FOREWORD

We have compiled this booklet covering

Models, Dimensions and Tolerances

to provide the Porsche mechanic with a ready reference for data and specifications necessary to render proper service.

We took into account that service operations outlined in the workshop manual are known to the user. The contents of this booklet is arranged to correspond with subject groups in the workshop manual.

When using this booklet, also refer to technical bulletins since the data are subject to change.

PORSCHE

TECHNICAL SPECIFICATIONS

MODELS DIMENSIONS TOLERANCES

911 T · 911 E · 911 S · Carrera RS

72, 73 MODELS

1st English Edition

Current as of May 31, 1973

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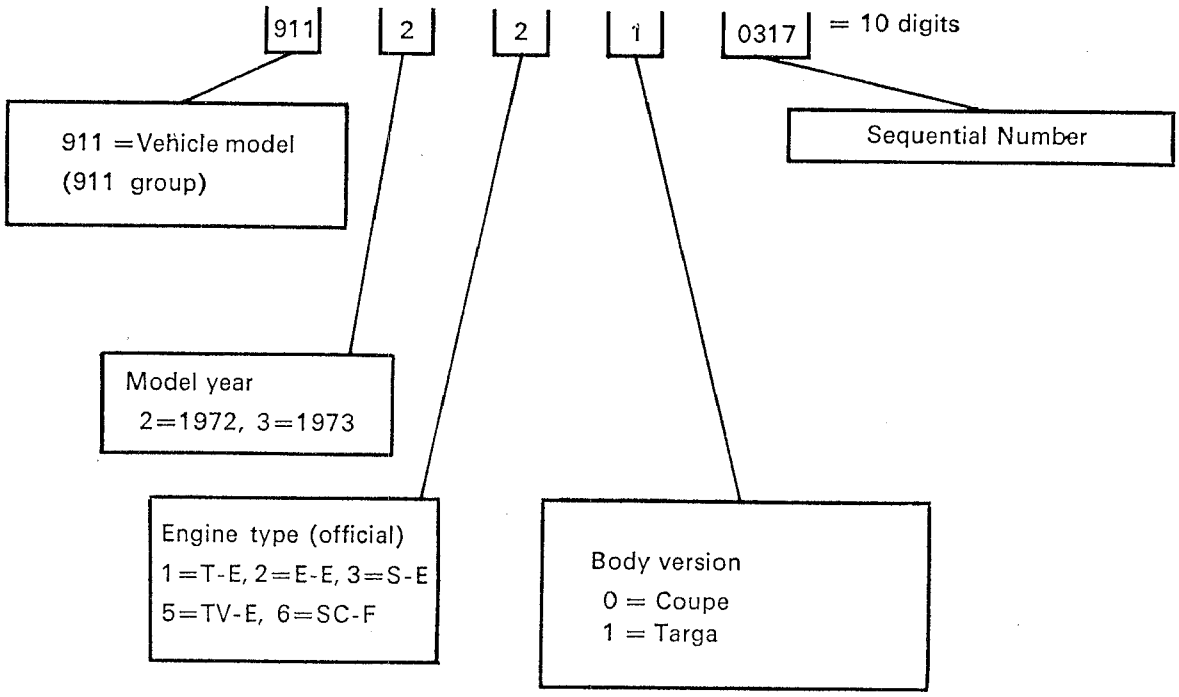
Type Classification Code

Year Mfd.	Model Year	Model Design. (Off.)	Engine Designation Official	Internal	Displ. (cm^3)	Horsepower DIN – HP (kW) at rpm	Stroke & Bore (mm)	Compr. Ratio
1971/ 1972	1972	911 T	911 TV-E	911/57	2341	130 (96)/ 5600	70.4/84	7.5 : 1
				911/67 (w/Sportomatic)				
			911 T-E	911/51 (USA)		140 (103)/ 5600		
				911/61 (USA-Sportomatic)				
		911 E	911 E-E	911/52	2341	165 (121)/ 6200	70.4/84	8.0 : 1
				911/62 (w/Sportomatic)				
		911 S	911 S-E	911/53	2341	190 (140)/ 6500	70.4/84	8.5 : 1
				911/63 (w/Sportomatic)				
1972/ 1973	1973	911 T	911 TV-E	911/57	2341	130 (96)/ 5600	70.4/84	7.5 : 1
				911/67 (w/Sportomatic)				
			911 T-E	911/51 (USA) 911/61 (USA-Sportomatic)		140 (103)/ 5600		
				911/91 (USA)		140 (103)/ 5700		8.0 : 1
				911/96 (USA Sportomatic)				
		911 E	911 E-E	911/52	2341	165 (121)/ 6200	70.4/84	8.0 : 1
				911/62 (w/Sportomatic)				
		911 S	911 S-E	911/53	2341	190 (140)/ 6500	70.4/84	8.5 : 1
				911/63 (w/Sportomatic)				
		911 SC	911 SC-F	911/83	2687	210 (154)/ 6300	70.4/90	8.5 : 1

Carburetors, F/I Pump or CIS	Engine Numbers	Transmission Type (Standard)	Chassis Numbers Coupe	Targa
Carburetor	652 0001—652 3284	915/12	911 250 0001— 911 250 1963	911 251 0001— 911 251 1523
	652 9001—652 9224	905/21	Chassis Number end December 1971	
F/I Pump	612 0001—612 4478	915/12	911 250 0781	911 251 0687
	612 9001—612 9293	925/00	911 210 0001— 911 210 2931	911 211 0001— 911 211 1821
			Chassis Number end December 1971 911 210 1176	911 211 0746
F/I Pump	622 0001—622 1765	915/12	911 220 0001— 911 220 1124	911 221 0001— 911 221 0861
	662 9001—622 9248	925/00	Chassis Number end December 1971 911 220 0378	911 221 0290
F/I Pump	632 0001—632 2586	915/12	911 230 0001— 911 230 1750	911 231 0001— 911 231 0989
	632 9001—632 9147	925/01	Chassis Number end December 1971 911 230 0489	911 231 0311
Carburetor	653 0001—	915/12	911 350 0001—	911 351 0001—
	653 9001—	905/21	Chassis Number end December 1972 911 350 0834	911 351 0736
F/I Pump	613 0001—	915/12	911 310 0001— 911 310 1252	911 311 0001— 911 311 0781
	613 9001—	925/00		
Continuous Injection System	613 3001—	915/12	911 310 1501—	911 311 1001
	613 9301—	925/00		
F/I Pump	623 0001—	915/12	911 320 0001—	911 321 0001
	623 9001—	925/00	Chassis Number end December 1972 911 320 0584	911 321 0431
F/I Pump	633 0001—	915/12	911 330 0001—	911 331 0001—
	633 9001—	925/01	Chassis Number end December 1972 911 330 0754	911 331 0468
F/I Pump	663 0001—	915/08	911 360 0001— Chassis Number end December 1972 911 360 0319	—

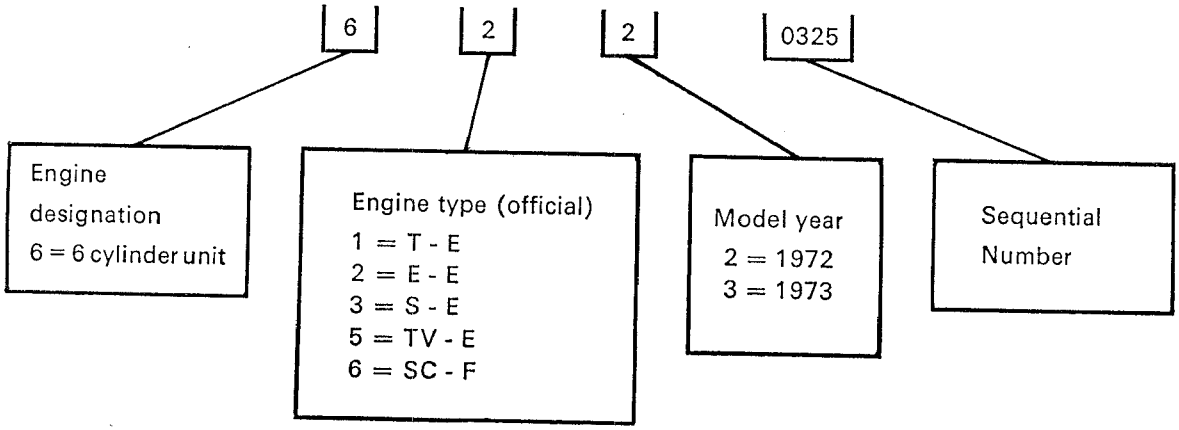
Chassis Number Code

Example : Chassis number of a Type 911 E 1972model,
Targa version vehicle



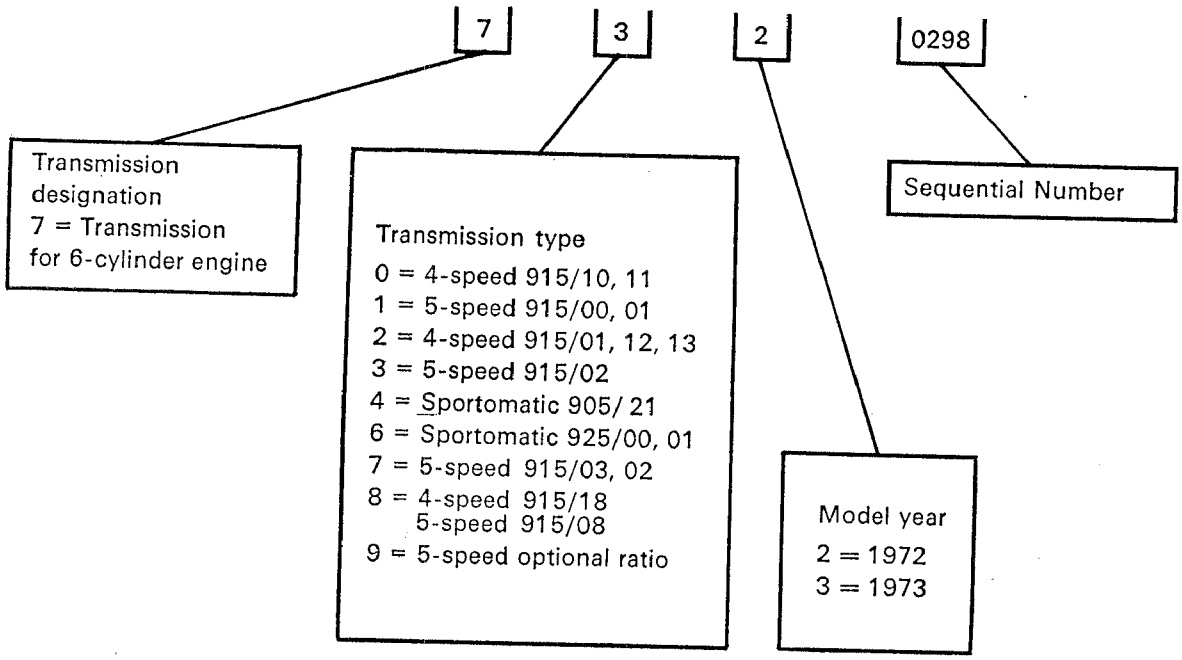
Engine Number Code

Example: Engine number of a Type 911 E, 1972 model



Transmission Number Code

Example: 5-speed transmission (915/02) for a 6-cylinder engine, 1972 model



Technical Data for Type 911 Vehicles

Engine specifications for 1972, 1973 models

Engine		911 TV (911 T – USA)	911 E	911 S	Carrera 2.7
Type design		Four-stroke cycle, internal combustion gasoline engine with two horizontally opposed banks with three cylinders each	same as 911 T	same as 911 T	same as 911 T
Number of cylinders		6	6	6	6
Bore	mm	84	84	84	90
Stroke	mm	70.4	70,4	70,4	70,4
Total displacement	cm^3	2,341	2341	2341	2687
Compression ratio		7.5 : 1 (8.0 : 1)	8,0 : 1	8,5 : 1	8,5 : 1
Cylinder pressure	kp/cm^2	maximum deviation between cylinders up to 1.5 kp/cm^2; engine oil temperature 60° C minimum	same as 911 T	same as 911 T	same as 911 T
Maximum power output (DIN)	HP/kW	130/96 (140/103)	165/121	190/140	210/154
(SAE)	HP/kW	147/110 (157/117)	185/138	210/157	230/172
at engine speed of	rpm	5,600 (5,700)	6200	6500	6300
Maximum torque	mkp/Nm	20/196 (20,5/201)	21/206	22/216	26/225
at engine speed of	rpm	4,000	4500	5200	5100
Maximum output in liters (DIN)	HP/1/ kW/1	55/41 (60/44)	70/52	81/60	78/57
Mean piston speed at maximum output	m/sec	13.1	14,5	15,3	14,8
Mean pressure at Ne maximum	kp/cm^2	10.76	11,30	11,84	12,19
Maximum speed	rpm	6,400	7000	7300	7300
Governed engine speed	rpm	6,500 ± 100	7100 ± 100	7300 ± 100	7300±100

	911 TV (911 T – USA)	911 E	911 S	Carrera 2.7
Fuel octane number RON	91	91	91	91
Engine cooling	By air fan on alternator shaft	same as 911 T	same as 911 T	same as 911 T
Cooling fan drive	Off crankshaft by V-belt	same as 911 T	same as 911 T	same as 911 T
Ratio crankshaft - alternator shaft	approx. 1 : 1.3	same as 911 T	same as 911 T	same as 911 T
Lubrication	Dry sump, forced feed	same as 911 T	same as 911 T	same as 911 T
Oil cooling	Oil cooler on crankcase in cooling air stream	same as 911 T	Oil cooler on crankcase in cooling air stream, plus oil cooler in front section of vehicle (cooling coil)	same as 911 S
Oil pressure indicator	Warning light	same as 911 T	by instrument in kp/cm²	same as 911 S
Oil pressure in warm engine at 5,000 rpm	5.5 to 7 kp/cm² at 80° C	same as 911 T	same as 911 T	same as 911 T
Max. oil temperature	130° C	same as 911 T	same as 911 T	same as 911 T
Oil filter	Full flow	same as 911 T	same as 911 T	same as 911 T
Oil consumption	1.5 to 2.0 ltr/1,000 km/600 miles	same as 911 T	same as 911 T	same as 911 T
Crankcase	Pressure cast, light alloy two-piece	same as 911 T	same as 911 T	same as 911 T
Crankshaft	forged (Tenifer treated)	same as 911 T	same as 911 T	same as 911 T
Main bearings	8 plain journals	same as 911 T	same as 911 T	same as 911 T
Main bearings 1–7	Tri-metal, split inserts	same as 911 T	same as 911 T	same as 911 T
Main bearing 1	Thrust bearing with hard lead journal	same as 911 T	same as 911 T	same as 911 T
Main bearing 8	Sleeve insert with hard lead journal	same as 911 T	same as 911 T	same as 911 T
Connecting rods	Forged steel	same as 911 T	forged steel (Tenifer treated)	same as 911 S
Connecting rod bearings	Split sleeve, tri-metal inserts	same as 911 T	same as 911 T	same as 911 T

	911 TV (911 T – USA)
Piston pin bearings	Pressed–in bronze bushings
Intermediate shaft bearings	Double, plain bearings
Pistons	Cast, light alloy Autothermic pistons
Piston pins	Floating, secured with circlips
Piston rings	2 compression rings, 1 oil scraper ring
Cylinders	Finned grey cast iron
Cylinder heads	1 per cylinder bank, light alloy
Valve seat inserts	Shrunk-in, special bronze
Spark plug threads	M 14 × 1.25, cut into cylinder head
Valves	1 intake and 1 exhaust valve per cylinder
Valve arrangement	Overhead in "V"
Exhaust valves	Sodium-filled with reinforced seats
Intake valve dia mm	46
Exhaust valve dia. mm	40
Valve springs	2 coil springs per valve
Valve timing	1 OHC per cylinder bank
Camshafts	Cast, three-bearing camshaft riding in base metal of camshaft housing
Camshaft drive	by chains

911 E	911 S	Carrera 2.7
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
same as 911 T	Light metal forged	same as 911 S
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
Grey-cast iron with light alloy finned jacket	same as 911 E	Light alloy cylinder with Ni-lining
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
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same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T

		911 TV (911 T – USA)
Valve timing at 1 mm valve clearance		
Intake opens		16° BTC
Intake closes		30° ABC
Exhaust opens		42° BBC
Exhaust closes		4° BTC
Intake valve lift at overlap TC with 0.1 mm valve clearance	mm	2.4–2.8
Valve clearance in cold engine		
Intake		0.10 mm between valve
Exhaust		and rocker arm
Clutch		Single disc, dry
Pressure plate	Type	MFZ 225 Fichtel and Sachs
Clutch pressure	kp	650–720
Fuel system		2 zenith triple-throat doundraft Type 40 TIN (Intake port fuel injection Bosch 6-plunger double row injection pump)
Air filter		Induction silencer with micronic cartridge insert and preheated induction air
Fuel pump		1 Electric roller-cell pump
Fuel delivery rate		80 (125) ltr/h
Operating pressure		0.3 (1.0) kp/cm²
Pressure relief valve opens at		0.2–0.3 (approx. 2) kp/cm²

911 E	911 S	Carrera 2.7
18° BTC	38° BTC	38° BTC
36° ABC	50° ABC	50° ABC
38° BBC	40° BBC	40° BBC
8° ATC	20° ATC	20° ATC
2.7–3.1	5.0–5.4	5.0–5.4
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	720–780
Intake pipe injection Bosch 6-plunger double row injection	same as 911 E	same as 911 E
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T
same as 911 T	same as 911 T	same as 911 T

		911 TV (911 T – USA)	911 E	911 S	Carrera 2.7
Fuel filter		with integral overflow valve (in front of injection pump)	with integral overflow valve (in front of injection pump)	same as 911 E	same as 911 E
Electrical System					
Battery rated voltage		12 V	same as 911 T	same as 911 T	same as 911 T
Battery capacity		2 × 36 Ah	same as 911 T	same as 911 T	same as 911 T
Alternator output		770 Watts	same as 911 T	same as 911 T	same as 911 T
Ignition		Battery, capacitive discharge	same as 911 T	same as 911 T	same as 911 T
Firing order		1—6—2—4—3—5	same as 911 T	same as 911 T	same as 911 T
Ignition transformer		Bosch	same as 911 T	same as 911 T	same as 911 T
Ignition distributor	Bosch	JFUDR 6 0231169003	JFUDR 6 0231169004	JFUDR 6 0231169005	JFUDR 6 0231169011
(optional)	Marelli	50109741	50109742	50109743	61015155
Ignition timing advance		centrifugal and vacuum	same as 911 T	same as 911 T	same as 911 T
Ignition basic adjustment (with vacuum hose connected)		5° ATC at 900 rpm ± 50	same as 911 T	same as 911 T	TDC at 900 rpm ± 50
Dwell angle/ breaker point gap	Bosch	38° ± 3°/0.35 mm	same as 911 T	same as 911 T	same as 911 T
	Marelli	37° ± 3°/0.35 mm			
Spark plugs (electrode gap in mm)	Bosch	W 230 T 30 (0.7)	W 260 T 2 (0.7)	same as 911 E	same as 911 E
	Bosch	W 235 P 21 (0.55)	W 265 P 21 (0.55)		
Optional brands	Beru	225/14/3 (0.7)	260/14/3 (0.7)	same as 911 E	same as 911 E
	Beru		265/14/3 P (0.55)		

Numbering of Cylinders and Firing Order

Firing order
1–6–2–4–3–5

Technical Data Model 911 T Continuous Injection System

(Data different from those of 1972 model 911 T)

Engine		911 T CIS
Maximum power output	(DIN) HP/kW	140/103
	(SAE) HP/kW	157/117
At engine speed of	rpm	5,700
Maximum output in liters	HP/l/KW/l	60/44
Maximum torque	mkp/Nm	20.5/201
At engine speed of	rpm	4,000
Compression ratio		8.0 : 1

Valve timing at 1 mm valve clearance:

Intake opens	0° at TC	Exhaust opens 30° BBC
Intake closes	32° ABC	Exhaust closes 10° BTC

Intake valve lift at overlap TC at 0.1 mm valve clearance: mm 0.9–1.1

Tolerances and Wear Limits – Engine

Note: B = Bore S = Shaft

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (—) from	to	Wear Limits mm
Crankshaft to main bearing Bearings 1–7 (d1)	B	57.020—57.059	+ 0.010	+ 0.072	Visual insp.
	S	56.971—56.990			56.960
Crankshaft to main bearing Bearing 8 (d3)	B	31.041—31.084	+ 0.048	+ 0.104	Visual insp.
	S	30.980—30.993			30.970
Crankpin to connecting rod bearing (d2)	B	52.020—52.059	+ 0.030	+ 0.088	Visual insp.
	S	51.971—51.990			51.960
Crankshaft runout (measured on bearings 4 and 8, with bearings 1 and 7 on V-blocks)					max. 0.04
Crankshaft unbalance					max. 10 cmg
Crankshaft to main bearing, end play			+ 0.110	+ 0.195	0.30
Crankshaft to timing gear	B	41.975—42.000	— 0.002	— 0.038	
	S	42.002—42.013			
Crankshaft to distributor drive gear	B	41.975—42.000	— 0.002	— 0.038	
	S	42.002—42.013			
Crankshaft to flywheel	B	65.000—65.030	0.0	+ 0.049	
	S	64.981—65.000			
Crankshaft to V-belt pulley	B	30.000—30.033	+ 0.007	+ 0.073	
	S	29.960—29.993			
Pulley: Vertical runout					max. 0.15
Lateral runout					max. 0.20

CRANKSHAFT – Standard and Reconditioning Stages

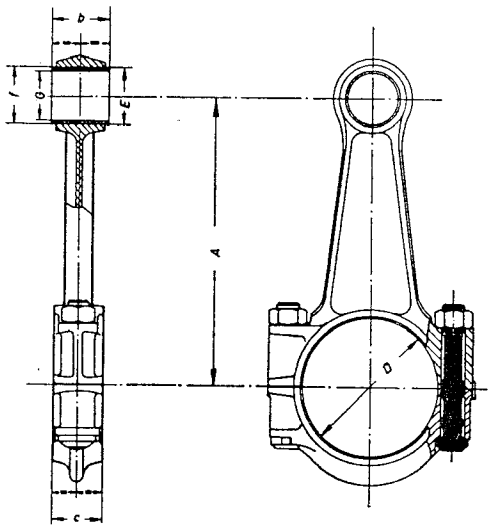
Stage	Crankcase Bores	All Main Bearing Journals d,	Connecting Rod Bearing Journals d 2	Main Bearing Journal d 3	Oil Seal Journal d 4	Timing Gear Seat d 5	Crankshaft Pulley Seat d 6	Width A of Thrust Surface
Normal	Standard 62,000-62,019	56,990-56,971	51,990-51,971	30,993-30,980	65,000-64,981	42,013-42,002	29,993-29,960	28,000-28,06
- 0,25	Oversize 62,269-62,250	56,740-56,721	51,740-51,721	30,743-30,730				
- 0,50		56,490-56,471	51,490-51,471	30,493-30,480	64,500-64,310		29,500-29,370	
- 0,75		56,240-56,221	51,240-51,221	30,243-30,230				

Machining finish of bearing journals: 2 microns; oil seal journals: 2–5 microns. Radius for all journals: maximum 2 mm.

Note: After grinding, subject crankshaft to Tenifer treatment; polish all bearing journals and thrust surface A; test crankshaft for cracks.
Do not attempt to straighten crankshaft after Tenifer treatment.

Ø Diameter d 4 Oil seal journal
Ø Diameter d 5 Drive gear seat for intermediate shafts
Ø Diameter d 6 Oil seal journal and crankshaft pulley seat

Measuring Point	Installation Size with Tolerances mm	Clearance (+) or Preload (–) from....to	Wear Limits mm
Crankcase			
Crankcase bore for main bearings:			
Bearings 1–8	62.000–62.019		
Oversize	62.250–62.269		
Crankcase bore for intermediate shaft:			
Bearing 1 (fitted bearing)	27.500–27.521		
Bearing 2	26.500–26.521		
Spring for pressure relief and safety valve:			
Free length	70.00		
Spring pressure at 52 mm	10.6 kp		
Spring pressure at 46 mm	14.1 kp		
Spring wire dia.	1.8 mm		
Connecting Rods			
A Distance between centers	127.80		
B Piston pin bushing width	26.00–25.98		
C Big end width	23.80–23.70		
Bearing width at crankpin	24.00–24.10	+0.200+0.400	
D Big end dia. (without bearing shell)	56.000–56.019		
E Small end dia.	25.000–25.021		
F Dia. with piston pin bushing removed	25.035–25.055		
Preload of bushing in connecting rod		–0.014–0.055	
G Dia. of installed piston pin bushing (finished dimension)	22.020–22.033		
Clearance piston pin bushing to piston pin		+0.020+0.039	0.055



Connecting Rod Weight Groups

Connecting rods are arranged in weight groups.

End digits of the spare part number indicate the given weight group.

The respective end digits are stamped into the shank of the given connecting rod if it was supplied as a spare part.

Weight Over grams	Weight Under grams	KD (Service) Weight Group	KD (Service) Connecting Rod Spare Part No.	Connecting Rod Mark
645	654	1	911.103.015.31	31
654	663	2	911.103.015.32	32
663	672	3	911.103.015.33	33
672	681	4	911.103.015.34	34
681	690	5	911.103.015.35	35
690	699	6	911.103.015.36	36
699	708	7	911.103.015.37	37
708	717	8	911.103.015.38	38

Note

Connecting rods installed in a given engine must not differ among each other by more than 9 grams. To determine weight group, weigh the complete connecting rod without bearing inserts.

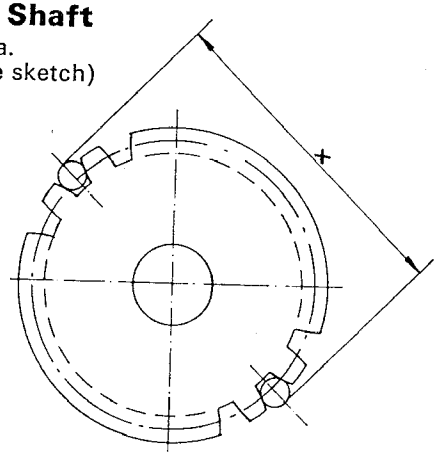
Matching Intermediate Shaft and Crankcase

See marking on left crankcase half below alternator support (0 or 1)

Axis Distance mm	Crankcase Marking	Marking on Crankshaft Gear	Marking on Intermediate Shaft	Gear Backlash
103.975–103.990	0	0	0	0.029–0.049
		Installation still permissible		
		1	0	0.016–0.042
		0	1	0.017–0.043
103.990–104.000	1	1	1	0.012–0.041
		Installation still permissible		
		0	1	0.025–0.049
		1	0	0.025–0.048

Checking Intermediate Shaft

Use steel rollers of 4.5 mm dia. to help make measurements (see sketch)



Intermediate shaft gear standard – wear limit × = 136.5 mm

Intermediate shaft gear marked 1 – wear limit × = 136.55 mm

Intermediate shaft gear and crankshaft gear can be replaced as a set only.

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (–) from	to	Wear Limits mm
Intermediate Shaft					
Bearing 1					
Crankcase bore – shaft	B	27.500—27.521			
	S	25.000—24.980			
Bearing 2					
Crankcase Bore – shaft	B	26.500—26.521			
	S	23.980—23.967			
Intermediate shaft running clearance			+ 0.030	+ 0.084	
Intermediate shaft end play			+ 0.040	+ 0.133	0.16
Flywheel to steel bushing for input shaft	B	25.000—25.021	– 0.001	– 0.035	
	S	25.022—25.035			
Distributor to crankcase	B	27.000—27.021	+ 0.020	+ 0.074	
	S	26.947—26.980			
Distributor pinion to distributor shaft	B	12.456—12.474	+ 0.001	+ 0.030	
	S	12.444—12.455			
Guide rail to stud bolts	B	8.000— 8.015			
	S	7.822— 7.837			
Flywheel					
Lateral runout					max. 0.10
Vertical runout					max. 0.20

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (–) from	to	Wear Limits mm
Timing Chain Housing					
Pivot shaft for sprocket wheel carrier to chain tensioner housing	B	15.000—15.018	+ 0.016	+ 0.045	Visual inspection
	S	14.973—14.984			
Pivot shaft for sprocket wheel carrier to sprocket wheel carrier	B	15.000—15.018	+ 0.016	+ 0.045	
	S	14.973—14.984			
Sprocket wheel carrier to sprocket wheel shaft	B	15.000—15.018	0.000	+ 0.029	
	S	14.989—15.000			
Stud to chain housing	B	7.857— 7.872	– 0.014	– 0.038	
	S	7.886— 7.895			
Stud to chain guide rail	B	8.000— 8.015	+ 0.105	+ 0.129	
	S	7.886— 7.895			
Sprocket wheel to sprocket wheel shaft	B	15.032—15.050	+ 0.032	+ 0.610	Visual inspection
	S	14.989—15.000			

Parallel alignment of both sprocket wheels may not deviate by more than 0.25 mm

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (–) from	to	Wear Limits mm
Camshaft Housings and Camshafts					
Camshaft bearings to camshaft	B S	46.967—46.992 46.926—46.942	+ 0.025	+ 0.066	0.10
Camshaft end play			+ 0.150	+ 0.200	0.40
Camshaft to sprocket wheel flange	B S	30.000—30.013 20.979—30.000	0.000	+ 0.034	
Camshaft runout, measured at center journal (between points)					max. 0.02
Rocker arm shaft to camshaft housing	B S	18.000—18.018 17.992—18.000	Rocker arm shafts are held firm by wedge effect of bolt		
Rocker arm to rocker arm shaft	B S	18.016—18.027 17.992—18.000	+ 0.016	+ 0.035	0.080
End play			+ 0.100	+ 0.350	0.50

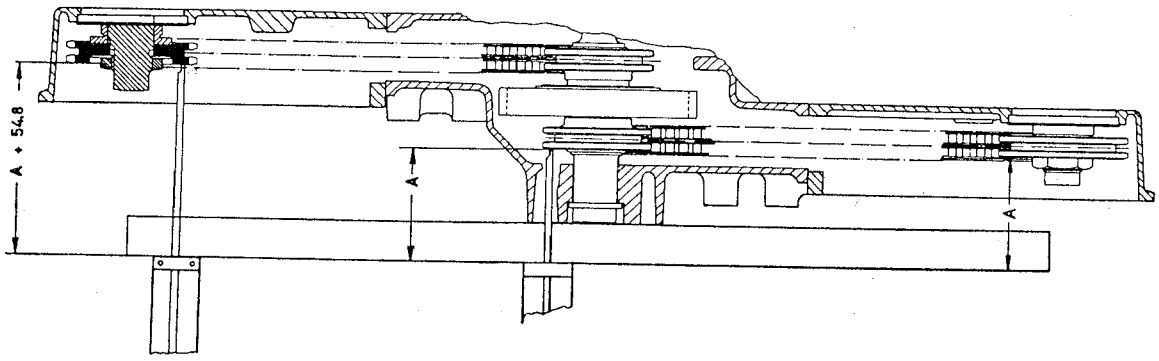
Measuring Sprocket Wheel Parallel Alignment

Before measuring, push intermediate shaft and camshaft axially toward the flywheel to set bearing thrust flanges in position.

The measurement is made through the hole below the intermediate shaft against the side of the forward chain sprocket on the intermediate shaft (dimension A).

This dimension must also be achieved at the sprocket wheel for bank of cylinders 4–6. Use shims if necessary (maximum permissible difference is 0.25 mm).

Sprocket wheel for bank of cylinders 1–3, mounted on the intermediate shaft, is positioned 54.8 mm farther to the front. These 54.8 mm (design dimension) must be considered when determining dimension A (maximum permissible difference is 0.25 mm).



Example: Measured dimension A = 78.8 mm

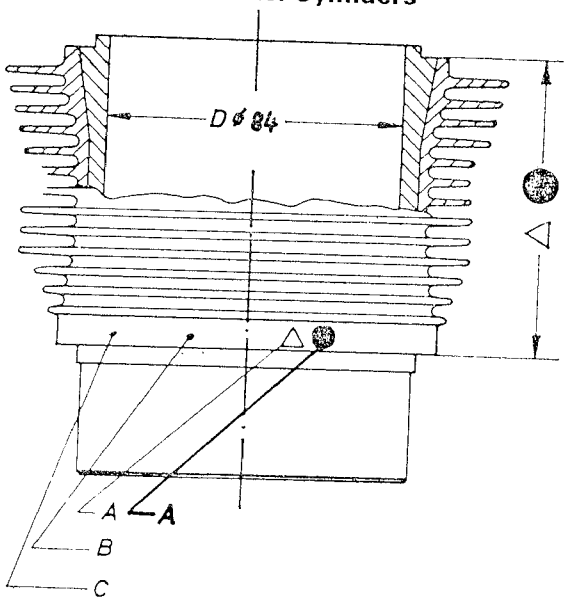
The formula for sprocket wheel of cylinder bank 1–3 is: A + 54.8 = 78.7 + 54.8 = 133.5 mm

Piston and Cylinder Specifications (Dimensions, Weights and Markings) 2.4 Liter Engine and Carrera 2.7

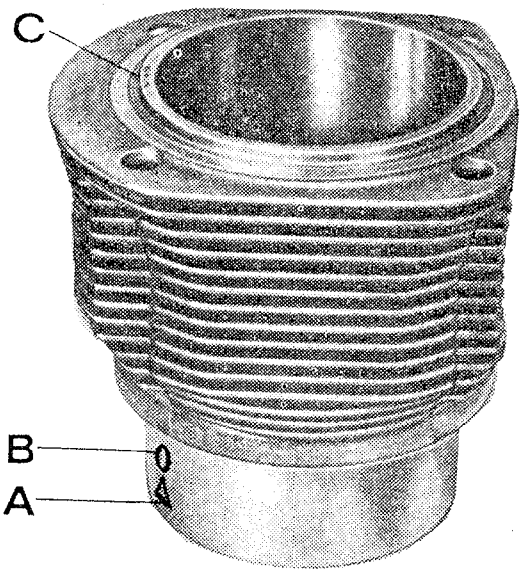
Vehicle Type Manufacturer Dimensions	Markings	Rated Dia.	Cylinder Dia	911 T Schmidt Piston Dia.	911 T Mahle Piston Dia.	911 E Mahle Piston Dia.	911 S Mahle Piston Dia.	Carrera 2.7 Cylinder Dia	Carrera 2.7 Mahle Piston Dia.
Standard	0		84.00–84.01	83.97	83.97	83.97	83.95	90.00–90.01	89.95
	1	84.00	84.01–84.02	83.98	83.98	83.98	83.96	90.01–90.02	89.96
	2		84.02–84.03	83.99	83.99	83.99	83.97	90.02–90.03	89.97
1st oversize	0 KD 1		84.25–84.26	84.22	84.22	84.22	84.20	No oversize	
	1 KD 1	84.25	84.26–84.27	84.23	84.23	84.23	84.21	for pistons	
	2 KD 1		84.27–84.28	84.24	84.24	84.24	84.22	and cylinders provided	
2nd oversize	0 KD 2		84.50–84.51	84.47	84.47	84.47	84.45		
	1 KD 2	84.50	84.51–84.52	84.48	84.48	84.48	84.46		
	2 KD 2		84.52–84.53	84.49	84.49	84.49	84.47		
Tolerances				+0.007 −0.008	±0.005	±0.005	±0.005		±0.005
Dimension h from bottom edge				12.5	8.0	2.5	8.0		2.5
Clearance between piston and cylinder				0.023– 0.048	0.025– 0.045	0.025– 0.045	0.045– 0.065		0.025–0.045
Piston weight				375 ± 4 g	376 ± 3 g	371 ± 3 g	354 ± 3 g		392 ± 3 g

Cylinder Dimensions

Biral Cylinders and Ni Cylinders



Grey Cast Iron Cylinders



A = Tolerance group for cylinder height (for Carrera 2.7 provided with a color dot)
B = Tolerance group for cylinder Dia. (refer to table)
C = Manufacturer's identification

Tolerance Groups for Cylinder Heights (2.4 Liter Engine)

Marking A	Cylinder Height (Production)	Marking A	Cylinder Height (Replacement Parts)
5	85.400—85.425	R 5	85.150—85.175
6	85.425—85.450	R 6	85.175—85.200

Tolerance Groups for Cylinder Heights (Carrera 2.7)

Color Marking A	Cylinder Height (Production)	
red	85.400—85.425	No oversize provided for pistons and cylinders
blue	85.425—85.450	

Only cylinders of equal height may be installed in any given cylinder bank.

Cylinders

D 1 = Measuring point for wear and ovality

Measured 2–3 mm below the upper return point of the upper piston ring. The cylinder can be considered worn to the limit when the dimension at this point exceeds the installation dimension by 0.1 mm. Ovality is determined by measuring the bore across lines a and b. Dimension a should not differ from dimension b by more than 0.04 mm.

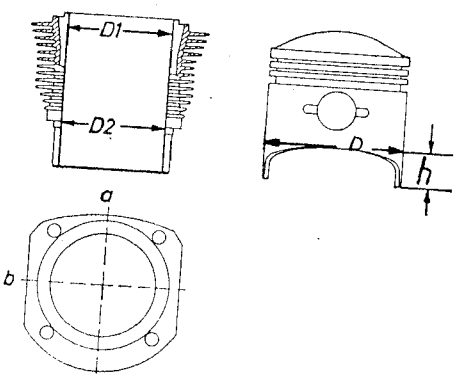
D 2 = Measuring point for ovality

Measured at the height of the cylinder base gasket. This measuring point is especially important for determining ovality, although not valid for determining cylinder wear.

Pistons

D = Measuring point for wear

The measuring point is to be determined from the table in all cases. Maximum wear: not to exceed 0.1 mm (of installation diameter).

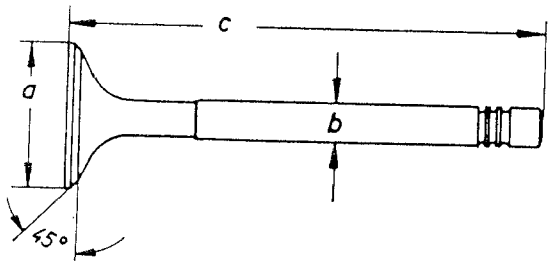


Dimensions for Piston Pins

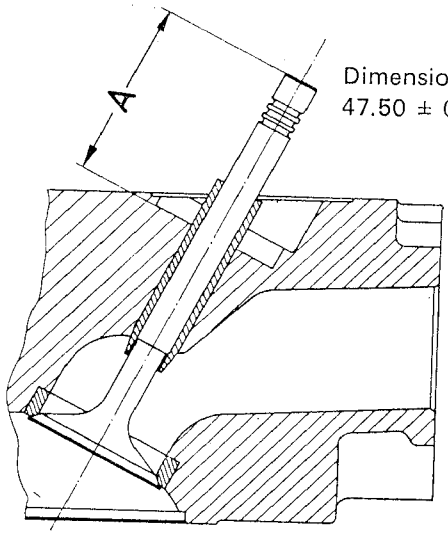
Color	Piston Pin Dia.	Piston Pin Bore Dia. in Piston
white	22.000 0 to —0.004	22.000 0 to + 0.005

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (–) from	to	Wear Limit mm
Pistons					
Piston ring side clearance Ring I	Groove Ring	1.560—1.590 1.478—1.490	+ 0.070	+ 0.112	
Piston ring side clearance Ring II	Groove Ring	1.530—1.560 1.478—1.490	+ 0.040	+ 0.082	0.20
Piston ring side clearance Ring 2 CIS	Groove Ring	1.790—1.810 1.728—1.740	+ 0.050	+ 0.028	
Oil scraper ring side clearance	Groove Ring	4.010—4.040 3.978—3.990	+ 0.020	+ 0,062	
Piston ring gap			+ 0.15	+ 0.45	1.00
Cylinder Heads					
Cylinder head to valve guide	B S	13.000—13.018 13.049—13.060	– 0.031	– 0.060	
Valve guide to intake valve	B S	9.000— 9.015 8.958— 8.970	+ 0.030	+ 0.057	0.15
Valve guide to exhaust valve	B S	9.000— 9.015 8.938— 8.950	+ 0.050	+ 0.077	0.20
NOTE: B = Bore S = Shaft					
Cylinders					
Cylinder to crankcase 2.4 liter engine	B S	92.072— 92.159 91.874— 91.928	+ 0.144	+ 0.285	
Cylinder to cylinder head 2.7 liter engine	B S	97.072— 97.159 96.874— 96.928	+ 0.144	+ 0.285	
Cylinder to cylinder head	B S	107.000—107.073 106.893—106.928	+ 0.072	+ 0.180	

Valve Dimensions



911 T, E, S, Carrera 2.7	Intake	Exhaust
a	46 ± 0.1	40 ± 0.1
b	8.97–0.012	8.95–0.012
c	114 ± 0.1	113.5 ± 0.1



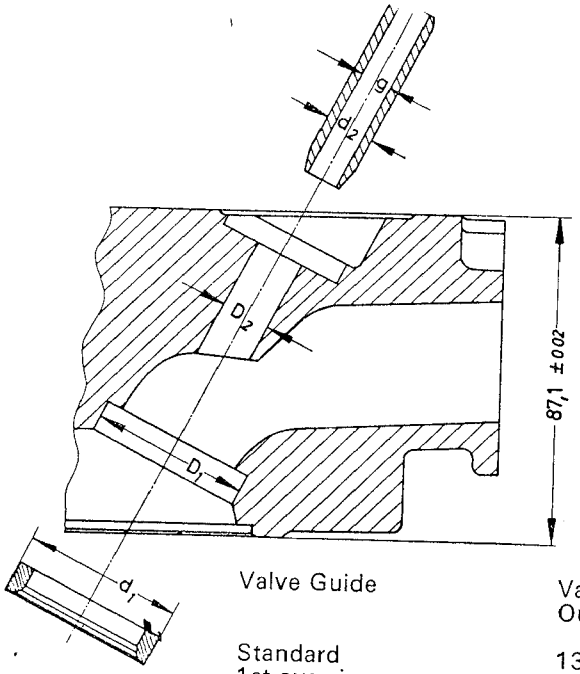
Dimension A
47.50 ± 0.6 mm

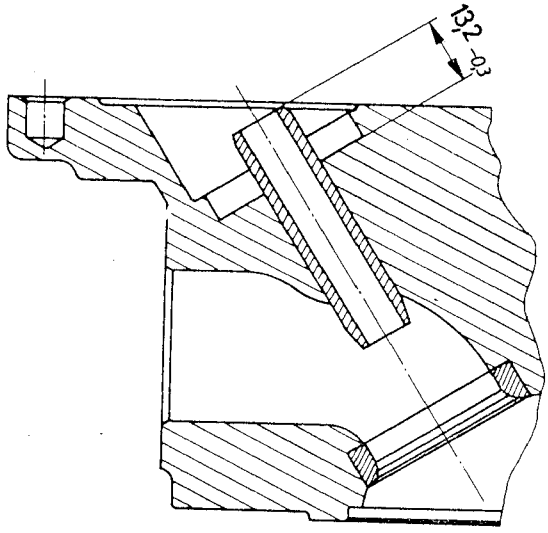
Checking Valve Seats

To check valve seat depth, insert the respective valve in the guide and measure the distance between the valve stem end and the bottom of the shim cavity, without shims (see dimension A in sketch).

