at the engine may not, however, be modified.

The noise emission level of the muffler must in every case conform to the official requirements of the country in which the competition is taking place.

p) Reconditioning, improvements:

All tuning work by means of improvement and polishing of the original parts, but not their replacement by parts of different manufacture, with the exception of springs, pistons and camshafts, is described in Para. i) and j). In other words, standard production parts may be modified by aligning, balancing, lightening, reduction in size or change in shape provided that it is possible at any time to establish origin of the production component beyond doubt. Not permitted are addition of material, any form of mechanical stretching or any treatment which will produce a change in properties (molecular structure) or the surface of the metal.

q) Wheels and rims:

Must comply with the dimensions laid down by the maker and shown in the Test Sheet.

One and the same type of car may be equipped with wheels of different design and rims of different size. Even if, however, these different designs are listed on the Test Sheet, the four wheels of the car must always have the same dimensions.

r) Brakes:

The installation of a duplex brake master cylinder or any device which permits the brakes to act either simultaneously on all four wheels or differently on front and rear wheels is permitted.

The make and attachment of the linings are not subject to any restrictions, but there should be no other modification. In particular the swept area must remain unchanged.

The installation of brake servo systems is permitted.

s) Steering wheel and front seats:

The steering wheel and the front seats may be changed, but the exchange seats must be the same weight as the original seats.

t) Pipes and electric cables:

It is permitted to modify the layout provided by the maker as regards pipes for liquids and ventilation, and electric cables.

2. GT Cars Group 3

Article 261 - Definition:

Cars produced in small quantities for the use of customers seeking optimum performance and/or maximum comfort without particular regard for economy.

Article 262 - Minimum number and number of seats

With GT Cars at least 500 completely identical cars must have been produced in twelve consecutive months. They must have at least two seats.

Article 263 - Modifications and/or permissible additions:

These are exactly the same as for Group 2 (Touring Cars).

3. Special Touring Cars Group 5

Externally the body may not be modified above the center of the axles.

The material of the side and rear windows may be changed from glass to a plastic material, but may not be less than 5 mm or 3/16" thick. The windshield must be of safety glass. The bumpers may be removed. (But all remaining sharp edges on the bodywork must be covered.)

No other form of body modification is permitted.

In the driving compartment (passenger compartment) of the car no modifications may be carried out on trim components and mechanical equipment, such as window cranks etc., although the carpets and mats may be removed. If a roll bar is fitted it may be built into the trim or rear seats, but it must nevertheless comply with the safety requirements of Art. 253, Appendix J.

The instrument panel, the steering wheel, the seats, etc., may of course be modified in accordance with Group 1 and 2 of Appendix J. Those parts of the body which are not visible, such as wheel suspension, engine compartment and the inside of the boot may be modified. In doing this of course no parts may be removed, nor may the shape of the car be modified internally or externally.

On the mechanical side, apart from the original cylinder block, clutch housing, gearbox housing and rear axle, which must be original, anything is permitted. In addition the above-mentioned housings may be modified to accommodate other parts. As long as the camshaft remains in the original position, the cylinder heads and the intake and exhaust ports may be modified. By original position is meant the position in the engine block or cylinder head (s).

The exhaust system including the exhaust manifold is not subject to any restrictions. On the other hand Group 5 vehicles must comply with the road traffic requirements for events on public roads. The number and types of bearings (roller or plain bearings) must be the same as the original.

The stroke and bore may be modified as long as the engine is still of the original capacity as regards Art. 252, Appendix J. However the engine may come into another class when a supercharger is fitted. In this case the cylinder capacity must be multiplied by a factor of 1.4 in order to give the vehicle another cylinder capacity.

A turbo-compressor will be regarded as a supercharger.

The mounting position and inclination of the engine are not subject to any restriction inside the original engine compartment.

The radiator, including its capacity, is free from restriction. Its position may be changed, provided that no modification is made to the body either inside (passenger compartment) or outside.

The capacity of the fuel tank is free from restriction in accordance with the Provisions of Art. 253, Appendix J. If the original tank is changed it is recommended that the other tank be of the safety type.

The position and size of the tank filler neck and cover may be modified, provided that the new device is acceptable as a part of the overall appearance (esthetically), the line of the bodywork is not broken and any fuel escaping cannot reach the interior of the vehicle.