If the dimension is greater than specified, measure again using a new valve. If the dimension still is beyond specification, it is an indication that the valve seat insert has been cut too deep and should be replaced or the cylinder head exchanged.

Specifications for Installing Valve Guides



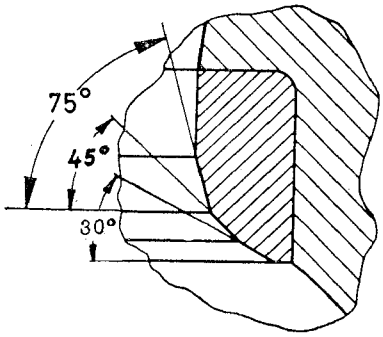


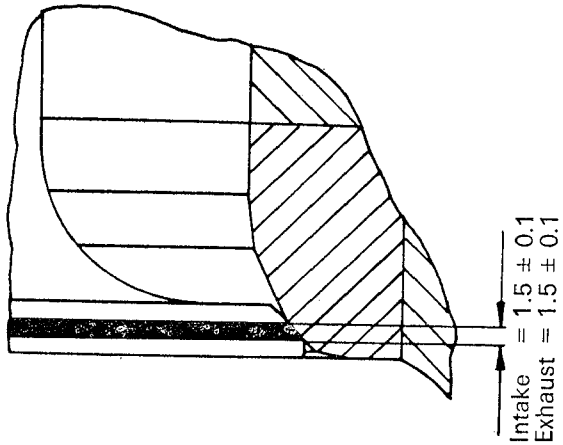
Valve Guide	Valve Guide Outside Diameter d 2	D 2 Bore Diameter in Cylinder Head
Standard	13.060—13.049	13.000—13.018
1st oversize	Machine to size according to bore in cylinder head.	

Specifications for Installing Valve Seat Inserts

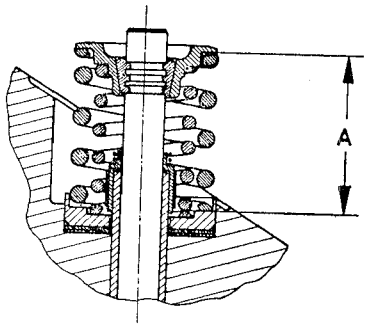
911 T, E, S a. Carrera 2.7	Valve Seat Insert	Outside Dia. of Valve Seat Insert Intake Exhaust d 1	Bore in Cylinder Head Intake Exhaust D 1
Standard	Intake	48.180—48.164	48.000—48.025
1st oversize	Intake	48.500—48.484	48.320—48.345
Standard	Exhaust	42.200—42.184	42.000—42.025
1st oversize	Exhaust	42.760—42.744	42.560—42.585

Angles and Dimensions of Valve Seat Inserts





Valve Springs and Installation Dimensions



	Intake	Exhaust
911 T	35 ± 0.3 mm	35 0.3 mm
911 E	34 ± 0.3 mm	34 ± 0.3 mm
911 S	35.5 ± 0.3 mm	34.5 ± 0.3 mm
Carrera 2.7	35.5 ± 0.3 mm	34.5 ± 0.3 mm

Camshafts for Type 911 and Carrera 2.7 Engines

	Type	Left Camshaft	Right Camshaft
	Model Year 72–73		
911 T Engine	911/51 911/61 (with Sportomatic)	901.105.133.00	901.105.134.00
911 T Engine CIS	911/91 911/92 (with Sportomatic)	911.105.141.00	911.105.142.00
911 E Engine	911/52 911/62 (with Sportomatic)	901.105.181.00	901.105.110.05
911 S Engine	911/53 911/63 (with Sportomatic)	901.105.183.01	901.105.168.00
Carrera 2.7	911/83	901.105.183.01	901.105.168.00

Intake Valve Lift at Overlap TC with 0.1 mm Valve Clearance	Cam Lift with Base Circle Radius	Valve Timing with 1 mm Valve Clearance
2.40—2.80 2.60*	I = 36.25 mm E = 35.51 mm	I = opens 16° BTC I = closes 30° ABC E = opens 42° BBC E = closes 4° BTC
0.90—1.10 1.00*	I = 38.00 mm E = 37.48 mm	I = opens 0° at TC I = closes 32° ABC E = opens 30° BBC E = closes 10° BTC
2.70—3.10 2.90*	I = 36.58 mm E = 36.25 mm	I = opens 18° BTC I = closes 36° ABC E = opens 48° BBC E = closes 8° ATC
5.00—5.40 5.20*	I = 37.30 mm E = 36.44 mm	I = opens 38° BTC I = closes 50° ABC E = opens 40° BBC E = closes 20° ATC
5.00—5.40 5.20*	I = 37.30 mm E = 36.44 mm	I = opens 38° BTC I = closes 50° ABC E = opens 40° BBC E = closes 20° ATC

Note: * desired adjustment value

Measuring Point	Installation Size with Tolerance mm	Clearance (+) or Overload (–)	Wear Limit mm

Clutch

Clutch plate with riveted lining

Free thickness (new)	8.1 ± 0.4	6.0 (when worn evenly)
Permissible lateral runout	max. 0.6	max. 0.6
Contact pressure (911 T, E, S)	650–720 kp	
Contact pressure (Carrera 2.7)	715–780 kp	

Note: Clutch plates cannot be reconditioned and must be replaced when necessary.

Transmission Clutch – Sportomatic

Clutch plate with riveted lining

Free thickness (new)	7.3 ± 0.4	5.5 (when worn evenly)
Permissible lateral runout	max. 0.5	max 0.5
Contact pressure	800–880 kp	

Note: Clutch plates cannot be reconditioned and must be replaced when necessary.

Machining (Refinishing) Flywheel

The flywheel may be machined on a lathe to clean grooves or heat spots. The machine cut should be kept as small as possible. Wear limit of flywheel thickness is 8.5 mm.

1 Wear limit 8.5 mm
2 Smallest possible cut
3 Maximum runout 0.1 mm
4 Lathe mounting points

Ignition Timing for Engine Types 911 T, 911 E, 911 S and Carrera 2.7

1. Check dwell angle and adjust, if required.
2. Make basic timing adjustment.
3. Bring engine to operating temperature.
4. Adjust ignition timing.

Adjustment must be made at approx. 80°C oil temperature with stroboscopic timing light. The notch at left of Z1-mark on V-belt pulley (5° ATC) should be in alignment with mark on fan housing at 900 rpm (vacuum hose connected).

On Carrera 2.7 the notch on V-belt pulley marked Z1 (TDC) must be in alignment with mark on fan housing at 900 rpm.

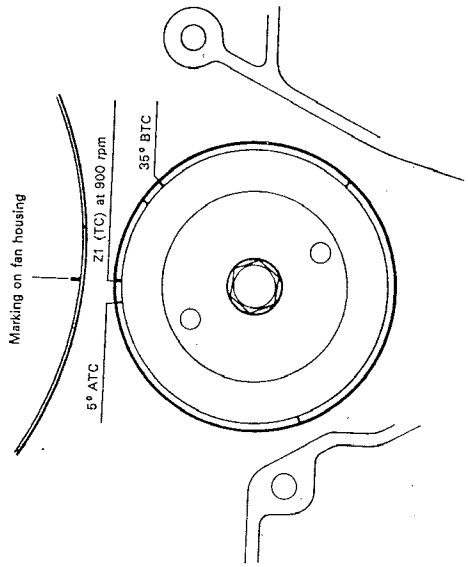
The vacuum hose must be connected to ignition distributor.

Note: At 900 rpm, ignition timing may fluctuate by ± 1°.

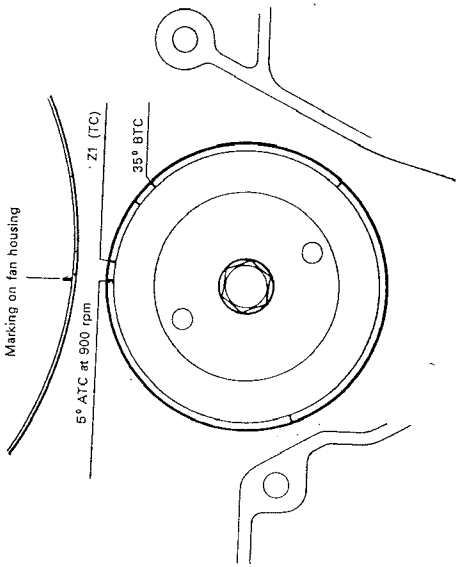
At 6,000 rpm, with vacuum hose pulled off, ignition timing should not exceed 38°.

Engine Type	Basic Adjustment	Ignition Adjustment at 900 rpm
911 T, 911 E, 911 S (Marelli or Bosch distributor)	TDC (Z1)	5° ATC
Carrera 2.7 (Marelli or Bosch distributor)	TDC (Z1)	TDC (Z1)

Carrera 2,7



911 T, 911 E, 911 S



Adjustment Values for Distributor

Bosch Distributor

Dwell angle 38° ± 3°
Breaker gap 0.35 mm
Contact pressure 650–800 p

Marelli Distributor

Dwell angle 37° ± 3°
Breaker gap 0.35 mm
Contact pressure 650–750 p

Checking Centrifugal Advance with Distributor Installed

(Bosch and Marelli)

With vacuum hose pulled off the following values apply:

911 T, 911 E, 911 S		Carrera 2.7	
Engine speed	Timing setting BTC	Engine speed	Timing setting BTC
1000 rpm	3.5°—6.5°	1000 rpm	8° —12°
1500 rpm	4.5°—14°	1500 rpm	8° —15°
2000 rpm	16° —24°	2000 rpm	11.5°—20°
4000 rpm	24° —31°	4000 rpm	25° —31.5°
6000 rpm	31° —38°	6000 rpm	32° —38°

Torque Values for Bolts or Nuts on Engine

Designation	Wrench Size	Thread	Tightening Torque mkp
Attachment of crankcase halves	13	M 8	2.2—2.5
Attachment of camshaft housing to cylinder heads	13 + 3 Allen head SW 8	M 8	2.2—2.5
Attachment of crankcase halves at main bearing webs	15	M 10	3.5
Flywheel attachment (multipoint bolt)	XZN–M 12	M 12 × 1.5	15
Connecting rod bolts	14	M 10 × 1.25	5—5.5
Cylinder head nuts	10 Allen head	M 10	3—3.3
Camshaft nut	46	M 27 × 2	10
Rocker arm shafts (studs)	5 Allen head	M 7	1.8
Crankshaft pulley to crankshaft	19	M 12 × 1.5	8
Alternator pulley to alternator	22	M 14 × 1.5 M 16 × 1	4
Spark plugs	21	M 14 × 1.25	2.5—3

Fuel Pump for Type 911 TV, T-USA, 911 E

Vehicle Type	911 TV
Spare part number	911 608 107 00
Bosch number	0580960009
Operating pressure	0.3 kp/cm² (0.3 bar)
Pressure relief valve opens between	0.2—0.3 kp/cm² (0.2—0.3 bar)
Fuel delivery rate	80 ltr/h at 12 Volts
Marking	Blue dot on pump housing (across from the fuel connections) Bosch number clearly embossed
Current input	2.5 Amps at 12 Volts
Speed	approx. 2,000 rpm
Fuel testing pressure	
Minimum fuel delivery rate	900—1,000 cm³/min
Weight	approx. 2.2 lbs.

911 S and Carrera 2.7 from Model 72

911 TE, 911 E, 911 S, Carrera 2.7	911 T CIS
901 608 105 00	901 608 110 00
0580970001	058254998
1 kp/cm² (1 bar)	5 kp/cm² (5 bar)
approx. 2 kp/cm² (2 bar)	
125 ltr/h at 12 Volts	90 ltr/h at 12 Volts
no color dot (Bosch number clearly embossed)	Lettering Bosch symbol B 580 082 320
3.5 Amps at 12 Volts	max. 8 Amps at 12 Volts
2,800 rpm	
0.8 ± 0.2 atm	
900—1,000 cm³ with power on for 30 sec.	750 cm³/30 seconds
approx. 1 kg (2.2 lb)	

Carburetor Specifications Type 911 TV

Carburetor Type	Solex-Zenith 40 TIN with auxiliary enrichment for overrun operation	
Vehicle and Engine Types	911 T (Model 72 and 73) 911 TV 911/57 and 911/67	
from Engine No.		6522313 911/57 Transmission 6529165 911/67 Sportomatic Change April 7, 1972
Venturi	28.5	
Main jet	120	*120 with changed flow characteristic
Air correction jet	190	210
Emulsion tube	4.3 mm dia.	
Idle jet	47.5	
Idle air bleed	155	
Float needle valve	P 1.5	

Float weight	15.7 grams
Fuel level (measured from housing upper edge without gasket	17 ± 1 mm
Injection quantity	0.5 ± 0.1 cm^3/stroke per tube
Injection tube	0.3 mm dia. cal.
Bypass orifices	0.65 / 0.75 / 1.1 / 1.45 mm dia.
Fuel jet	50
Air correction (submerged)	100

Idle speed	900 ± 50 rpm
Exhaust emission (volume %)	
At idling speed	3.5 ± 0.5 %
At 100–150 rpm rise	2.0—2.5 %

* Mark: Recess (groove) on outside diameter

Fuel Injection System Specifications

End of delivery stroke adjustment: Bring number 1 cylinder (Z 1) to top dead center overlap, then continue turning crankshaft beyond this top dead center mark for 40° and align FE mark

Linkage dimensions: Injection pump control lever = 114 ± 0.2 mm (dimension-ball head center to ball head center).
Set push rods free of tension and individually in relation to throttle valve housing. (Adjust with engine at operating temperature of 75—85° C oil temperature). Difference in length between lefthand rod and righthand rod may amount to max. 5 mm. Pull rod from accelerator linkage bell crank to cross shaft = 275 mm. (Dimension-ball head center to ball head center).

Correlation values of fuel injection pump with throttle valve assemblies

Protractor on pump	Protractor on throttle valve assy.	Maximum deviation	Protractor on pump	Protractor on throttle valve assy.	Maximum deviation
0°	0°		40°	30.0°	
5°	3°		50°	40.5°	
10°	6°	0.5°	60°	52.0°	± 1°
15°	9.5°		70°	65.0°	
20°	13.0°		79°—82°	80°—85°	(Full throttle)
30°	21.0°				

Injection valve opening pressure = 15 to 18 kp/cm²
Max. pressure difference between injection valves in given engine = 3 kp/cm²

Torque Values for Fuel Injection System

Nut M 12 for hub of pump drive wheel	2.5 mkp
Injection valve	3.0 mkp
Coupling nuts of fuel injection lines at injection valve and injection pump	1.0 mkp
Injection line fitting in injection pump	4.0 mkp

Emission Values

Operating temperature (approx. 80° C) at idle speed 900 ± 50 rpm

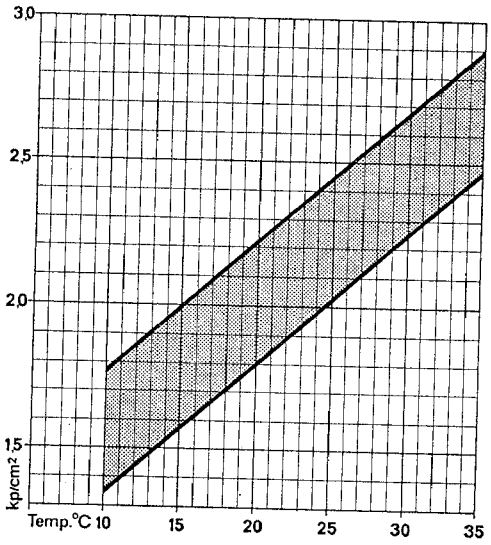
Idle Speed CO Adjusting Values:

USA	2.5 ± 0.5%
Europe	3.0 ± 0.5%
Carrera 2.7	2.5 ± 0.5%

Partial Load CO Adjusting Values: Determine emission values by means of road test or dynamometer test. Exhaust emissions (CO volume-%) in partial load range at 9° throttle valve setting and 2,400 rpm in 2nd speed:

	USA	Europe
911 T-USA	1.5—2.0	
911 E	2.0—2.5	2.0—3.0
911 S	2.0—2.5	2.0—3.0
Carrera 2.7	—	2.5—3.0

Testing and Adjusting Values for 911 T CIS

Test Procedure		Testing and Adjusting Values
Electric fuel pump delivered quantity		min. 750 cm³ / 30 seconds
Control pressure "cold" (corresponding to outside temperature)		
Control pressure "warm" Throttle valve position:	Idle speed	2.9 to 3.1 – adjusting tolerance 2.95 to 3.05
	Part load	3.5 to 3.9
	Full load	2.7 to 3.1
System pressure		4.5 to 5.2 kp/cm²
Leak test Min. pressure after 10 minutes		0.7 kp / cm²
Injection valves:	Opening pressure	2.4 to 3.3 kp / cm²
	Max. dispersion within one set or engine	0.6 kp / cm²
Idle speed adjustment:	Idle speed	900 ± 50 rpm 950 ± 50 rpm (Sportomatic)
CO contents		1.5 — 2.0%

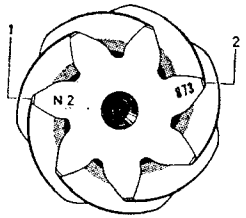
1 kp / cm² = 0.981 bar

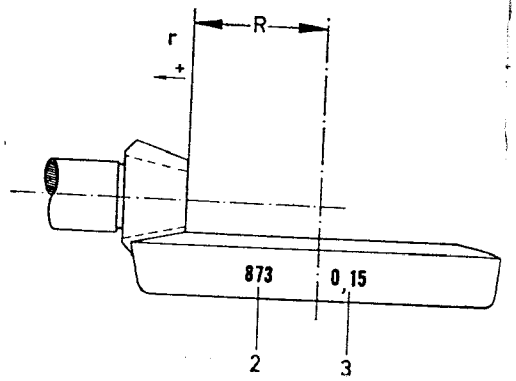
Transmission Type and Specification Table

Transmission Type	Number of Gears	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	Ring and Pinion
Model 72							
915/10	4	11:35	18:32	24:27	28:23		7:31
915/00	5	11:35	18:33	23:29	26:25	29:22	7:31
915/01	5	11:35	18:33	23:29	26:25	29:22	7:31
915/12	4	11:35	18:32	24:27	28:23		7:31
915/02	5	11:35	18:33	23:29	26:25	29:22	7:31
915/03	5	11:35	18:33	23:29	26:25	29:22	7:31
905/21	4	15:36	20:31	24:27	28:24		7:27
925/00	4	15:36	20:31	24:27	28:24		7:27
925/01	4	15:36	20:31	24:27	28:24		7:27
—	5		Ratios to order				—
Model 73							
915/10	4	11:35	18:32	24:27	28:23		7:31
915/11	4	11:35	18:32	24:27	28:23		7:31
915/00	5	11:35	18:33	23:29	26:25	29:22	7:31
915/01	5	11:35	18:33	23:29	26:25	29:22	7:31
915/12	4	11:35	18:32	24:27	28:23		7:31
915/13	4	11:35	18:32	24:27	28:23		7:31
915/02	5	11:35	18:33	23:29	26:25	29:22	7:31
915/03	5	11:35	18:33	23:29	26:35	29:22	7:31
915/08	5	11:35	18:33	23:29	27:25	29:21	7:31
—	5 + 4		Ratios to order				—
905/21	4	15:36	20:31	24:27	28:24		7:27
925/00	4	15:36	20:31	24:27	28:24		7:27
925/01	4	15:36	20:31	24:27	28:24		7:27

Transmission No.	Notes
702 0001—702 0013	Transmission with oil pump and ground gears
712 0001—712 0030	Transmission with oil pump and ground gears
712 5001—712 5012	Transmission with oil pump and shaved gears
722 0001—722 1357	Transmission without oil pump and ground gears
732 0001—732 9999	Transmission without oil pump and ground gears
772 0001—772 0658	
772 5001—772 5089	Transmission without oil pump and shaved gears
742 0001—742 0212	Sportomatic (for 911 TV only)
762 0001—762 0910	Sportomatic (for 911 T/USA and 911 E only)
762 0401—762 0535	Sportomatic (for 911 S only)
792 0001—792 0015	Special transmission
703 0001—703 5000	Transmission with oil pump and ground gears
703 5001—703 9999	Transmission with oil pump and shaved gears
713 0001—713 5000	Transmission with oil pump and ground gears
713 5001—713 9999	Transmission with oil pump and shaved gears
723 0001—723 5000	Transmission without oil pump and ground gears
723 5001—723 9999	Transmission without oil pump and shaved gears
733 0001—733 9999	Transmission without oil pump and ground gears
773 0001—773 5000	
773 5001—773 9999	Transmission without oil pump and shaved gears
783 0001—783 2000	Transmission with oil pump and ground gears
793 1001—793 2000	Special transmission with oil pump
743 0001—743 1000	Sportomatic (for 911 TV only)
763 0001—763 2000	Sportomatic (for 911 T/USA and 911 E only)
763 2001—763 4000	Sportomatic (for 911 S only)

Pinion Adjustment from Model 72





R = Blueprint value 66.30 mm
(Sportomatic 905/21 = 54.20 mm; 925/00 and 925/01 = 59.70 mm)

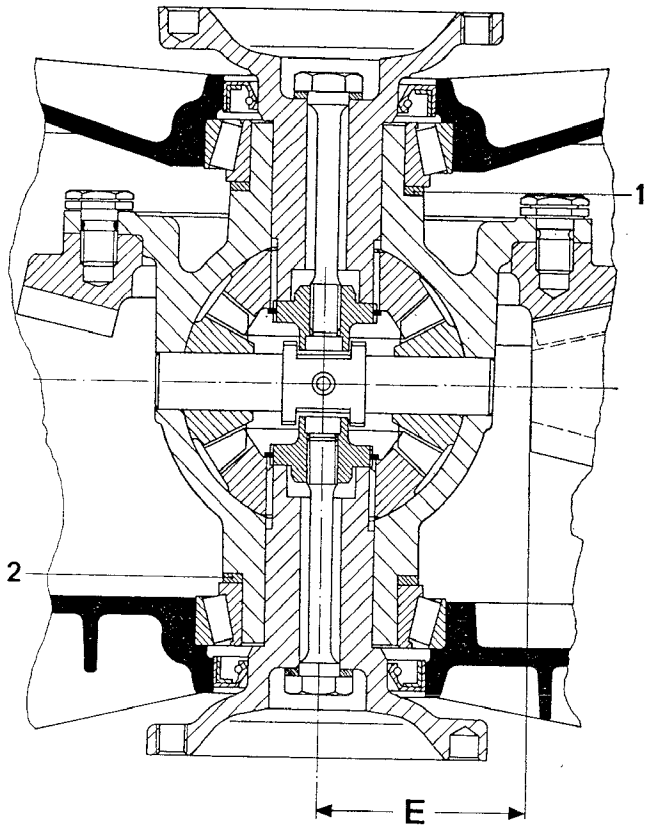
r = Deviation from R + shown in 1/100 mm (N 2 = + 0.02 mm)

1 = Deviation r

2 = Mating number

3 = Gear backlash

Ring Gear Adjustment



Gear backlash between ring and pinion is adjusted only by changing spacer thickness and should be 0.12 to 0.18 mm (measure at 4 different points).

1 Spacer S 1
2 Spacer S 2
E Adjusting value

To ensure accurate measurements and proper operation, make sure all parts are clean.

Important Transmission Adjustment Data

2 Examples for Adjusting Ring Gear and Pinion Gears from Model 72

	With Transmission Plug Gauge P 258	With Universal Plug Gauge VW 385
Blueprint value	66.30 mm	66.30 mm
Deviation	+ 0.02 mm	+ 0.10 mm
	66.32 mm	66.40 mm
Dial gauge setting	66.61 mm	66.30 mm
Measured value (without gaskets)	− 0.39 mm	− 0.29 mm
Distance to pinion shaft end face	66.22 mm	66.01 mm
Adjustment value "E"	66.32 mm	66.40 mm
Distance to pinion shaft end face	− 66.22 mm	− 66.01 mm
Thickness of gaskets	0.10 mm	* 0.39 mm

*) Round off to nearest 0.05 mm.

Gaskets are available 0.10, 0.15 and 0.20 mm thick.

Re-check adjustment value "E" upon installation of paper gaskets; a deviation of ± 0.03 mm is permissible.

Important Adjusting Data for Sportomatic Transmission

	Transmission Type 905/21	Transmission Type 925/00 and 925/01	
	With Transmission Plug Gauge P 258	With Transmission Plug Gauge P 258	With Universal Plug Gauge VW 385
Blueprint value	54.20 mm	59.70 mm	59.70 mm
Deviation	+ 0.18 mm	+ 0.18 mm	+ 0.04 mm
Adjustment value "E"	54.38 mm	59.88 mm	59.74 mm
Empirical value (without gasket)	55.70 mm	60.70 mm	60.70 mm
Adjustment value	− 54.38 mm	− 59.88 mm	− 59.74 mm
Spacer thickness	1.32 mm*	0.82 mm*	0.96 mm*
Measurement after installation of spacers:			
Dial gauge setting	54.01 mm	60.02 mm	59.70 mm
Measured value (without gasket)	− 0.04 mm	− 0.37 mm	− 0.32 mm
Distance to pinion shaft end face	53.97 mm	59.65 mm	59.38 mm
Adjustment value "E"	54.38 mm	59.88 mm	59.74 mm
Distance to pinion shaft end face	− 53.97 mm	− 59.65 mm	− 59.38 mm
Paper gasket	0.41 mm*	0.23 mm*	0.36 mm*

*) Round off to nearest 0.05 mm.

Paper gaskets are available 0.10, 0.15 and 0.20 mm thick.

Re-check adjustment value upon installation of paper gaskets; a deviation of ± 0.03 mm is permissible.

Transmission Tolerances

Measuring Point	Installation Tolerance (new) mm	Wear Limit mm
1. Backlash between gear I and II 1st gear 2nd gear 2nd gear 4th gear 5th gear	0.06–0.12	0.22
2. Free gears on input and pinion shafts		
1st gear	0.3–0.4	0.5
2nd gear	0.2–0.3	0.4
3rd gear axial play	0.2–0.3	0.4
4th gear	0.2–0.3	0.4
5th gear	0.2–0.3	0.4
3. Shift rods		
a) radial play in guides	0.195–0.236	0.4
b) runout	—	0.10
4. Shift fork in synchonizing sleeve, axial play		
5th and reverse gear	0.1–0.3	0.5
1st and 2nd gear	0.1–0.3	0.5
3rd and 4th gear	0.1–0.3	0.5
5. Synchronizing rings		
1st gear	86.20–86.54	When molybdenum layer has worn off in spots.
2nd gear	86.20–86.54	
3rd gear	76.12–76.48	
4th gear	76.12–76.48	
5th gear	76.12–76.48	
Outer diameter, installed		
6. Input shaft		
a) Guide pin runout	max. 0.1	max. 0.1 (straighten)

Torque Values for Transmission Bolts and Nuts

Application	Designation	Threads	Material	Tightening Torque mkp
Final drive housing (oil drain)	Magnetic plug	M 24 Taper	St 37	2.0— 2.5
Trans. housing (oil filler)	Plug	M 24 Taper	St 37	2.0— 2.5
Trans, housing front cover, side cover	Self-locking nut	M 8 × 1.25	× 12 Cr Ni 18,8	2.2— 2.5
Front cover	Backup light switch	M 18 × 1.5	Ms	3.5— 4.0
Input shaft	Flange nut	M 30 × 1.5	8.8	16.0—18.0
Input shaft	Castle nut	M 18 × 1.5	6.8	12.0—14.0
Clamping plate and attachment of transmission carrier	Nut	M 8 × 1.25	8	2.1— 2.3
Pinion shaft	Flange nut	M 24 × 1.5	8	14.0—16.0
Fork, gear shift	Nut	M 6 × 1,0	8	0.8— 0.9
Shift detent, transmission housing	Bolt	M 10 × 1.5	8.8	1.5— 1.8
Trans. housing	Breather	M 16 × 1.5	9 S 20 K	2.0— 3.0
Shift forks	Bolt	M 8 × 1.25	8.8	2.4— 2.6
Ring gear (differential)	Bolt	M 12 × 1.25	11.9	11.5—12.0
Drive shaft	Stretch bolt	M 10 × 1.5	8.8	2.6— 3.0
Starter attachment	Nut	M 10 × 1.5	8	4.6— 4.8
Pressure pipe (pinion shaft)	Bolt M 6 × 35	M 6 × 1.0	8.8	0.8— 0.9
Front cover	Breather bolt	M 12 × 1.5	9 S 20 K	2.2— 2.5
Oil pump cover	Self-locking nut	M 6 × 1.0	× 12 Cr Ni 18.8	0.9— 1.0
Intake pipe	Allen head bolt M 6 × 15	M 6 × 1.0	8.8	0.8— 0.9
Pressure pipe (Trans. housing)	Bolt M 6 × 12	M 6 × 1.0	8.8	0.8— 09

Torque Values for Sportomatic Transmission Bolts and Nuts

Application	Designation	Threads	Material	Tightening Torque mkp
Transmission housing (on studs in side and front housing covers, as well as fork)	Nut	M 8 × 1.25	6.8	2.1—2.3
	Self-locking nut	M 8 × 1.25	× 12 Cr NI 18.8	2.2—2.5
Transmission housing (oil filler)	Plug	M 24 × 1.5 (Taper 1:16)	St 37	2.0—2.5
Final drive housing (oil drain)	Magnetic plug	M 24 × 1.5 (Taper 1:16)	St 37	2.0—2.5
Transmission housing	Breather	M 14 × 1.5 (Taper 1:16)	9 S 20 K	2.0—3.0
Transmission housing	Backup light switch	M 18 × 1.5	Ms	3.5—4.0
Transmission housing	Bypass switch	M 18 × 1.5	Ms	3.5—4.0
Transmission housing (starter attachment)	Nut	M 10 × 1.5	8.8	4.6—4.8
Transmission housing (servo motor carrier and servo motor attachment)	Nut	M 8 × 1.25	6.8	21.—2.3
Torque converter housing (attachment to transmission housing)	Nut	M 8 × 1.25	6.8	2.1—2.3
	Nut	M 10 × 1.5	8.8 (SW 15)	4.6—4.8
Torque converter housing (attachment to freewheeling support)	Allen head bolt	M 6 × 1.0	10.9	1.2—1.4
Torque converter housing	Hydraulic connector	M 24 × 1.5	6 S	3.0—3.5
Torque converter housing	Temperature sensor	M 14 × 1.5	Ms	2.5—3.0
Torque converter housing	Temperature switch	M 14 × 1.5	Ms	2.5—3.0
Torque converter housing (clutch pressure plate)	Allen head bolt	M 6 × 1.0	10.9	1.2—1.4
Torque converter coupling plate	Twelve-point bolt	M 8 × 1.25	8.8	2.4—2.6
Intermediate plate (clamping plate)	Bolt	M 8 × 1.25	8.8	2.1—2.3
Intermediate plate	Bolt for guide lever	M 8 × 1.25	9 S 20 K	2.1—2.3
Intermediate plate (shift detent)	Plug	M 14 × 1.5	4.6	2.2—2.5
Front transmission cover (tachometer drive detent)	Bolt	M 8 × 1.25	8.8	1.6—1.8
Front transmission cover (ball dia. 9 mm – parking lock)	Plug	M 12 × 1.5	5.8	3.0—3.5
Angle drive in guide bushing	Hollow bolt	M 24 × 1.5	6.8	2.2—2.4
Input shaft	Nut	M 24 × 1.5	6.9	10—12
Input shaft	Flange nut	M 18 × 1.5	5.8	11—13
Pinion shaft	Stretch bolt	M 12 × 1.5	10.9	11—12
Shift forks	Bolt	M 8 × 1.25	8.8	2.2—2.6
Differential (ring gear attachment)	Bolt	M 12 × 1.25	11.9	11.5—12
Drive shaft (differential)	Stretch bolt	M 10 × 1.5	8.8	3.5—4.0
Front transmission cover (attachment of transmission carrier)	Nut	M 8 × 1.25	6.8	2.1—2.3

Technical Data for Sportomatic

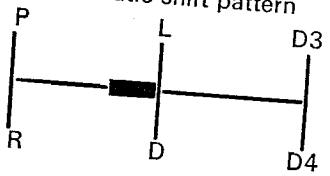
Clutch:

Hydrodynamic torque coverter and vacuum-controlled, single-plate dry clutch.

Transmission: Porsche servo-thrust synchronization

No. of speeds: 4 forward, 1 reverse and parking lock

Sportomatic shift pattern



P = Parking lock
R = Reverse
L = Low (ratio for extreme gradients)
D = Drive (city ratio)
D 3 = Drive 3 (road ratio)
D 4 = Drive 4 (expressway ratio)

Model 72

	TV	T–USA	E
Final drive ratio	7:27	7:27	7:27
Stall speed	2,500—2,700 rpm	2,500—2,700 rpm	2,500—2,700 rpm
Maximum reduction	2.1—2.27	2.1—2.27	2.1—2.27
Clutch speed (at full load)	approx. 3,720 rpm	approx. 3,720 rpm	approx. 3,720 rpm
Torque converter (oil transfer rate)	approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²
Engine oil capacity (total capacity)	approx. 10 ltr	approx. 10 ltr	approx. 10 ltr
Transmission oil filling capacity	approx. 3 ltr	approx. 3 ltr	approx. 3 ltr

Model 73

S	TV	T – USA	E	S
7 : 27	7 : 27	7 : 27	7 : 27	7 : 27
2,900–3,100 rpm	2,500–2,700 rpm	2,500–2,700 rpm	2,500–2,700 rpm	2,900–3,100 rpm
2.0–2.2	2.1–2.27	2.1–2.27	2.1–2.27	2.0–2.2
approx. 4,100 rpm	approx. 3,720 rpm	approx. 3,720 rpm	approx. 3,750 rpm	approx. 4,100 rpm
approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²
approx. 11 ltr	approx 13.5 ltr	approx. 13.5 ltr	approx. 13.5 ltr	approx. 16 ltr
approx. 3 ltr	approx. 2.5 ltr	approx. 3 ltr	approx. 3 ltr	approx. 3 ltr

Front Axle and Steering – Technical Data

	911 T	911 E	911 S	Carrera 2.7
Front suspension	Wheels individually suspended to transverse control arms and shock absorber struts			
Springing	One round, longitudinal torsion bar per wheel (hydropneumatic suspension struts optional)			
Track	Wheel size 5 1/2 J×15 1.360 mm	same as 911 T	same as 911 T	same as 911 T
	Wheel size 6 J×15 1.372 mm	same as 911 T	same as 911 T	same as 911 T
	Wheel size 5 1/2 J×14 1.362 mm	—	—	—
Shock Absorbers	double acting hydraulic shock absorber struts	same as 911 T	same as 911 T	same as 911 T
Make				
Boge	standard	standard	standard	—
Koni	optional	optional	optional	—
Bilstein	optional	optional	optional	standard
self-levelling hydropneumatic struts	optional	optional	optional	—
Stabilizers: front/rear	Optional 15/15 mm dia	Optional 15/15	standard 15/15	standard 15/15 or 18/19

Adjustment of the ZF Rack & Pinion Steering

Steering box turning torque (measured at steering flange with tie rods disconnected)	8 to 14 cmkp

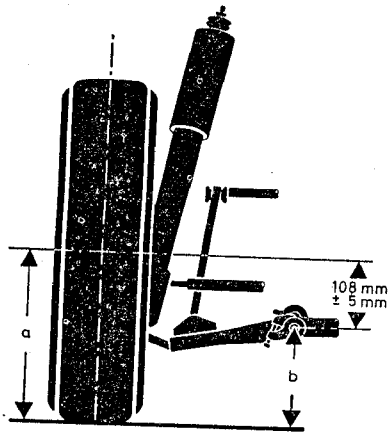
Technical Data for ZF Steering

Overall ratio	1 : 17 . 78 (mean)
Steering wheel turns, lock to lock	approx. 3.1
Smallest turning circle diameter	approx. 10.7 m
Steering track length	501 mm
Total stroke	171 mm

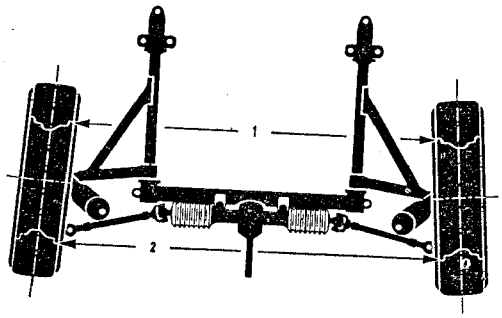
Tolerances and Adjustment Specifications

(Vehicle unladen, empty weight acc. to DIN 70020)

Designation	Adjustment Value and Tolerances	Maximum Deviation Left to Right
Front Axle		
Wheel center to center of torsion bar	108 mm ± 5 mm	5 mm

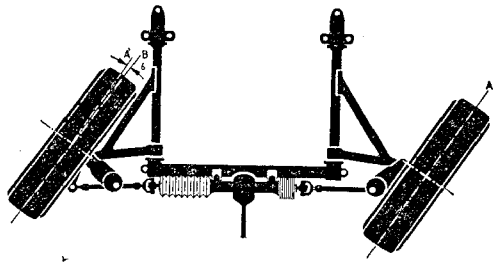


Toe-in (pressed with 15 kp) Total for left and right front wheel	0°	—

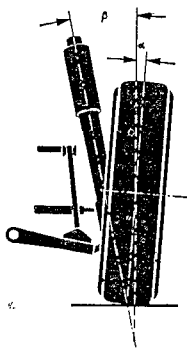


Designation	Adjustment Value and Tolerances	Maximum Deviation Left to Right
Angle differential in 20° turn (towards toe-in)	0° to 30°	corrections only through replacement of steering levers

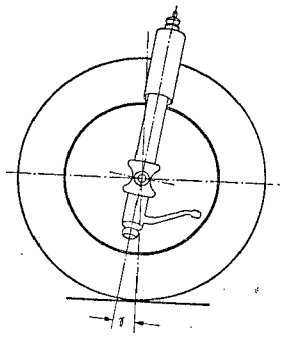
A' = Parallel to A
B = Wheel center line
γ = Angle differential



Front wheel camber (in straight ahead wheel position)		
α = Camber angle	0° ±·10	10'
β = Steering axis inclination	10° 55'	



Designation	Adjustment Value and Tolerances	Maximum Deviation Left to Right
γ = Caster Caster results from total camber difference at 20° left-hand turn and 20° righthand turn × 1.5	5° 5′ ± 15′	30′



These wheel alignment values can also be applied to earlier vehicles

Torque Values for Front Axle and Steering

Application	Designation	Threads	Class	Tightening Torque mkp
Supporting bearing to shock absorber strut	Nut	M 14 × 1.5	8	8
Clamp to tie rod	Nut	M 8	8.8	1.5
Supporting bearing to body	Allen head bolt	M 10	8.8	4.7
Auxiliary carrier to body	Bolt	M 12 × 1.5	8.8	9
Attachment underfloor protection	Bolt	M 10	8.8	4.7
Attachment underfloor protection	Bolt	M 8	8.8	2.5
Flanblock attachment	Bolt	M 10	8.8	4.7
Attachment auxiliary carrier	Bolt	M 10	8.8	4.7
Attachment steering gear	Bolt	M 10 × 20	8.8	4.7
Drag link to steering gear	Bolt	M 10	8.8	4.7
Stabilizer bearing to body	Bolt	M 8	8.8	2.5
Stabilizer arm to stabilizer	Bolt	M 8	8.8	2.5

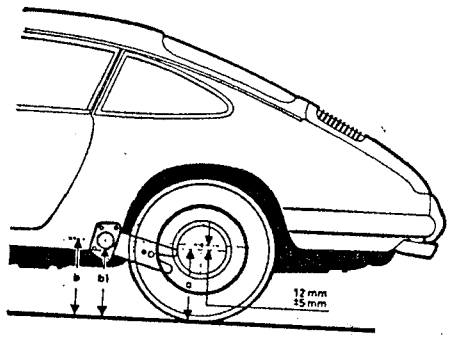
Application	Designation	Threads	Class	Tightening Torque mkp
Wheel bearing clamping nut to steering knuckle	Allen head bolt	M 7	10.9	1.5
Ball joint to shock absorber strut	Self-locking nut	M 8	8	2.2
Ball joint to shock absorber strut	Bolt	M 10 × 30	10.9	4.5
Ball joint to transverse control arm (threads lubricated)	Slotted nut	M 45 × 1.5	8.8	25
Plug for shock absorber strut (Boge)	Plug			12 + 2
Plug for shock absorber strut (Koni)	Plug			20
Wheel to wheel hub	Wheel nut	M 14 × 1.5	10.9	13
Brake disc to wheel hub	Nut	M 8	8.8	2.3
Splash shield to steering knuckle	Bolt	M 8	8.8	1.0
Caliper to steering knuckle	Bolt	M 12 × 1.5	8.8	7.0
Brake fitting to caliper	Hollow bolt	M 10 × 1		2.0
Steering coupling to steering shaft	Bolt	M 8	8.8	2.5
Steering shaft to steering gear	Bolt	M 8	8.8	2.5
Attachment steering shaft bearing	Allen head bolt	M 8	8.8	2.5
Attachment universal joint to steering shaft	Bolt	M 8	8.8	2.5
Attachment steering wheel	Nut	M 18 × 1.5	8	7.5
Bellows holder to rack	Slotted nut	M 16 × 1.5	8	7.0
Ball joint to steering lever	Castle nut	M 10 × 1	8	4.5
Coupling flange to drive pinion	Self-locking nut	M 10	8	4.7
Housing cover to steering gear	Bolt	M 8 × 1	8.8	1.5

Rear Axle – Technical Data

	911 T	911 E	911 S	Carrera 2.7
Rear suspension	Wheels individually suspended to trailing arms			
Springing	One round transverse torsion bar per wheel			
Track	Wheel size 5 1/2 J × 15 1.342 mm	same as 911 T	same as 911 T	same as 911 T
(wheel center 12 mm below cross tube center)	Wheel size 6 J × 15 1.354 mm	same as 911 T	same as 911 T	same as 911 T
	Wheel size 5 1/2 J × 14 1.344 mm	—	—	—
				Wheel size 7 J × 15 1.394 mm
Shock Absorbers	double-acting hydraulic shock absorbers	same as 911 T	same as 911 T	same as 911 T
Make				
Boge	standard	standard	standard	—
Koni	optional	optional	optional	—
Bilstein	optional	optional	optional	standard
Stabilizers	optional 15 mm dia.	optional 15 mm dia.	standard 15 mm dia.	standard 15 or 19 mm dia.

Adjusting Values and Tolerances (at empty weight acc. to DIN 70020)

Designation	Adjustment Value and Tolerances	Maximum Deviation Left to Right
Rear Axle		
Torsion bar adjustment:		
Torsion bar	dia. 23 mm	
Radius arm angle		
Type 911 T, 911 E, 911 S, Carrera 2.7	36° 30′ to 37°	
Rear wheel camber	−1° ± 10′	
Toe-in	0° to +20′ each wheel	
Height Adjustment		
Transverse tube center above	12 mm	8 mm
rear wheel center	± 5 mm	



Torque Specifications for Rear Axle Bolts and Nuts

Application	Designation	Threads	Class	Tightening Torque mkp
Bearing cap to body	Bolt	M 10	8.8	4.7
Rear axle control arm to transverse tube	Bolt	M 14 × 1.5	10 K	9.0
Radius arm to control arm	Eccentric bolt	M 12 × 1.5	8.8	6.0
Radius arm to control arm	Bolt	M 12 × 1.5	10.9	9.5
Caliper to control arm	Bolt	M 12 × 1.5	8.8	7.0
Shock absorber to control arm	Bolt	M 14 × 1.5	8.8	12.5
Shock absorber to body	Nut	M 10 × 1	8	2.5
Brake hose to lines	Brake hose	M 10 × 1		1.5
Stabilizer to body	Bolt	M 8	8.8	2.5
Drive shaft flange	Allen head bolt	M 10	12 K	8.3
Parking brake assembly to control arm	Bolt	M 8	8.8	2.5
Wheel to wheel hub	Wheel lug nut	M 14 × 1.5		13
Wheel hub to axle shaft	Castle nut	M 20 × 1.5	10.9	30—35
Brake disc to wheel hub	Countersunk screw	M 6	8.8	0.5
Parking brake control to control arm	Bolt	M 6	8.8	0.5

General Data

Designation	Dimensions and Adjusting Values	Wear Limit
Tandem Brake Master Cylinder		
Bore	19.05 mm dia.	
Stroke	18/13 mm	
Ratio on brake pedal	5.4 : 1	
Play: actuating rod/piston	1 mm	
Front Wheel Brake		
Brake disc (OD)	282.5 mm, internal venting	
Thickness, when new	20.0 mm	
Minimum thickness upon refinishing *)	18.6 mm	18.0 mm
Thickness limit	max. 0.03 mm	
Lateral runout of brake disc	max. 0.05 mm	
Lateral runout installed	0.2 mm	
Caliper piston dia.	48 mm	
Lining thickness	10 mm	
Vent clearance	0.2 mm	2.0 mm
Lining surface per wheel		
Type 911 T, E	52.5 cm²	
Type 911 S and Carrera 2.7	76.0 cm²	
Rear Wheel Brake		
Brake disc (OD)	290 mm, internal venting	
Thickness, when new	20.0 mm	
Minimum thickness upon refinishing *)	18.6 mm	18.0 mm
Thickness limit	max. 0.03 mm	
Lateral runout of brake disc	max. 0.05 mm	
Lateral runout installed	max. 0.2 mm	
Roughness of brake disc upon refinishing	max. 0.006 mm	
Caliper piston dia.	38 mm	
Lining thickness	10 mm	
Vent clearance	0.2 mm	2.0 mm
Lining surface par wheel Type 911, all	52.5 cm²	
Parking Brake		
Parking brake drum dia. when new	180 mm	181.0 mm
Parking brake lining thickness		2.0 mm

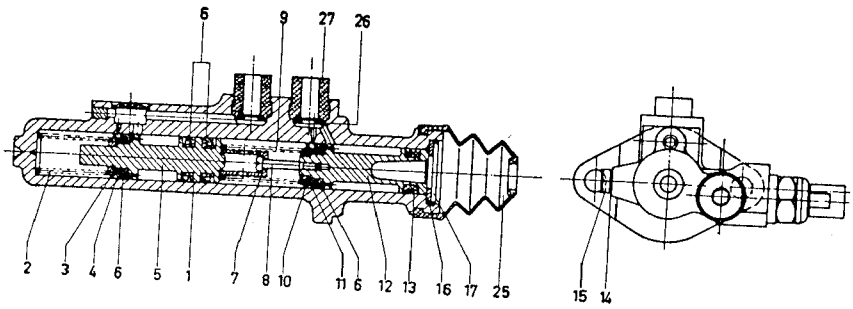
Calipers

911 T, E front: grey cast iron
rear: grey cast iron

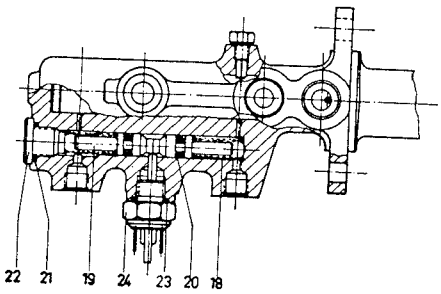
911 S and **Carrera 2.7** front: light alloy
rear: grey cast iron

*) Machine brake disc uniformly on both sides.

Cross Section of Tandem Master Brake Cylinder (with Warning Sender, USA Version)

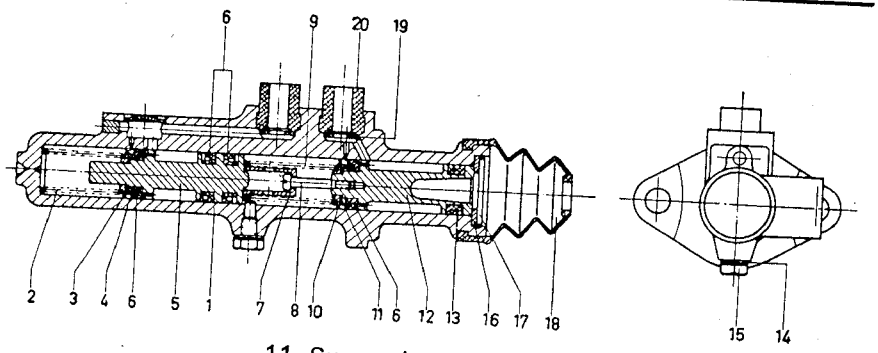


1 Housing
2 Second piston return spring
3 Spring seat
4 Supporting washer
5 Second piston with filler disc
6 Primary cup
7 Travel stop
8 Stroke limiting bolt
9 First piston return spring



10 Spring seat
11 Supporting washer
12 First piston with filler disc
13 Secondary cup
14 Gasket
15 Stop bolt (outer)
16 Stop plate
17 Lock ring
18 Spring
19 Piston
20 Piston cup
21 O-ring
22 Bolt
23 O-ring
24 Brake failure warning switch
25 Dust boot
26 Washer
27 Grommet

Cross Section of Tandem Brake Master Cylinder
(without partial system failure indication, European version)



1 Housing
2 Second piston return spring
3 Spring
4 Supporting washer
5 Second piston with filler disc
6 Primary cup
7 Travel stop
8 Stroke limiting bolt
9 First piston return spring
10 Spring seat
11 Supporting washer
12 First piston with filler disc
13 Secondary cup
14 Gasket
15 Stop bolt (outer)
16 Stop plate
17 Lock ring
18 Dust boot
19 Washer
20 Grommet

Reconditioning Dimensions and Wear Limits for Brake Discs and Parking Brake

Vehicle Type	Brake Disc Type	Brake Disc Location	Dimension "a" (based on new brake disc thickness)	Brake Disc Thickness New	Minimum Brake Disc Thickness when Reconditioned	Brake Disc Wear Limit (when worn symmetrically)
911 all	Vented disc	Front wheel	35 ± 0.1 mm	20.0–0.2 mm	18.6 mm	18.0 mm (1.0 mm each side)
911 all	Vented disc	Rear wheel	76 + 0.2 mm	20.0–0.2 mm	18.6 mm	18.0 mm (1.0 mm each side)
911 all	Brake disc thickness tolerance				max. 0.03 mm	
911 all	Brake disc lateral runout				max. 0.05 mm	
911 all	Brake disc machined roughness upon reconditioning max.				max. 0.006 mm	

Caution

The refinishing and wear dimensions named below are based on the assumption that the remaining thickness of the brake lining is not less than 2.0 mm, otherwise functional troubles on brake may result. (Guaranteed by installation of expanding spring.)

Only balanced brake discs will be supplied. Brake discs are balanced by special clips attached to the cooling wents.

Caution. Do not remove these clips.

Parking Brake:

Brake diameter of drum (new)	180 + 0.2 mm
Brake drum wear limit	max. 181.0 mm dia.
Brake lining width	25 mm

Caution

Parking brake linings may be used only to a thickness of 2.0 mm

Caution

The brake disc must be machined evenly on both sides. See arrows for locating reference or mounting points of the disc.

Front wheel brake

Rear wheel brake

Checking Disc Wheels

Measuring Points for Vertical and Lateral Runout on Wheel Rim

Dimension "a" = 8 mm

Max. permissible vertical runout for steel wheels	1.25 mm
Max. permissible vertical runout for light alloy wheels	1.0 mm
Max. permissible lateral runout for steel wheels	1.25 mm
Max. permissible lateral runout for light alloy wheels	0.8 mm

Caution

Straightening of distorted wheels is not permitted.

Tire Pressures (Reference Values)

Measured in cold tires

Tire Size Designation	Air Pressure (kp/cm² or bar) Front Axle	Rear Axle
165 HR 15 (4 1/2 and 5 1/2 J × 15)	2.0 (29 psi)	2.4 (35 psi)
185/70 VR 15 (6 and 7 J × 15)	2.0 (29 psi)	2.4 (35 psi)
215/60 VR 15 (7 and 8 J × 15)	2.0 (29 psi)	2.4 (35 psi)

Values also apply to winter tires.

Exceptions: Type Carrera RS

165 VR 15 (6 J × 15)	2.2 (32 psi)

Wheels and Tires

Type	Model Year	Standard Wheel	Tires	Permissible Wheel	Tires
911 T	72—73	5 1/2 J × 15 (Steel)	165 HR 15	6 J × 15	185/70 VR 15
				5 1/2 J × 14	185 HR 14
				5 1/2 J × 15	185/70 SR 15 snow or studded snow
				4 1/2 J × 15	165 SR 15 snow or studded snow
911 E	72—73	6 J × 15 (Model 72 steel wheel)	185/70 VR 15	5 1/2 J × 15	165 VR 15
				6 J × 15	185/70 SR 15 snow or studded snow
		(from model 73 light-alloy die-cast wheel)		5 1/2 J × 15	185/70 SR 15 snow or studded snow
				5 1/2 J × 15	165 SR 15 snow or studded snow
				4 1/2 J × 15	165 SR 15 snow or studded snow
911 S	72—73	6 J × 15 (Light alloy wheel, forged)	185/70 VR 15	6 J × 15	185/70 SR 15 snow or studded snow
				5 1/2 J × 15	185/70 SR 15 snow or studded snow
				5 1/2 J × 15	165 SR 15 snow or studded snow
				4 1/2 J × 15	165 SR 15 snow or studded snow
Carrera 2.7	73	front 6 J × 15 rear 7 J × 15	185/70 VR 15 215/60 VR 15	6 J × 15	185/70 SR 15 snow or studded snow
		(Light alloy wheel, forged)		5 1/2 J × 15	185/70 SR 15 snow or studded snow
				5 1/2 J × 15	165 SR 15 snow or studded snow

Torque Specifications for Front and Rear Wheel Brakes

Application	Designation	Threads	Class	Tightening Torque mkp
Tandem brake master cylinder mounting	Nut	M 8	8.8	2.5
Master cylinder push rod to adapter	Nut	M 10	C 45/6	1,0
Brake line connection	Union nut	M 10 × 1	5.8	1.5
Brake fitting to caliper	Hollow bolt	M 10 × 1		2.0
Caliper to steering knuckle	Bolt	M 12 × 1.5	8.8	7.0
Clamping nut for wheel bearing	Allen head bolt	M 7	10.9	1.5
Brake disc to wheel hub	Nut	M 8	8.8	2.3
Splash shield for brake disc	Bolt	M 8	8.8	1.0
Housing bolt for caliper (front)	Allen head bolt	M 8	10.9	3.4
Housing bolt for caliper (rear)	Allen head bolt	M 6	12.9	2.2
Caliper to rear axle control arm	Bolt	M 12 × 1.5	8.8	7.0
Brake disc to rear wheel hub	Countersunk screw	M 6	8.8	0.5
Brake carrier plate to rear axle control arm	Bolt	M 10		4.7
Splash shield to brake carrier plate	Bolt	M 8	8.8	2.5
Parking brake cable guide to control arm	Bolt	M 6	8.8	0.5
Wheel to wheel hub	Wheel lug nut	M 14 × 1.5		13.0
Bleeder valve to caliper SW 7	—	—	—	0.3

Electrical System Specifications

	911 T	911 E	911 S	Carrera 2.7
Operating voltage	12 V	12 V	12 V	12 V
Radio noise suppression	acc. to VDE 0879	same as 911 T	same as 911 T	same as 911 T
Alternator	770 W, 55 A, 14 V Bosch: 0 120 400 725 S.E.V. Alternateurs: 712 237 12 (= Motorola = S.E.V. Marchal)	same as 911 T	same as 911 T	same as 911 T
Voltage regulator (same make as alternator)	Bosch: 0 190 601 006 S.E.V. Alternateurs: 0 33 542	same as 911 T	same as 911 E	same as 911 E
Spark plugs / electrode gap	Bosch: W 230 T 30/0,7 (not for USA) Beru: 225/14/3/0.7 (not for USA) Bosch: W 235 P 21/0.55 Beru: 235/14/3 P/0.55	Bosch: W 260 T 2/0.7 (not for USA) Beru: 260/14/3/0.7 (not for USA) Bosch: W 265 P 21/0.55 Beru: 265/14/3 P/0.55	same as 911 E	same as 911 E

Distributor	Bosch: 0 231 169 003 From Model 73: 008* Marelli: 501 09 741	Bosch: 0 231 169 004 From Model 73: 009* Marelli: 501 09 742	Bosch: 0 231 169 005 From Model 73: 010* Marelli: 501 09 743	Bosch: 0 231 169 011 Marelli: 610 151 55
Dwell angle	Bosch: 38° ± 3° Marelli: 40° ± 3° From Model 73: 37° ± 3°	same as 911 T	same as 911 T	same as 911 T
Starter	Bosch: 0 001 212 005 (.8 HP)	same as 911 T	same as 911 T	Bosch: 0 001 312 100 (1.5 HP)

*) Ignition distributors Model 73 may be installed in vehicles Model 72.

Battery Electrical Condition	Temperate Zones Specific Gravity	Tropical Zones Freezing Point	Tropical Zones Specific Gravity
Battery dead	1.12	— 11° C	1.08
Battery half-charged	1.20	— 27° C	1.14
Battery fully charged	1.28	— 65° C	1.23

Technical Data for Auxiliary Heater

Operating voltage	12 V
Calorific output	approx. 2,500 kcal/h
Fuel consumption rate	approx. 0.44 ltr/h
Air flow rate	110 cu. m/h
Heating air temperature	approx. 85°C
Power draw	
Heater	approx. 70 W
Ventilator	approx. 35 W

Technical Data for Porsche Air Conditioner

Operating voltage	12 V
Weight	approx. 35 kp
Power draw	
Evaporator blower	approx. 185 W
Condenser blower	approx. 62 W
Evaporation pressure at 1,000 rpm (engine)	2.0–2.6 kp/cm² (2.0–2.6 bar)
Cold air delivery temperature	1°C – 5°C
Current draw of clutch	approx. 4 Amps
Air flow rate	approx. 90 ltr/sec

Bulb Chart

	Wattage	Base (DIN)
Headlamps (halogen) H 1	55 W	P 14, 5 S
Headlamps (halogen) H 4	60/55 W	P 43 t – 38
Auxiliary driving lamps (halogen) H 1 and H 3	55 W	P 14.5 S/PK 22 S
Fog lamps (halogen) H 1 and H 3	55 W	P 14,5 S/PK 22 S
Stop / tail lamps	21/5 W	BAY 15 d
Directional signal lamps	21 W	BA 15 S
Backup lamp	15 W	BA 15 S
Interior lamp, engine compartment lamp	10 W	SV 8,5 — 8
Tail fog lamp	18 W	SV 8.5 — 8
Luggage compartment lamp	10 W	BA 15 S
Parking and license plate lamp	4 W	BA 9 S
Instrument illumination, control lamps	2 W	BA 7 S
Glass base control lamps	1.2 W	W 2 × 4.6 d
Fog lamps (USA)	35 W	BA 20 S
		Base (SAE)
Sealed beam headlamps (USA)	50/40 W	6012
Sealed beam headlamps (righthand steering)	60/50 W	6014
Sealed beam headlamps (lefthand steering)	60/50 W	7002
Stop / tail lamps (USA)	32/3 cp	1034
Front directional / parking lamps (USA)	32/3 cp	1034
Directional lamp (USA)	32 cp	1073
Backup lamp	15 cp	1003
Side marker lamp (USA), license plate lamp (USA)	2 cp	1895

Fuse Chart

Fusebox I

1	Interior light, clock, luggage compartment lamp	5 A
2	Emergency flasher	16 A
3	(Window regulator)	25 A
4	Cigarette ligher (auxiliary heater)	16 A (25 A)
5	(Sun roof)	16 A
6	Windshield wiper and washer	25 A
7	Fresh air fan	25 A
8	Stop/rear turn/backup lights	16 A
9	Turn signal, left front	5 A
10	Turn signal, right front	5 A

Fusebox II

1	High beam left	8 A
2	High beam right	8 A
3	Low beam left	8 A
4	Low beam right	8 A
5	Parking light left	5 A
6	Parking light right	5 A
7	License plate light	5 A
8	(Fog lights)	16 A

Fusebox III

1	Sportomatic	5 A
2	Start enrichment / shutoff solenoids, solenoid valve	8 A
3	Rear window defogger	25 A

Fuse 2 not required for vehicles with CIS.

Weights and Measures

Dimensions at DIN Empty Weight		911 T	911 E	911 S	Carrera 2.7
Wheelbase	mm	2,271	same as 911 T	same as 911 T	same as 911 T
Track front (wheel center 108 mm above torsion bar center)	mm	1,360	1,372	1,372	1,372
Track rear (wheel center 12 mm below transverse tube center)	mm	1,342	1,354	1,354	1,394
Length	mm	4,127	4,127	4,147	4,147
Width	mm	1,610	same as 911 T	same as 911 T	1,652
Height (empty)	mm	1,320	same as 911 T	same as 911 T.	same as 911 T
Ground clearance	mm	150	same as 911 T	same as 911 T	same as 911 T

Weights

Engine weight (complete w/o oil) approx.	kg	183	182	182	182
Transmission weight (complete w/o oil and starter)	kg	54	same as 911 T	same as 911 T	same as 911 T
Empty weight (DIN)	kg	1,050	1,075	1,075	1,075
Empty weight (DIN) with Sportomatic	kg	1,065	1,090	1,090	—
Permissible total weight	kg	1,400	1,400	1,400	1,400
Permissible axle load front/rear*)	kg	600/840	same as 911 T	same as 911 T	same as 911 T
Permissible trailer load load (w/o brakes)	kg	480	same as 911 T	same as 911 T	same as 911 T
Permissible trailer (w/brakes)	kg	600	same as 911 T	same as 911 T	same as 911 T

*) Do not exceed permissible total weight.

Filling Capacities

		911 T	911 E	911 S	Carrera 2.7
Engine (Total Capacity)		Single viscosity premium HD oil, or oil of API specification MS or SD. Summer SAE 30, winter SAE 20 W/20, below —15° C SAE 10 W.			
Model 72 (oil tank in front of rear axle)					
	approx. liters	8	8	9	—
with Sportomatic	approx. liters	10	10	11	—
Model 73 (oil tank in right rear wheel housing)					
Dipstick mark min./max.	liters	8.5/10.5	8.5/10.5	11.0/13.0	11.0/13.0
with Sportomatic	liters	11.0/13.0	11.0/13.0	13.5/15.5	—
Oil change quantity	liters	approx. 10	approx. 10	approx. 10	approx. 10
Transmissions *)	liters	approx. 2.5	approx. 3.0	approx. 3.0	approx. 3.0
Fuel tank Model 72	liters	62, incl. approx. 6 liters reserve	same as 911 T	same as 911 T	—
Fuel tank Model 73	liters	62, incl. 6 liters reserve	85, incl. 9 liters reserve	85, incl. 9 liters reserve	85, incl. 9 liters reserve
Brake fluid reservoir	approx. liters	0.2	same as 911 T	same as 911 T	same as 911 T
Windshield washer	approx. liters	2	same as 911 T	same as 911 T	same as 911 T

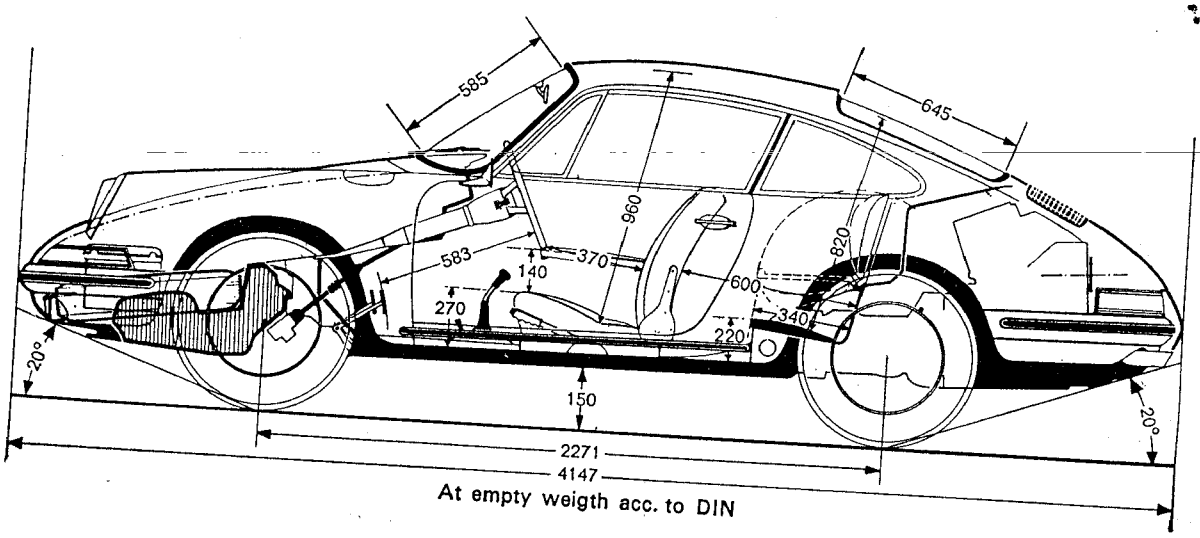
*) EP oil acc. to MIL-L 2105 or 2105 B – for locking differential (positive traction) Shell S 1747 A

Performance

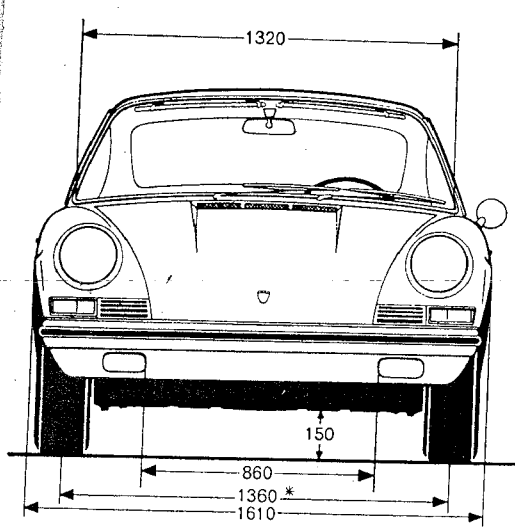
Max. speed (with 4-speed or 5-speed transmission)	mph	127	137	143	149
		with Sportomatic transmission approx. 3 mph slower than with manual transmission			
Acceleration 0–100 km/h (0–62 mph) at DIN empty weight plus 1/2 payload	sec	9.5	7.9	7.0	6.3
Kilometer from standing start (DIN empty weight plus 1/2 payload)	sec	30.35	28.5	27.5	26.5
Nominal fuel consumption liters/100 km		9.2	9.0	9.5	10.2

PORSCHE

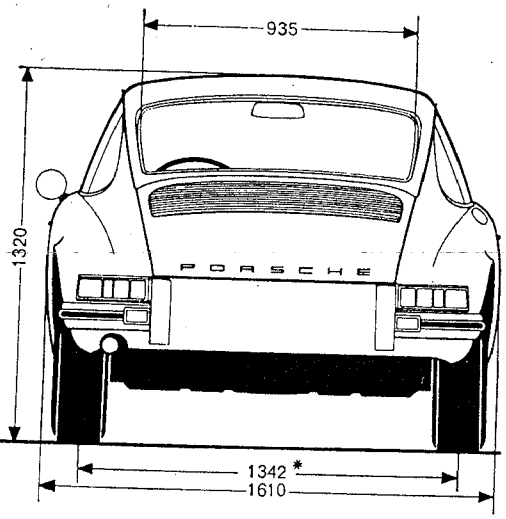
Body Dimensions for Type 911 (from 1972 Models)



At empty weigth acc. to DIN



* 1360 with wheels 5½ J x 15
1327 with wheels 6 J x 15



* 1342 with wheels 5½ J x 15
1354 with wheels 6 J x 15

Metric to English

LENGTH

Millimeters to Inches	multiply by	0.03937
Centimeters to Inches		0.3937
Meters to Feet		3.2808
Meters to Yards		1.0936
Kilometers to Miles		0.6214

WEIGHT

Grammes to Ounces	multiply by	0.03527
Kilogrammes to lbs.		2.2046
Tons (Metric) to tons		0.9842

LIQUID

Liters to U. S. gallons	multiply by	0.2642
Liters to Imperial gallons		0.2200
Liters to U. S. pints.		2.114
Liters to Imperial pints		1.7598

PRESSURE

Kg/cm^2 to $lbs./in.^2$	multiply by 14.223

TEMPERATURE

°Centigrade to °Fahrenheit	multiply by 9/5 and add 32

English to Metric

LENGTH

Inches to millimeters	multiply by	25.4001
Inches to centimeters		2.54
Feet to meters		0.3048
Yards to meters		0.9144
Miles to kilometers		1.609

WEIGHT

Ounces to grammes	multiply by	28.35
Lbs. to kilogrammes		0.4536
Tons to tons (Metric)		1.016

LIQUID

U. S. gallons to liters	multiply by	3.875
Imperial gallons to liters		4.546
U. S. Pints to liters		0.473
Imperial pints to liters		0.568

PRESSURE

$lbs./in.^2$ to kg/cm^2	multiply by 0.07031

TEMPERATURE

°Fahrenheit to °Centigrade	subtract 32 and multiply by 5/9

FOREWORD

We have compiled this booklet covering

Models, Dimensions and Tolerances

to provide the Porsche mechanic with a ready reference for data and specifications necessary to render proper service.

We took into account that service operations outlined in the workshop manual are known to the user. The contents of this booklet is arranged to correspond with subject groups in the workshop manual.

When using this booklet, also refer to technical bulletins since the data are subject to change.

PORSCHE

TECHNICAL SPECIFICATIONS

MODELS DIMENSIONS TOLERANCES

911 T · 911 E · 911 S · Carrera RS

72, 73 MODELS

1st English Edition

Current as of May 31, 1973

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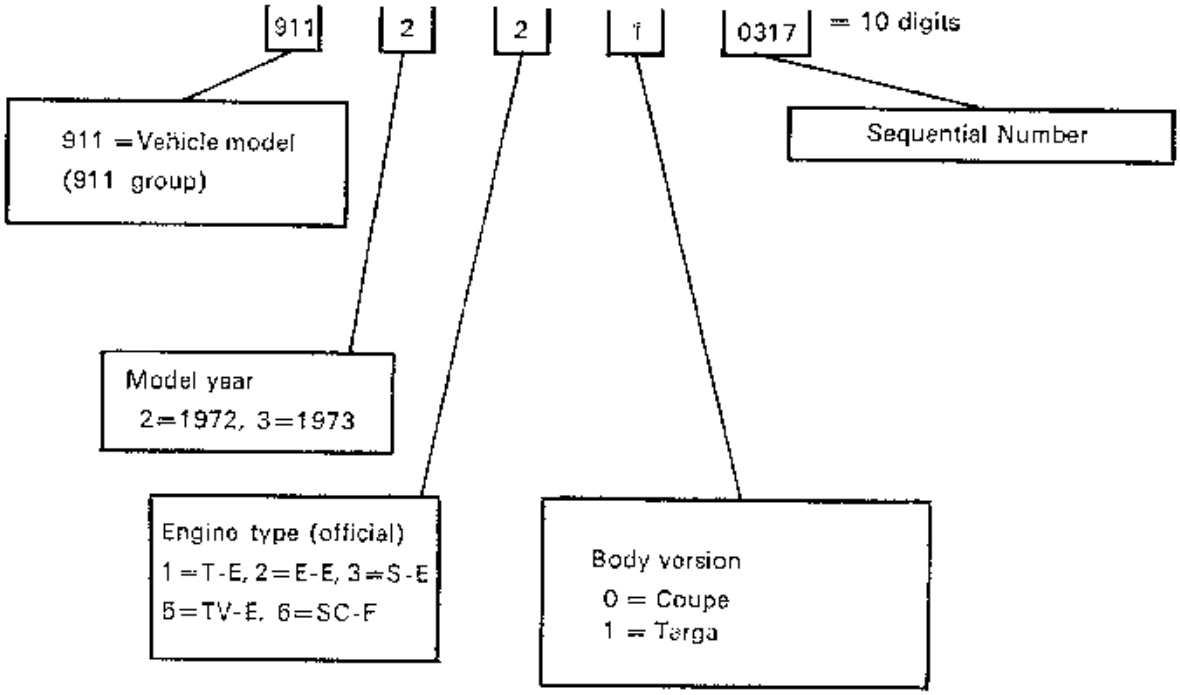
Type Classification Code

Year Mfd	Model Year	Model Design. (Off.)	Engine Designation Official	Engine Designation Internal	Displ. (cm³)	Horsepower DIN – HP (kW) at rpm	Stroke & Bore (mm)	Compr. Ratio
1971/ 1972	1972	911 T	911 TV-E	911/57	2341	130 (96)/ 5600	70.4/84	7.5 : 1
				911/67 (w/Sportomatic)				
			911 T-E	911/51 (USA)		140 (103)/ 5600		
				911/61 (USA-Sportomatic)				
		911 E	911 E-E	911/52	2341	165 (121)/ 6200	70.4/84	8.0 : 1
				911/62 (w/Sportomatic)				
		911 S	911 S-E	911/53	2341	190 (140)/ 6500	70.4/84	8.5 : 1
				911/63 (w/Sportomatic)				
1972/ 1973	1973	911 T	911 TV-E	911/57	2341	130 (96)/ 5600	70.4/84	7.5 : 1
				911/67 (w/Sportomatic)				
			911 T E	911/51 (USA) 911/61 (USA-Sportomatic)		140 (103)/ 5600		
				911/91 (USA)		140 (103)/ 5700		8.0 : 1
				911/96 (USA Sportomatic)				
		911 E	911 E-E	911/52	2341	165 (121)/ 6200	70.4/84	8.0 : 1
				911/62 (w/Sportomatic)				
		911 S	911 S-E	911/53	2341	190 (140)/ 6500	70.4/84	8.5 : 1
				911/63 (w/Sportomatic)				
		911 SC	911 SC-E	911/83	2687	210 (154)/ 6300	70.4/90	8.5 : 1

Carburetors, F/I Pump or CIS	Engine Numbers	Transmission Type (Standard)	Chassis Numbers Coupe	Chassis Numbers Targa
Carburetor	652 0001—652 3284	915/12	911 250 0001 – 911 250 1963	911 251 0001— 911 251 1523
	652 9001—652 9224	905/21	Chassis Number end December 1971	
F/I Pump	612 0001 —612 4478	915/12	911 250 0781	911 251 0587
			911 210 0001— 911 210 2031	911 211 0001- 911 211 1821
	612 9001—612 9293	925/00	Chassis Number end December 1971	
			911 210 1176	911 211 0746
F/I Pump	622 0001—622 1765	915/12	911 220 0001— 911 220 1124	911 221 0001— 911 221 0861
	662 9001—622 9248	925/00	Chassis Number end December 1971	
			911 220 0378	911 221 0290
F/I Pump	632 0001—632 2586	915/12	911 230 0001— 911 230 1750	911 231 0001— 911 231 0989
	632 9001 -632 0147	925/01	Chassis Number end December 1971	
			911 233 0489	911 231 0311
Carburetor	653 0001—	915/12	911 350 0001	911 351 0001—
	653 9001—	905/21	Chassis Number end December 1972	
F/I Pump	613 0001	915/12	911 310 0001— 911 310 1252	911 311 0001— 911 311 0781
	613 9001—	925/00		
Continuous Injection System	613 3001 –	915/12	911 310 1501—	911 311 1301
	613 9301—	925/00		
F/I Pump	623 0001—	915/12	911 320 0001—	911 321 0001
	623 9001—	925/00	Chassis Number end December 1972	
			911 320 0584	911 321 0431
F/I Pump	633 0001—	915/12	911 330 0001—	911 331 0001—
	633 9001—	925/01	Chassis Number end December 1972	
			911 330 0754	911 331 0458
F/I Pump	663 0001—	915/08	911 360 0001 – Chassis Number end December 1972 911 360 0319	

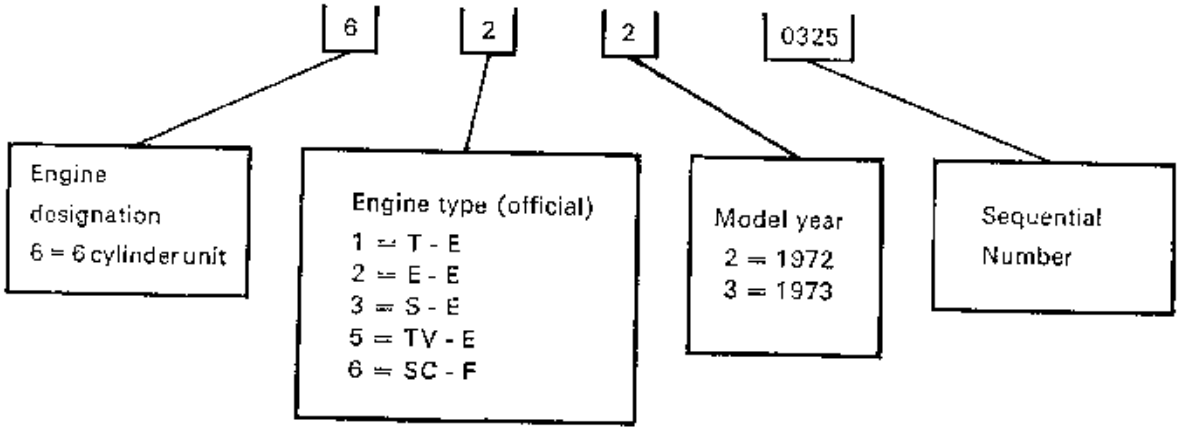
Chassis Number Code

Example : Chassis number of a Type 911 E 1972model,
Targa version vehicle



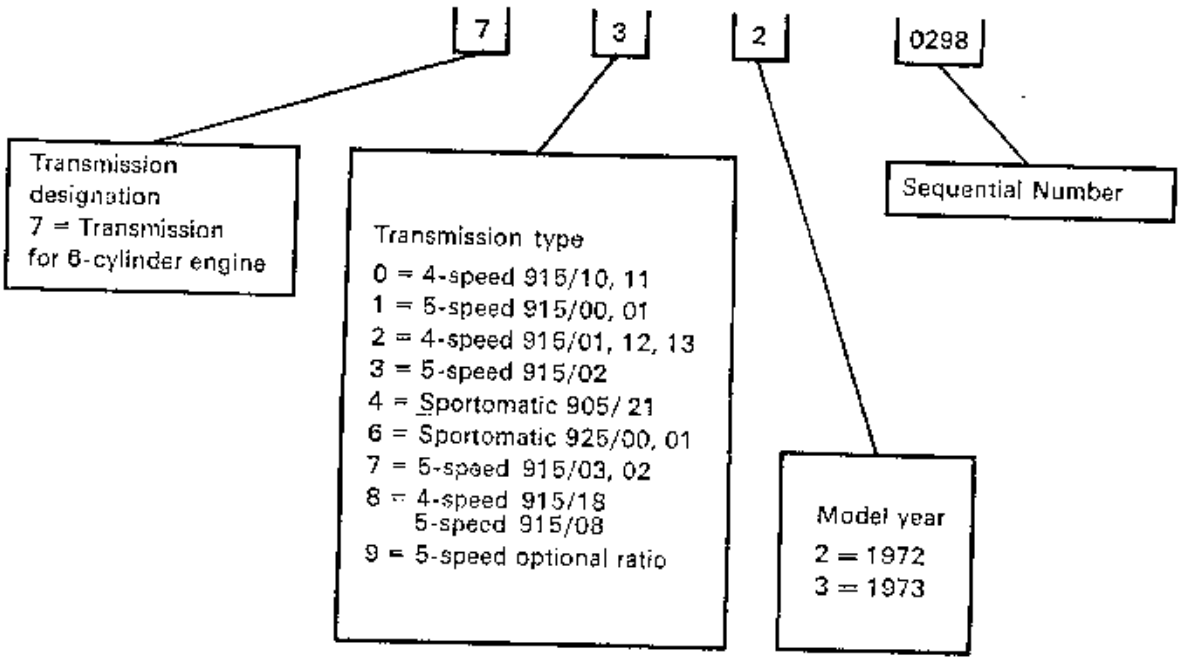
Engine Number Code

Example: Engine number of a Type 911 E, 1972 model



Transmission Number Code

Example: 5-speed transmission (915/02) for a 6-cylinder engine, 1972 model



Technical Data for Type 911 Vehicles

Engine specifications for 1972, 1973 models

Engine		911 TV (911 T – USA)	911 E	911 S	Carrera 2.7
Type design		Four stroke cycle, internal combustion gasoline engine with two horizontally opposed banks with three cylinders each	same as 911 T	same as 911 T	same as 911 T
Number of cylinders		6	6	6	6
Bore	mm	84	84	84	90
Stroke	mm	70.4	70,4	70,4	70,4
Total displacement	cm^3	2.341	2341	2341	2687
Compression ratio		7.5 : 1 (8.0 : 1)	8,0 : 1	8,5 : 1	8,5 : 1
Cylinder pressure	kp/cm^2	maximum deviation between cylinders up to 1.5 kp/cm^2; engine oil temperature 60° C minimum	same as 911 T	same as 911 T	same as 911 T
Maximum power output (DIN)	HP/kW	130/96 (140/103)	165/121	190/140	210/154
(SAE)	HP/kW	147/110 (157/117)	185/138	210/157	230/172
at engine speed of	rpm	5,600 (5,700)	6200	6500	6300
Maximum torque	mkp/Nm	20/196 (20,5/201)	21/206	22/216	26/225
at engine speed of	rpm	4,000	4500	5200	5100
Maximum output in liters (DIN)	HP/l/ kW/l	55/41 (60/44)	70/52	81/60	78/57
Mean piston speed at maximum output	m/sec	13.1	14,5	15,3	14,8
Mean pressure at Ne maximum	kp/cm^2	10.76	11,30	11,84	12,19
Maximum speed	rpm	6,400	7000	7300	7300
Governed engine speed	rpm	6,500 ± 100	7100 ± 100	7300 ± 100	7300±100

	911 TV (911 T – USA)	911 E	911 S	Carrera 2.7
Fuel octane number RON	91	91	91	91
Engine cooling	By air fan on alternator shaft	same as 911 T	same as 911 T	same as 911 T
Cooling fan drive	Off crankshaft by V-belt	same as 911 T	same as 911 T	same as 911 T
Ratio crankshaft - alternator shaft	approx. 1 : 1.3	same as 911 T	same as 911 T	same as 911 T
Lubrication	Dry sump, forced feed	same as 911 T	same as 911 T	same as 911 T
Oil cooling	Oil cooler on crankcase in cooling air stream	same as 911 T	Oil cooler on crankcase in cooling air stream, plus oil cooler in front section of vehicle (cooling coil)	same as 911 S
Oil pressure indicator	Warning light	same as 911 T	by instrument in kp/cm²	same as 911 S
Oil pressure in warm engine at 5,000 rpm	5.5 to 7 kp/cm² at 80° C	same as 911 T	same as 911 T	same as 911 T
Max. oil temperature	130° C	same as 911 T	same as 911 T	same as 911 T
Oil filter	Full flow	same as 911 T	same as 911 T	same as 911 T
Oil consumption	1.5 to 2.0 ltr/1,000 km/600 miles	same as 911 T	same as 911 T	same as 911 T
Crankcase	Pressure cast, light alloy two piece	same as 911 T	same as 911 T	same as 911 T
Crankshaft	forged (Tenifer treated)	same as 911 T	same as 911 T	same as 911 T
Main bearings	8 plain journals	same as 911 T	same as 911 T	same as 911 T
Main bearings 1–7	Tri-metal, split inserts	same as 911 T	same as 911 T	same as 911 T
Main bearing 1	Thrust bearing with hard lead journal	same as 911 T	same as 911 T	same as 911 T
Main bearing 8	Sleeve insert with hard lead journal	same as 911 T	same as 911 T	same as 911 T
Connecting rods	Forged steel	same as 911 T	forged steel (Tenifer treated)	same as 911 S
Connecting rod bearings	Split sleeve, tri-metal inserts	same as 911 T	same as 911 T	same as 911 T

	911 TV (911 T – USA)	911 E	911 S	Carrera 2.7
Piston pin bearings	Pressed–in bronze bushings	same as 911 T	same as 911 T	same as 911 T
Intermediate shaft bearings	Double, plain bearings	same as 911 T	same as 911 T	same as 911 T
Pistons	Cast, light alloy Autothermic pistons	same as 911 T	Light metal forged	same as 911 S
Piston pins	Floating, secured with circlips	same as 911 T	same as 911 T	same as 911 T
Piston rings	2 compression rings, 1 oil scraper ring	same as 911 T	same as 911 T	same as 911 T
Cylinders	Finned grey cast iron	Grey-cast iron with light alloy finned jacket	same as 911 E	Light alloy cylinder with Ni-lining
Cylinder heads	1 per cylinder bank, light alloy	same as 911 T	same as 911 T	same as 911 T
Valve seat inserts	Shrunk-in, special bronze	same as 911 T	same as 911 T	same as 911 T
Spark plug threads	M 14 × 1.25, cut into cylinder head	same as 911 T	same as 911 T	same as 911 T
Valves	1 intake and 1 exhaust valve per cylinder	same as 911 T	same as 911 T	same as 911 T
Valve arrangement	Overhead in "V"	same as 911 T	same as 911 T	same as 911 T
Exhaust valves	Sodium-filled with reinforced seats	same as 911 T	same as 911 T	same as 911 T
Intake valve dia. mm	46	same as 911 T	same as 911 T	same as 911 T
Exhaust valve dia. mm	40	same as 911 T	same as 911 T	same as 911 T
Valve springs	2 coil springs per valve	same as 911 T	same as 911 T	same as 911 T
Valve timing	1 OHC per cylinder bank	same as 911 T	same as 911 T	same as 911 T
Camshafts	Cast, three-bearing camshaft riding in base metal of camshaft housing	same as 911 T	same as 911 T	same as 911 T
Camshaft drive	by chains	same as 911 T	same as 911 T	same as 911 T