When a vehicle is fitted with a live axle, this must be retained, but the leaf springs may be replaced by torsion bars and other spring types. If it is a vehicle with independent suspension, the

system must be retained, but the type of springs used may be altered.

The shock absorbers are free from restriction - this includes the number and method of attachment.

The gear ratios are free from restriction - this includes the number of gears. It is also permitted to install a limited slip differential which will lock the normal function of the differential, provided that it fits into the original differential housing.

Wheels and their attachment are free from restriction provided that the wheels are of a diameter that is homologated. The track is free from restriction, but the fenders must effectively cover at least 1/3 of the wheel circumference. (Art. 253, Appendix J).

Fender widening may only be carried out if it is homologated for the particular vehicle model. The mounting of wider wheels is subject to the requirements relating to turning circle under Art. 253, Appendix J.

In addition the ground clearance must not be less than 10 cm (3.937").

GUARANTEE

In the case of vehicles used for competition purposes that section of the guarantee provisions will apply under which the guarantee is invalid for all damage which occurs as a result of overstressing in practice or as a result of participation in sports competitions of any type.

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.

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DR. ING. H. C. F. PORSCHE KG

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PARTS LIST

homologated or permissible

911/911 L Group 3
Group 2 Group 5 911 T 911 S
(Rally)

Part No. Description and explanation

901.108.109.00	Carburetor 46 IDA 3 C	1	1	1
901.108.110.00	Carburetor 46 IDA 3 C 1	1	1	1
901.108.046.00	Right intake manifold	1	1	1
901.108.045.00	Left intake manifold	1	1	1
901.105.103.00	Left camshaft Carrera 6	2	2	2
901.105.104.00	Right camshaft Carrera 6	2	2	2
901.105.123.00	Left camshaft 911 S	2	-	2
901.105.124.00	Right camshaft 911 S	2	-	2
901.103.906.01	Pistons and cylinders 911 S	6	-	6
901.103.905.00	Pistons and cylinders Carrera 6	-	6	6
901.103.012.03	Titanium con rod	-	6	6
	<u>Competition clutch consisting of:</u>	1	1	1
901.102.201.10	Lightened flywheel	1	1	1
901.116.014.00	Drive plate (production)	1	1	1
901.116.003.01	Clutch pressure plate	1	1	1
901.115.011.03	Reinforced engine bracket	1	1	1
901.603.113.00	900 W generator	1	1	1
901.603.206.10	Voltage regulator for 900 W generator	-	1	1
	<u>911 R exhaust system consisting of:</u>	-	1	1
901.111.041.00	Left exhaust pipe	-	1	1
901.111.042.00	Right exhaust pipe	-	1	1
901.111.043.00	Diffusor	-	2	2
901.111.015.01	Muffler	-	1	1
901.111.151.04	Bracket for muffler	-	1	1
901.111.157.04	Clamping clip	-	2	2
999.512.587.02	Clamping clip	-	2	2
901.111.193.00	Gasket	-	-	2
901.111.194.01	Gasket	-	-	6

only available together

homologated or permissible

911/911 L Group 3
 Group 2 Group 5 911 T 911 S
 (Rally)

Description and explanation

Part No.	Description and explanation	Group 2	Group 5	911 T	911 S
01.100.906.00	Competition Kit I 911 S contains:	-	-	1	1
01.108.331.01	36 dia. venturi	-	-	6	6
01.100.978.10	Main jet 155 (for carburetors 40 IDA "S")	-	-	6	6
01.100.978.09	Main jet 150 (for carburetors 40 IDS)	-	-	6	6
01.108.820.00	Cover plate	-	-	2	2
01.107.083.00	Oil collector tank	-	-	1	1
44.628.091.00	Retainer strip	-	-	1	1
01.107.394.00	Breather hose	-	-	1	1
01.107.656.00	Angle bracket	-	-	2	2
00.075.015.02	Hexagon bolt M 6 x 20	-	-	2	2
00.027.014.01	Spring washer B 6	-	-	2	2
00.076.010.02	Hexagon nut M 6	-	-	2	2
99.170.022.90	Bosch W 265 P 21 plug	-	-	2	2
01.100.907.00	Competition Kit II contains Sports Kit I plus additionally:	-	-	6	6
01.111.153.00	Bracket for outlet pipe	-	-	1	1
01.111.193.00	Gasket	-	-	2	2
01.111.035.00	Left outlet pipe	-	-	1	1
01.111.036.00	Right outlet pipe	-	-	1	1
00.075.078.02	Hexagon bolt M 8 x 15	-	-	4	4
00.076.025.02	Hexagon nut M 8	-	-	4	4
00.076.025.02	Spring washer	-	-	-	-
01.100.906.01	Competition Kit I 911 S with competition clutch contains in addition to Competition Kit I:	-	-	1	1
01.102.201.10	Flywheel (lightened)	-	-	1	1
01.116.003.01	Clutch	-	-	3	3
99.012.014.00	Cylindrical pin with annular head	-	-	-	-
01.108.331.00	Competition Kit I 911 (for 130 bhp engine) consisting of:	1	-	-	-
01.100.978.03	Venturi	6	-	-	-
	Main jet 145	6	-	-	-