		911 TV (911 T – USA)	911 E	911 S	Carrera 2.7
Valve timing at 1 mm valve clearance					
Intake opens		16° BTC	18° BTC	38° BTC	38° BTC
Intake closes		30° ABC	36° ABC	50° ABC	50° ABC
Exhaust opens		42° BBC	38° BBC	40° BBC	40° BBC
Exhaust closes		4° BTC	8° ATC	20° ATC	20° ATC
Intake valve lift at overlap TC with 0.1 mm valve clearance	mm	2.4–2.8	2.7–3.1	5.0–5.4	5.0–5.4
Valve clearance in cold engine					
Intake		0.10 mm between valve	same as 911 T	same as 911 T	same as 911 T
Exhaust		and rocker arm			
Clutch		Single disc, dry	same as 911 T	same as 911 T	same as 911 T
Pressure plate	Type	MFZ 225 Fichtel and Sachs	same as 911 T	same as 911 T	same as 911 T
Clutch pressure	kp	650–720	same as 911 T	same as 911 T	720–780
Fuel system		2 zenith triple-throat downdraft Type 40 TIN	Intake pipe injection Bosch 6-plunger double row injection	same as 911 E	same as 911 E
		(Intake port fuel injection Bosch 6-plunger double row injection pump)			
Air filter		Induction silencer with micronic cartridge insert and preheated induction air	same as 911 T	same as 911 T	same as 911 T
Fuel pump		1 Electric roller-cell pump	same as 911 T	same as 911 T	same as 911 T
Fuel delivery rate		80 (125) ltr/h	same as 911 T	same as 911 T	same as 911 T
Operating pressure		0.3 (1.0) kp/cm²	same as 911 T	same as 911 T	same as 911 T
Pressure relief valve opens at		0.2 -0.3 (approx. 2) kp/cm²	same as 911 T	same as 911 T	same as 911 T

		911 TV (911 T – USA)	911 E	911 S	Carrera 2.7
Fuel filter		with integral overflow valve (in front of injection pump)	with integral overflow valve (in front of injection pump)	same as 911 E	same as 911 E
Electrical System					
Battery rated voltage		12 V	same as 911 T	same as 911 T	same as 911 T
Battery capacity		2 × 36 Ah	same as 911 T	same as 911 T	same as 911 T
Alternator output		770 Watts	same as 911 T	same as 911 T	same as 911 T
Ignition		Battery, capacitive discharge	same as 911 T	same as 911 T	same as 911 T
Firing order		1– 6—2—4—3—5	same as 911 T	same as 911 T	same as 911 T
Ignition transformer		Bosch	same as 911 T	same as 911 T	same as 911 T
Ignition distributor	Bosch	JFUDR 6 0231169003	JFUDR 6 0231169004	JFUDR 6 0231169005	JFUDR 6 0231169011
(optional)	Marelli	50109741	50109742	50109743	61015155
Ignition timing advance		centrifugal and vacuum	same as 911 T	same as 911 T	same as 911 T
Ignition basic adjustment (with vacuum hose connected)		5° ATC at 900 rpm ± 50	same as 911 T	same as 911 T	TDC at 900 rpm ± 50
Dwell angle/ breaker point gap	Bosch	38° ± 3°/0.35 mm	same as 911 T	same as 911 T	same as 911 T
	Marelli	37° ± 3°/0.35 mm			
Spark plugs (electrode gap in mm)	Bosch	W 230 T 30 (0.7)	W 260 T 2 (0.7)	same as 911 E	same as 911 E
	Bosch	W 235 P 21 (0.55)	W 265 P 21 (0.55)		
Optional brands	Beru	225/14/3 (0.7)	260/14/3 (0.7)	same as 911 E	same as 911 E
	Beru		265/14/3 P (0.55)		

Numbering of Cylinders and Firing Order

Firing order
1–6–2–4–3–5

Technical Data Model 911 T Continuous Injection System

(Data different from those of 1972 model 911 T)

Engine		911 T CIS
Maximum power output (DIN)	HP/kW	140/103
(SAE)	HP/kW	157/117
At engine speed of	rpm	5,700
Maximum output in liters	HP/l/KW/l	60/44
Maximum torque	mkp/Nm	20.5/201
At engine speed of	rpm	4,000
Compression ratio		8.0 : 1
Valve timing at 1 mm valve clearance:		
Intake opens	0° at TC	Exhaust opens 30° BBC
Intake closes	32° ABC	Exhaust closes 10° BTC
Intake valve lift at overlap TC at 0.1 mm valve clearance:	mm 0.9–1.1	

Toferances and Wear Limits – Engine

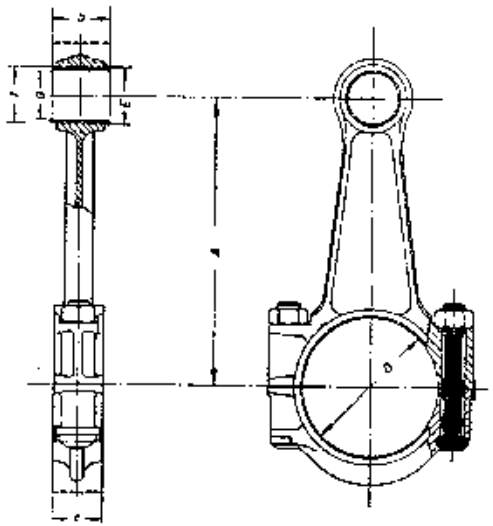
Note: B = Bore S = Shaft

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (—) from	to	Wear Limits mm
Crankshaft to main bearing Bearings 1–7 (d1)	B	57.020—57.059	+ 0.010	+ 0.072	Visual insp.
	S	56.971—56.990			56.960
Crankshaft to main bearing Bearing 8 (d3)	B	31.041—31.084	+ 0.048	+ 0.104	Visual insp.
	S	30.980—30.993			30.970
Crankpin to connecting rod bearing (d2)	B	52.020—52.059	+ 0.030	+ 0.088	Visual insp.
	S	51.971—51.990			51.960
Crankshaft runout (measured on bearings 4 and 8, with bearings 1 and 7 on V-blocks)					max. 0.04
Crankshaft unbalance					max. 10 cmg
Crankshaft to main bearing, end play			+ 0.110	+ 0.195	0.30
Crankshaft to timing gear	B	41.975—42.000	— 0.002	— 0.038	
	S	42.002—42.013			
Crankshaft to distributor drive gear	B	41.975—42.000	— 0.002	— 0.038	
	S	42.002—42.013			
Crankshaft to flywheel	B	65.000—65.030	0.0	+ 0.049	
	S	64.981—66.000			
Crankshaft to V-belt pulley	B	30.000—30.033	+ 0.007	+ 0.073	
	S	29.960—29.993			
Pulley: Vertical runout					max. 0.15
Lateral runout					max. 0.20

CRANKSHAFT – Standard and Reconditioning Stages

Stage	Crankcase Bores	All Main Bearing Journals d 1	Connecting Rod Bearing Journals d 2	Main Bearing Journal d 3	Oil Seal Journal d 4	Timing Gear Seat d 5	Crankshaft Pulley Seat d 6	Width A of Thrust Surface
Normal	Standard 62.000–62.019	53,993–56,971	51,990–51,971	30,993–30,986	65,000–64,981	42,013–42,002	29,993–29,980	28,000–28,06
- 0,25	Oversize 62.250–62.269	56,743–56,721	51,740–51,721	30,743–30,730				
- 0,50		56,490–56,471	51,490–51,471	30,493–30,480	64,500–64,310		29,500–29,370	
- 0,75		56,240–56,221	51,240–51,221	30,243–30,230				

Measuring Point	Installation Size with Tolerances mm	Clearance (+) or Preload (-) from....to	Wear Limits mm
Crankcase			
Crankcase bore for main bearings:			
Bearings 1–8	62.000–62.019		
Oversize	62.250–62.269		
Crankcase bore for intermediate shaft:			
Bearing 1 (fitted bearing)	27.500–27.521		
Bearing 2	26.500–26.521		
Spring for pressure relief and safety valve:			
Free length	70.00		
Spring pressure at 52 mm	10.6 kp		
Spring pressure at 46 mm	14.1 kp		
Spring wire dia.	1.8 mm		
Connecting Rods			
A Distance between centers	127.80		
B Piston pin bushing width	26.00–25.98		
C Big end width	23.80–23.70		
Bearing width at crankpin	24.00–24.10	+0.200 +0.400	
D Big end dia. (without bearing shell)	56.000–56.019		
E Small end dia.	25.000–25.021		
F Dia. with piston pin bushing removed	25.035–25.055		
Preload of bushing in connecting rod		−0.014–0.055	
G Dia. of installed piston pin bushing (finished dimension)	22.020–22.033		
Clearance piston pin bushing to piston pin		+0.020÷0.039	0.055



Connecting Rod Weight Groups

Connecting rods are arranged in weight groups.

End digits of the spare part number indicate the given weight group.

The respective end digits are stamped into the shank of the given connecting rod if it was supplied as a spare part.

Weight Over grams	Weight Under grams	KD (Service) Weight Group	KD (Service) Connecting Rod Spare Part No.	Connecting Rod Mark
645	654	1	911.103.015.31	31
654	663	2	911.103.015.32	32
663	672	3	911.103.015.33	33
672	681	4	911.103.015.34	34
681	690	5	911.103.015.35	35
690	699	6	911.103.015.36	36
699	708	7	911.103.015.37	37
708	717	8	911.103.015.38	38

Note

Connecting rods installed in a given engine must not differ among each other by more than 9 grams. To determine weight group, weigh the complete connecting rod without bearing inserts.

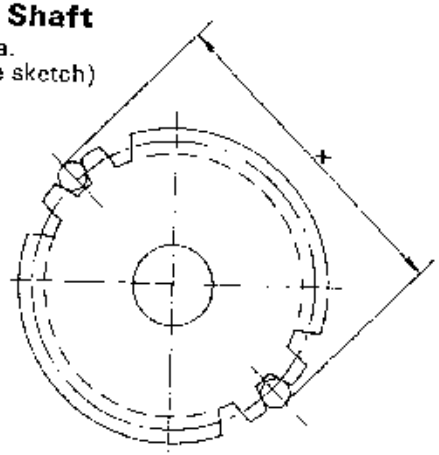
Matching Intermediate Shaft and Crankcase

See marking on left crankcase half below alternator support (0 or 1)

Axis Distance mm	Crankcase Marking	Marking on Crankshaft Gear	Marking on Intermediate Shaft	Gear Backlash
103.975–103.990	0	0	0	0.029–0.049
		Installation still permissible		
		1	0	0.016–0.042
		0	1	0.017–0.043
103.990–104.000	1	1	1	0.012–0.041
		Installation still permissible		
		0	1	0.025–0.049
		1	0	0.025–0.048

Checking Intermediate Shaft

Use steel rollers of 4.5 mm dia. to help make measurements (see sketch)



Intermediate shaft gear standard – wear limit × = 136.5 mm

Intermediate shaft gear marked 1 – wear limit × = 136.55 mm

Intermediate shaft gear and crankshaft gear can be replaced as a set only.

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (–) from	to	Wear Limits mm
Intermediate Shaft					
Bearing 1					
Crankcase bore – shaft	B	27.500—27.521			
	S	25.000—24.980			
Bearing 2					
Crankcase Bore – shaft	B	26.500—26.521			
	S	23.980—23.967			
Intermediate shaft running clearance			+ 0.030	+ 0.084	
Intermediate shaft end play			+ 0.040	+ 0.133	0.16
Flywheel to steel bushing for input shaft	B	25.000—25.021	– 0.001	– 0.035	
	S	25.022—25.035			
Distributor to crankcase	B	27.000—27.021	+ 0.020	+ 0.074	
	S	26.947—26.980			
Distributor pinion to distributor shaft	B	12.456—12.474	+ 0.001	+ 0.030	
	S	12.444—12.455			
Guide rail to stud bolts	B	8.000— 8.015			
	S	7.822— 7.837			
Flywheel					
Lateral runout					max. 0.10
Vertical runout					max. 0.20

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (–) from	to	Wear Limits mm
Timing Chain Housing					
Pivot shaft for sprocket wheel carrier to chain tensioner housing	B	15.000—15.018	+ 0.016	+ 0.045	Visual inspection
	S	14.973—14.984			
Pivot shaft for sprocket wheel carrier to sprocket wheel carrier	B	15.000—15.018	+ 0.016	+ 0.045	
	S	14.973—14.984			
Sprocket wheel carrier to sprocket wheel shaft	B	15.000—15.018	0.000	+ 0.029	
	S	14.989—15.000			
Stud to chain housing	B	7.857— 7.872	– 0.014	– 0.038	
	S	7.886— 7.895			
Stud to chain guide rail	B	8.000— 8.015	+ 0.105	+ 0.129	
	S	7.886— 7.895			
Sprocket wheel to sprocket wheel shaft	B	15.032—15.050	+ 0.032	+ 0.610	Visual inspection
	S	14.989—15.000			

Parallel alignment of both sprocket wheels may not deviate by more than 0.25 mm

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (–) from	to	Wear Limits mm
Camshaft Housings and Camshafts					
Camshaft bearings to camshaft	B S	46.967—46.992 46.926—46.942	+ 0.025	+ 0.066	0.10
Camshaft end play			+ 0.150	+ 0.200	0.40
Camshaft to sprocket wheel flange	B S	30.000—30.013 20.979—30.000	0.000	+ 0.034	
Camshaft runout, measured at center journal (between points)					max. 0.02
Rocker arm shaft to camshaft housing	B S	18.000—18.018 17.992—18.000	Rocker arm shafts are held firm by wedge effect of bolt		
Rocker arm to rocker arm shaft	B S	18.016—18.027 17.992—18.000	+ 0.016	+ 0.035	0.080
End play			+ 0.100	+ 0.350	0.50

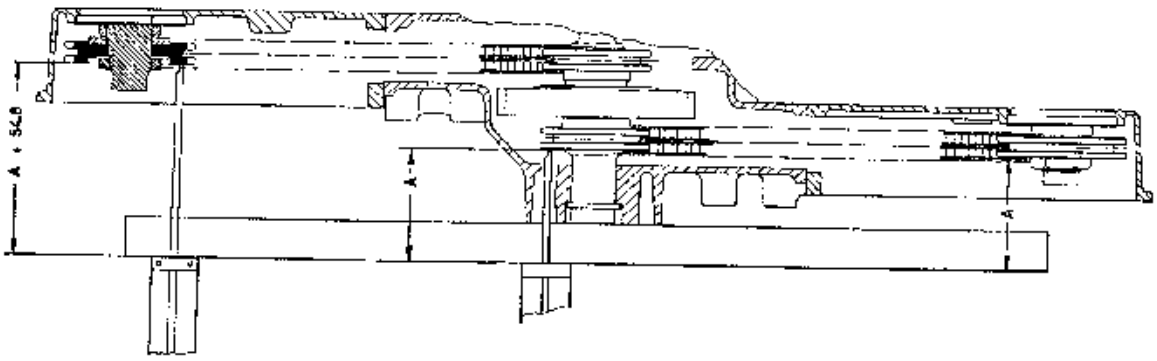
Measuring Sprocket Wheel Parallel Alignment

Before measuring, push intermediate shaft and camshaft axially toward the flywheel to set bearing thrust flanges in position.

The measurement is made through the hole below the intermediate shaft against the side of the forward chain sprocket on the intermediate shaft (dimension A).

This dimension must also be achieved at the sprocket wheel for bank of cylinders 4–6. Use shims if necessary (maximum permissible difference is 0.25 mm).

Sprocket wheel for bank of cylinders 1–3, mounted on the intermediate shaft, is positioned 54.8 mm farther to the front. These 54.8 mm (design dimension) must be considered when determining dimension A (maximum permissible difference is 0.25 mm).



Example: Measured dimension A = 78.8 mm

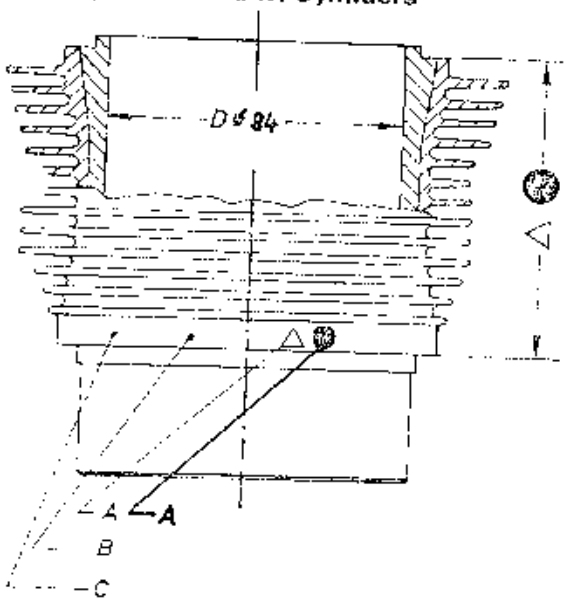
The formula for sprocket wheel of cylinder bank 1–3 is: A + 54.8 = 78.7 + 54.8 = 133.5 mm

Piston and Cylinder Specifications (Dimensions, Weights and Markings) 2.4 Liter Engine and Carrera 2.7

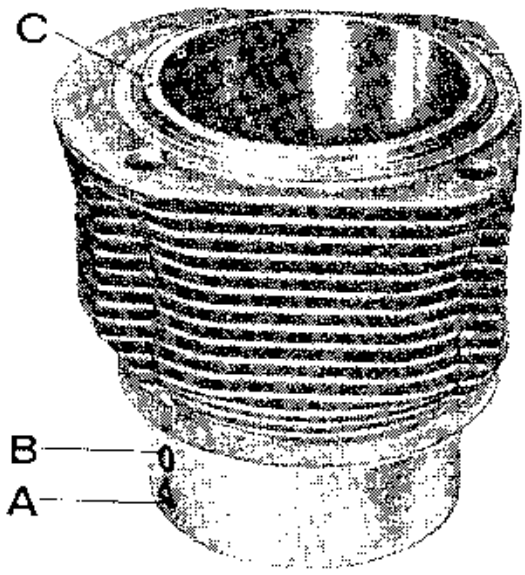
Vehicle Type Manufacturer Dimensions	Markings	Rated Dia.	Cylinder Dia	911 T Schmidt Piston Dia.	911 T Mahle Piston Dia.	911 E Mahle Piston Dia.	911 S Mahle Piston Dia.	Carrera 2.7 Cylinder Dia	Carrera 2.7 Mahle Piston Dia.
Standard	0		84.00–84.01	83.97	83.97	83.97	83.95	90.00–90.01	89.95
	1	84.00	84.01–84.02	83.98	83.98	83.98	83.96	90.01–90.02	89.96
	2		84.02–84.03	83.99	83.99	83.99	83.97	90.02–90.03	89.97
1st oversize	0 KD 1		84.25–84.26	84.22	84.22	84.22	84.20	No oversize	
	1 KD 1	84.25	84.26–84.27	84.23	84.23	84.23	84.21	for pistons	
	2 KD 1		84.27–84.28	84.24	84.24	84.24	84.22	and cylinders provided	
2nd oversize	0 KD 2		84.50–84.51	84.47	84.47	84.47	84.45		
	1 KD 2	84.50	84.51–84.52	84.48	84.48	84.48	84.46		
	2 KD 2		84.52–84.53	84.49	84.49	84.49	84.47		
Tolerances				+0.007 −0.008	±0.005	±0.005	±0.005		±0.005
Dimension h from bottom edge				12.5	8.0	2.5	8.0		2.5
Clearance between piston and cylinder				0.023–0.048	0.025–0.045	0.025–0.045	0.045–0.065		0.025–0.045
Piston weight				375 ± 4g	376 ± 3g	371 ± 3g	354 ± 3g		392 ± 3g

Cylinder Dimensions

Biral Cylinders and Ni Cylinders



Grey Cast Iron Cylinders



A = Tolerance group for cylinder height (for Carrera 2.7 provided with a color dot)
B = Tolerance group for cylinder Dia. (refer to table)
C = Manufacturer's identification

Tolerance Groups for Cylinder Heights (2.4 Liter Engine)

Marking A	Cylinder Height (Production)	Marking A	Cylinder Height (Replacement Parts)
5	85.400—85.425	R 5	85.150—85.175
6	85.425—85.450	R 6	85.175—85.200

Tolerance Groups for Cylinder Heights (Carrera 2.7)

Color Marking A	Cylinder Height (Production)	
red	85.400—85.425	No oversize provided for pistons and cylinders
blue	85.425—85.450	

Only cylinders of equal height may be installed in any given cylinder bank.

Cylinders

D 1 = Measuring point for wear and ovality

Measured 2–3 mm below the upper return point of the upper piston ring. The cylinder can be considered worn to the limit when the dimension at this point exceeds the installation dimension by 0.1 mm. Ovality is determined by measuring the bore across lines *a* and *b*. Dimension *a* should not differ from dimension *b* by more than 0.04 mm.

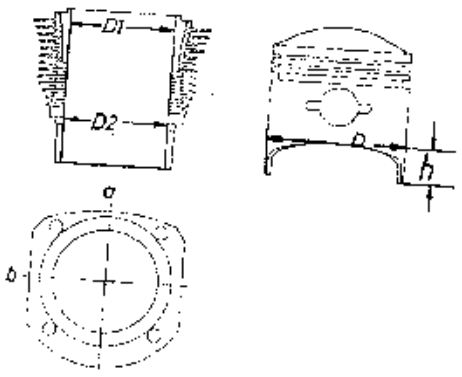
D 2 = Measuring point for ovality

Measured at the height of the cylinder base gasket. This measuring point is especially important for determining ovality, although not valid for determining cylinder wear.

Pistons

D = Measuring point for wear

The measuring point is to be determined from the table in all cases. Maximum wear: not to exceed 0.1 mm (of installation diameter).

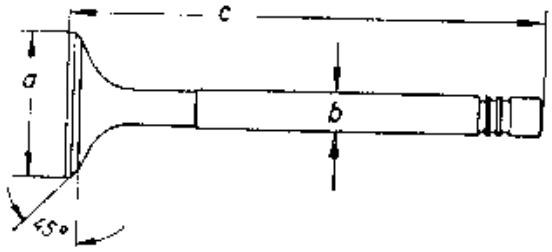


Dimensions for Piston Pins

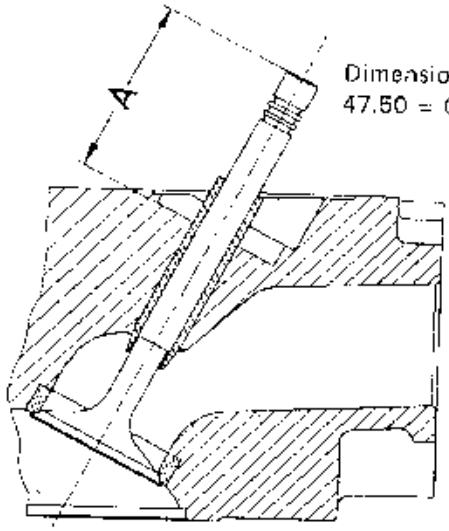
Color	Piston Pin Dia.	Piston Pin Bore Dia. in Piston
white	22.000 0 to −0.004	22.000 0 to + 0.005

Measuring Point		Installation Size with Tolerances mm	Clearance (+) or Preload (−) from	to	Wear Limit mm
Pistons					
Piston ring side clearance Ring 1	Groove	1.560—1.590	+ 0.070	+ 0.112	0.20
	Ring	1.478—1.490			
Piston ring side clearance Ring II	Groove	1.530—1.560	+ 0.040	+ 0.082	
	Ring	1.478—1.490			
Piston ring side clearance Ring 2 CIS	Groove	1.790—1.810	+ 0.050	+ 0.028	
	Ring	1.728—1.740			
Oil scraper ring side clearance	Groove	4.010—4.040	− 0.020	+ 0.062	
	Ring	3.978—3.990			
Piston ring gap			+ 0.15	+ 0.45	1.00
Cylinder Heads					
Cylinder head to valve guide	B	13.000—13.018	− 0.031	− 0.060	
	S	13.049—13.060			
Valve guide to intake valve	B	9.000—9.015	+ 0.030	+ 0.057	0.15
	S	8.958—8.970			
Valve guide to exhaust valve	B	9.000—9.015	+ 0.050	+ 0.077	0.20
	S	8.938—8.950			
NOTE: B = Bore S = Shaft					
Cylinders					
Cylinder to crankcase 2.4 liter engine	B	92.072—92.159	− 0.144	+ 0.285	
	S	91.874—91.928			
Cylinder to cylinder head 2.7 liter engine	B	97.072—97.159	+ 0.144	+ 0.285	
	S	96.874—96.928			
Cylinder to cylinder head	B	107.000—107.073	− 0.072	+ 0.180	
	S	106.893—106.928			

Valve Dimensions



911 T, E, S, Carrera 2.7	Intake	Exhaust
a	46 + 0.1	40 ± 0.1
b	8.97- 0.012	8.95–0.012
c	114 ± 0.1	113.5 ± 0.1



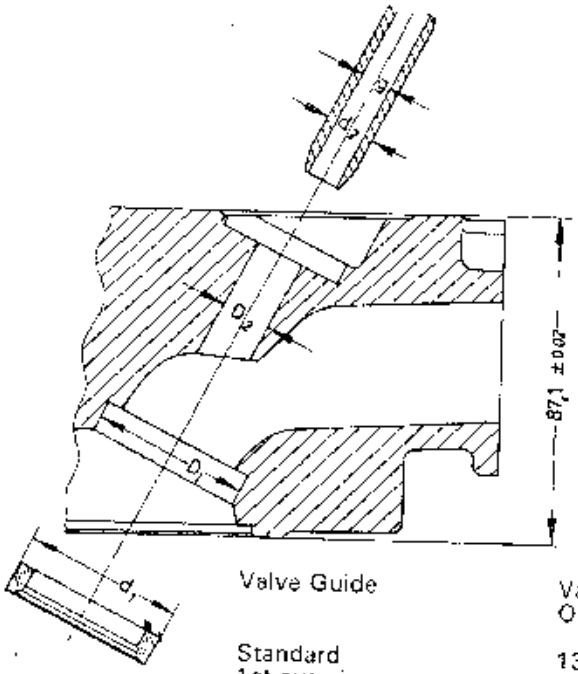
Dimension A
47.50 = 0.6 mm

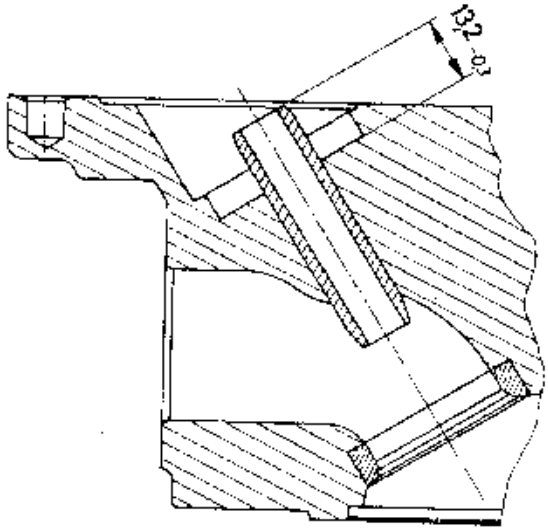
Checking Valve Seats

To check valve seat depth, insert the respective valve in the guide and measure the distance between the valve stem end and the bottom of the shim cavity, without shims (see dimension A in sketch).

If the dimension is greater than specified, measure again using a new valve. If the dimension still is beyond specification, it is an indication that the valve seat insert has been cut too deep and should be replaced or the cylinder head exchanged.

Specifications for Installing Valve Guides



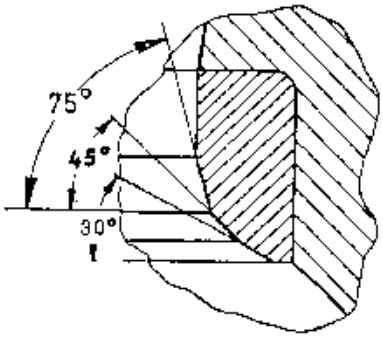


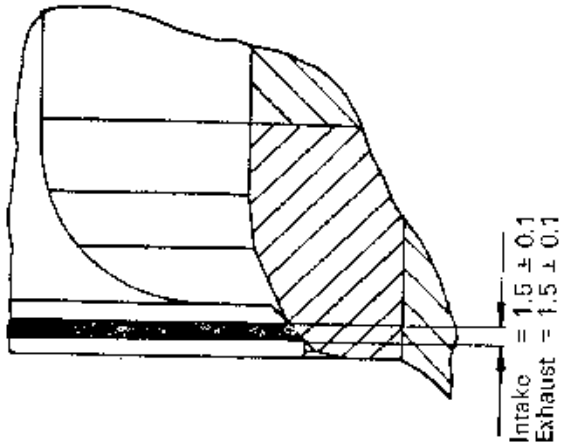
Valve Guide	Valve Guide Outside Diameter d 2	D 2 Bore Diameter in Cylinder Head
Standard	13.060—13.049	13.000—13.018
1st oversize	Machine to size according to bore in cylinder head.	

Specifications for Installing Valve Seat Inserts

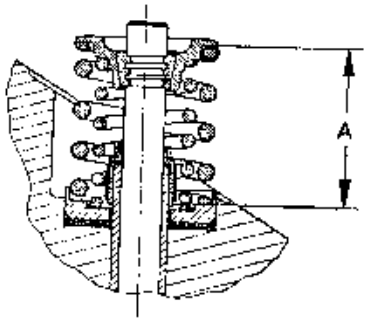
911 T, E, S a. Carrera 2.7	Valve Seat Insert	Outside Dia. of Valve Seat Insert Intake Exhaust d 1	Bore in Cylinder Head Intake Exhaust D 1
Standard	Intake	48.180—48.164	48.000—48.025
1st oversize	Intake	48.500—48.484	48.320—48.345
Standard	Exhaust	42.200—42.184	42.000—42.025
1st oversize	Exhaust	42.760—42.744	42.560—42.585

Angles and Dimensions of Valve Seat Inserts





Valve Springs and Installation Dimensions



	Intake	Exhaust
911 T	35 ± 0.3 mm	35 0.3 mm
911 E	34 ± 0.3 mm	34 ± 0.3 mm
911 S	35.5 ± 0.3 mm	34.5 ± 0.3 mm
Carrera 2.7	35.5 ± 0.3 mm	34.5 ± 0.3 mm

Camshafts for Type 911 and Carrera 2.7 Engines

	Type	Left Camshaft	Right Camshaft
	Model Year 72 73		
911 T Engine	911/51 911/61 (with Sportomatic)	901.105.133.00	901.105.134.00
911 T Engine CIS	911/91 911/92 (with Sportomatic)	911.105.141.00	911.105.142.00
911 E Engine	911/52 911/62 (with Sportomatic)	901.105.181.00	901.105.110.05
911 S Engine	911/53 911/63 (with Sportomatic)	901.105.183.01	901.105.168.00
Carrera 2.7	911/83	901.105.183.01	901.105.168.00

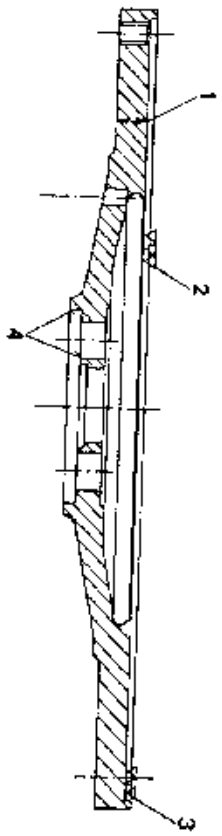
Intake Valve Lift at Overlap TC with 0.1 mm Valve Clearance	Cam Lift with Base Circle Radius	Valve Timing with 1 mm Valve Clearance
2.40--2.80 2.60*	I = 36.25 mm E = 35.51 mm	I = opens 16° BTC I = closes 30° ABC E = opens 42° BBC E = closes 4° BTC
0.90 1.10 1.00*	I = 38.00 mm E = 37.48 mm	I = opens 0° at TC I = closes 32° ABC E = opens 30° BBC E = closes 10° BTC
2.70—3.10 2.90*	I = 36.58 mm E = 36.25 mm	I = opens 18° BTC I = closes 36° ABC E = opens 48° BBC E = closes 8° ATC
5.00—5.40 5.20*	I = 37.30 mm E = 36.44 mm	I = opens 38° BTC I = closes 50° ABC E = opens 40° BBC E = closes 20° ATC
5.00—5.40 5.20*	I = 37.30 mm E = 36.44 mm	I = opens 38° BTC I = closes 50° ABC E = opens 40° BBC E = closes 20° ATC

Note: * desired adjustment value

Measuring Point	Installation Size with Tolerance mm	Clearance (+) or Overload (–)	Wear Limit mm
Clutch			
Clutch plate with riveted lining			
Free thickness (new)	8.1 + 0.4		6.0 (when worn evenly)
Permissible lateral runout	max. 0.6		max. 0.6
Contact pressure (911 T, E, S)	650–720 kp		
Contact pressure (Carrera 2.7)	715–780 kp		
Note: Clutch plates cannot be reconditioned and must be replaced when necessary.			
Transmission Clutch – Sportomatic			
Clutch plate with riveted lining			
Free thickness (new)	7.3 + 0.4		5.5 (when worn evenly)
Permissible lateral runout	max. 0.5		max. 0.5
Contact pressure	800–880 kp		
Note: Clutch plates cannot be reconditioned and must be replaced when necessary.			

Machining (Refinishing) Flywheel

The flywheel may be machined on a lathe to clean grooves or hot spots. The machine cut should be kept as small as possible. Wear limit of flywheel thickness is 8.5 mm.



1 Wear limit 8.5 mm
2 Smallest possible cut
3 Maximum runout 0.1 mm
4 Lathe mounting points

Ignition Timing for Engine Types 911 T, 911 E, 911 S and Carrera 2.7

1. Check dwell angle and adjust, if required.
2. Make basic timing adjustment.
3. Bring engine to operating temperature.
4. Adjust ignition timing.

Adjustment must be made at approx. 80° C oil temperature with stroboscopic timing light. The notch at left of Z1 mark on V-belt pulley (5° ATC) should be in alignment with mark on fan housing at 900 rpm (vacuum hose connected).

On Carrera 2.7 the notch on V-belt pulley marked Z1 (TDC) must be in alignment with mark on fan housing at 900 rpm.

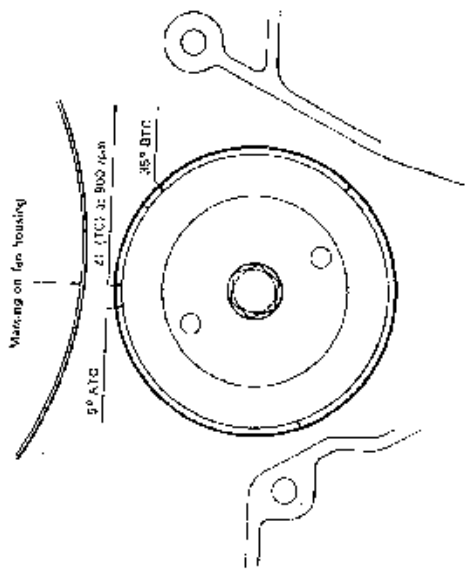
The vacuum hose must be connected to ignition distributor.

Note: At 900 rpm, ignition timing may fluctuate by ± 1°.

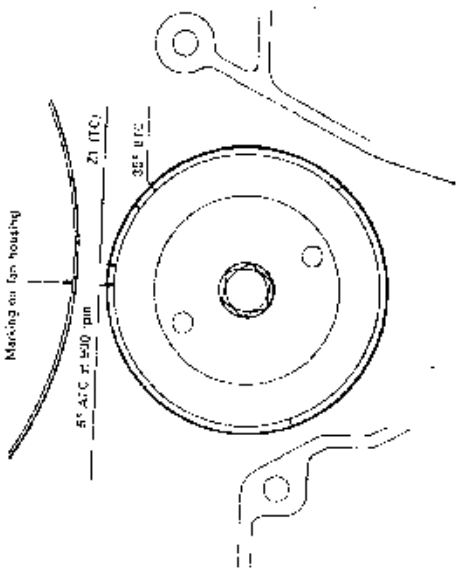
At 6,000 rpm, with vacuum hose pulled off, ignition timing should not exceed 38°.

Engine Type	Basic Adjustment	Ignition Adjustment at 900 rpm
911 T, 911 E, 911 S (Marelli or Bosch distributor)	TDC (Z1)	5° ATC
Carrera 2.7 (Marelli or Bosch distributor)	TDC (Z1)	TDC (Z1)

Carrera 2,7



911 T, 911 E, 911 S



Adjustment Values for Distributor

Bosch Distributor

Dwell angle 38° ± 3°
Breaker gap 0.35 mm
Contact pressure 650–800 p

Marelli Distributor

Dwell angle 37° ± 3°
Breaker gap 0.35 mm
Contact pressure 650–750 p

Checking Centrifugal Advance with Distributor Installed

(Bosch and Marelli)

With vacuum hose pulled off the following values apply:

911 T, 911 E, 911 S		Carrera 2.7	
Engine speed	Timing setting BTC	Engine speed	Timing setting BTC
1000 rpm	3.5°—6.5°	1000 rpm	8° —12°
1500 rpm	4.5°—14°	1500 rpm	8° —16°
2000 rpm	16° —24°	2000 rpm	11.5°—20°
4000 rpm	24° - 31°	4000 rpm	25° —31.5°
6000 rpm	31° —38°	6000 rpm	32° —38°

Torque Values for Bolts or Nuts on Engine

Designation	Wrench Size	Thread	Tightening Torque mkp
Attachment of crankcase halves	13	M 8	2.2—2.5
Attachment of camshaft housing to cylinder heads	13 + 3 Allen head SW 8	M 8	2.2—2.5
Attachment of crankcase halves at main bearing webs	15	M 10	3.5
Flywheel attachment (multipoint bolt)	XZN–M 12	M 12 × 1.5	15
Connecting rod bolts	14	M 10 × 1.25	5—5.5
Cylinder head nuts	10 Allen head	M 10	3– 3.3
Camshaft nut	46	M 27 × 2	10
Rocker arm shafts (studs)	5 Allen head	M 7	1.8
Crankshaft pulley to crankshaft	19	M 12 × 1.5	8
Alternator pulley to alternator	22	M 14 × 1.5 M 16 × 1	4
Spark plugs	21	M 14 × 1.25	2.5—3

Fuel Pump for Type 911 TV, T-USA, 911 E

Vehicle Type	911 TV
Spare part number	911 608 107 00
Bosch number	0580960009
Operating pressure	0.3 kp/cm² (0.3 bar)
Pressure relief valve opens between	0.2—0.3 kp/cm² (0.2—0.3 bar)
Fuel delivery rate	80 ltr/h at 12 Volts
Marking	Blue dot on pump housing (across from the fuel connections) Bosch number clearly embossed
Current input	2.5 Amps at 12 Volts
Speed	approx. 2,000 rpm
Fuel testing pressure	
Minimum fuel delivery rate	900—1,000 cm³/min
Weight	approx. 2.2 lbs.

911 S and Carrera 2.7 from Model 72

911 TE, 911 E, 911 S, Carrera 2.7	911 T CIS
901 608 105 00	901 608 110 00
0580970001	058254998
1 kp/cm² (1 bar)	5 kp/cm² (5 bar)
approx. 2 kp/cm² (2 bar)	
125 ltr/h at 12 Volts	90 ltr/h at 12 Volts
no color dot (Bosch number clearly embossed)	Lettering Bosch symbol B 580 082 320
3.5 Amps at 12 Volts	max. 8 Amps at 12 Volts
2,800 rpm	
0.8 ± 0.2 atm	
900—1,000 cm³ with power on for 30 sec.	750 cm³/30 seconds
approx. 1 kg (2.2 lb)	

Carburetor Specifications Type 911 TV

Carburetor Type	Solex-Zenith 40 TIN with auxiliary enrichment for overrun operation	
Vehicle and Engine Types	911 T (Model 72 and 73) 911 TV 911/57 and 911/67	
from Engine No.		6522313 911/57 Transmission 6529165 911/67 Sportomatic Change April 7, 1972
Venturi	28.5	
Main jet	120	*120 with changed flow characteristic
Air correction jet	190	210
Emulsion tube	4.3 mm dia.	
Idle jet	47.5	
Idle air bleed	155	
Float needle valve	P 1.5	

Float weight	15.7 grams
Fuel level (measured from housing upper edge without gasket	17 ± 1 mm
Injection quantity	0.5 ± 0.1 cm³/stroke per tube
Injection tube	0.3 mm dia. cal.
Bypass orifices	0.65 / 0.75 / 1.1 / 1.45 mm dia.
Fuel jet	50
Air correction (submerged)	100

Idle speed	900 ± 50 rpm
Exhaust emission (volume %)	
At idling speed	3.5 ± 0.5 %
At 100–150 rpm rise	2.0–2.5 %

* Mark: Recess (groove) on outside diameter

Fuel Injection System Specifications

End of delivery stroke adjustment: Bring number 1 cylinder (Z 1) to top dead center overlap, then continue turning crankshaft beyond this top dead center mark for 40° and align FE mark

Linkage dimensions: Injection pump control lever = 114 ± 0.2 mm (dimension-ball head center to ball head center).
Set push rods free of tension and individually in relation to throttle valve housing. (Adjust with engine at operating temperature of 75—85° C oil temperature). Difference in length between lefthand rod and righthand rod may amount to max. 5 mm. Pull rod from accelerator linkage bell crank to cross shaft = 275 mm. (Dimension-ball head center to ball head center).

Correlation values of fuel injection pump with throttle valve assemblies

Protractor on pump	Protractor on throttle valve assy.	Maximum deviation	Protractor on pump	Protractor on throttle valve assy.	Maximum deviation
0°	0°				
5°	3°		40°	30.0°	
10°	6°		50°	40.5°	
15°	9.5°	0.5°	60°	52.0°	
20°	13.0°		70°	65.0°	± 1°
30°	21.0°		79°—82°	80°—85°	(Full throttle)

Injection valve opening pressure = 15 to 18 kp/cm²
Max. pressure difference between injection valves in given engine = 3 kp/cm²

Torque Values for Fuel Injection System

Nut M 12 for hub of pump drive wheel	2.5 mkp
Injection valve	3.0 mkp
Coupling nuts of fuel injection lines at injection valve and injection pump	1.0 mkp
Injection line fitting in injection pump	4.0 mkp

Emission Values

Operating temperature (approx. 80° C) at idle speed 900 ± 50 rpm

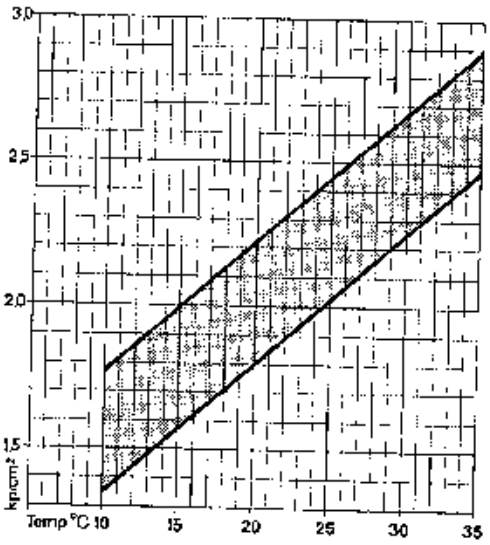
Idle Speed CO Adjusting Values:

USA	2.5 ± 0.5%
Europe	3.0 ± 0.5%
Carrera 2.7	2.5 ± 0.5%

Partial Load CO Adjusting Values: Determine emission values by means of road test or dynamometer test. Exhaust emissions (CO volume-%) in partial load range at 9° throttle valve setting and 2,400 rpm in 2nd speed:

	USA	Europe
911 T-USA	1.5—2.0	2.0—3.0
911 E	2.0—2.5	2.0—3.0
911 S	2.0—2.5	2.5—3.0
Carrera 2.7	—	

Testing and Adjusting Values for 911 T CIS

Test Procedure		Testing and Adjusting Values
Electric fuel pump delivered quantity		min. 750 cm³ / 30 seconds
Control pressure "cold" (corresponding to outside temperature)		
Control pressure "warm" Throttle valve position:	Idle speed	2.9 to 3.1 – adjusting tolerance 2.95 to 3.05
	Part load	3.5 to 3.9
	Full load	2.7 to 3.1
System pressure		4.5 to 5.2 kp/cm²
Leak test Min. pressure after 10 minutes		0.7 kp/cm²
Injection valves:	Opening pressure	2.4 to 3.3 kp/cm²
	Max. dispersion within one set of engine	0.6 kp/cm²
Idle speed adjustment:	Idle speed	900 ± 50 rpm 950 ± 50 rpm (Sportomatic)
CO contents		1.5 — 2.0%

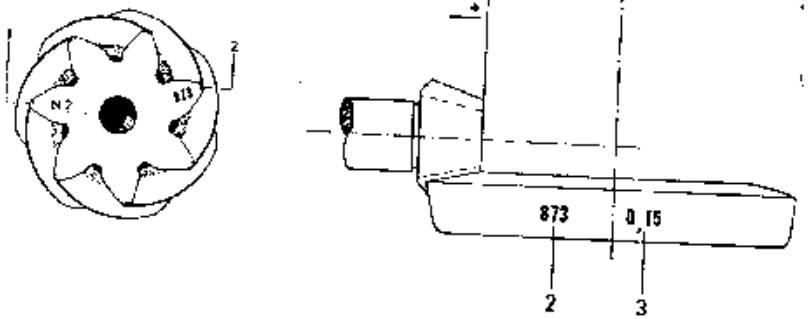
1 kp/cm² = 0.981 bar

Transmission Type and Specification Table

Transmission Type	Number of Gears	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	Ring and Pinion
Model 72							
915/10	4	11:35	18:32	24:27	28:23		7:31
915/00	5	11:35	18:33	23:29	26:25	29:22	7:31
915/01	5	11:35	18:33	23:29	26:25	29:22	7:31
915/12	4	11:35	18:32	24:27	28:23		7:31
915/02	5	11:35	18:33	23:29	26:25	29:22	7:31
915/03	5	11:35	18:33	23:29	26:25	29:22	7:31
905/21	4	15:36	20:31	24:27	28:24		7:27
925/00	4	15:36	20:31	24:27	28:24		7:27
925/01	4	15:36	20:31	24:27	28:24		7:27
—	5		Ratios to order				—
Model 73							
915/10	4	11:35	18:32	24:27	28:23		7:31
915/11	4	11:35	18:32	24:27	28:23		7:31
915/00	5	11:35	18:33	23:29	26:25	29:22	7:31
915/01	5	11:35	18:33	23:29	26:25	29:22	7:31
915/12	4	11:35	18:32	24:27	28:23		7:31
915/13	4	11:35	18:32	24:27	28:23		7:31
915/02	5	11:35	18:33	23:29	26:25	29:22	7:31
915/03	5	11:35	18:33	23:29	26:35	29:22	7:31
915/08	5	11:35	18:33	23:29	27:25	29:21	7:31
—	5 + 4		Ratios to order				—
905/21	4	15:36	20:31	24:27	28:24		7:27
925/00	4	15:36	20:31	24:27	28:24		7:27
925/01	4	15:36	20:31	24:27	28:24		7:27

Transmission No.	Notes
702 0001—702 0013	Transmission with oil pump and ground gears
712 0001—712 0030	Transmission with oil pump and ground gears
712 5001—712 5012	Transmission with oil pump and shaved gears
722 0001—722 1357	Transmission without oil pump and ground gears
732 0001—732 9999	Transmission without oil pump and ground gears
772 0001—772 0658	
772 5001—772 5089	Transmission without oil pump and shaved gears
742 0001—742 0212	Sportomatic (for 911 TV only)
762 0001—762 0910	Sportomatic (for 911 T/USA and 911 E only)
762 0401—762 0535	Sportomatic (for 911 S only)
792 0001—792 0015	Special transmission
703 0001—703 5000	Transmission with oil pump and ground gears
703 5001—703 9999	Transmission with oil pump and shaved gears
713 0001—713 5000	Transmission with oil pump and ground gears
713 5001—713 9999	Transmission with oil pump and shaved gears
723 0001—723 5000	Transmission without oil pump and ground gears
723 5001—723 9999	Transmission without oil pump and shaved gears
733 0001—733 9999	Transmission without oil pump and ground gears
773 0001—773 5000	
773 5001—773 9999	Transmission without oil pump and shaved gears
783 0001—783 2000	Transmission with oil pump and ground gears
793 1001—793 2000	Special transmission with oil pump
743 0001—743 1000	Sportomatic (for 911 TV only)
763 0001—763 2000	Sportomatic (for 911 T/USA and 911 E only)
763 2001—763 4000	Sportomatic (for 911 S only)

Pinion Adjustment from Model 72



R = Blueprint value 66.30 mm
(Sportomatic 905/21 = 54.20 mm; 925/00 and 925/01 = 59.70 mm)

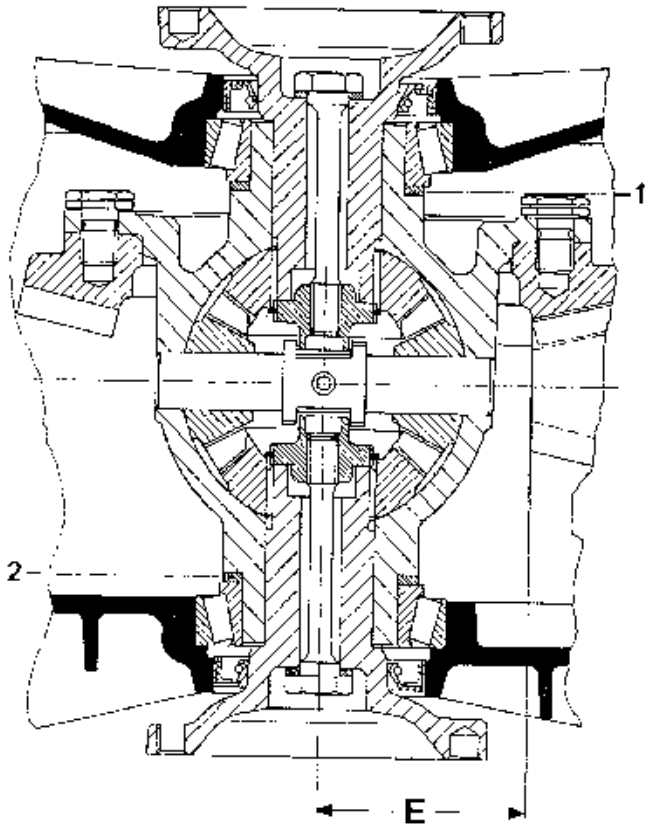
r = Deviation from R + shown in 1/100 mm (N 2 = + 0.02 mm)

1 = Deviation r

2 = Mating number

3 = Gear backlash

Ring Gear Adjustment



Gear backlash between ring and pinion is adjusted only by changing spacer thickness and should be 0.12 to 0.18 mm (measure at 4 different points).

1 Spacer S 1
2 Spacer S 2
E Adjusting value

To ensure accurate measurements and proper operation, make sure all parts are clean.

Important Transmission Adjustment Data

2 Examples for Adjusting Ring Gear and Pinion Gears from Model 72

	With Transmission Plug Gauge P 258	With Universal Plug Gauge VW 385
Blueprint value	66.30 mm	66.30 mm
Deviation	+ 0.02 mm	+ 0.10 mm
	66.32 mm	66.40 mm
Dial gauge setting	66.61 mm	66.30 mm
Measured value (without gaskets)	− 0.39 mm	− 0.29 mm
Distance to pinion shaft end face	66.22 mm	66.01 mm
Adjustment value "E"	66.32 mm	66.40 mm
Distance to pinion shaft end face	− 66.22 mm	− 66.01 mm
Thickness of gaskets	0.10 mm	*) 0.39 mm

*) Round off to nearest 0.05 mm.

Gaskets are available 0.10, 0.15 and 0.20 mm thick.

Re-check adjustment value "E" upon installation of paper gaskets; a deviation of ± 0.03 mm is permissible.

Important Adjusting Data for Sportomatic Transmission

	Transmission Type 905/21	Transmission Type 925/01 and 925/00	
	With Transmission Plug Gauge P 258	With Transmission Plug Gauge P 258	With Universal Plug Gauge VW 385
Blueprint value	54.20 mm	59.70 mm	59.70 mm
Deviation	+ 0.18 mm	+ 0.18 mm	+ 0.04 mm
Adjustment value "E"	54.38 mm	59.88 mm	59.74 mm
Empirical value (without gasket)	55.70 mm	60.70 mm	60.70 mm
Adjustment value	− 54.38 mm	− 59.88 mm	− 59.74 mm
Spacer thickness	1.32 mm*	0.82 mm*	0.96 mm*
Measurement after installation of spacers:			
Dial gauge setting	54.01 mm	60.02 mm	59.70 mm
Measured value (without gasket)	− 0.04 mm	− 0.37 mm	− 0.32 mm
Distance to pinion shaft end face	53.97 mm	59.65 mm	59.38 mm
Adjustment value "E"	54.38 mm	59.88 mm	59.74 mm
Distance to pinion shaft end face	− 53.97 mm	− 59.65 mm	− 59 38 mm
Paper gasket	0.41 mm*	0.23 mm*	0.36 mm*

*) Round off to nearest 0.05 mm.
Paper gaskets are available 0.10, 0.15 and 0.20 mm thick.
Re-check adjustment value upon installation of paper gaskets; a deviation of ± 0.03 mm is permissible.

Transmission Tolerances

Measuring Point	Installation Tolerance (new) mm	Wear Limit mm
1. Backlash between gear I and II 1st gear 2nd gear 2nd gear 4th gear 5th gear	0.06–0.12	0.22
2. Free gears on input and pinion shafts 1st gear 2nd gear 3rd gear axial play 4th gear 5th gear	0.3–0.4 0.2–0.3 0.2–0.3 0.2–0.3 0.2–0.3	0.5 0.4 0.4 0.4 0.4
3. Shift rods a) radial play in guides b) runout	0.195–0.236 —	0.4 0.10
4. Shift fork in synchonizing sleeve, axial play 5th and reverse gear 1st and 2nd gear 3rd and 4th gear	0.1–0.3 0.1–0.3 0.1–0.3	0.5 0.5 0.5
5. Synchronizing rings 1st gear 2nd gear 3rd gear 4th gear 5th gear Outer diameter, installed	86.20–86.54 86.20–86.54 76.12–76.48 76.12–76.48 76.12–76.48	When molybdenum layer has worn off in spots.
6. Input shaft a) Guide pin runout	max. 0.1	max. 0.1 (straighten)

Torque Values for Transmission Bolts and Nuts

Application	Designation	Threads	Material	Tightening Torque mkp
Final drive housing (oil drain)	Magnetic plug	M 24 Taper	St 37	2.0— 2.5
Trans. housing (oil filler)	Plug	M 24 Taper	St 37	2.0— 2.5
Trans. housing front cover, side cover	Self-locking nut	M 8 × 1.25	× 12 Cr Ni 18,8	2.2— 2.5
Front cover	Backup light switch	M 18 × 1.5	Ms	3.5— 4.0
Input shaft	Flange nut	M 30 × 1.5	8.8	16.0—18.0
Input shaft	Castle nut	M 18 × 1.5	6.8	12.0—14.0
Clamping plate and attachment of transmission carrier	Nut	M 8 × 1.25	8	2.1— 2.3
Pinion shaft	Flange nut	M 24 × 1.5	8	14.0—16.0
Fork, gear shift	Nut	M 6 × 1,0	8	0.8— 0.9
Shift detent, transmission housing	Bolt	M 10 × 1.5	8.8	1.5— 1.8
Trans. housing	Breather	M 16 × 1.5	9 S 20 K	2.0— 3.0
Shift forks	Bolt	M 8 × 1.25	8.8	2.4— 2.6
Ring gear (differential)	Bolt	M 12 × 1.25	11.9	11.5—12.0
Drive shaft	Stretch bolt	M 10 × 1.5	8.8	2.6— 3.0
Starter attachment	Nut	M 10 × 1.5	8	4.6— 4.8
Pressure pipe (pinion shaft)	Bolt M 6 × 35	M 6 × 1.0	8.8	0.8— 0.9
Front cover	Breather bolt	M 12 × 1.5	9 S 20 K	2.2— 2.5
Oil pump cover	Self-locking nut	M 6 × 1.0	× 12 Cr Ni 18.8	0.9— 1.0
Intake pipe	Allen head bolt M 6 × 15	M 6 × 1.0	8.8	0.8— 0.9
Pressure pipe (Trans. housing)	Bolt M 6 × 12	M 6 × 1.0	8.8	0.8— 09

Torque Values for Sportomatic Transmission Bolts and Nuts

Application	Designation	Threads	Material	Tightening Torque mkp
Transmission housing (on studs in side and front housing covers, as well as fork)	Nut	M 8 × 1.25	6.8	2.1–2.3
	Self-locking nut	M 8 × 1.25	× 12 Cr Ni 18.8	2.2 –2.5
Transmission housing (oil filler)	Plug	M 24 × 1.5 (Taper 1:16)	St 37	2.0—2.5
Final drive housing (oil drain)	Magnetic plug	M 24 × 1.5 (Taper 1:16)	St 37	2.0—2.5
Transmission housing	Breather	M 14 × 1.5 (Taper 1:16)	9 S 20 K	2.0—3.0
Transmission housing	Backup light switch	M 18 × 1.5	Ms	3.5—4.0
Transmission housing	Bypass switch	M 18 × 1.5	Ms	3.5—4.0
Transmission housing (starter attachment)	Nut	M 10 × 1.5	8.8	4.6—4.8
Transmission housing (servo motor carrier and servo motor attachment)	Nut	M 8 × 1.25	6.8	21.—2.3
Torque converter housing (attachment to transmission housing)	Nut	M 8 × 1.25	6.8	2.1–2.3
	Nut	M 10 × 1.5	8.8 (SW 15)	4.6—4.8
Torque converter housing (attachment to freewheeling support)	Allen head bolt	M 6 × 1.0	10.9	1.2—1.4

Torque converter housing	Hydraulic connector	M 24 × 1.5	6 S	3.0—3.5
Torque converter housing	Temperature sensor	M 14 × 1.5	Ms	2.5—3.0
Torque converter housing	Temperature switch	M 14 × 1.5	Ms	2.5—3.0
Torque converter housing (clutch pressure plate)	Allen head bolt	M 6 × 1.0	10.9	1.2—1.4
Torque converter coupling plate	Twelve-point bolt	M 8 × 1.25	8.8	2.4—2.6
Intermediate plate (clamping plate)	Bolt	M 8 × 1.25	8.8	2.1–2.3
Intermedrate plate	Bolt for guide lever	M 8 × 1.25	9 S 20 K	2.1–2.3
Intermediate plate (shift detent)	Plug	M 14 × 1.5	4.6	2.2—2.5
Front transmission cover (tachometer drive detent)	Bolt	M 8 × 1.25	8.8	1.6—1.8
Front transmission cover (ball dia. 9 mm – parking lock)	Plug	M 12 × 1.5	5.8	3.0—3.5
Angle drive in guide bushing	Hollow bolt	M 24 × 1.5	6.8	2.2–2.4
Input shaft	Nut	M 24 × 1.5	6.9	10—12
Input shaft	Flange nut	M 18 × 1.5	5.8	11—13
Pinion shaft	Stretch bolt	M 12 × 1.5	10.9	11– 12
Shift forks	Bolt	M 8 × 1.25	8.8	2.2—2.6
Differential (ring gear attachment)	Bolt	M 12 × 1.25	11.9	11.5—12
Drive shaft (differential)	Stretch bolt	M 10 × 1.5	8.8	3.5—4.0
Front transmission cover (attachment of transmission carrier)	Nut	M 8 × 1.25	6.8	2.1–2.3

Technical Data for Sportomatic

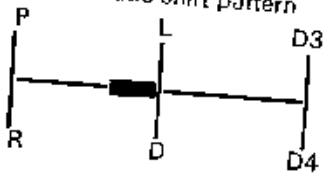
Clutch:

Hydrodynamic torque coverter and vacuum-controlled, single-plate dry clutch.

Transmission: Porsche servo-thrust synchronization

No. of speeds: 4 forward, 1 reverse and parking lock

Sportomatic shift pattern



P = Parking lock
R = Reverse
L = Low (ratio for extreme gradients)
D = Drive (city ratio)
D3 = Drive 3 (road ratio)
D4 = Drive 4 (expressway ratio)

Model 72

	TV	T-USA	E
Final drive ratio	7:27	7:27	7:27
Stall speed	2,500–2,700 rpm	2,500–2,700 rpm	2,500–2,700 rpm
Maximum reduction	2.1–2.27	2.1–2.27	2.1–2.27
Clutch speed (at full load)	approx. 3,720 rpm	approx. 3,720 rpm	approx. 3,720 rpm
Torque converter (oil transfer rate)	approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²
Engine oil capacity (total capacity)	approx. 10 ltr	approx. 10 ltr	approx. 10 ltr
Transmission oil filling capacity	approx. 3 ltr	approx. 3 ltr	approx. 3 ltr

Model 73

S	TV	T – USA	E	S
7 : 27	7 : 27	7 : 27	7 : 27	7 : 27
2,900–3,100 rpm	2,500–2,700 rpm	2,500–2,700 rpm	2,500–2,700 rpm	2,900–3,100 rpm
2.0–2.2	2.1–2.27	2.1–2.27	2.1–2.27	2.0–2.2
approx. 4,100 rpm	approx. 3,720 rpm	approx. 3,720 rpm	approx. 3,750 rpm	approx. 4,100 rpm
approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²	approx. 3 ltr/min max pressure 4 kg/cm²	approx. 3 ltr/min max. pressure 4 kg/cm²
approx. 11 ltr	approx 13.5 ltr	approx. 13.5 ltr	approx. 13.5 ltr	approx. 16 ltr
approx. 3 ltr	approx. 2.5 ltr	approx. 3 ltr	approx. 3 ltr	approx. 3 ltr

Front Axle and Steering – Technical Data

	911 T	911 E	911 S	Carrera 2.7
Front suspension	Wheels individually suspended to transverse control arms and shock absorber struts			
Springing	One round, longitudinal torsion bar per wheel (hydropneumatic suspension struts optional)			
Track	Wheel size 5 1/2 J×15 1.360 mm Wheel size 6 J×15 1.372 mm Wheel size 5 1/2 J×14 1.362 mm	same as 911 T same as 911 T —	same as 911 T same as 911 T —	same as 911 T same as 911 T —
Shock Absorbers	double acting hydraulic shock absorber struts	same as 911 T	same as 911 T	same as 911 T
Make				
Boge	standard	standard	standard	—
Koni	optional	optional	optional	—
Bilstein	optional	optional	optional	standard
self-levelling hydropneumatic struts	optional	optional	optional	—
Stabilizers: front/rear	Optional 15/15 mm dia	Optional 15/15	standard 15/15	standard 15/15 or 18/19

Adjustment of the ZF Rack & Pinion Steering

Steering box turning torque (measured at steering flange with tie rods disconnected)	8 to 14 cmkp

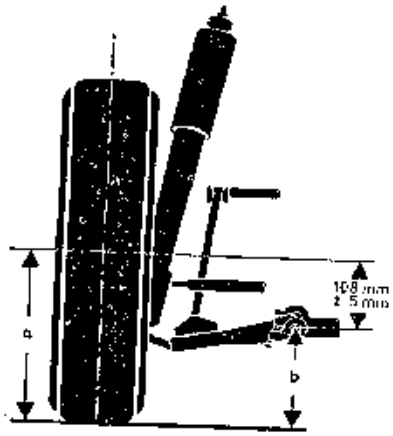
Technical Data for ZF Steering

Overall ratio	1 : 17 , 78 (mean)
Steering wheel turns, lock to lock	approx. 3.1
Smallest turning circle diameter	approx. 10.7 m
Steering track length	501 mm
Total stroke	171 mm

Tolerances and Adjustment Specifications

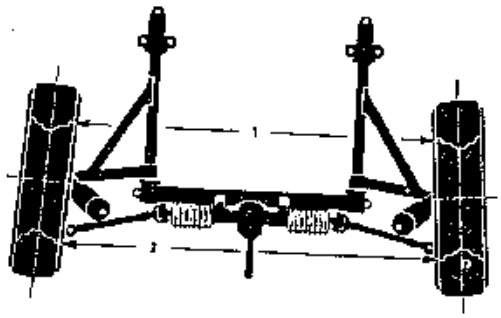
(Vehicle unladen, empty weight acc. to DIN 70020)

Designation	Adjustment Value and Tolerances	Maximum Deviation Left to Right
Front Axle		
Wheel center to center of torsion bar	108 mm ± 5 mm	5 mm



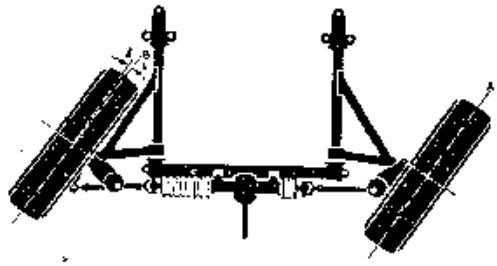
Toe-in (pressed with 15 kp)

Total for left and right front wheel 0° —



Designation	Adjustment Value and Tolerances	Maximum Deviation Left to Right
Angle differential in 20° turn (towards toe-in)	0° to 30'	corrections only through replacement of steering levers

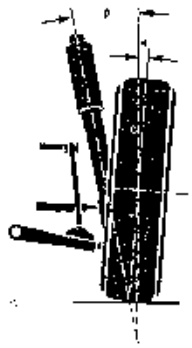
A' = Parallel to A
B = Wheel center line
γ = Angle differential



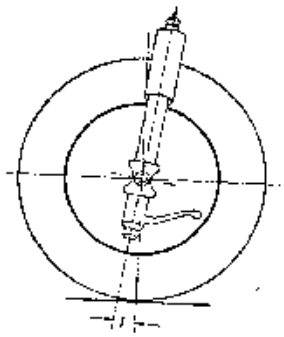
Front wheel camber (in straight ahead wheel position)

α = Camber angle 0° ÷ -10 10'

β = Steering axis inclination 10° 55'



Designation	Adjustment Value and Tolerances	Maximum Deviation Left to Right
γ = Caster Caster results from total camber difference at 20° left-hand turn and 20° righthand turn × 1.5	5° 5' ± 15'	30'



These wheel alignment values can also be applied to earlier vehicles

Torque Values for Front Axle and Steering

Application	Designation	Threads	Class	Tightening Torque mkp
Supporting bearing to shock absorber strut	Nut	M 14 × 1.5	8	8
Clamp to tie rod	Nut	M 8	8.8	1.5
Supporting bearing to body	Allen head bolt	M 10	8.8	4.7
Auxiliary carrier to body	Bolt	M 12 × 1.5	8.8	9
Attachment underfloor protection	Bolt	M 10	8.8	4.7
Attachment underfloor protection	Bolt	M 8	8.8	2.5
Flanblock attachment	Bolt	M 10	8.8	4.7
Attachment auxiliary carrier	Bolt	M 10	8.8	4.7
Attachment steering gear	Bolt	M 10 × 20	8.8	4.7
Drag link to steering gear	Bolt	M 10	8.8	4.7
Stabilizer bearing to body	Bolt	M 8	8.8	2.5
Stabilizer arm to stabilizer	Bolt	M 8	8.8	2.5

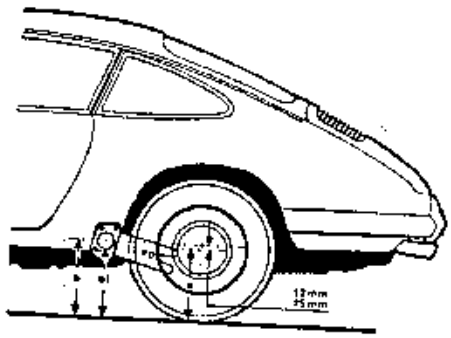
Application	Designation	Threads	Class	Tightening Torque mkp
Wheel bearing clamping nut to steering knuckle	Allen head bolt	M 7	10.9	1.5
Ball joint to shock absorber strut	Self-locking nut	M 8	8	2.2
Ball joint to shock absorber strut	Bolt	M 10 × 30	10.9	4.5
Ball joint to transverse control arm (threads lubricated)	Slotted nut	M 45 × 1.5	8.8	25
Plug for shock absorber strut (Boge)	Plug			12 + 2
Plug for shock absorber strut (Koni)	Plug			20
Wheel to wheel hub	Wheel nut	M 14 × 1.5	10.9	13
Brake disc to wheel hub	Nut	M 8	8.8	2.3
Splash shield to steering knuckle	Bolt	M 8	8.8	1.0
Caliper to steering knuckle	Bolt	M 12 × 1.5	8.8	7.0
Brake fitting to caliper	Hollow bolt	M 10 × 1		2.0
Steering coupling to steering shaft	Bolt	M 8	8.8	2.5
Steering shaft to steering gear	Bolt	M 8	8.8	2.5
Attachment steering shaft bearing	Allen head bolt	M 8	8.8	2.5
Attachment universal joint to steering shaft	Bolt	M 8	8.8	2.5
Attachment steering wheel	Nut	M 18 × 1.5	8	7.5
Bellows holder to rack	Slotted nut	M 16 × 1.5	8	7.0
Ball joint to steering lever	Castle nut	M 10 × 1	8	4.5
Coupling flange to drive pinion	Self-locking nut	M 10	8	4.7
Housing cover to steering gear	Bolt	M 8 × 1	8.8	1.5

Rear Axle – Technical Data

	911 T	911 E	911 S	Carrera 2.7
Rear suspension	Wheels individually suspended to trailing arms			
Springing	One round transverse torsion bar per wheel			
Track	Wheel size 5 1/2 J × 15 1.342 mm	same as 911 T	same as 911 T	same as 911 T
(wheel center 12 mm below cross tube center)	Wheel size 6 J × 15 1.354 mm	same as 911 T	same as 911 T	same as 911 T
	Wheel size 5 1/2 J × 14 1.344 mm	—	—	—
				Wheel size 7 J × 15 1.394 mm
Shock Absorbers	double-acting hydraulic shock absorbers	same as 911 T	same as 911 T	same as 911 T
Make				
Boge	standard	standard	standard	—
Koni	optional	optional	optional	—
Bilstein	optional	optional	optional	—
Stabilizers	optional 15 mm dia.	optional 15 mm dia.	standard 15 mm dia.	standard 16 or 19 mm dia.

Adjusting Values and Tolerances (at empty weight acc. to DIN 70020)

Designation	Adjustment Value and Tolerances	Maximum Deviation Left to Right
Rear Axle		
Torsion bar adjustment:		
Torsion bar	dia. 23 mm	
Radius arm angle		
Type 911 T, 911 E, 911 S, Carrera 2.7	36° 30' to 37°	
Rear wheel camber	−1° ± 10'	
Toe-in	0° to +20' each wheel	
Height Adjustment		
Transverse tube center above	12 mm	8 mm
rear wheel center	± 5 mm	



Torque Specifications for Rear Axle Bolts and Nuts

Application	Designation	Threads	Class	Tightening Torque mkp
Bearing cap to body	Bolt	M 10	8.8	4.7
Rear axle control arm to transverse tube	Bolt	M 14 × 1.5	10 K	9.0
Radius arm to control arm	Eccentric bolt	M 12 × 1.5	8.8	6.0
Caliper to control arm	Bolt	M 12 × 1.5	10.9	9.5
Shock absorber to control arm	Bolt	M 12 × 1.5	8.8	7.0
Shock absorber to body	Nut	M 14 × 1.5	8.8	12.5
Brake hose to lines	Brake hose	M 10 × 1	8	2.5
Stabilizer to body	Bolt	M 10 × 1		1.5
Drive shaft flange	Allen head bolt	M 8	8.8	2.5
Parking brake assembly to control arm	Bolt	M 10	12 K	8.3
Wheel to wheel hub	Wheel lug nut	M 8	8.8	2.5
Wheel hub to axle shaft	Castle nut	M 14 × 1.5		13
Brake disc to wheel hub	Countersunk screw	M 20 × 1.5	10.9	30—35
Parking brake control to control arm	Bolt	M 6	8.8	0.5
		M 6	8.8	0.5

Designation	Dimensions and Adjusting Values	Wear Limit
Tandem Brake Master Cylinder		
Bore	19.05 mm dia.	
Stroke	18/13 mm	
Ratio on brake pedal	5.4 : 1	
Play: actuating rod/piston	1 mm	
Front Wheel Brake		
Brake disc (OD)	282.5 mm, internal venting	
Thickness, when new	20.0 mm	
Minimum thickness upon refinishing *)	18.6 mm	18.0 mm
Thickness limit	max. 0.03 mm	
Lateral runout of brake disc	max. 0.05 mm	
Lateral runout installed	0.2 mm	
Caliper piston dia.	48 mm	
Lining thickness	10 mm	
Vent clearance	0.2 mm	2.0 mm
Lining surface per wheel		
Type 911 T, E	52.5 cm²	
Type 911 S and Carrera 2.7	76.0 cm²	
Rear Wheel Brake		
Brake disc (OD)	290 mm, internal venting	
Thickness, when new	20.0 mm	
Minimum thickness upon refinishing *)	18.6 mm	18.0 mm
Thickness limit	max. 0.03 mm	
Lateral runout of brake disc	max. 0.05 mm	
Lateral runout installed	max. 0.2 mm	
Roughness of brake disc upon refinishing	max. 0.006 mm	
Caliper piston dia.	38 mm	
Lining thickness	10 mm	
Vent clearance	0.2 mm	2.0 mm
Lining surface per wheel Type 911, all	52.5 cm²	
Parking Brake		
Parking brake drum dia. when new	180 mm	
Parking brake lining thickness		181.0 mm
		2.0 mm

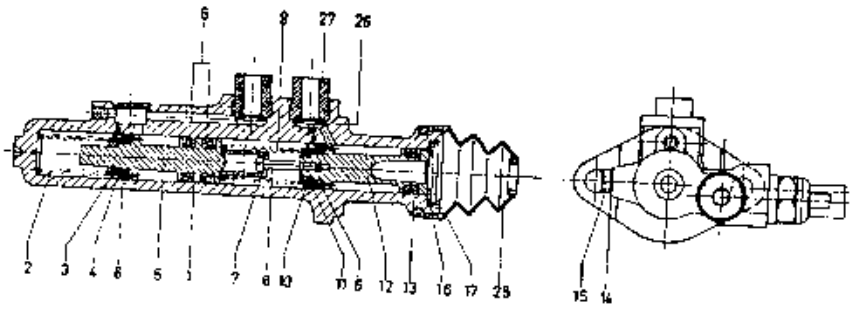
Calipers

911 T, E front: grey cast iron
rear: grey cast iron

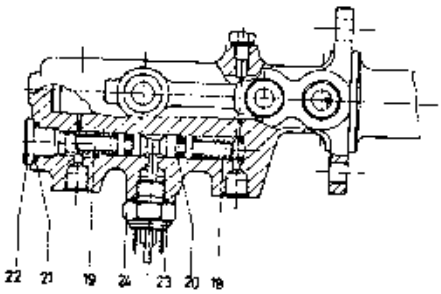
911 S and **Carrera 2.7** front: light alloy
rear: grey cast iron

*) Machine brake disc uniformly on both sides.

Cross Section of Tandem Master Brake Cylinder (with Warning Sender, USA Version)

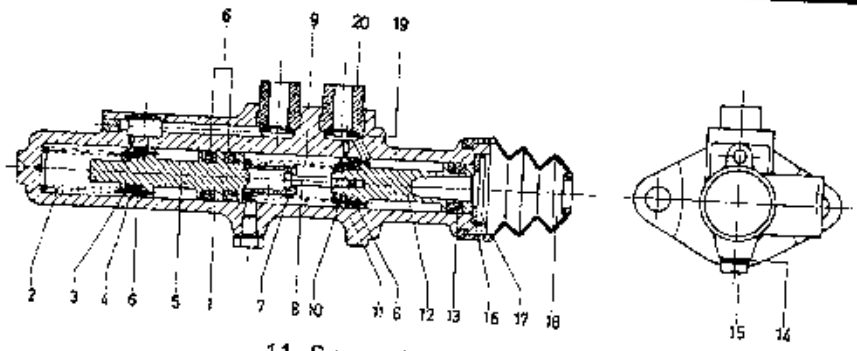


1 Housing
2 Second piston return spring
3 Spring seat
4 Supporting washer
5 Second piston with filler disc
6 Primary cup
7 Travel stop
8 Stroke limiting bolt
9 First piston return spring



10 Spring seat
11 Supporting washer
12 First piston with filler disc
13 Secondary cup
14 Gasket
15 Stop bolt (outer)
16 Stop plate
17 Lock ring
18 Spring
19 Piston
20 Piston cup
21 O-ring
22 Bolt
23 O-ring
24 Brake failure warning switch
25 Dust boot
26 Washer
27 Grommet

Cross Section of Tandem Brake Master Cylinder
(without partial system failure indication, European version)



1 Housing
2 Second piston return spring
3 Spring
4 Supporting washer
5 Second piston with filler disc
6 Primary cup
7 Travel stop
8 Stroke limiting bolt
9 First piston return spring
10 Spring seat
11 Supporting washer
12 First piston with filler disc
13 Secondary cup
14 Gasket
15 Stop bolt (outer)
16 Stop plate
17 Lock ring
18 Dust boot
19 Washer
20 Grommet

Reconditioning Dimensions and Wear Limits for Brake Discs and Parking Brake

Vehicle Type	Brake Disc Type	Brake Disc Location	Dimension "a" (based on new brake disc thickness)	Brake Disc Thickness New	Minimum Brake Disc Thickness when Reconditioned	Brake Disc Wear Limit (when worn symmetrically)
911 all	Vented disc	Front wheel	35 ± 0.1 mm	20.0–0.2 mm	18.6 mm	18.0 mm (1.0 mm each side)
911 all	Vented disc	Rear wheel	76 + 0.2 mm	20.0–0.2 mm	18.6 mm	18.0 mm (1.0 mm each side)
911 all	Brake disc thickness tolerance				max. 0.03 mm	
911 all	Brake disc lateral runout				max. 0.05 mm	
911 all	Brake disc machined roughness upon reconditioning max.				max. 0.006 mm	

Caution

The refinishing and wear dimensions named below are based on the assumption that the remaining thickness of the brake lining is not less than 2.0 mm, otherwise functional troubles on brake may result. (Guaranteed by installation of expanding spring.)

Only balanced brake discs will be supplied. Brake discs are balanced by special clips attached to the cooling vents.

Caution. Do not remove these clips.

Parking Brake:

Brake diameter of drum (new)	180 + 0.2 mm
Brake drum wear limit	max. 181.0 mm dia.
Brake lining width	25 mm

Caution

Parking brake linings may be used only to a thickness of 2.0 mm

Caution

The brake disc must be machined evenly on both sides. See arrows for locating reference or mounting points of the disc.

Front wheel brake

Rear wheel brake

Checking Disc Wheels

Measuring Points for Vertical and Lateral Runout on Wheel Rim

Dimension "a" = 8 mm

Max. permissible vertical runout for steel wheels	1.25 mm
Max. permissible vertical runout for light alloy wheels	1.0 mm
Max. permissible lateral runout for steel wheels	1.25 mm
Max. permissible lateral runout for light alloy wheels	0.8 mm

Caution

Straightening of distorted wheels is not permitted.

Tire Pressures (Reference Values)

Measured in cold tires

Tire Size Designation

	Air Pressure (kp/cm² or bar) Front Axle	Rear Axle
165 HR 15 (4 1/2 and 5 1/2 J × 15)	2.0 (29 psi)	2.4 (35 psi)
185/70 VR 15 (6 and 7 J × 15)	2.0 (29 psi)	2.4 (35 psi)
215/60 VR 15 (7 and 8 J × 15)	2.0 (29 psi)	2.4 (35 psi)

Values also apply to winter tires.

Exceptions: Type Carrera RS

165 VR 15 (6 J × 15) 2.2 (32 psi)

Wheels and Tires

Type	Model Year	Standard Wheel	Tires	Permissible Wheel	Tires
911 T	72—73	5 1/2 J × 15 (Steel)	165 HR 15	6 J × 15	185/70 VR 15
				5 1/2 J × 14	185 HR 14
				5 1/2 J × 15	185/70 SR 15 snow or studded snow
				4 1/2 J × 15	165 SR 15 snow or studded snow
911 E	72—73	6 J × 15 (Model 72 steel wheel)	185/70 VR 15	5 1/2 J × 15	165 VR 15
				6 J × 15	185/70 SR 15 snow or studded snow
		(from model 73 light-alloy die-cast wheel)		5 1/2 J × 15	185/70 SR 15 snow or studded snow
				5 1/2 J × 15	165 SR 15 snow or studded snow
				4 1/2 J × 15	165 SR 15 snow or studded snow
911 S	72—73	6 J × 15 (Light alloy wheel, forged)	185/70 VR 15	6 J × 15	185/70 SR 15 snow or studded snow
				5 1/2 J × 15	185/70 SR 15 snow or studded snow
				5 1/2 J × 15	165 SR 15 snow or studded snow
				4 1/2 J × 15	165 SR 15 snow or studded snow
Carrera 2.7	73	front 6 J × 15 rear 7 J × 15 (Light alloy wheel, forged)	185/70 VR 15 215/60 VR 15	6 J × 15	185/70 SR 15 snow or studded snow
				5 1/2 J × 15	185/70 SR 15 snow or studded snow
				5 1/2 J × 15	165 SR 15 snow or studded snow

Torque Specifications for Front and Rear Wheel Brakes

Application	Designation	Threads	Class	Tightening Torque mkp
Tandem brake master cylinder mounting	Nut	M 8	8.8	2.5
Master cylinder push rod to adapter	Nut	M 10	C 45/6	1.0
Brake line connection	Union nut	M 10 × 1	5.8	1.5
Brake fitting to caliper	Hollow bolt	M 10 × 1		2.0
Caliper to steering knuckle	Bolt	M 12 × 1.5	8.8	7.0
Clamping nut for wheel bearing	Allen head bolt	M 7	10.9	1.5
Brake disc to wheel hub	Nut	M 8	8.8	2.3
Splash shield for brake disc	Bolt	M 8	8.8	1.0
Housing bolt for caliper (front)	Allen head bolt	M 8	10.9	3.4
Housing bolt for caliper (rear)	Allen head bolt	M 6	12.9	2.2
Caliper to rear axle control arm	Bolt	M 12 × 1.5	8.8	7.0
Brake disc to rear wheel hub	Countersunk screw	M 6	8.8	0.5
Brake carrier plate to rear axle control arm	Bolt	M 10		4.7
Splash shield to brake carrier plate	Bolt	M 8	8.8	2.5
Parking brake cable guide to control arm	Bolt	M 6	8.8	0.5
Wheel to wheel hub	Wheel lug nut	M 14 × 1.5		13.0
Bleeder valve to caliper SW 7	—	—	—	0.3

Electrical System Specifications

	911 T	911 E	911 S	Carrera 2.7
Operating voltage	12 V	12 V	12 V	12 V
Radio noise suppression	acc. to VDE 0879	same as 911 T	same as 911 T	same as 911 T
Alternator	770 W, 55 A, 14 V Bosch: 0 120 400 725 S.E.V. Alternateurs: 712 237 12 (= Motorola = S.E.V. Marchal)	same as 911 T	same as 911 T	same as 911 T
Voltage regulator (same make as alternator)	Bosch: 0 190 601 006 S.E.V. Alternateurs: 0 33 542	same as 911 T	same as 911 E	same as 911 E
Spark plugs / electrode gap	Bosch: W 230 T 30/0,7 (not for USA) Beru: 225/14/3/0.7 (not for USA) Bosch: W 235 P 21/0.55 Beru: 235/14/3 P/0.55	Bosch: W 260 T 2/0.7 (not for USA) Beru: 260/14/3/0.7 (not for USA) Bosch: W 265 P 21/0.55 Beru: 265/14/3 P/0.55	same as 911 E	same as 911 E

Distributor	Bosch: 0 231 169 003 From Model 73: 008* Marelli: 501 09 741	Bosch: 0 231 169 004 From Model 73: 009* Marelli: 501 09 742	Bosch: 0 231 169 005 From Model 73: 010* Marelli: 501 09 743	Bosch: 0 231 169 011 Marelli: 610 151 55
Dwell angle	Bosch: 38° ± 3° Marelli: 40° ± 3° From Model 73: 37° ± 3°	same as 911 T	same as 911 T	same as 911 T
Starter	Bosch: 0 001 212 005 (.8 HP)	same as 911 T	same as 911 T	Bosch: 0 001 312 100 (1.5 HP)

*) Ignition distributors Model 73 may be installed in vehicles Model 72.