homologated or permissible
 911/911 L Group 3
 Group 2 Group 5 911 T 911
 (Rally)

Part No. Description and explanation

901.100.989.03	Compensating jet 140	6	-	-
901.100.981.01	Idling jet 60	6	-	-
901.108.820.00	Carburetor cover plate	2	-	-
999.170.022.90	Bosch W 265 P 21 plug	6	-	-
901.107.083.00	Oil collection tank	1	-	-
644.628.091.00	Retainer strip	1	-	-
901.107.394.00	Breather hose	1	-	-
901.107.656.00	Fixing bracket	2	-	-
900.075.015.02	Hexagon bolt M 6 x 20	2	-	-
900.076.010.02	Hexagon nut M 6	2	-	-
900.027.014.01	Spring washer B 6	2	-	-
901.100.922.03	Competition Kit II 911 (for 130 bhp engine) contains Competition Kit I 911 and additionally:	2	-	-
901.111.153.00	Bracket for outlet pipe	1	-	-
901.111.193.00	Gasket for outlet pipe	2	-	-
901.111.035.00	Left outlet pipe	1	-	-
901.111.036.00	Right outlet pipe	1	-	-
900.075.089.02	Hexagon bolt M 8 x 15	4	-	-
900.076.025.02	Hexagon nut M 8	4	-	-
900.027.015.01	Spring washer	4	-	-

homologated or permissible

911/ 911 L Group 3
 Group 2 Group 5 911 T 911 S
 (Rally)

Description and explanation

Pinion sets for 1st gear:

01.302.906.10	Pinion set	11:34 (A)	1	1	1
01.302.920.10	"	12:34 (AA)	1	1	1
01.302.907.10	"	14:37 (B)	1	1	1
04.302.906.10	"	15:36 (C)	1	1	1
04.302.937.00	"	16:35 (D)	1	1	1

Pinion sets for 2nd gear:

04.302.909.10	Pinion set	17:34 (E)	1	1	1
04.302.910.10	"	18:34 (F)	1	1	1
04.302.925.11	"	18:33 (G)	1	1	1
04.302.932.10	"	18:32 (GA)	1	1	1
04.302.912.11	"	19:32 (H)	1	1	1
04.302.934.10	"	20:32 (HA)	1	1	1
04.302.926.11	"	20:31 (I)	1	1	1

Pinion sets for 3rd gear:

01.302.908.10	Pinion set	20:31 (I)	1	1	1
04.302.927.10	"	21:31 (J)	1	1	1
04.302.915.10	"	21:30 (K)	1	1	1
04.302.928.10	"	22:30 (L)	1	1	1
01.302.909.10	"	22:29 (M)	1	1	1
04.302.916.10	"	23:28 (O)	1	1	1
04.302.917.11	"	24:27 (Q)	1	1	1

Pinion sets for 4th and 5th gear (interchangeable):

04.302.919.11	Pinion set	22:29 (M)	1	1	1
04.302.938.00	"	23:29 (N)	1	1	1
01.302.910.11	"	23:28 (O)	1	1	1
+	"	23:27 (P)	1	1	1

+ = in preparation

homologated or permissible

911/911 L Group 3
 Group 2 Group 5 911 T 911 S
 (Rally)