Battery Electrical Condition	Temperate Zones Specific Gravity	Freezing Point	Tropical Zones Specific Gravity
Battery dead	1.12	— 11° C	1.08
Battery half-charged	1.20	— 27° C	1.14
Battery fully charged	1.28	— 65° C	1.23

Technical Data for Auxiliary Heater

Operating voltage	12 V
Calorific output	approx. 2,500 kcal/h
Fuel consumption rate	approx. 0.44 ltr/h
Air flow rate	110 cu. m/h
Heating air temperature	approx. 85° C
Power draw	
Heater	approx. 70 W
Ventilator	approx. 35 W

Technical Data for Porsche Air Conditioner

Operating voltage	12 V
Weight	approx. 35 kp
Power draw	
Evaporator blower	approx. 185 W
Condenser blower	approx. 62 W
Evaporation pressure at 1,000 rpm (engine)	2.0–2.6 kp/cm² (2.0–2.6 bar)
Cold air delivery temperature	1° C – 5° C
Current draw of clutch	approx. 4 Amps
Air flow rate	approx. 90 ltr/sec

Bulb Chart

	Wattage	Base (DIN)	Base (SAE)
Headlamps (halogen) H 1	55 W	P 14,5 S	
Headlamps (halogen) H 4	60/55 W	P 43 t – 38	
Auxiliary driving lamps (halogen) H 1 and H 3	55 W	P 14,5 S/PK 22 S	
Fog lamps (halogen) H 1 and H 3	55 W	P 14,5 S/PK 22 S	
Stop / tail lamps	21/5 W	BAY 15 d	
Directional signal lamps	21 W	BA 15 S	
Backup lamp	15 W	BA 15 S	
Interior lamp, engine compartment lamp	10 W	SV 8,5 — 8	
Tail fog lamp	18 W	SV 8,5 — 8	
Luggage compartment lamp	10 W	BA 15 S	
Parking and license plate lamp	4 W	BA 9 S	
Instrument illumination, control lamps	2 W	BA 7 S	
Glass base control lamps	1.2 W	W 2 × 4,6 d	
Fog lamps (USA)	35 W	BA 20 S	
Sealed beam headlamps (USA)	50/40 W		Base (SAE)
Sealed beam headlamps (righthand steering)	60/50 W		6012
Sealed beam headlamps (lefthand steering)	60/60 W		6014
Stop / tail lamps (USA)	32/3 cp		7002
Front directional / parking lamps (USA)	32/3 cp		1034
Directional lamp (USA)	32 cp		1034
Backup lamp	15 cp		1073
Side marker lamp (USA), license plate lamp (USA)	2 cp		1003
			1895

Fuse Chart

Fusebox I

1	Interior light, clock, luggage compartment lamp	5 A
2	Emergency flasher	16 A
3	(Window regulator)	25 A
4	Cigarette ligher (auxiliary heater)	16 A (25 A)
5	(Sun roof)	16 A
6	Windshield wipor and washer	25 A
7	Fresh air fan	25 A
8	Stop/rear turn/backup lights	16 A
9	Turn signal, left front	5 A
10	Turn signal, right front	5 A

Fusebox II

1	High beam left	8 A
2	High beam right	8 A
3	Low beam left	8 A
4	Low beam right	8 A
5	Parking light left	5 A
6	Parking light right	5 A
7	License plate light	5 A
8	(Fog lights)	16 A

Fusebox III

1	Sportomatic	5 A
2	Start enrichment / shutoff solenoids, solenoid valve	8 A
3	Rear window defogger	25 A

Fuse 2 not required for vehicles with CIS.

Weights and Measures

Dimensions at DIN Empty Weight		911 T	911 E	911 S	Carrera 2.7
Wheelbase	mm	2,271	same as 911 T	same as 911 T	same as 911 T
Track front (wheel center 108 mm above torsion bar center)	mm	1,360	1,372	1,372	1,372
Track rear (wheel center 12 mm below transverse tube center)	mm	1,342	1,354	1,354	1,394
Length	mm	4,127	4,127	4,147	4,147
Width	mm	1,610	same as 911 T	same as 911 T	1,652
Height (empty)	mm	1,320	same as 911 T	same as 911 T	same as 911 T
Ground clearance	mm	150	same as 911 T	same as 911 T	same as 911 T

Weights

Engine weight (complete w/o oil) approx.	kg	183	182	182	182
Transmission weight (complete w/o oil and starter)	kg	54	same as 911 T	same as 911 T	same as 911 T
Empty weight (DIN)	kg	1,050	1,075	1,075	1,075
Empty weight (DIN) with Sportomatic	kg	1,065	1,090	1,090	—
Permissible total weight	kg	1,400	1,400	1,400	1,400
Permissible axle load front/rear*)	kg	600/840	same as 911 T	same as 911 T	same as 911 T
Permissible trailer load load (w/o brakes)	kg	480	same as 911 T	same as 911 T	same as 911 T
Permissible trailer (w/brakes)	kg	600	same as 911 T	same as 911 T	same as 911 T

*) Do not exceed permissible total weight.

Filling Capacities

		911 T	911 E	911 S	Carrera 2.7
Engine (Total Capacity)		Single viscosity premium HD oil, or oil of API specification MS or SD. Summer SAE 30, winter SAE 20 W/20, below —15° C SAE 10 W.			
Model 72 (oil tank in front of rear axle)					
	approx. liters	8	8	9	—
with Sportomatic	approx. liters	10	10	11	—
Model 73 (oil tank in right rear wheel housing)					
Dipstick mark min./max.	liters	8.5/10.5	8.5/10.5	11.0/13.0	11.0/13.0
with Sportomatic	liters	11.0/13.0	11.0/13.0	13.5/15.5	—
Oil change quantity	liters	approx. 10	approx. 10	approx. 10	approx. 10
Transmissions *)	liters	approx. 2.5	approx. 3.0	approx. 3.0	approx. 3.0
Fuel tank Model 72	liters	62, incl. approx. 6 liters reserve	same as 911 T	same as 911 T	—
Fuel tank Model 73	liters	62, incl. 6 liters reserve	85, incl. 9 liters reserve	85, incl. 9 liters reserve	85, incl. 9 liters reserve
Brake fluid reservoir	approx. liters	0.2	same as 911 T	same as 911 T	same as 911 T
Windshield washer	approx. liters	2	same as 911 T	same as 911 T	same as 911 T

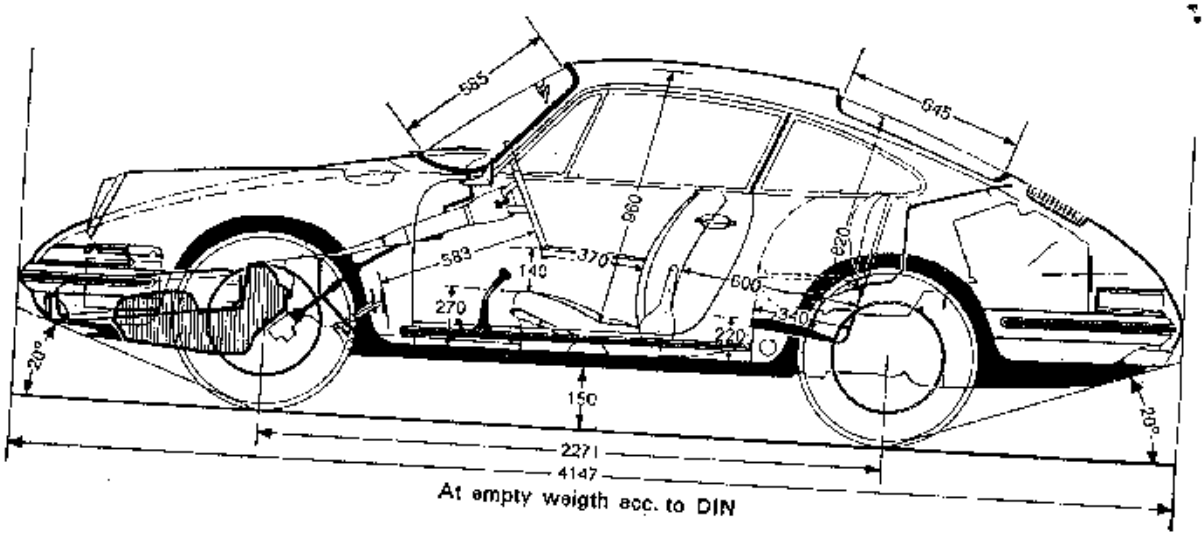
*) EP oil acc. to MIL-L 2105 or 2105 B – for locking differential (positive traction) Shell S 1747 A

Performance

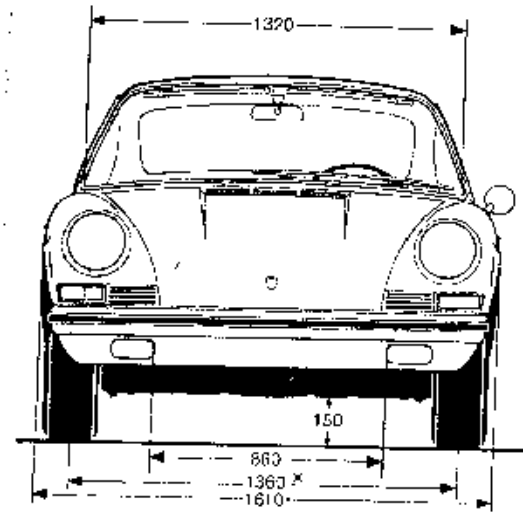
Max. speed (with 4-speed or 5-speed transmission)	mph	127	137	143	149
		with Sportomatic transmission approx. 3 mph slower than with manual transmission			
Acceleration 0–100 km/h (0–62 mph) at DIN empty weight plus 1/2 payload	sec	9.5	7.9	7.0	6.3
Kilometer from standing start (DIN empty weight plus 1/2 payload)	sec	30.35	28.5	27.5	26.5
Nominal fuel consumption liters/100 km		9.2	9.0	9.5	10.2

PORSCHE

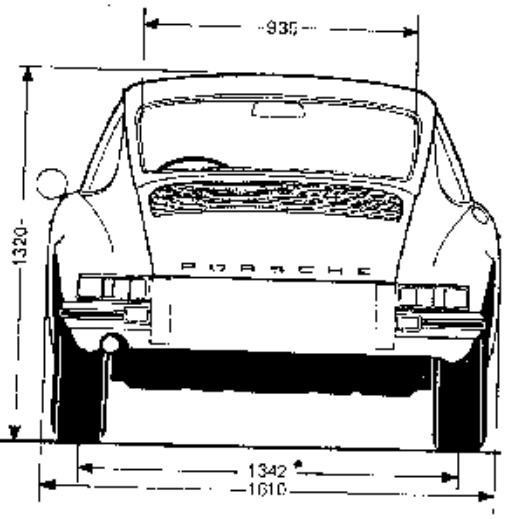
Body Dimensions for Type 911 (from 1972 Models)



At empty weigth acc. to DIN



* 1360 with wheels 5½ J x 15
1327 with wheels 6 J x 15



* 1342 with wheels 5½ J x 15
1354 with wheels 6 J x 15

Metric to English

LENGTH

Millimeters to Inches	multiply by	0.03937
Centimeters to Inches		0.3937
Meters to Feet		3.2808
Meters to Yards		1.0936
Kilometers to Miles		0.6214

WEIGHT

Grammes to Ounces	multiply by	0.03527
Kilogrammes to lbs.		2.2046
Tons (Metric) to tons		0.9842

LIQUID

Liters to U. S. gallons	multiply by	0.2642
Liters to Imperial gallons		0.2200
Liters to U. S. pints		2.114
Liters to Imperial pints		1.7598

PRESSURE

Kg/cm^2 to $lbs./in.^2$	multiply by 14.223

TEMPERATURE

°Centigrade to °Fahrenheit	multiply by 9/5 and add 32

English to Metric

LENGTH

Inches to millimeters	multiply by	25.4001
Inches to centimeters		2.54
Feet to meters		0.3048
Yards to meters		0.9144
Miles to kilometers		1.609

WEIGHT

Ounces to grammes	multiply by	28.35
Lbs. to kilogrammes		0.4536
Tons to tons (Metric)		1.016

LIQUID

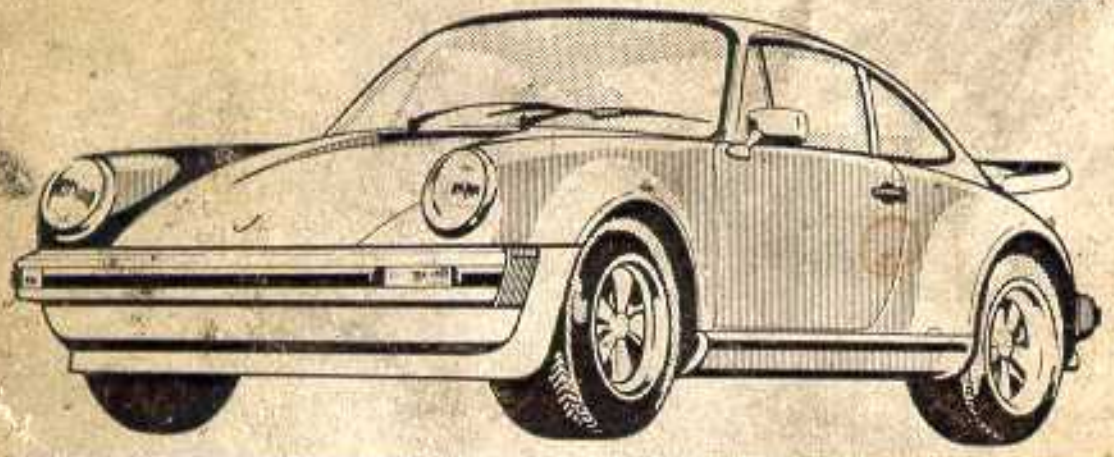
U. S. gallons to liters	multiply by	3.875
Imperial gallons to liters		4.546
U. S. Pints to liters		0.473
Imperial pints to liters		0.568

PRESSURE

$lbs./in.^2$ to kg/cm^2	multiply by 0.07031

TEMPERATURE

°Fahrenheit to °Centigrade	subtract 32 and multiply by 5/9



76/77 Models 911. Carrera 3.0 Turbo

Technical Specifications



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Important conversion factors and new units of measurement

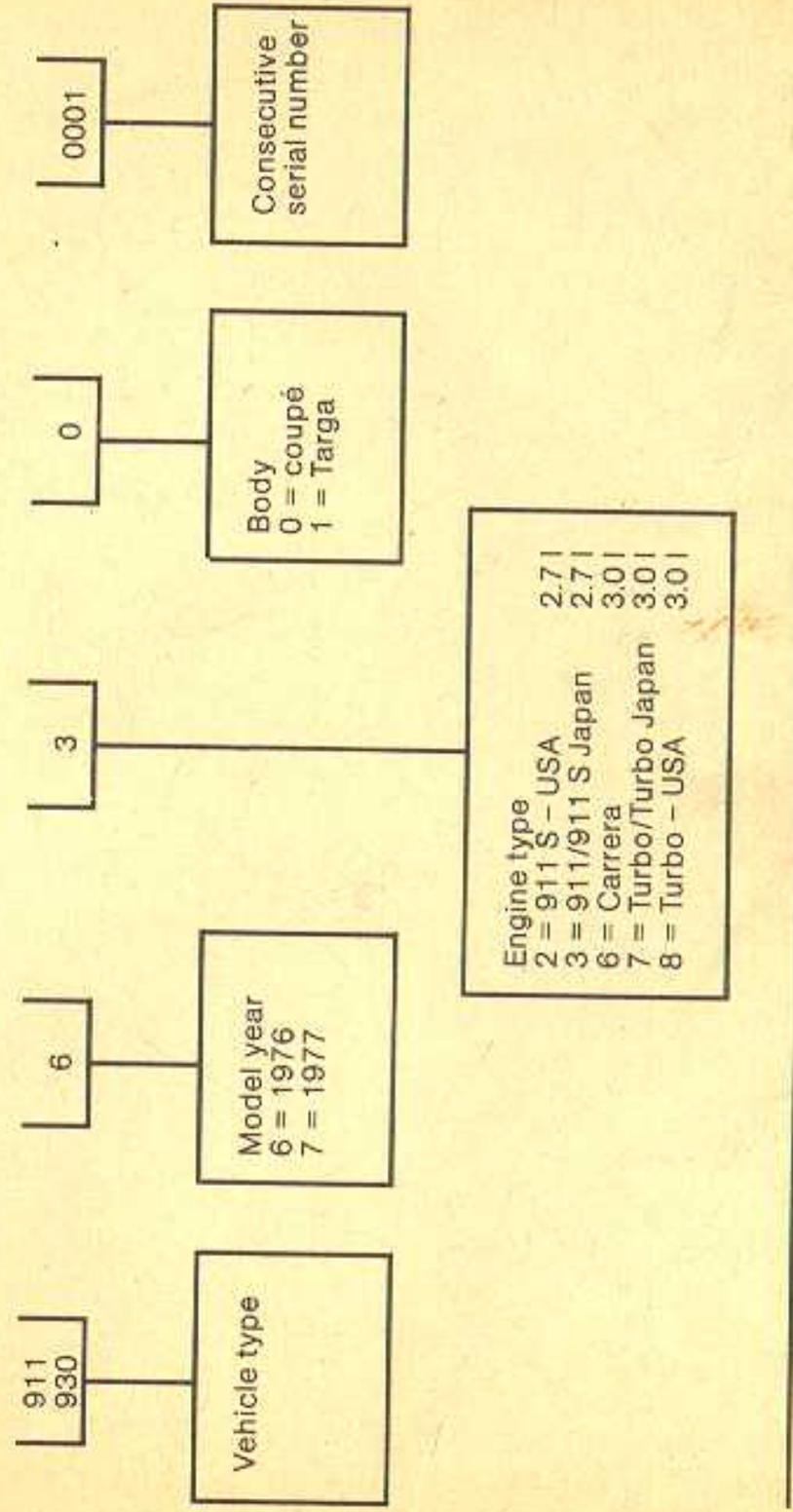
	Old units		New units
Pressure	tech. atmosphere at	(kp/cm^2)	Bar (bar)
Output	Horsepower	HP	Kilowatt (kW)
Force	Kilopond	kp	Newton (N)
Power	Kilopondmeter	kpm	Newtonmeter (Nm)

Conversion factors

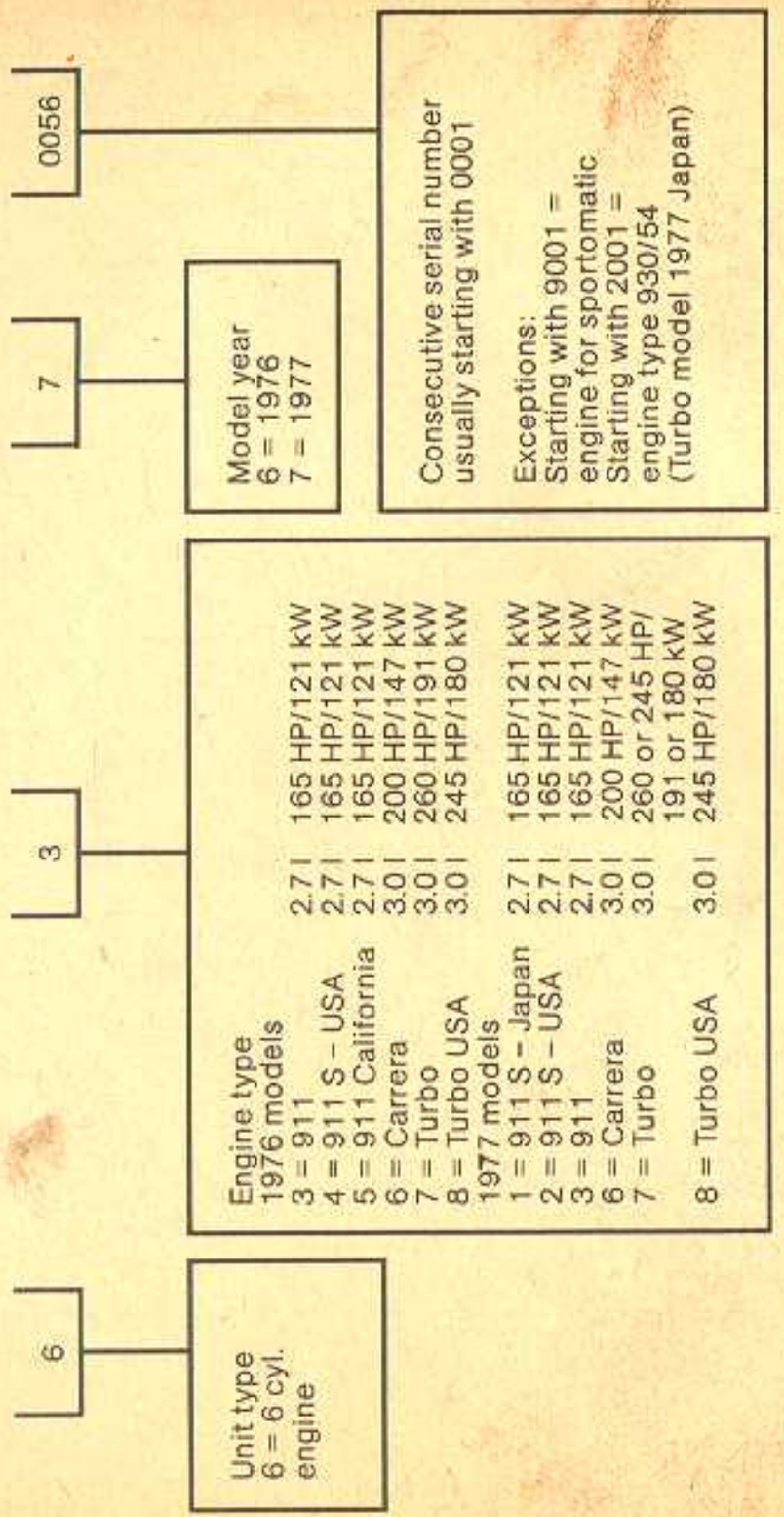
at (kp/cm^2)	in bar	x 0.981
kp	in N	x 9.81
HP	in kW	x 0.736
kpm	in Nm	x 9.81
m/s	in km/h	x 3.6
at	in mm Hg	x 735.56
km/h	in mph (miles)	x 0.621
°F (Fahrenheit)	in °C	(°F - 32) x 0.555
l	in U.S. gal.	x 0.264
l	in Imp. gal.	x 0.22

The conversion factor 10 is applied for the conversion of tightening torque from kpm to Nm. This is more than sufficient for shop practice.

Chassis numbers



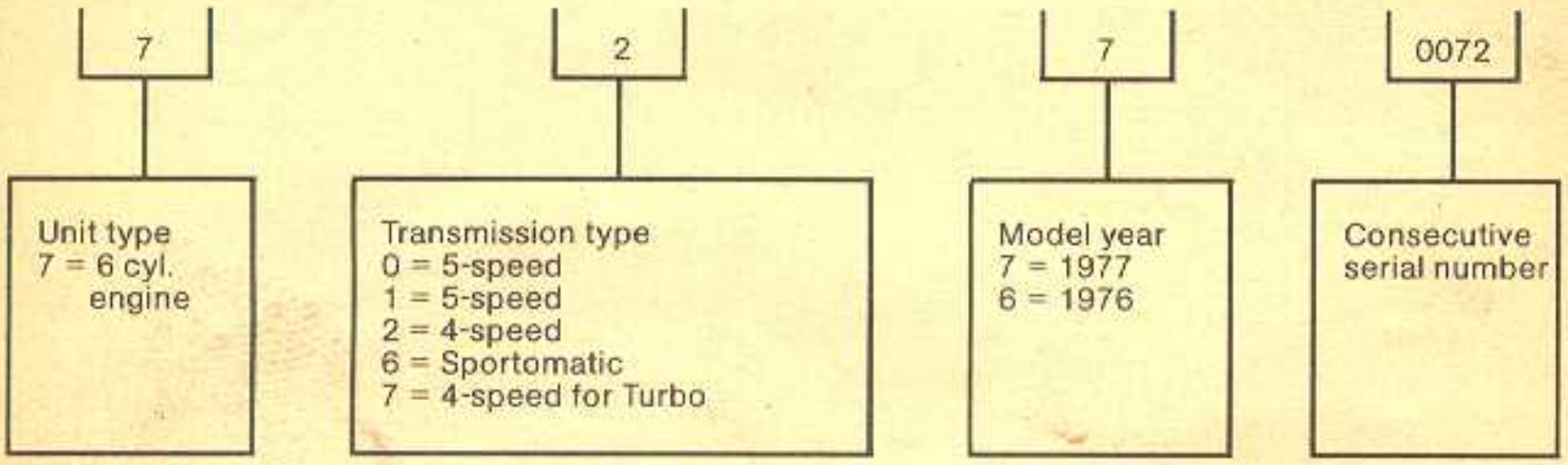
Engine numbers



Engine type designations

Year mfd.	Model year	Engine type designation Official	Internal	Displacement	HP/kw
1975/ 1976	1976	911	911/81	2.7 ltr.	165/121
		911 Sportomatic	911/86	2.7 ltr.	165/121
		911 S – USA	911/82	2.7 ltr.	165/121
		911 S – California	911/84	2.7 ltr.	165/121
		911 S – USA/ California (Sportomatic)	911/89	2.7 ltr.	165/121
		Carrera	930/02	3.0 ltr.	200/147
		Carrera Sportomatic	930/12	3.0 ltr.	200/147
		Turbo	930/50	3.0 ltr.	260/191
		Turbo – USA	930/51	3.0 ltr.	245/180
1976/ 1977	1977	911	911/81	2.7 ltr.	165/121
		911 Sportomatic	911/86	2.7 ltr.	165/121
		911 S – USA	911/85	2.7 ltr.	165/121
		911 S – USA Sportomatic	911/90	2.7 ltr.	165/121
		911 S – Japan	911/94	2.7 ltr.	165/121
		911 S – Japan Sportomatic	911/99	2.7 ltr.	165/121
		Carrera	930/02	3.0 ltr.	200/147
		Carrera Sportomatic	930/12	3.0 ltr.	200/147
		Turbo	930/52	3.0 ltr.	260/191
		Turbo – USA	930/53	3.0 ltr.	245/180
		Turbo – Japan	930/54	3.0 ltr.	245/180

Transmission numbers



Transmission type codes

Trans-mission type	Number of gears	1st gear	2nd gear	3rd gear	4th gear	5th gear	Pinion/ ring gear	As from chassis number	Remarks
1976 models									
915/44	5	11/35	18/33	23/29	26/26	28/23	8/31	7160001	Manual transm. 911, 911 S – USA, Carrera
915/49	4	11/35	20/32	25/27	28/23		8/31	7260001	Manual transm. 911, Carrera
930/30	4	16/36	23/30	28/25	32/21		9/38	7760001	Manual transm. Turbo
930/32	4	16/36	23/30	28/25	32/21		9/36	7761001	Manual transm. Turbo with 50% tires
925/09	3 SPM	15/36	21/30	27/25			8/27	7662001	Sportomatic 911
925/12	3 SPM	15/36	21/30	27/25			8/27	7660001	Sportomatic 911, 911 S – USA
925/13	3 SPM	15/36	21/30	27/25			8/27	7661001	Sportomatic Carrera
1977 models									
915/60	5	11/35	18/33	23/29	26/26	28/23	8/31	7070001	Manual transm. 911
915/61	5	11/35	18/33	23/29	26/26	28/23	8/31	7170001	Manual transm. 911, 911 S – USA, Carrera
915/65	4	11/35	20/32	25/27	28/23		8/31	7270001	Manual transm. 911
915/66	4	11/35	20/32	25/27	28/23		8/31	7271001	Manual transm. 911, Carrera
925/15	3 SPM	15/36	21/30	27/25			8/27	7670001	Sportomatic 911
925/16	3 SPM	15/36	21/30	27/25			8/27	7671001	Sportomatic Carrera
925/17	3 SPM	15/36	21/30	27/25			8/27	7670501	Sportomatic 911 S – USA
930/33	4	16/36	23/30	28/25	32/21		9/38	7770001	Manual transm. Turbo

Engine specifications for 1976/1977 models

Engine		911	Carrera 3.0	Turbo (Turbo-Carrera USA)
Design		4-stroke internal combustion flat engine (two banks of cylinders opposite each other)		
No. of cylinders		6	same as 911	same as 911
Bore	mm	90	95	95
Stroke	mm	70.4	same as 911	same as 911
Total displacement	cm^3	2687	2993	2993
Compression ratio	ε	8.5 : 1	8.5 : 1	6.5 : 1
Compression pressure	kp/cm^2 = bar	max. deviation among each other 1.5, engine temperature at least 60° C		
Max. output (DIN 70020)	HP/kW	165/121	200/147	260/191 (245/180)
At speed	rpm	5800	6000	5500
Max. torque	kpm/Nm	24/235	26/255	35/343
At speed	rpm	4000	4200	4000
Max. liter output	HP/l/kw/l	62/46	68/50	87/64 (82/58)
Mean piston speed at max. output	m/sec	13.6	14.1	12.9
Cut-off speed of speed governor in distributor	rpm	6500 ± 200	6800 ± 200	7000 ± 200

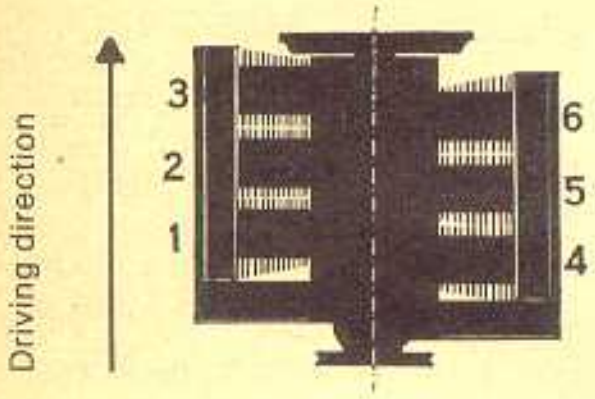
Engine		911	Carrera 3.0	Turbo (Turbo-Carrera USA)
Fuel octane	RON	91	91	96
Cooling system		Air-cooling from axial blower on alternator		
Blower drive		By V-belt off of crankshaft		
Crankshaft/blower ratio		1 : 1.8	1 : 1.8	1 : 1.67
Lubricating system		Dry sump lubrication		
Oil cooling		Oil cooler on crankcase in blower air stream, also cooling coil		
Oil pressure at 80° C	kp/cm^2 = bar	5000 rpm ca. 5	same as 911	5500 rpm ca. 4
Oil consumption	1/1000 km	1.5 to 2	1.5 to 2	1 to 2
Crankcase		Pressure cast al/mg alloy 2-piece	Al/si alloy 2-piece	same as Carrera 3.0
Crankshaft		Forged (tenifer treated)	same as 911	same as 911
Crankshaft bearings		8 plain brgs.	same as 911	same as 911
Connecting rods		Forged steel	same as 911	same as 911
Conrod bearings		Half shells	same as 911	same as 911

Engine		**911**	**Carrera 3.0**	**Turbo** (Turbo-Carrera USA)
Piston pin bearing		Press fit bronze bushing	same as 911	same as 911
Intermediate shaft bearings		Two plain bearings	same as 911	same as 911
Pistons		Cast aluminium	Cast aluminium	Forged aluminium
Piston pin		Floating installation, held by circlips		
Piston rings		2 compression rings, 1 oil scraper ring		
Cylinders		Alusil or nikasil cyl.	Nikasil cylinder	Nikasil cylinder
Cylinder head		Single alloy cyl. head	same as 911	same as 911
Valve seat insert		Shrink fit made of alloy gray cast iron	Shrink fit made of annealed sintered steel	same as Carrera 3.0
Valve guide		Thermohedul E or Thermohedul FS	same as 911	same as 911
Valve arrangement for each cylinder		1 intake and 1 exhaust valve in vee suspension		
Exhaust valve		Sodium filled with reinforced seat surface	As Turbo, but without sodium filling	Sodium filled with reinforced seat surface
Valve springs		2 coil springs per valve	same as 911	same as 911

Engine		**911**	**Carrera 3.0**	**Turbo** (Turbo-Carrera USA)
Valve timing		Left and right one each overhead camshaft		
Camshaft		Cast, 3 plain bearings direct in camshaft housing	Cast, 4 plain bearings	same as Carrera 3.0
Camshaft drive		By chain	same as 911	same as 911
Valve clearance on cold engine				
Intake Exhaust		0.10 mm measured betw. valve and rocker arm	same as 911	same as 911
Clutch		Single plate dry type	same as 911	same as 911
Diameter (manual transmission)	mm	225	225	240
Contact pressure	(kp) N	(795–866) 7800–8495	same as 911	(920–1020) 9025–10006
Diameter (sportomatic)	mm	190	190	–
Contact pressure	(kp) N	(800–880) 8000–8800	same as 911	–
Fuel supply		K-Jetronic	same as 911	same as 911
Fuel pump(s)		1 electric roller cell pump	same as 911	2 electric roller cell pumps

Engine		911	Carrera 3.0	Turbo (Turbo-Carrera USA)
Electrical system				
Battery voltage	V	12	same as 911	same as 911
Battery capacity	Ah	66	same as 911	same as 911
Alternator/output	A/W	70/980	same as 911	same as 911
Regulator switch		Matched to alternator, black plastic housing		
Ignition		CDI contact controlled	same as 911	CDI without contacts
Ignition transformer		Bosch	same as 911	same as 911
Firing order		1-6-2-4-3-5	same as 911	same as 911

Designation of cylinders on 6 cylinder engine



Firing order
1 – 6 – 2 – 4 – 3 – 5

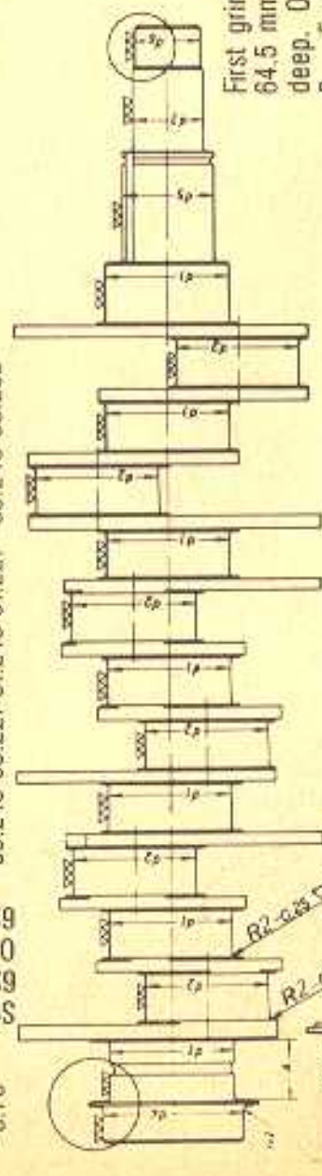
Engine tolerance and wear limit survey

Note: B = bore W = shaft

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (–) to	Wear limits in mm
Crankshaft – main bearing Bearings 1–7 (d 1)	B 57.020–57.059 W 56.971–56.990	+ 0.010	+ 0.072	visual inspection 56.960
Crankshaft – main bearing Bearing 8 (d 3)	B 31.041–31.084 W 30.980–30.993	+ 0.048	+ 0.104	visual inspection 30.970
Crankpin – conrod bearing (d 2)	B 52.020–52.059 W 51.971–51.990	+ 0.030	+ 0.088	visual inspection 51.960
Crankshaft runout (measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)				max. 0.04
Crankshaft unbalance				max. 10 cmg
Crankshaft – main bearing Axial play		+ 0.110	+ 0.195	0.30
Crankshaft – timing gear	B 41.975–42.000 W 42.002–42.013	– 0.002	– 0.038	
Crankshaft – disbributor drive	B 41.975–42.000 W 42.002–42.013	– 0.002	– 0.038	
Crankshaft – flywheel	B 65.000–65.030 W 64.981–65.000	0.0	+ 0.049	
Crankshaft – pulley	B 30.000–30.033 W 29.960–29.993	+ 0.007	+ 0.073	
Pulley: radial runout				max. 0.15
lateral runout				max. 0.20

Crankshaft – standard and repair sizes

Size	Crankcase dia. brgs. 1-8	All main bearings d 1	Connecting rod bearings d 2	Main brg. dia. d 3 of crankshaft brg. 8	Collar dia. d 4	Seat for timing gear dia. d 5	Crankshaft pulley dia. d 6	Thrust bearing width A
Standard	Standard 62.000-62.019	56.990-56.971	51.990-51.971	30.993-30.980	65.000-64.981	42.013-42.002	29.993-29.960	28.000-28.060
- 0.25	Oversize 62.269-62.250	56.740-56.721	51.740-51.721	30.743-30.730				
- 0.50		56.490-56.471	51.490-51.471	30.493-30.480	64.500-64.310		29.500-29.370	
- 0.75		56.240-56.221	51.240-51.221	30.243-30.230				

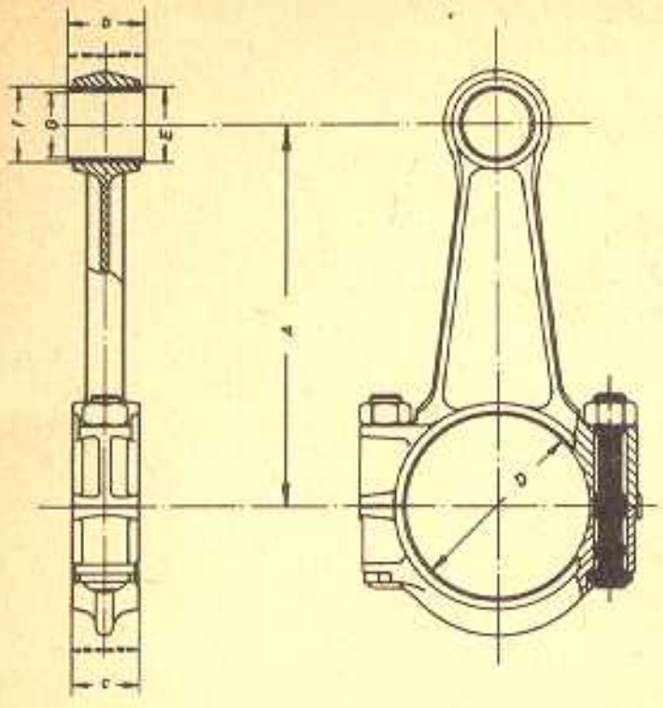


First grind oil seal journals to 29.5 and 64.5 mm as specified, if scoring is too deep. Otherwise repolish as required: 2 ... 5 microns.

Note: After grinding, subject crankshaft to tenifer treatment; then polish bearing journals and thrust surfaces A; test crankshaft for cracks.

Max. radial runout: 0.04 mm as measured on bearings 4 and 8, with bearings 1 and 7 on V-blocks. Max. crankshaft imbalance: 10 cmg. Never straighten main bearings III and V after tenifer treatment.

Measuring point	Installation size with tolerances mm	Clearance or press fit from	(+) (–) to	Wear limit mm
Crankcase				
Case bore for main bearings:				
Bearings 1 – 8	62.000–62.019			
Oversize	62.250–62.269			
Case bor for intermediate shaft:				
Bearing 1 (thrust bearing)	27.500–27.521			
Bearing 2	26.500–26.521			
Spring for pressure relief and safety valve:				
Relaxed length	70.00			
Spring force at 52 mm	10.6 kp			
Spring force at 46 mm	14.1 kp			
Spring wire dia.	1.8			
Block length	33.3			
Connecting rods				
A Distance betw. centers	127.80			
b Width of conrod bush	26.00–25.98			
c Width at big end	23.80–23.70			
Width at crankpin	24.00–24.10	+ 0.200	+ 0.400	
D Conrod dia. (w/o bearing shell)	56.000–56.019			
E Small end dia.	25.000–25.021			
f Conrod bush removed	25.035–25.055			
Press fit of conrod bush in conrod		– 0.014	– 0.055	
G Conrod bush dia. installed in conrod (finished)	22.020–22.033			
Piston pin bushing/ piston pin clearance		+ 0.020	+ 0.039	0.055



Connecting rod weight groups

Connecting rods are grouped according to weights.

Final digits of the part number indicate the specified weight group.

These final digits are stamped on the connecting rod shank if it is supplied as a replacement part.

Weight Over grams	Under grams	Weight group for service	Service Conrod part number	Conrod code
645	654	1	911.103.015.31	31
654	663	2	911.103.015.32	32
663	672	3	911.103.015.33	33
672	681	4	911.103.015.34	34
681	690	5	911.103.015.35	35
690	699	6	911.103.015.36	36
699	708	7	911.103.015.37	37
708	717	8	911.103.015.38	38
718	727	9	911.103.015.39	39

Note

Connecting rods installed in a given engine must not differ in weight by more than 9 grams. To determine weight group, weigh the complete connecting rod without bearing shells.

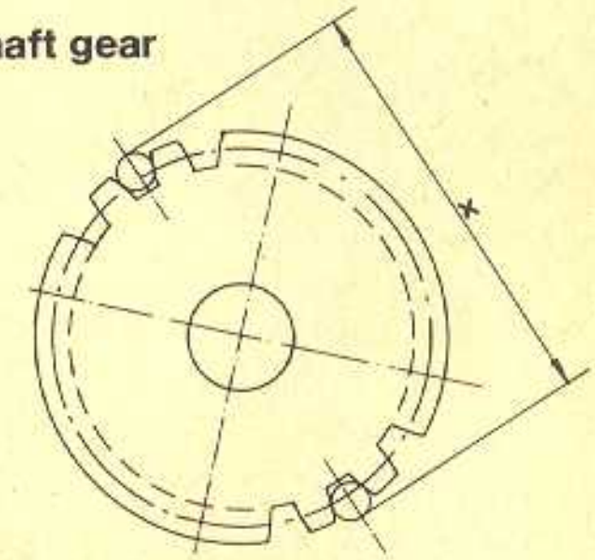
Matching intermediate shaft and crankcase

See marking on left half of crankcase below alternator support: 0 or 1.

Distance between centers mm	Crankcase mark	Crankshaft gear marking	Intermediate shaft gear marking	Backlash mm
103.975-103.990	0	0	0	0.029–0.049
		Installation	still possible	
		1	0	0.016–0.042
		0	1	0.017–0.043
103.990-104.000	1	1	1	0.012–0.041
		Installation	still possible	
		0	1	0.025–0.049
		1	0	0.025–0.048

Checking intermediate shaft gear

Use 4.5 mm dia. steel rollers to measure gear (see sketch).



Intermediate shaft gear (standard) – wear limit x 136.5 mm
Intermediate shaft gear (marked 1) – wear limit = 136.55 mm

Replace intermediate shaft gears and crankshaft gears in sets only.

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Intermediate shaft				
Bearing 1 Crankcase bore – shaft	B 27.500–27.521 W 25.000–24.980			
Bearing 2 Crankcase bore – shaft	B 26.500–26.521 W 23.980–23.967			
Intermediate shaft clearance		+ 0.030	+ 0.084	
Intermediate shaft axial play		+ 0.040	+ 0.133	0.16
Chain guide – bolt	B 8.000– 8.015 W 7.822– 7.837			
Pinion – distributor shaft	B 12.456–12.474 W 12.444–12.455	+ 0.001	+ 0.030	
Distributor – crankcase	B 27.000–27.021 W 26.947–26.980	+ 0.020	+ 0.074	
Flywheel – drive shaft steel bushing	B 25.000–25.021 W 25.022–25.035	– 0.001	– 0.035	
Flywheel				
Lateral runout				max. 0.10
Radial runout				max. 0.20

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Timing chain case				
Sprocket pivot shaft – chain tensioner housing	B 15.000–15.018 W 14.973–14.984	+ 0.016	+ 0.045	Visual inspection
Sprocket pivot shaft – sprocket carrier	B 15.000–15.018 W 14.973–14.984	+ 0.016	+ 0.045	
Sprocket carrier – sprocket pin	B 15.000–15.018 W 14.989–15.000	0.000	+ 0.029	
Sprocket – sprocket pin	B 15.032–15.050 W 14.989–15.000	+ 0.032	+ 0.610	Visual inspection
Pin – chain guide	B 8.000– 8.015 W 7.886– 7.895	+ 0.105	+ 0.129	
Pin – timing chain case	B 7.857– 7.872 W 7.886– 7.895	– 0.014	– 0.038	

Parallel alignment of both sprockets may not deviate by more than 0.25 mm.

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Camshaft housing – camshaft				
Camshaft bearings	B 46.967–46.992 (48.967–48.992)	+ 0.025	+ 0.066	0.010
Camshaft	W 46.926–46.942 (48.926–48.942)			
Camshaft – axial play		+ 0.150	+ 0.200	0.40
Camshaft – timing gear flange	B 30.000–30.013 W 29.979–30.000	0.000	+ 0.034	
Camshaft – runout, measured on center bearing (between points)				max. 0.02
Rocker arm shaft – camshaft case	B 18.000–18.018 W 17.992–18.000	Rocker arm shaft held firm by wedge effect		
Rocker arm – rocker arm shaft	B 18.016–18.027 W 17.992–18.000	+ 0.016	+ 0.035	0.080
Axial play		+ 0.100	+ 0.350	0.50

(values in brackets only for Turbo and Carrera 3.0)

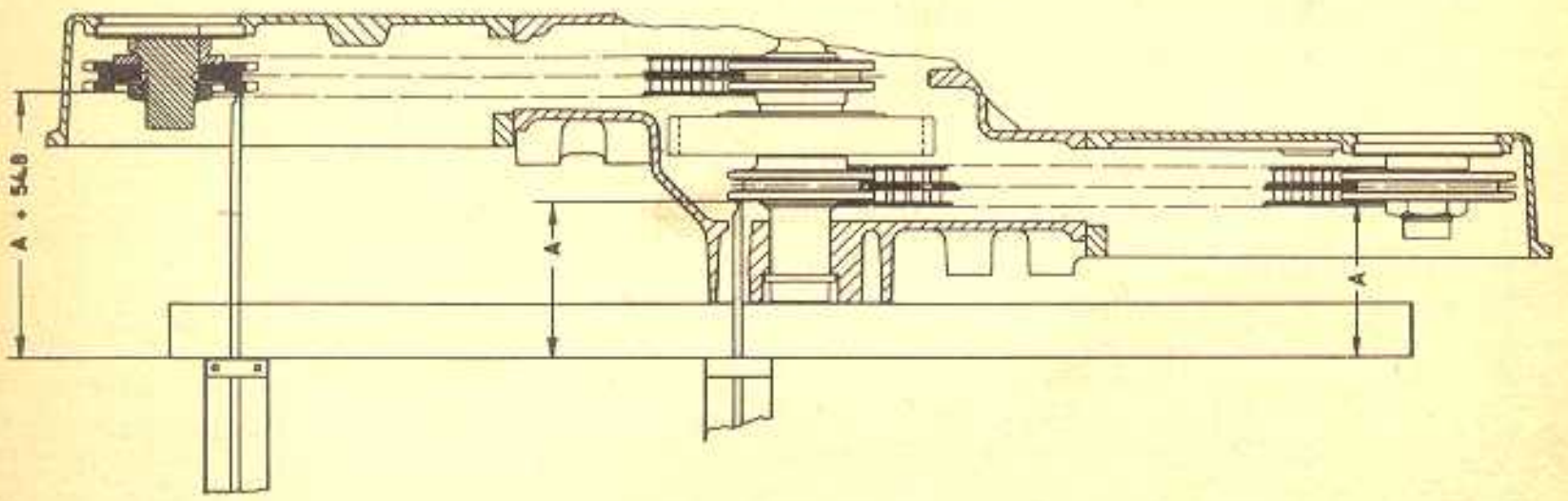
Checking parallel alignment of timing chain sprockets

Before measuring, push intermediate shaft and camshaft axially toward flywheel to set bearing thrust flanges in position.

Measurement is made through hole below intermediate shaft against side of forward chain sprocket on intermediate shaft (dimension A).

This dimension must also be achieved at sprocket for cylinders 4 – 6. Use shims if necessary (maximum permissible difference is 0.25 mm).

Sprocket for cylinders 1 – 3, mounted on intermediate shaft, is positioned 54.8 mm further to front. This 54.8 mm (design dimension) must be considered when determining dimension A. (maximum permissible difference is 0.25 mm).

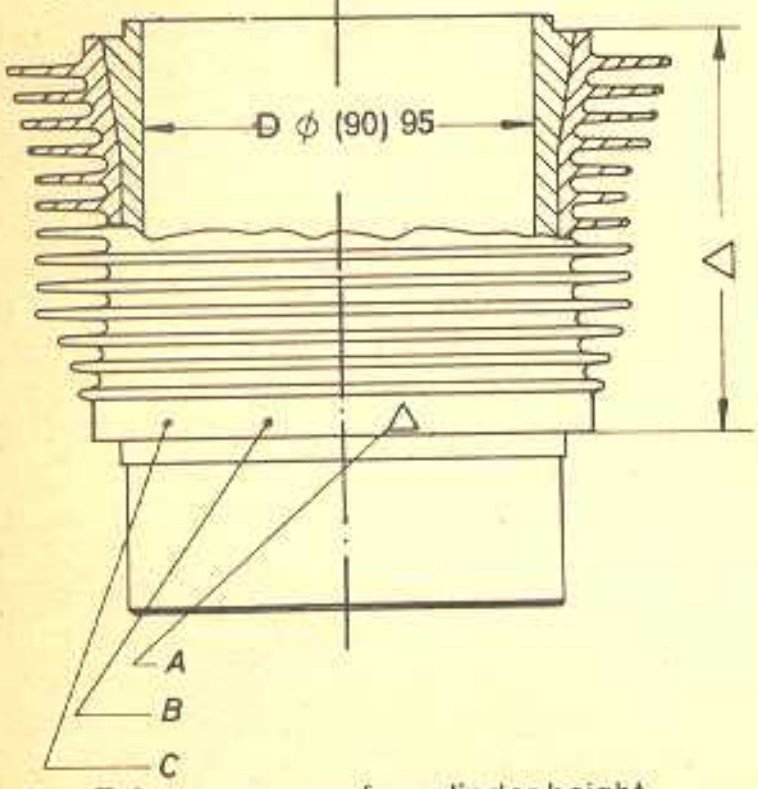


Example: measured dimension A = 78.7 mm
This means sprocket of cylinders 1 – 3 is A + 54.8 = 78.7 + 54.8 = 133.5 mm

Pistons and cylinders (sizes, weights and marks)

			911	Carrera 3.0	Turbo
Size	Code	Nominal dia.	**Piston dia. D**	**Piston LS dia. D**	**Piston dia. D**	**Piston dia. D**
Standard	0	90/95	89.965–89.975	89.952–89.967	94.963–94.977	94.933–94.947
	1		89.975–89.985	89.962–89.977	94.970–94.984	94.943–94.957
	2		89.985–89.995	89.972–89.987	94.977–94.991	94.953–94.967
	3		–	–	94.984–94.998	–
			Nikasil cylinder dia.	**Alusil cylinder dia.**	**Nikasil cylinder dia.**	**Nikasil cylinder dia.**
Standard	0	90/95	90.000–90.010	90.000–90.010	95.000–95.007	95.000–95.010
	1		90.010–90.020	90.010–90.020	95.007–95.014	95.010–95.020
	2		90.020–90.030	90.020–90.030	95.014–95.021	95.020–95.030
	3		–	–	95.021–95.028	–
Play between piston and cylinder			0.025–0.045	0.035–0.060	0.023–0.044	0.053–0.077
Piston weight			Max. difference in weight of pistons of one set: 6 g.			

Cylinder sizes



Cylinder height tolerances

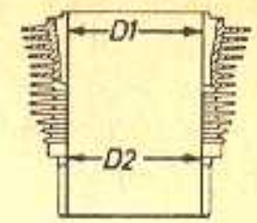
Code A	Cylinder height
5	85.400–85.425
6	85.425–85.450

A Tolerance group for cylinder height

B Tolerance group for cylinder diameter (refer to table)

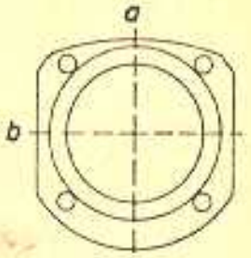
C Manufacturer's identification

Checking pistons and cylinders



Cylinders
D1 = Measuring point for wear and ovality

30 mm below cylinder upper edge
The cylinder is worn, if the distance at this measuring point is 0.08 mm more than the installation size. The ovality of a cylinder is determined by measuring in directions a and b. The difference between a and b must not exceed 0.04 mm.

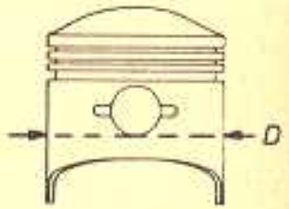


D2 = Measuring point for piston pin gap

Rings slid in at height of cylinder base gasket.

Pistons
D = Measuring point for wear

At height of piston pin bore lower edge.



Note
Replace pistons and cylinders when running clearance exceeds 0.15 mm. This results from the difference between the max. cylinder dia. and the min. piston dia.

Piston ring gap

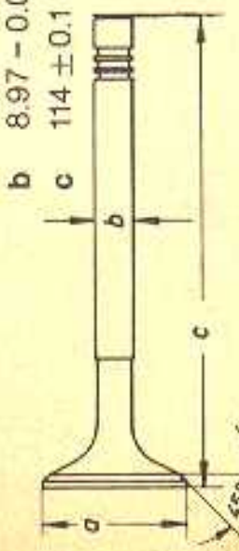
Piston ring	Gap mm (installation size)	Gap mm (wear limit)
M ring, I and II	0.1 – 0.2	0.8
Oil scraper ring, III	0.15 – 0.3	1.0
Oil scraper ring, III 3-piece „LS" ring (see measuring point „D2")	0.4 – 1.4	2.0

Piston ring height clearance

Piston ring	Height play mm (installation size)	Height play mm (wear limit)
M ring, I	0.070 – 0.102	0.2
M ring, II	0.040–0.072	0.2
Oil scraper ring, III	0.020–0.052	0.1

Valve size

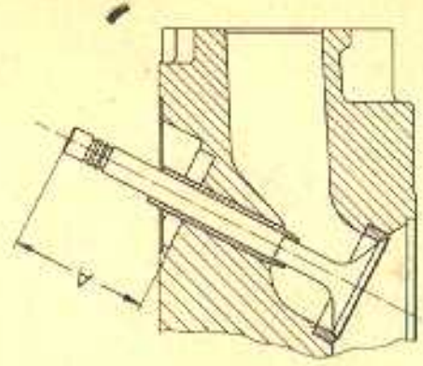
	911		Carrera 3.0		Turbo	
	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust
a	46 ± 0.1	40 ± 0.1	49 ± 0.1	41.5±0.1	49 ± 0.1	41.5 ± 0.1
b	8.97 – 0.012	8.95 – 0.012	8.97 – 0.012	8.95 – 0.012	8.97–0.012	8.95-0.012
c	114 ± 0.1	113.5 ± 0.1	110.1 ± 0.25	108.4 ± 0.25	110.1 ± 0.25	108.4±0.25



Checking valve seats

To check valve seat depth, insert respective valve into guide and measure distance between valve stem end and bottom of shim cavity, without shims (see distance A in sketch).

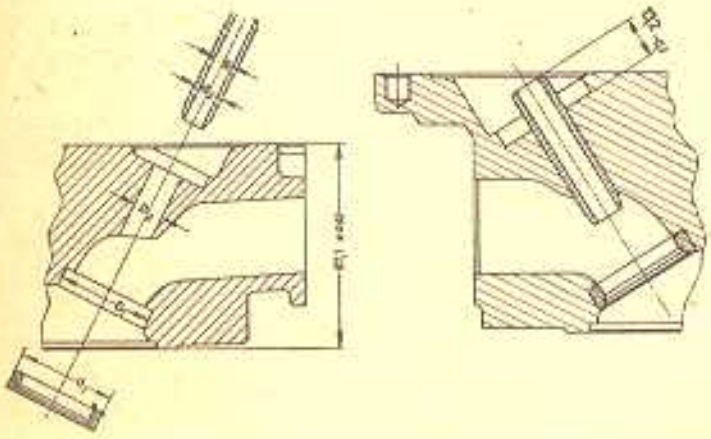
If dimension is greater than specified, measure again a new valve. If dimension is still beyond specifications, valve seat inserts have been cut too deep and should be replaced, or exchange cylinder head.



Distance A	
911	47.50 ± 0.6 mm
Carrera 3.0, Turbo	46.00 ± 0.3 mm

Valve guides (wear limits, installation sizes)

Measuring point	Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits mm
Valve guide, outside dia. d2 Cylinder head, bore dia. D2	13.049–13.060 13.000–13.018	– 0.031	– 0.060	
Intake valve guide, inside dia. g Intake valve stem, dia. b	9.000– 9.015 8.958– 8.970	+ 0.030	+ 0.057	0.15
Exhaust valve guide, inside dia. g Exhaust valve stem, dia. b	9.000– 9.015 8.938– 8.950	+ 0.050	+ 0.077	0.20

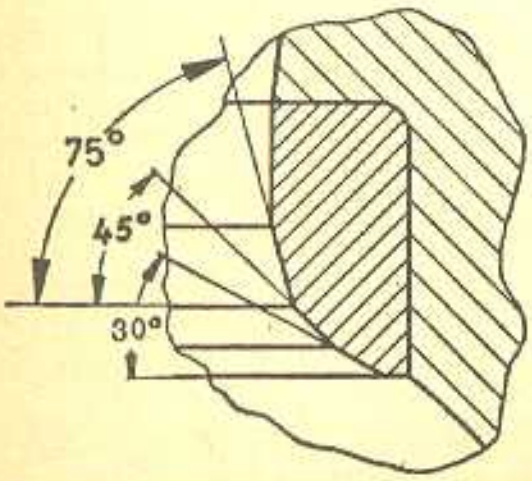


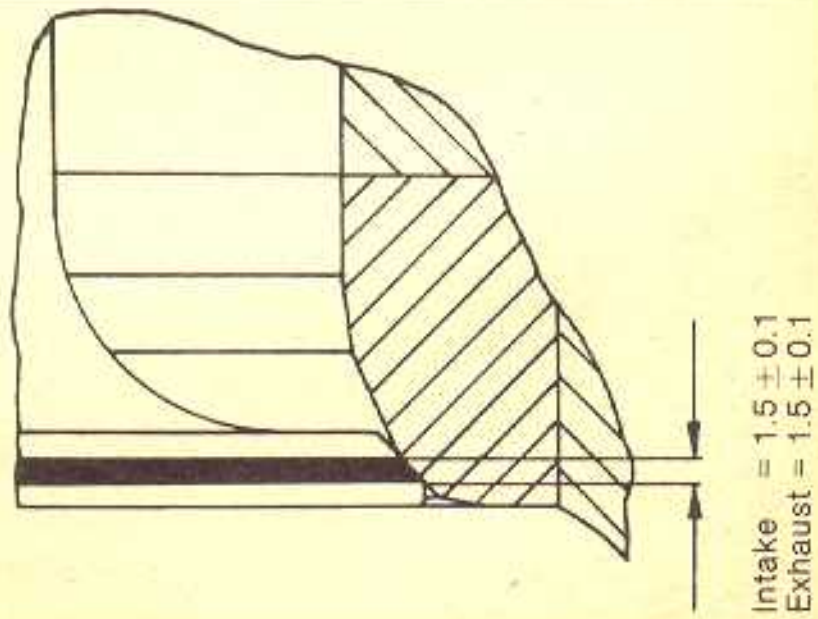
Machine 1st and 2nd oversize to correspond with bore in cylinder head.
Press fit: 0.06–0.09 mm.

Specifications for installation of valve seat inserts

		911		Turbo, Carrera 3.0	
		Outside dia. d1 valve seat insert	Bore D1 in cylinder head	Outside dia. d1 valve seat insert	Bore D1 in cylinder head
Standard size	Intake	48.180–48.164	48.000–48.025	51.680–51.661	51.500–51.530
Standard size	Exhaust	42.200–42.184	42.000–42.025	44.200–44.184	44.000–44.025
1st oversize	Intake	48.500–48.484	48.320–48.345	52.000–51.981	51.820–51.850
1st oversize	Exhaust	42.760–42.744	42.560–42.585	44.760–44.744	44.560–44.585

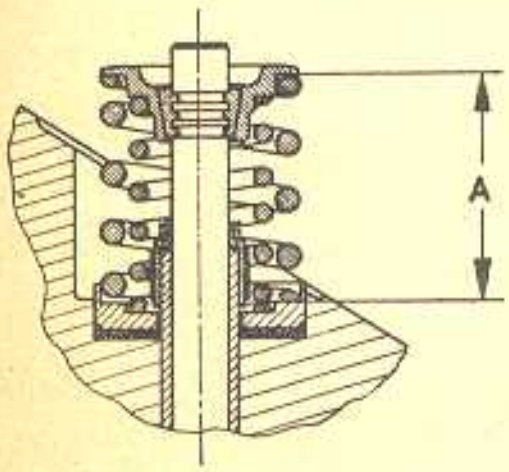
Angles and sizes of valve seat inserts





Installation lengths of valve springs

Check distance A with Special Tool P 10 C and, if necessary, correct by adding or removing shims.



	Intake	Exhaust
911	35.0 ± 0.3 mm	35.5 ± 0.3 mm
Carrera	34.5 ± 0.3 mm	34.5 ± 0.3 mm
Turbo	33.5 ± 0.3 mm	33.5 ± 0.3 mm

Camshafts, timing

	Type	Camshaft left Part No.	Camshaft right Part No.
911 engine	911/81 911/82 911/84 911/86 911/89 911/85	911.105.143.00	911.105.144.00
Carerra engine	930/02 930/12	930.105.147.08	930.105.148.08
Turbo engine	930/50 930/51 930/52 930/53 930/54	930.105.141.00 930.105.143.00	930.105.142.00

Clutch drive plate

Measuring point, type	Installation size with tolerances mm
911, Carrera	
Clutch drive plate	
Relaxed thickness (new)	8.1 ± 0.3
Max. lateral runout	0.6
Turbo	
Relaxed thickness (new)	10.1 ± 0.3
Max. lateral runout	0.5
Sportomatic	
Relaxed thickness (new)	7.3 ± 0.25
Max. lateral runout	0.5

Identification on face of camshaft Left	Right	Intake valve stroke in overlapping TDC with 0.1 mm valve clearance	Timing with 0.1 mm valve clearance
911.143.00	911.144.00	0.4 – 0.54	Intake opens 6° ATDC Intake closes 50° ABDC Exhaust opens 24° BBDC Exhaust closes 2° ATDC
930.147.08	930.148.08	0.9 – 1.1	Intake opens 1° BTDC Intake closes 53° ABDC Exhaust opens 43° BBDC Exhaust closes 3° ATDC
930.141.00 930.143.00	930.142.00	0.65 – 0.8	Intake opens 3° ATDC Intake closes 37° ABDC Exhaust opens 29° BBDC Exhaust closes 3° BTDC

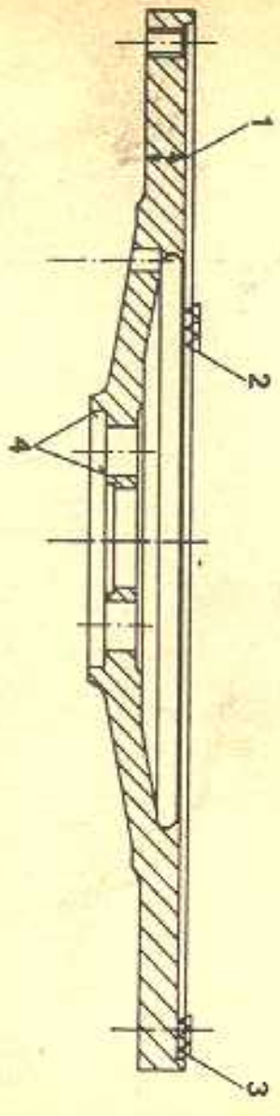
Wear limits mm
6.3 for symmetrical wear max. 0.6
8.5 for symmetrical wear max. 0.5
5.5 for symmetrical wear max. 0.5

Machining flywheel

The flywheel bearing surface on the drive plate can be machined on a lathe, if there is serious scoring or considerable burnt spots.

Keep lathe cut as small as possible.

Wear limit of flywheel thickness is 8.5 mm.



1 Wear limit 8.5 mm*
2 Smallest possible cut
3 Max. runout 0.1 mm
4 Lathe mounting points

*Turbo: wear limit of 9.9 mm.

Important engine adjusting data

Engine, type	**911** 76/77 models	**Carrera** 76/77 models	**Turbo** 76/77 models	**911 S (USA)** 1977 models	**911 S (Calif.)** 1977 models
Ignition timing **	5° ATDC	5° ATDC	29 + 2° BTDC	TDC ± 2°	15 ± 2° ATDC
at engine speed (rpm)	900	900	4000	950 – 1000	1000
Vacuum hose detached?	no	no	yes	no	no
Ignition timing control			TDC ± 4°		
at engine speed (rpm)			900 – 950		
Vacuum hose detached?			no		
Idle speed (rpm)	900 ± 50	900 ± 50	900 ± 50	900 – 1000*	950 – 1050*
CO level (%)	1.0 – 1.5	1.0 – 1.5	2.0 – 4.0*	1.5 – 3.0*	1.5 – 3.0*
(at idle speed)			(2 – 2.5 for 1976 models)		
Charge pressure (bar)	–	–	0.80 – 0.87	–	–
at engine speed (rpm)	–	–	4000	–	–
System pressure (bar)	4.5 – 5.2	4.5 – 5.2	6.0 – 6.7	4.5 – 5.2	4.5 – 5.2
Control pressure (bar) (warm-up regulator off) at idle speed/throttle valve closed	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15
With engine stopped – fuel pump running	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15
Valve clearance,					
intake (mm)	0.10	0.10	0.10	0.10	0.10
exhaust (mm)	0.10	0.10	0.10	0.10	0.10
Timing adjustment (mm)	0.40 – 0.54	0.90 – 1.10	0.65 – 0.80	0.40 – 0.54	0.40 – 0.54

*Detach hose at auxiliary air pump and plug, if CO level has to be checked or adjusted.

** At 80° C oil temperature.

Important engine adjusting data

Engine, type	911 S (Japan) 1977 models	Turbo (USA) 1977 models	Turbo (Japan) 1977 models	Turbo (USA) 1976 models	911 S (USA) 1976 models
Ignition timing**	15 ± 2° ATDC	7 ± 2° ATDC	15 ± 2° ATDC	5 ± 3° ATDC	5° ATDC
at engine speed (rpm)	950 – 1000	950 – 1050	950 – 1050	900 – 1000	900
Vacuum hose detached?	no	no	no	no	no
Ignition timing control	–	29 ± 3° BTDC	30 ± 3° BTDC	26 ± 3° BTDC	–
at engine speed (rpm)	–	4000	4000	4000	–
Vacuum hose detached?	–	yes	yes	yes	–
Idle speed (rpm)	950 – 1050*	950 – 1050*	950 – 1050*	900 + 50	900 ± 50
CO level (%) (at idle speed)	1.0 – 2.0*	2.0 – 4.0*	1.0 – 1.5*	1.0 – 3.0*	2.0 – 4.0*
Charge pressure (bar)	–	0.80 – 0.87	0.80 – 0.87	0.80 – 0.87	–
at engine speed (rpm)	–	4000	4000	4000	–
System pressure (bar)	4.5 – 5.2	6.0 – 6.7	6.0 – 6.7	6.0 – 6.7	4.5 – 5.2
Control pressure (bar) (warm-up regulator off) at idle speed/throttle valve closed	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15
With engine stopped – fuel pump running	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15
Valve clearance,					
intake (mm)	0.10	0.10	0.10	0.10	0.10
exhaust (mm)	0.10	0.10	0.10	0.10	0.10
Timing adjustment (mm)	0.40 – 0.54	0.65 – 0.80	0.65 – 0.80	0.65 – 0.80	0.40 – 0.54

*Detach hose at auxiliary air pump and plug, if CO level has to be checked or adjusted.

**At 80° C oil temperature.

		911	Carrera	Turbo
Dwell angle	Bosch	38 ± 3°/0.35 mm	same as 911	–
	Marelli	37 ± 3°/0.35 mm		
Spark plugs	Bosch	W 225 T 30 (0.7 mm)	W 260 T 2 (0.7 mm)	W 280 P 21 (0.6 mm)
(electrode gap)	Beru	225/14/3 (0.7 mm)	260/14/3 (0.7 mm)	

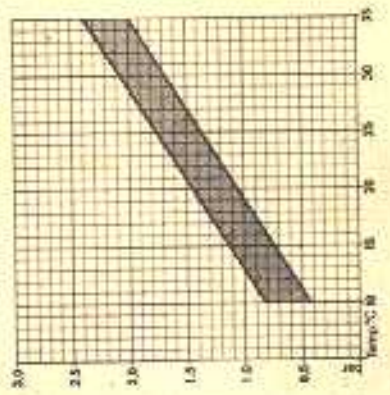
Battery charge condition	Normal climate zone Density	Freezing point	Tropics Density
Dead	1.12	– 11° C	1.08
Half charged	1.20	– 27° C	1.16
Charged	1.28	– 68° C	1.23

Tightening torque for engine

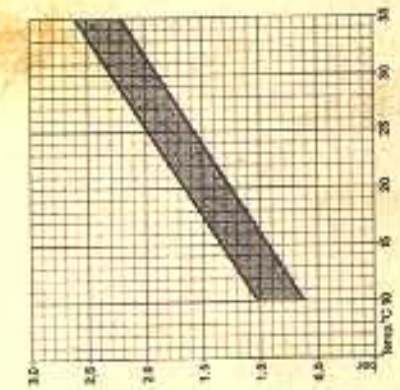
Location	Threads	Torque kpm	Nm
Crankcase bolts	M 10	3.5	35
All bolts on crankcase and camshaft housing	M 8	2.5	25
Flywheel mountings	M 12 x 1.5	15	150
Pulley to crankshaft	M 12 x 1.5	8	80
Double-belt pulley to crankshaft (air conditioner)	M 12 x 1.5	15	150
Connecting rod bolts	M 10 x 1.25	5 – 5.5	50 – 55
Cylinder head nuts	M 10 socket	3 – 3.3	30 – 33
Nuts con camshaft	M 27 x 2	14	140
Rocker arm shafts	M 6 socket	1.8	18
Wide clamp on blower housing	M 8	0.8	8
Pulley to alternator	M 16 x 1	4	40
Spark plugs	M 14 x 1.25	2.5 – 3	25 – 30
Adaptor on cylinder head (air injection)	M 10 x 1	1.0 – 1.2	10 – 12
Air line (coupling) to adaptor	M 14 x 1.5	2.2 – 2.4	22 – 24
Reactor to cylinder head	M 8	2.0 – 2.3	20 – 23

Warm-up regulator, fuel injectors (continuous fuel injection system)

Testing and adjusting data
911, Carrera, 911 S – USA **Turbo**

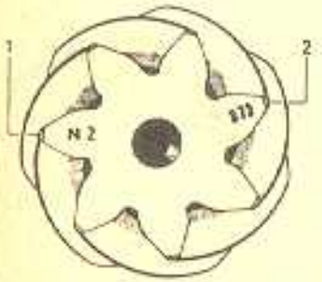


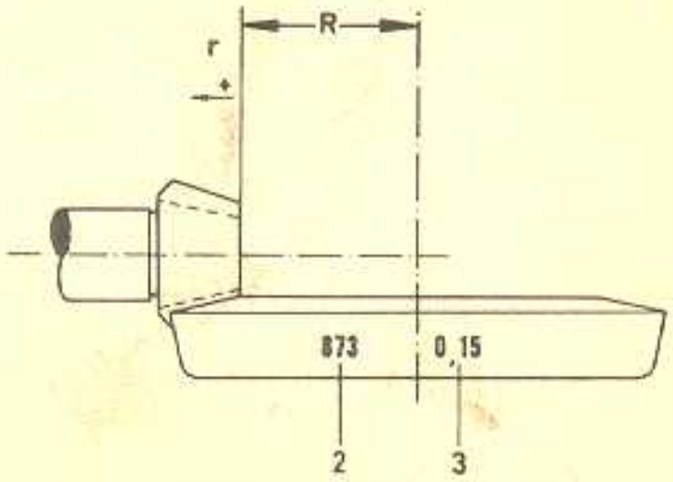
Control pressure cold (corresponding with outside temperature) 2.0 to 3.2 bar



Fuel injectors: opening pressure 2.5 to 3.6 bar

Adjustment of drive pinion

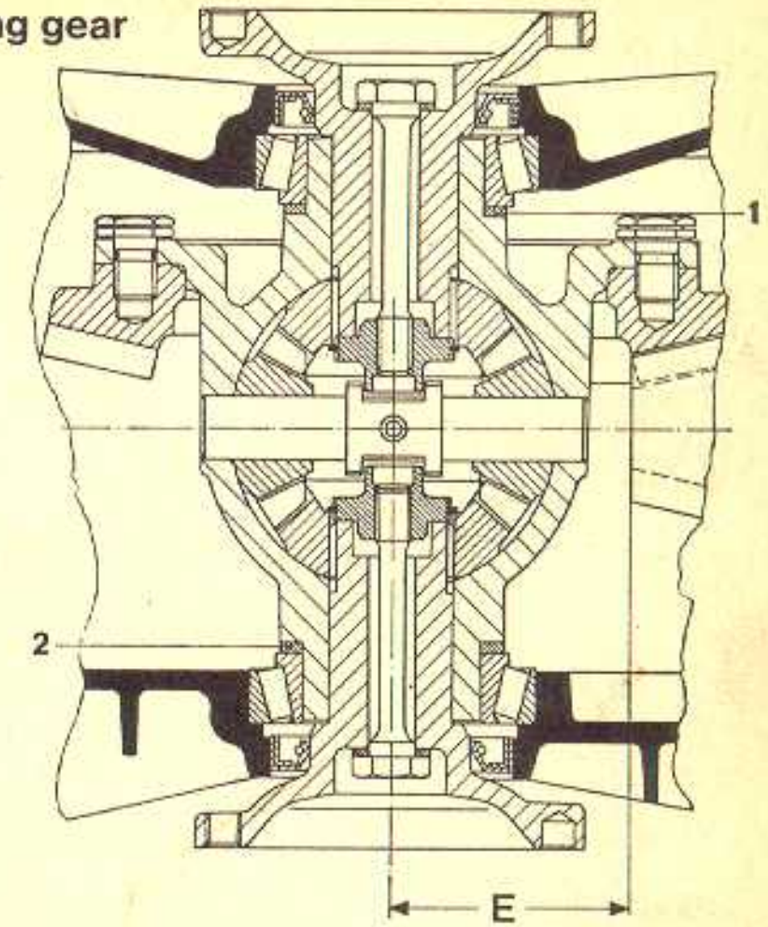




R = Design dimension
911, Carrera = 66.30 mm
Turbo = 81.69 mm (82.29 transm. type 930/30 and 930/33)
Sportomatic = 59.70 mm

r = Deviation from R given in + 1/100 mm (N 2 = + 0.02 mm)
1 = Deviation r
2 = Matching number
3 = Backlash

Adjustment of ring gear



The backlash between the ring gear and pinion can only be adjusted by changing the thickness of spacers and must be from 0.12 to 0.18 mm (measured at 4 different points).

Exception: the Turbo is measured at reverse gear III = 0.38 ± 0.1 mm equals 0.20 mm on the ring gear (930/30 = 0.33 ± 0.1 mm equals 0.16 mm).

Care and cleanliness are essential during all assembly operations and measurements to assure accurate results.

Press fit of taper roller bearings for differential in transmission case – for SKF bearings 2.5 – 3.5 Nm (25 – 35 kpcm), for Fag bearings 4.5 – 6.5 Nm (45 – 65 kpcm).

Important manual transmission adjusting data

2 examples for adjustment of pinion and ring gear on type 915 transmissions

	With transmission gauge P 258	With universal gauge VW 385
Design dimension	66.30 mm	66.30 mm
Deviation	+ 0.02 mm	+ 0.10 mm
	66.32 mm	66.40 mm
Dial gauge setting	66.61 mm	66.30 mm
Measured dimension (without shims)	- 0.39	- 0.29 mm
Distance to face end of pinion shaft	66.22 mm	66.01 mm
Adjustment dimension „E"	66.32 mm	66.40 mm
Distance to face end of pinion shaft	- 66.22 mm	- 66. 01 mm
Thickness of shims	0.10 mm	* 0.39 mm

*) Round off to nearest 0.05 mm.

Shims are available 0.10, 0.15 and 0.20 mm thick.

Recheck adjustment dimension „E" after installation of paper gaskets; a deviation of ±0.03 mm is permissible.

Important sportomatic transmission adjusting data

	Transmission type 925	
	With transmission gauge P 258	With universal gauge VW 385
Design dimension	59.70 mm	59.70 mm
Deviation	+ 0.18 mm	+ 0.04 mm
Adjustment dimension „E"	59.88 mm	59.74 mm
Basic dimension (without gasket)	60.70 mm	60.70 mm
Adjustment dimension	- 59.88 mm	- 59.74 mm
Thickness of shim	0.82 mm *	0.96 mm *
Measurement after installation of shims:		
Dial gauge setting	60.02 mm	59.70 mm
Measured dimension (without gasket)	- 0.37 mm	- 0.32 mm
Distance to face end of pinion shaft	59.65 mm	59.38 mm
Adjustment dimension „E"	59.88 mm	59.74 mm
Distance to face end of pinion shaft	- 59.65 mm	- 59.38 mm
Paper gasket	0.23 mm *	0.36 mm *

*) Round off to nearest 0.05 mm.

Paper gaskets are available 0.1, 0.15 and 0.20 mm thick.

Recheck adjustment dimension „E" after installation of paper gaskets; a deviation of ±0.03 mm is permissible.

Transmission tolerance survey

Measuring point	Type 915 Installation tolerance mm	Type 915 Wear limit mm	Type 930 Installation tolerance mm	Type 930 Wear limit mm
1. Backlash between gear I and II				
1st gear	0.05 – 0.13 (0.17)	0.22	0.055 – 0.13	0.22
2nd gear				
3rd gear				
4th gear				
5th gear				
2. Loose gears on pinion and drive shaft Axial clearance				
1st gear	0.3 – 0.4	0.5		
2nd gear	0.2 – 0.3	0.4		
3rd gear	0.2 – 0.3	0.4	same as 915	
4th gear	0.2 – 0.3	0.4		
5th gear	0.2 – 0.3	0.4		
3. Selector rods				
a) in guides radial clearance	0.195 – 0.236	0.4	same as 915	
b) Runout	–	0.1		

Measuring point	Installation tolerance mm	Wear limit mm	Installation tolerance mm	Wear limit mm
4. Selector forks in operating sleeve Axial clearance				
5th and reverse gear	0.1 – 0.3	0.5		
1st and 2nd gear	0.1 – 0.3	0.5	same as 915	
3rd and 4th gear	0.1 – 0.3	0.5		
5. Synchronizing rings Outside dia. installed				
1st gear	86.20 – 86.54	after	86.15 – 86.65	after
2nd gear	86.20 – 86.54	local wear	86.15 – 86.65	local wear
3 rd gear	76.12 – 76.48	through of	76.20 – 76.55	through of
4th gear	76.12 – 76.48	molybdenum	76.20 – 76.55	molybdenum
5th gear	76.12 – 76.48	layer	–	layer
6. Drive shaft Max. runout at guidepin	0.1	0.1 (align)	same as 915	

(in brackets: only 1st and 2nd gear of 5-speed transmissions)

Tightening torque for bolts and nuts of manual transmission 915

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Transmission case (oil drain)	Plug with magnet	M 24 taper	St 37	2.0 – 2.5	20-25
Gear box (oil filler)	Plug	M 24 taper	St 37	2.0 – 2.5	20-25
Gear box, side, front cover, shift cover	Mid-grip nut	M 8 x 1.25	X12CrNi 18.8	2.2 – 2.5	22-25
Front cover	Backup light switch	M 18 x 1.5	Ms	3.5 – 4.0	35-40
Drive shaft	Collared nut	M 30 x 1.5	8.8	16. 0 – 18. 0	160-180
Drive shaft	Castle nut	M 18 x 1.5	6.8	12. 0 – 14.0	120-140
Transmission support clamping plate and mountings	Hexagon nut	M 8 x 1.25	8	2.1 – 2.3	21-23
Drive pinion	Collared nut	M 24 x 1.5	8	14.0 – 16.0	140-160
Fork, gearshift	Hexagon nut	M 6 x 1.0	8	0.8 – 0.9	8-9
Shift lock, transmission case	Hexagon head bolt	M 10 x 1.5	8.8	1.5 – 1.8	15 – 18
Transmission case	Vent	M 16 x 1.5	9 S 20 K	2.3 – 3.0	20 – 30
Selector forks	Hexagon head bolt	M 8 x 1.25	8.8	2.4 – 2.6	24 – 26
Ring gear (differential)	Hexagon head bolt	M 12 x 1.25	11.9	11.5 – 12.0	115–120
Ring gear (locking differential)	Hexagon head bolt	M 12 x 1.25	11.9 12.9	14.0 – 15.0 15.0 – 16.0	140–150 150–160
Joint flange	Expansion bolt	M 10 x 1.5	8.8	2.6 – 3.0	26 – 30
Starter mountings	Hexagon nut	M 10 x 1.5	8	4.6 – 4.8	46 – 48
Pressure tube (drive pinion)	Hexagon head bolt M 6 x 35	M 6 x 1.0	8.8	0.8 – 0.9	8 – 9
Front cover	Pressure relief bolt	M 12 x 1.5	9 S 20 K	2.2 – 2.5	22 – 25
Oil pump cover	Mid-grip nut	M 6 x 1.0	X12CrNi 18.8	0.9 – 1.0	9 – 10
Suction tube	Fillister head bolt M 6 x 15	M 6 x 1.0	8.8	0.8 – 0.9	8 – 9
Pressure tube (gear box)	Hexagon head bolt M 6 x 12	M 6 x 1.0	8.8	0.8 – 0.9	8 – 9

Tightening torque for bolts and nuts of manual transmission 930

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Drive shaft	Collared nut	M 30x1.5	8.8	21.0	210
Drive shaft	Collared nut	M 20x1.5	C 35 V	16.0–18.0	160–180
Drive pinion	Collared nut	M 24x1.5	8	19.0–20.0	190–200
Joint flange	Expansion bolt	M 10x1.5	8.8	2.6–3.0	26–30
Transmission case	Vent	M 14x1.5	9 S 20 K	2.0–3.0	20–30
Connecting rod, gearshift	Conical bolt	M 8x1.25	8.8	2.3–2.6	23–26
Shift cover	Mid-grip nut	M 8x1.25	X12CrNi 18.8	2.2–2.5	22–25
Gear box	Backup light switch	M 18x1.5	Ms	2.5–3.5	25–35
Gearshift, fork	Hexagon nut	M 6x1.0	8.8	0.9–1.1	9–11
Clamping plate, gear box and transmission case, front and side transmission covers	Hexagon nut	M 8x1.25	8	2.2–2.5	22–25
Shift lock, transmission case	Hexagon head bolt	M 10x1.5	8.8	1.5–1.8	15–18
Selector forks	Hexagon head bolt	M 8x1.25	8.8	2.4–2.6	24–26
Ring gear (differential)	Hexagon head bolt	M 12x1.25	11.9	13.5–14.0	135–140
Locking differential	Hexagon head bolt	M 12x1.25	12.0	15.0–16.0	150–160
Transmission case (oil drain)	Plug with magnet	M 24 x 1.5 (taper 1:16)	St 37	2.0 – 2.5	20 – 25
Gear box (oil filler)	Plug	M 30x1.5	5.8	2.0 – 2.5	20 – 25
Reverse gear detent	Plug	M 16x1.5	5.8	2.0 – 2.5	20 – 25
Guide tube	Fillister head bolt	M 6x1.0	8.8	0.8 – 1.0	8 – 10
Clutch and gear ring mountings	Fillister head bolt	M 8x1.0	8.8	2.0 – 2.5	10 – 25
Starter mountings	Hexagon nut	M 10x1.5	8	4.6 – 5.0	46 – 50
Holder to shift base	Hexagon head bolt	M 6.	8.8	0.6	6
Shift base to tunnel	Fillister head bolt	M 8	8.8	2.1	21
Conical bolt in selector rod head	Conical bolt	M 8	8.8	1.5	15
Conical bolt on shift coupling	Conical bolt	M 8	8.8	1.5	15
Clamp mountings	Hexagon head bolt	M 8	8.8	2.5	25
Transmission cover	Fillister head bolt	M 6	8.8	1.4	14
Locking differential					

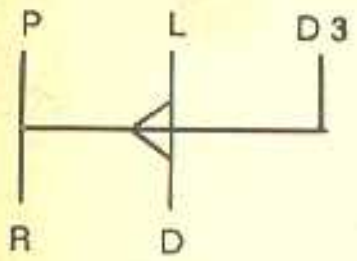
Tightening torque for bolts and nuts of sportomatic transmission

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Transmission case (on stud for side and front transmission cover as well as fork)	Hexagon nut	M 8x1.25	6.8	2.1 – 2.3	21 – 23
	Mid-grip nut	M 8x1.25	x12CrNi 18.8	2.2 – 2.5	22 – 25
Transmission case (oil filler)	Plug	M 24x1.5 (taper 1 : 16)	St 37	2.0 – 2.5	20 – 25
Transmission case (oil drain)	Plug with magnet	M 24x1.5 (taper 1 : 16)	St 37	2.0 – 2.5	20 – 25
Transmission case (vent)	Vent	M 14x1.5 (taper 1 : 16)	9 S 20 K	2.0 – 3.0	20 – 30
Transmission case	Backup light switch	M 18x1.5	Ms	3.5 – 4.0	35 – 40
Transmission case	Bridge-over switch	M 18x1.5	Ms	3.5 – 4.0	35 – 40
Transmission case (starter)	Hexagon nut	M 10x1.5	8.8	4.6 – 4.8	46 – 48
Transmission case (power motor support and mountings)	Hexagon nut	M 8x1.25	6.8	2.1 – 2.3	21 – 23
Converter housing to transmission case	Hexagon nut Hexagon nut	M 8x1.25 M 10x1.5	6.8 8.8 (SW15)	2.1 – 2.3 4.6 – 4.8	21 – 23 46 – 48
Converter housing (one-way clutch mountings)	Fillister head bolt	M 6x1.0	10.9	1.2 – 1.4	12 – 14
Converter housing	Threaded adaptor	M 24x1.5	6 S	3.0 – 3.5	30 – 35
Converter housing	Temperature transmitter	M 14x1.5	Ms	2.5 – 3.0	25 – 30
Converter housing	Temperature switch	M 14x1.5	Ms	2.5 – 3.0	25 – 30
Converter housing (clutch pressure plate)	Fillister head bolt	M 6x1.0	10.9	1.2 – 1.4	12 – 14
Converter drive plate	12-sided bolt	M 8x1.25	8.8	2.4 – 2.6	24 – 26
Intermediate plate (clamping)	Hexagon head bolt	M 8x1.25	8.8	2.1 – 2.3	21 – 23
Intermediate plate	Reversing lever shaft	M 8x1.25	9 S 20 K	2.1 – 2.3	21 – 23
Intermediate plate (shift lock)	Plug	M 14x1.5	4.6	2.2 – 2.5	22 – 25
Front transmission cover (speedometer drive lock)	Hexagon head bolt	M 8x1.25	8.8	1.6 – 1.8	16 – 18
Front transmission cover (9 mm parking lock ball dia.)	Plug	M 12x1.5	5.8	3.0 – 3.5	30 – 35
Angle drive in guide sleeve	Hollow bolt	M 24x1.5	6.8	2.2 – 2.4	22 – 24
Drive shaft	Hexagon nut	M 24x1.5	6.9	10.0 – 12.0	100–120
Drive shaft	Collared nut	M 18x1.5	5.8	11.0 – 13.0	110 – 130
Drive pinion	Expansion bolt	M 12x1.5	10.9	11.0 – 12.0	110–120
Selector forks	Hexagon head bolt	M 8x1.25	8.8	2.2 – 2.6	22 – 26
Differential (ring gear mtgs.)	Hexagon head bolt	M 12x1.25	11.9	11.5 – 12.0	115–120
Joint flange (differential)	Expansion bolt	M 10x1.5	8.8	3.5 – 4.0	35–40
Front transmission cover Transmission support mtgs.	Hexagon nut	M 8x1.25	6.8	2.1 – 2.3	21–23

Sportomatic transmission specifications

Clutch
Hydrodynamic torque converter and a vacuum operated single plate dry clutch
Manual transmission: Porsche locking synchromesh
No. of gears: 3 forward, 1 reverse and parking lock

Shift scheme



P = Parking lock
R = Reverse gear
L = Low (driving range for steep gradients)
D = Drive (driving range for city)
D3 = Drive 3 (driving range for open roads)

Final drive ratio	8/27
Towing speed	approx. 40 km/h
Stall speed	1900 ± 200 rpm
Converter ratio	1.8
Clutch speed (at full throttle)	3200 ± 200 rpm
Transmission oil	approx. 2.5 ltr.