Part No.	Description	Pinion set	24:27 (Q)	25:27 (R)	25:26 (S)	26:26 (T)	26:25 (U)	27:25 (V)	27:24 (W)	28:24 (X)	28:23 (Y)	29:23 (Z)	29:22 (ZA)					
904.302.920.11		Pinion set												1	1	1	1	1
901.302.911.10		"												1	1	1	1	1
904.302.929.10		"												1	1	1	1	1
901.302.912.10		"												1	1	1	1	1
904.302.921.10		"												1	1	1	1	1
904.302.930.10		"												1	1	1	1	1
904.302.923.10		"												1	1	1	1	1
904.302.924.10		"												1	1	1	1	1
901.302.913.11		"												1	1	1	1	1
901.302.918.11		"												1	1	1	1	1
901.302.914.11		"												1	1	1	1	1
904.302.101.00	Drive shaft permitting interchanging of all pinions													1	1	1	1	1
904.332.053.00	Limited slip differential													1	1	1	1	1
904.332.209.01	Universal flange for limited slip differential													2	2	2	2	2
901.332.025.50	Nadella articulated shaft reinforced													2	2	2	2	2
901.302.901.00	Crownwheel and pinion 7:31													1	1	1	1	1
906.302.902.00	Crownwheel and pinion 6:32													1	1	1	1	1

homologated or permissible

Part No.	Description	911/911 L Group 3			
		Group 2	Group 5	911 T	911 S
		(Rally)			
901.341.067.05	Front suspension unit, adjustable (Koni), not for Targa	2	2	2	2
901.333.051.12	Rear shock absorber, adjustable (Koni), not for Targa	2	2	2	2
901.361.012.04	Alloy rim, forged 5 1/2 J x 15	5	5	5	5
901.361.012.03	Alloy rim, forged 6 J x 15 (1)	5	5 (3)	5 (3)	5 (3)
901.361.012.05	Alloy rim, forged 7 J x 15 (2)	-	2	2	2
901.352.413.00	Spacer ring 7 mm (starting with 68 model only at rear)	4	4	4	4
901.352.413.01	Spacer ring 27 mm (only for 7" rim on rear)	-	2	2	2
901.331.671.00	Wheel bolts for 7 mm spacer ring (52 mm)	5	5	5	5
901.331.671.01	Wheel bolts for 27 mm spacer ring (77 mm)	-	5	5	5
	<u>Stabilizer, front:</u>				
901.343.703.05	11 mm dia.	1	1	1	1
901.343.703.01	13 mm dia.	1	1	1	1
901.343.703.02	14 mm dia.	1	1	1	1
901.343.703.03	15 mm dia.	1	1	1	1
901.343.703.04	16 mm dia.	1	1	1	1
901.343.792.01	Rubber bush 13/14 mm dia.	2	2	2	2
901.343.792.02	Rubber bush 15/16 mm dia.	2	2	2	2
	<u>Stabilizer, rear:</u>				
901.333.701.04	15 mm dia.	1	1	1	1
901.333.701.03	16 mm dia.	1	1	1	1

(1) = only 3 of the 6" rims if 7" rims are fitted on the rear axle

(2) = rear axle only

homologated or permissible

911/911 L Group 3
 Group 2 Group 5 911 T 911 S
 (Rally)

Description

Part No.

ACCESSORIES:

901.201.010.30	100 liter fuel tank	1	1	1	1
901.741.801.01	Transmitter unit for 100 liter tank	1	1	1	1
901.741.502.04	Gauge for 100 liter tank	1	1	1	1
901.551.045.23	Trunk compartment mat for 100 liter tank	1	1	1	1
901.201.275.30	Filter cap for 100 liter tank	1	1	1	1
901.201.081.00	Front end stone guard	1	1	1	1
901.385.035.00	Engine and gearbox stone guard	1	1	1	1
901.555.085.00	Rear partition with tool and spares pocket	1	1	1	1
901.501.825.00	Footrest for driver's left foot	1	1	1	1
901.351.912.10	FERODO DS 11 competition brake segments, front (for solid disc)	4	4	-	-
901.352.915.10	FERODO DS 11 competition brake segments, rear (for solid disc)	4	4	-	-
901.351.912.16	TEXTAR 1431 G competition brake segments, front (for air cooled brake disc)	4	4	4	4
901.352.915.16	TEXTAR 1431 G competition brake segments, rear (for air cooled brake disc)	4	4	4	4