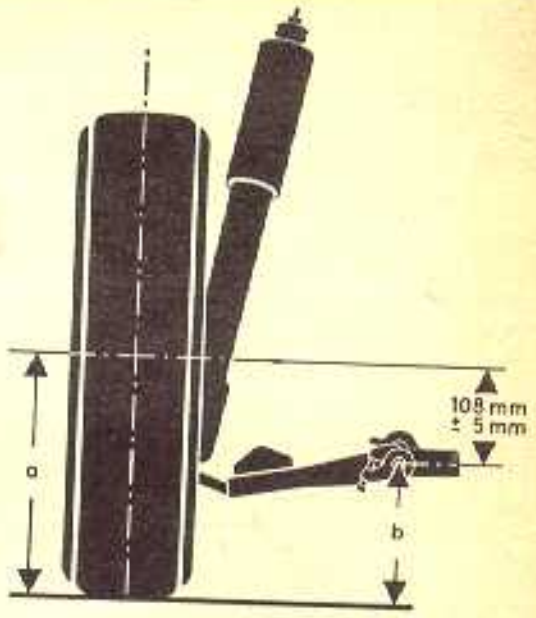
Front axle and steering specifications

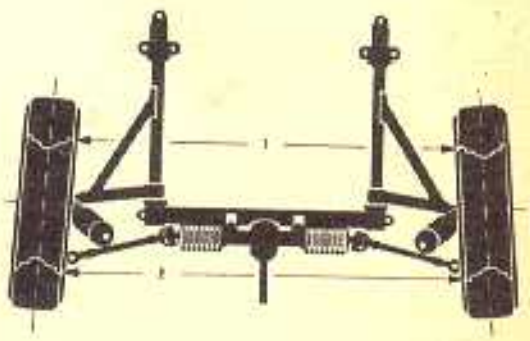
	911	Carrera 3.0	Turbo
Wheel suspension	Independent employing control arms and shock absorber struts		
Springs	One round torsion bar in driving direction for each wheel		
Track width	1369 mm	1369 mm	1438 mm

Specifications and tolerances

At curb weight according to DIN 70020
Car with full fuel tank, spare wheel and tools

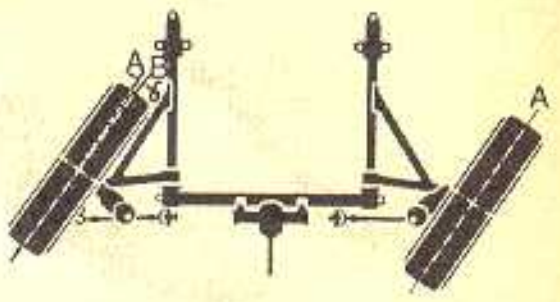
Designation	Adjustment data and tolerances	Max. difference between left and right
Front axle		
Height adjustment: Wheel center above middle of torsion bar		
911, Carrera	108 mm ± 5 mm	5 mm
911 S – USA (repair)	93 mm ± 5 mm	5 mm
Turbo	93.5 mm ± 5 mm (84.5 mm ± 5 mm USA)	5 mm
Total toe (pressed with 15 kp)	0°	–





Designation	Adjustment data and tolerances	Max. difference between left and right
Difference angle at 20° lock (toward toe-in)	0° to 30'	Can only be influenced by exchanging steering arm

A' = Parallel to A
B = Centerline of wheel
Y = Difference angle



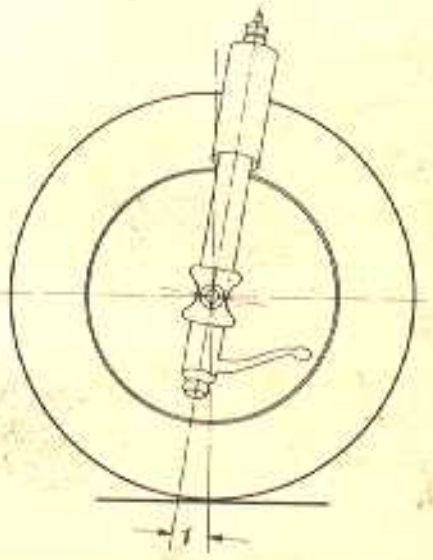
Camber of front wheels
(wheels pointing straight ahead)

a = Camber angle		
911, Carrera, Turbo	0° ± 10'	10'
911 S – USA, Turbo – USA	+ 30' ± 10'	10'
ß = Inclination of kingpin	11°	



Designation	Adjustment data and tolerances	Max. difference between left an right
y = Caster	6° 5' ±15'	30'

Caster results from total camber difference at 20° left lock and 20° right lock x 1.5



These wheel alignment specifications can also be applied to earlier models.

Tightening torque for front axle and steering

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Support bearing to strut	Hexagon nut	M 14x1.5	8	8	80
Clamp to tie rod	Hexagon nut	M 8	8.8	1.5	15
Support bearing to body	Fillister head bolt (socket)	M 10	8.8	4.7	47
Auxiliary carrier to body	Hexagon head bolt	M 12x1.5	8.8	9	90
Guard mountings	Hexagon head bolt	M 10	8.8	4.7	47
Guard mountings	Hexagon head bolt	M 8	8.8	2.5	25
Flan block mountings	Hexagon head bolt	M 10	8.8	4.7	47
Auxiliary carrier mountings	Hexagon head bolt	M 10	8.8	4.7	47
Steering gear mountings	Hexagon head bolt	M 10x20	8.8	4.7	47
Tie rod to steering gear	Hexagon head bolt	M 10	8.8	4.7	47
Stabilizer bearing to body	Hexagon head bolt	M 8	8.8	2.5	25
Stabilizer lever to stabilizer	Hexagon head bolt	M 8	8.8	2.5	25

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Clamping nut on steering knuckle	Fillister head bolt (socket)	M 7	10.9	1.5	15
Ball joint to strut	Uni-stop nut	M 8	8	2.2	22
Ball joint to strut	Hexagon head bolt	M 10x30	10.9	4.5	45
Ball joint to control arm (threads lubricated)	Slotted nut	M 45x1.5	8.8	25	250
Plug for spring strut (Boge)	Plug			12 + 2	120+20
Plug for spring strut (Koni)	Plug			20	200
Wheel to wheel hub	Wheel nut	M 14 x 1.5	10.9	13	130
Brake disc to wheel hub	Hexagon nut	M 8	M 8	2.3	23
[illegible] to steering knuckle	Hexagon head bolt	M 8	M 8	1.0	10
Caliper to steering knuckle	Hexagon head bolt	M 12x1.5	8.8	7.0	70

Hollow bolt to caliper	Hollow bolt	M 10x1		2.0	20
Steering coupling to steering shaft	Hexagon head bolt	M 8	8.8	2.5	25
Steering shaft to steering gear	Hexagon head bolt	M 8	8.8	2.5	25
Steering shaft bearings	Fillister head bolt	M 8	8.8	2.5	25
Universal joint to steering shaft	Hexagon head bolt	M 8	8.8	2.5	25
Steering wheel	Hexagon nut	M 18x1.5	8	7.5	75
Dust cover holder to rack	Slotted nut	M 16x1.5	8	7.0	70
Ball joint to steering arm	Castle nut	M 10x1	8	4.5	45
Coupling flange to drive pinion	Hexagon nut (self-locking)	M 10	8	4.7	47
Case cover to steering gear	Hexagon head bolt	M 8x1	8.8	1.5	15
Tie rod to rack (only Turbo)	Ball joint	M 16x1.5	8.8	15	150

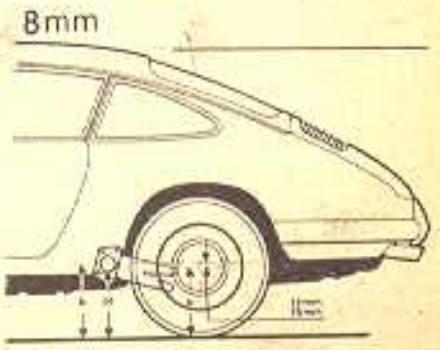
Rear axle specifications

	911	Carrera 3.0	Turbo
Wheel suspension	Independent, employing trailing arms, wheels driven by propeller shafts		
Springs	One round torsion bar in lateral direction for each wheel		
Track width (wheel center 12 mm below center of cross tube)	1354 mm with rim 6 J x 15	1380 mm with rim 7 J x 15	1511 mm with rim 8 J x 15 or 8 J x 16 (1977 models)
Shock absorbers	Double action, hydraulic shock absorbers		
Stabilizers front/rear dia. in mm	16/–	20/18	18/18 20/18 (1977 models)

Specifications and tolerances

(at curb weight according to DIN 70020; car with full fuel tank, spare wheel and tools)

Designation	Adjustment data and tolerances	Max. difference betw. left and right
Torsion bar specification		
Inclination of spring strut		
Coupe 911, Carrera	38°	
Coupe 911 S – USA	42°	
Targa	+ 0.5°	
Air conditioner	+ 0.5°	
Sportomatic	+ 0.5°	
911, Carrera with Bielstein shock absorbers	37°	
911 S – USA with Bielstein shock absorbers	41°	
Turbo	31°	
Turbo – USA	34°	
Camber of rear wheels		
911, Carrera	– 1° ± 10'	20'
Turbo	– 50' ± 10'	20'
911 S – Turbo – USA	0° ± 10'	20'
Track for all types	+ 10' ± 10' each wheel	20'
Height adjustment		
Wheel center below center of cross tube		8 mm
911, Carrera, Turbo	12 mm ± 5 mm	8 mm
911 S – Turbo – USA	37 mm ± 5 mm	



1° change in spring strut inclination = approx. 8 – 9 mm change in vehicle height.

Tightening torque for bolts and nuts of rear axle

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Bearing cover to body	Hexagon head bolt	M 10	8.8	4.7	47
Control arm to cross tube	Hexagon head bolt	M 14x1.5	10.9	6.0	60
Spring strut to contr. arm	Eccentric	M 12x1.5	8.8	6.0	60
Spring strut to contr. arm	Hexagon head bolt	M 12x1.5	10.9	9.5	95
Brake caliper to contr. arm	Hexagon head bolt	M 12x1.5	8.8	6.0	60
Shock absorber to contr. arm	Hexagon head bolt	M 14x1.5	8.8	12.5	125
Shock absorber to body	Hexagon nut	M 10x1	8	2.5	25
Brake hose to lines	Brake hose	M 10x1		1.5	15
Stabilizer to body	Hexagon head bolt	M 8	8.8	2.5	25
Propeller shaft flange	Fillister head bolt	M 10	12.9	8.3	83
Parking brake to contr. arm	Hexagon head bolt	M 8	8.8	2.5	25
Wheel to wheel hub	Wheel nut	M 14x1.5		13	130
Wheel hub to drive shaft	Castle nut	M 20x1.5	10.9	30–35	300–350
Brake disc to wheel hub	Countersunk bolt	M 6	8.8	0.5	5
Parking brake cable to control arm	Hexagon head bolt	M 6	8.8	0.5	5
Adjusting lever to spring strut	Hexagon head bolt	M 16x1.5	10.9	24.5	245
Adjusting lever to spring strut	Eccentric bolt	M 16x1.5	10.9	24.5	245

General technical data

Designation	Specification	Wear limit
Tandem brake master cylinder		
Bore	19.05 mm dia.	
Stroke	18/13 mm	
Ratio at brake pedal	5.8 : 1	
Operating linkage/piston play	1 mm	
Brake system with brake pressure booster T 52		
Tandem brake master cylinder		
Bore	20.64 mm dia.	
Stroke	20/12 mm	
Mean amplification factor	2.2 (Turbo 1.8)	
Play at brake pedal with bled brakes and engine stopped	min. 10 mm	
Ratio at brake pedal	5.2 : 1	

Designation	Specification	Wear limit
Front wheel brakes		
Brake disc outside dia.	282.5 mm, inboard vent	
New thickness	20.0 mm or 20.5 mm	
Min. thickness after machining*	18.6 mm	18.0 mm
Thickness tolerance	max. 0.03 mm	
Brake disc lateral runout	max. 0.05 mm	
Lateral runout when installed	0.2 mm	
Caliper piston dia.	48 mm	
Pad thickness	10 mm (13 mm Turbo)	2.0 mm
Clearance	0.2 mm	
Pad area on each wheel	76 cm^2	
Rear wheel brakes		
Brake disc outside dia.	290 mm, inboard vent	
New thickness	20.0 mm	
Min. thickness after machining*	18.6 mm	18.0 mm
Thickness tolerance	max. 0.03 mm	
Brake disc lateral runout	max. 0.05 mm	
Lateral runout when installed	max. 0.2 mm	
Surface finish of brake disc after machining	max. 0.006 mm	
Caliper piston dia.	38 mm	
Pad thickness	10 mm	2.0 mm
Clearance	0.2 mm	
Pad area on each wheel	52.5 cm^2	
Parking brake		
New brake drum dia.	180 mm	181.0 mm
Liner thickness		2.0 mm

Caliper versions

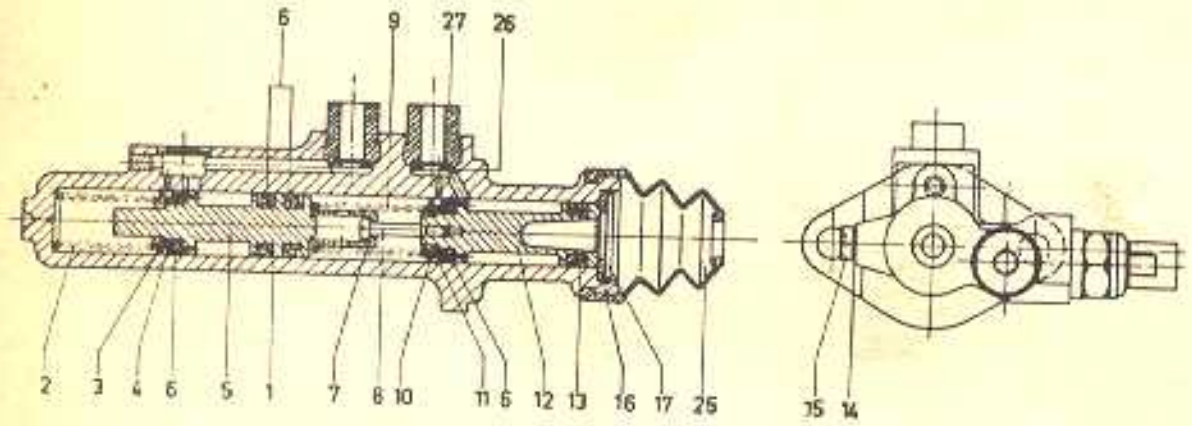
911, Carrera front: gray cast iron (A)
rear: gray cast iron

Turbo front: aluminium
rear: gray cast iron

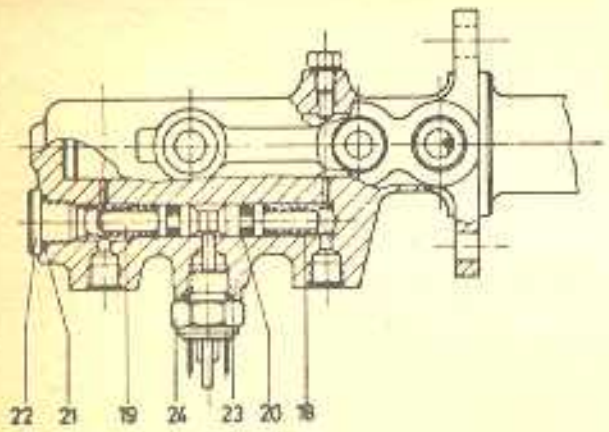
* Brake discs may only be machined symmetrically, i.e. evenly on both sides.

Cross section drawing of tandem brake master cylinder (with warning device)

(version without brake pressure booster and without permanent contact)



1 Housing
2 Spring for intermediate piston
3 Spring retainer
4 Support ring
5 Intermediate piston with filler disc
6 Primary cover
7 Stop sleeve
8 Stop screw for stroke limit
9 Spring for pressure piston



10 Spring retainer
11 Support ring
12 Pressure piston with filler disc
13 Grooved cover
14 Seal
15 Stop screw (outer)
16 Stop washer
17 Circlip
18 Spring
19 Piston
20 Cover
21 Round cord seal
22 Screw
23 Round cord seal
24 Brake warning switch
25 Guard
26 Washer
27 Container plug

Machining specifications and wear limits for brake discs and parking brake

Vehicle type	Type of brake disc	Location of brake disc	Distance „a" (in ref. to new brake disc thickness)	New brake disc thickness	Min. thickness of brake disc after machining	Wear limit of brake disc (for symmetr. wear)
All	Vented brake disc		35 ± 0.1 mm	20 – 0.2 mm*	18.6 mm	18.0 mm (1.0 mm each side)
All	Vented brake disc		76 + 0.2 mm	20 – 0.2 mm	18.6 mm	18.0 mm (1.0 mm each side)
All	Thickness tolerance of brake discs				max. 0.03 mm	
All	Lateral runout of brake discs				max. 0.05 mm	
All	Surface finish of brake discs after machining				max. 0.006 mm	

* Was increased to 20.5 – 0.2 mm.

Caution

Refinishing and wear specifications listed above are based on the assumption that the remaining thickness of the brake pad is not less than 2.0 mm. This pad thickness is required to assure perfect operation of brakes. (Installation of cross spring assures this.)

Only balanced brake discs are supplied. Brake discs are balanced by special clips in the cooling vents.

Caution! Never remove balance clips.

Parking brake

Brake drum dia. (new)	180 + 0.2 mm
Brake drum wear limit	max. 181.0 dia.
Brake liner width	25 mm

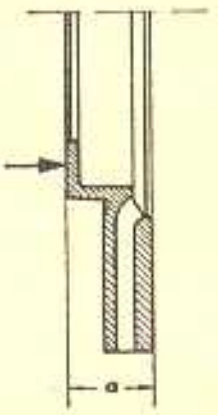
Caution!

Parking brake liners must be at least 2.0 mm thick.

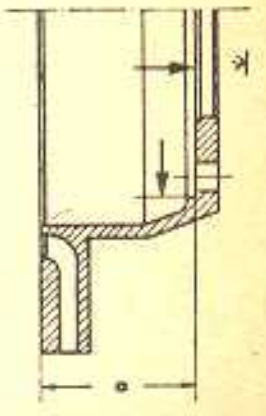
Caution

Machine brake disc symmetrically, i.e. uniformly on both sides. Arrows indicate brake disc reference or mounting points.

Front wheel brake disc



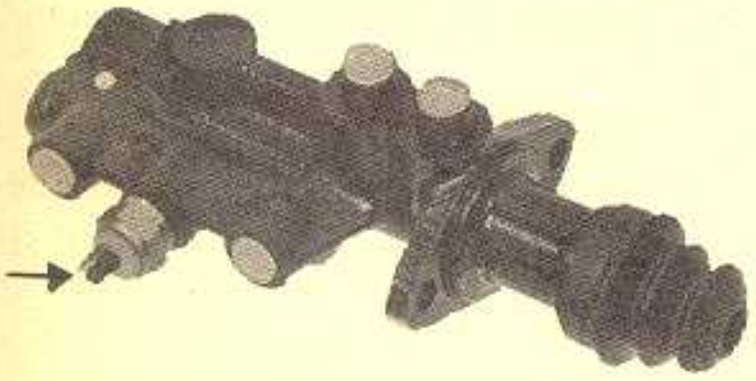
Rear wheel brake disc



Brake circuit failure indicator

Tandem brake master cylinder with permanent contact (as from January, 1976)

With the new brake failure warning switch the brake indicator lamp remains in action when a brake circuit fails, even after completion of repairs. Consequently after elimination of the defect or damage the release cap of the switch will have to be pressed back to normal position.



Tandem brake master cylinder with brake pressure booster

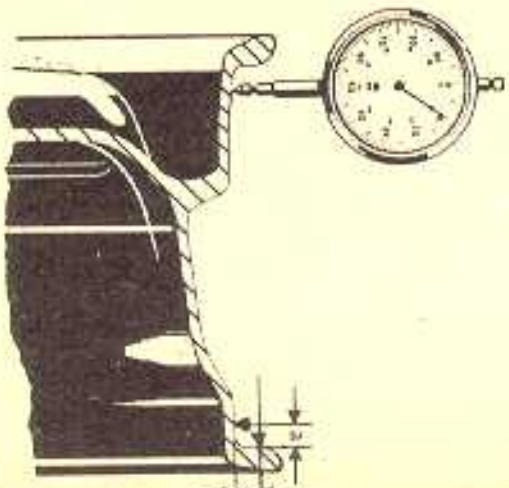
Each brake circuit has a stop light switch, which also fulfills the function of a brake warning switch. The brake indicator lamp comes on when a brake circuit fails.
After completion of repairs, the brake circuit failure indicator must be put out by detaching the battery.

Checking wheel rims

Measuring points for radial and lateral runout on inner and outer shoulders of wheel rim

Distance „a" = 8 mm

Max. permissible radial runout for steel rims	1.25 mm
Max. permissible radial runout for aluminium rims	1.00 mm
Max. permissible lateral runout for steel rims	1.25 mm
Max. permissible lateral runout for aluminum rims	0.80 mm



Caution!

Distorted rims cannot be straightened.

Tire pressures (reference values)
Measured on cold tire

	Pressure in bar (kp/cm^2)	
	Front	Rear
All tire sizes	2.0	2.4

These values also apply to winter tires.

Rims and tires

Type	Standard rims	Tires	Approved rims	Tires
1976 Models				
911	LMg 6 J x 15	185/70 VR 15	Lmgs 6 J x 15	185/70 VR 15
			Winter tires	
			5 1/2 J x 15 6 J x 15	185/70 SR 15 M + S
			4 1/2 J x 15 5 1/2 J x 15	165 SR 15 M + S
			5 1/2 J x 14	185 SR 14 M + S
Carrera	front LMgs 6 J x 15 rear LMgs 7 J x 15	185/70 VR 15 215/60 VR 15	front LMgs 7 J x 15 rear LMgs 8 J x 15	185/70 VR 15 215/60 VR 15 or 185/70 VR 15
			front LMgs 6 J x 15 rear LMgs 7 J x 15	205/50 VR 15 225/50 VR 15*
			front LMgs 7 J x 15 rear LMgs 8 J x 15	205/50 VR 15 225/50 VR 15*
			Winter tires	
			5 1/2 J x 15	165 SR 15 M + S
			5 1/2 J x 14	185 SR 14 M + S
			5 1/2 J x 15 6 J x 15 7 J x 15	185/70 SR 15 M+S

*** with adapted speedometer**

Type	Standard rims	Tires	Approved rims	Tires
Turbo	front LMgs 7 J x 15 rear LMgs 8 J x 15	205/50 VR 15 225/50 VR 15	front LMgs 7 J x 15 rear LMgs 8 J x 15	185/70 VR 15 215/60 VR 15 (in conjunction with transmission 930/30 and adapted speedometer)
			Winter tires	
			51/2 J x 14	185 SR 14 M + S
			6 J x 15 rear 7 J x 15	185/70 SR 15 M + S
			51/2 J x 14	*185/70 SR 14 M + S

*Only for cars which are equipped with 15" series 50 summer tires.

1977 Models			**With wider fenders as Carrera**	
911	LMg 6 J x 15	185/70 VR 15	front 6 J x 15 rear 7 J x 15	185/70 VR 15
			front 7 J x 15 rear 7 J x 15	185/70 VR 15
			front 6 J x 15 rear 7 J x 15	185/70 VR 15 215/60 VR 15
			front 7 J x 15 rear 8 J x 15	185/70 VR 15 215/60 VR 15
			front 6 J x 16 rear 7 J x 16	205/55 VR 16 225/50 VR 16

Winter tires same as for 1976 models.

Rims and tires

Type	Standard rims	Tires	Approved rims	Tires
Carrera	front LMg 6 J x 15 rear LMg 7 J x 15	185/70 VR 15 215/60 VR 15	front 7 J x 15 rear 8 J x 15	185/70 VR 15 215/60 VR 15
			front 6 J x 16 rear 7 J x 16	205/55 VR 16 225/50 VR 16
Turbo	front LMgs 7 J x 16 rear LMgs 8 J x 16	205/55 VR 16 225/50 VR 16	front 7 J x 15 rear 8 J x 15	185/70 VR 15 215/60 VR 15
			Winter tires	
			51/2 J x 14	185 SR 14 M+S
			6 J x 15 rear 7 J x 15	185/70 SR 15 M+S

LMg = Cast aluminum
LMgs = Forged aluminum

Tightening torque for front and rear wheel brakes

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Tandem brake master cylinder to cross panel	Hexagon nut	M 8	8.8	2.5	25
Piston rod to connector	Hexagon nut (flat)	M 10	C 45/6	1.0	10
Brake line	Hexagon hollow bolt	M 10 x 1	5.8	1.5	15
Hollow bolt to caliper	Hollow bolt	M 10 x 1		2.0	20
Caliper to steering knuckle	Hexagon head bolt	M 12 x 1.5	8.8	7.0	70
Clamping nut to steering knuckle	Fillister head bolt (socket)	M 7	10.9	1.5	15
Brake disc to wheel hub	Hexagon nut	M 8	8.8	2.3	23
Brake disc guard (front)	Hexagon head bolt	M 8	8.8	1.0	10
Case bolt for caliper (front)	Fillister head bolt	M 8	10.9	3.4	34
Case bolt for caliper (rear)	Fillister head bolt	M 6	12.9	2.2	22
Caliper to rear control arm	Hexagon head bolt	M 12 x 1.5	8.8	7.0	70
Brake disc to rear wheel hub	Countersunk bolt	M 6	8.8	0.5	5
Brake backplate to rear control arm	Hexagon head bolt	M 10		4.7	47
Guard to brake backplate	Hexagon head bolt	M 8	8.8	2.5	25
Parking brake cable to control arm	Hexagon head bolt	M 6	8.8	0.5	5
Wheel to wheel hub	Spherical collared nut	M 14 x 1.5		13.0	130
Bleeder valve in caliper (wrench size 7 mm)	–	–	–	0.3	3

Fuse chart for 911 and Carrera 3.0

Fuse no.	Fused equipment	Amps
1	Fog lights	16
2	License plate light, fog light indicator lamp and relay	5
3	Front and rear right marker lights	5
4	Front and rear left marker lights, engine compartment light	5
5	Right low beam headlight	8
6	Left low beam headlight	8
7	Right high beam headlight	8
8	Left high beam headlight, high beam indicator lamp	8
9	Right front turn signal	5
10	Left front turn signal	5
11	Left and right stop lights, flasher relay, backup lights	16
12	Rear window defogger relay, heater blower, rear window defogger indicator lamp	25
13	Windshield wipers, washer pump, air conditioner	25
14	Electric sliding roof, rear window wiper, outside mirror	25
15	Cigar lighter, blower switch indicator lamp	16
16	Electric window controls	25
17	Hazard lights	16
18	Courtesy light, clock, glove box light, trunk light	5
19	Headlight cleaners	16
20	Blower for air conditioner	25
21	Fuel pump	16
	Fuses in engine compartment	
1	Sportomatic, heater blower relay	5
2	Heater blower	25
3	Rear window defogger	25

Relays in fuse box

1 Air conditioner
2 Fog lights
3 Horn
4 Not occupied
5 Window controls
6 Not occupied
7 Fuel pump

Relays in engine compartment

1 Heater blower
2 Rear window defogger (for only one heating circuit)

Fuse chart for Turbo

Fuse no.	Fused equipment	Amps
1	Fog lights	16
2	License plate lights, fog light indicator lamp and relay	5
3	Front and rear right marker lights	5
4	Front and rear left marker lights, engine compartment light	5
5	Right low beam headlight	8
6	Left low beam headlight	8
7	Right high beam headlight	8
8	Left high beam headlight, high beam indicator lamp	8
9	Right front turn signal	5
10	Left front turn signal	5
11	Flasher relay, backup lights	16
12	Left and right stop lights, blower, rear window defogger indicator lamp, relay for windshield and rear window defoggers	25
13	Windshield wipers, washer pump, air conditioner	25
14	Electric sliding roof, rear window wiper, outside mirror	25
15	Cigar lighter, blower switch indicator lamp	16
16	Electric window controls	25
17	Hazard lights	16
18	Courtesy light, clock, glove box light, trunk light	5
19	Headlight cleaners	16
20	Air conditioner blower	25
21	Windshield defogger	16
	Rear window defogger (in engine compartment)	25

Relays in fuse box

1 Air conditioner
2 Fog lights
3 Horn
4 Not occupied
5 Window controls
6 Fuels pump 1
7 Fuel pump 2

Relays in engine compartment

Air sensor and charge pressure safety switch

Bulb chart

	Wattage	Base (DIN)
Main headlight (halogen) H 4	60/55 W	P 43 t – 38
Extra headlight (halogen) H 3	55 W	PK 22 S
Fog light (halogen) H 3	55 W	PK 22 S
Stop light/tail light	21/5 W	BAY 15 d
Turn signal	21 W	BA 15 S
Backup light	21 W	BA 15 S
Courtesy light, engine compartment light	10 W	SV 8.5 – 8
Tail fog light	18 W	SV 8.5 – 8
Trunk light	10 W	BA 15 S
Marker light	4 W	BA 9 S
Instrument light, indicator lamps	2 W	BA 7 S
Glass socket indicator lamps	1.2 W	W 2 x 4.6 d
License plate light	5 W	BA 15 S
		Base (SAE)
Sealed beam headlight, USA (right hand traffic)	60/50 W	6014
Sealed beam headlight (left hand traffic)	60/50 W	7002
Stop light/tail light (USA)	32/3 cp	1034
Turn signal/marker light (USA)	32/3 cp	1034
Turn signal (USA)	32 cp	1073
Backup light	15 cp	1003
Side marker light (USA), license plate light (USA)	2 cp	1895

Dimensions at curb weight according to DIN

		911	Carrera	Turbo
Wheelbase	mm	2272	2272	2272
Front track width	mm	1369	1369	1438
Rear track width	mm	1354	1380	1511
Length	mm	4291	4291	4291
Width	mm	1610	1652	1775
Height	mm	1320	1320	1320
Weights				
Curb weight acc. to DIN	ca. kg	1120	1120	1195
Gross vehicle weight	ca. kg	1440	1440	1525
Max. axle load, front/rear	kg	600/840	600/840	625/900
Max. trailer load, w/o brakes **	kg	480	480	–
Max. trailer load, with brakes**	kg	800	800	–
Max. roof load (only coupe)*	kg	35	35	35

* But without exceeding the gross vehicle weight.

** For gradients up to 16%.

Filling capacites

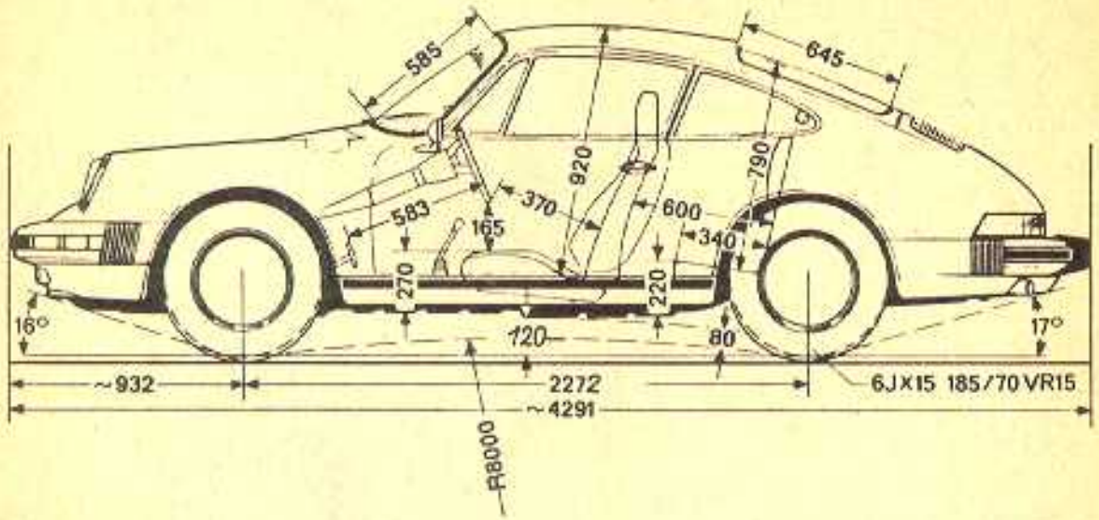
		911	Carrera	Turbo
Engine		Brand name heavy duty oils according to API classification SE of viscosity SAE 10 W/50, 15 W/50, 20 W/50. Only use well known oil makes, which have been tested and approved by Porsche. Single grade oils are also permissible, but then the oil must be changed according to the seasons of the year (temperature – summer/winter) in addition to the normal change intervals. Summer SAE 30, winter SAE 20, at permanent temperatures from – 15° C to 0° C SAE 20 W/20 or SAE 10 W at permanent temperatures below – 15°C.		
Tofal oil capacity	ca. ltr.	13	13	13
With sportomatic transmission	ca. ltr.	2 more	2 more	–
Oil change quantity	ca. ltr.	10	10	10
Transmission*	ca. ltr.	3.0	3.0	3.7
Sportomatic/manual transmission	ca. ltr.	2.5	2.5	–
Fuel tank	ca. ltr.	80	80	80
Brake fluid tank	ca. ltr.	0.2	0.2	0.2
Windshield washer	ca. ltr.	8.5	8.5	8.5

* SAE 90 meeting specifications of API-GL 5 or Mil-L 2105 B. For locking differential with **80% locking factor** oil meeting Ford Specification M 2 C 28 B.

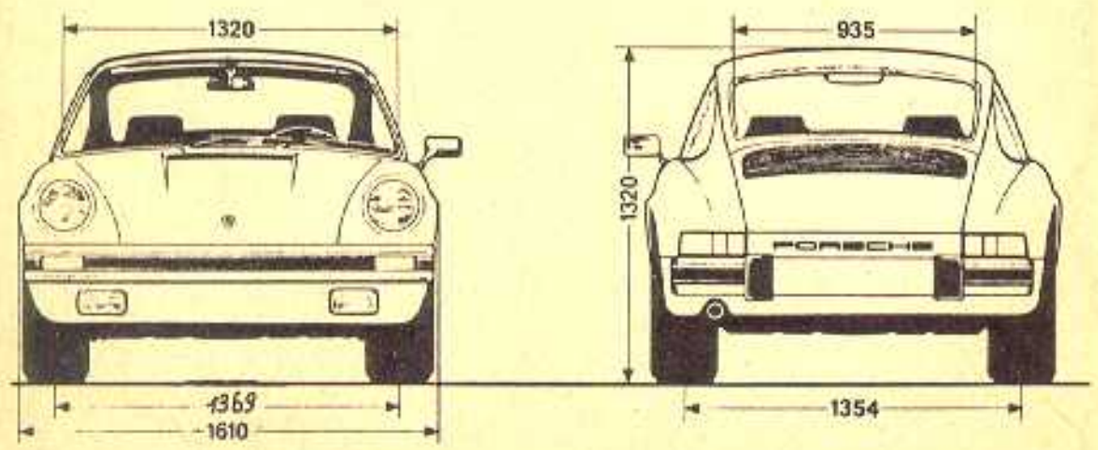
Performances, consumption of fuel and oil

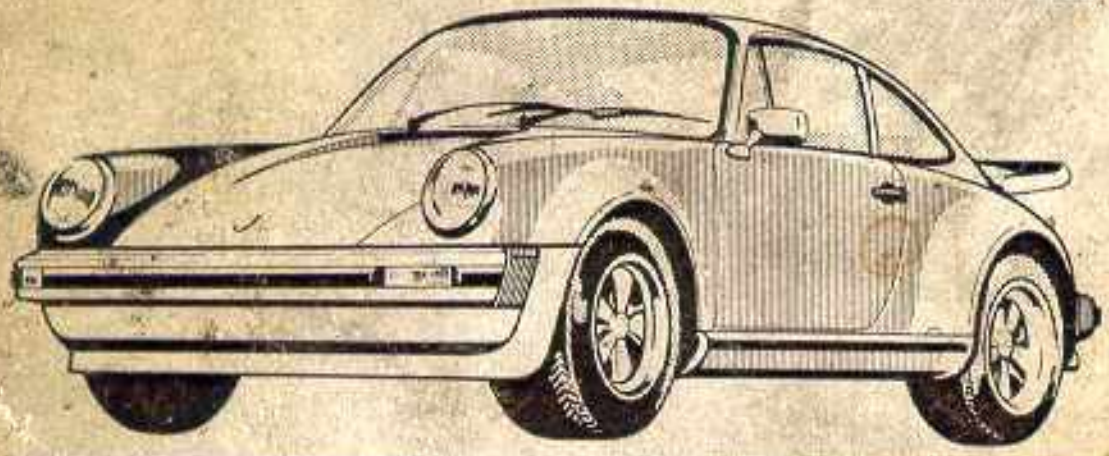
		911	Carrera	Turbo
Top speed	km	above 210 only slight deviation for models with sportomatic transmission	above 230	above 250 –
Acceleration at DIN curb weight plus 1/2 payload	0-100 km/h	7.8 sec	6.5 sec	5.5 sec
Kilometer from standing start		29 sec	27 sec	24 sec
Fuel consumption in mixed traffic	ca. l/100 km	13 – 15	14 – 16	14 – 18
Engine oil consumption	ca. l/1000 km	1.5 to 2.0	1.5 to 2.0	1 to 2

Dimensions for Type 911 – 1976/1977 models



The specifications for overhang angles, curved and normal ground clearances apply to cars at full load.





76/77 Models

911. Carrera 3.0 Turbo



Technical Specifications

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Important conversion factors and new units of measurement

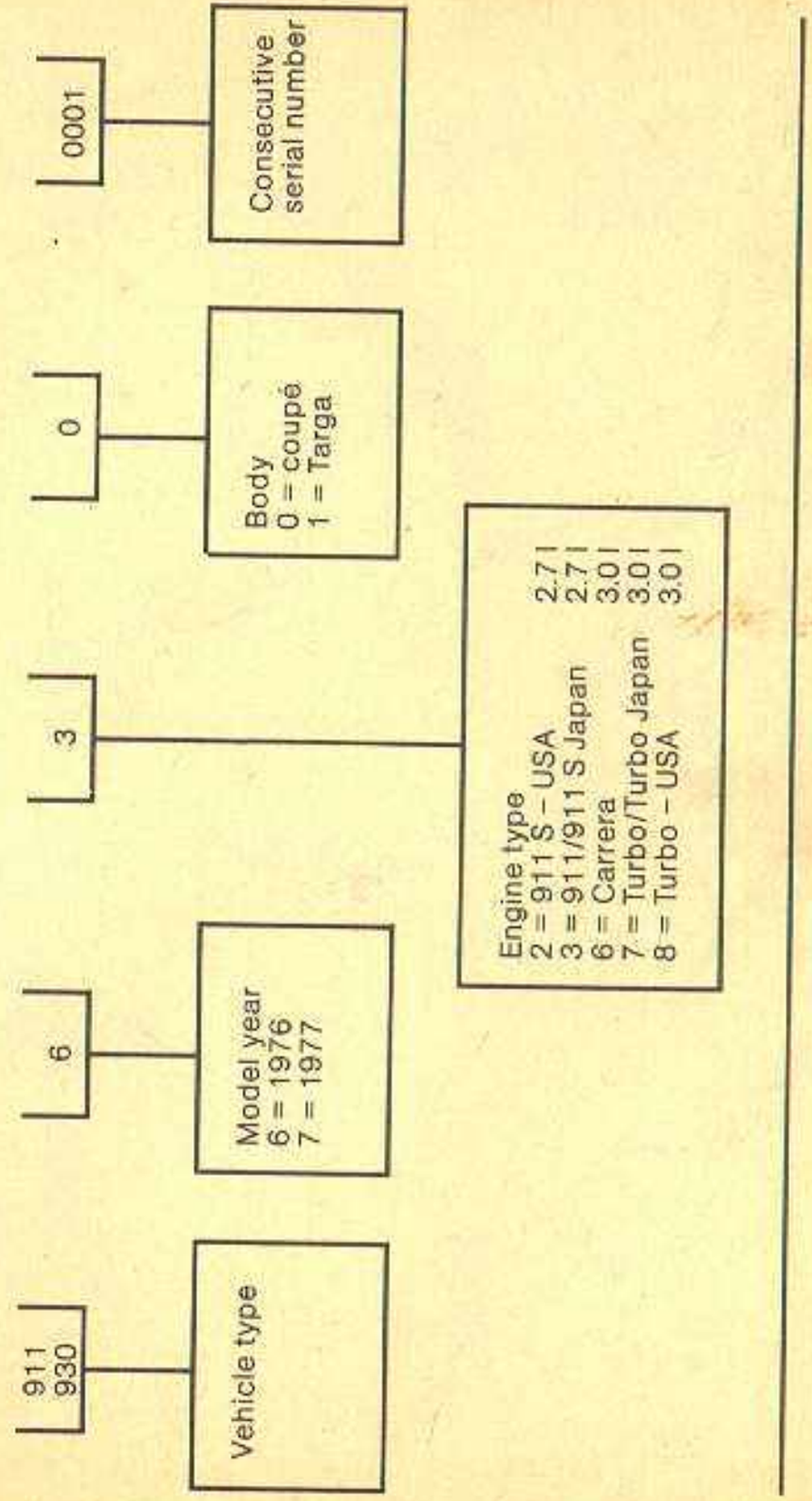
	Old units		New units
Pressure	tech. atmosphere at	(kp/cm^2)	Bar (bar)
Output	Horsepower	HP	Kilowatt (kW)
Force	Kilopond	kp	Newton (N)
Power	Kilopondmeter	kpm	Newtonmeter (Nm)

Conversion factors

at (kp/cm^2)	in bar	x 0.981
kp	in N	x 9.81
HP	in kW	x 0.736
kpm	in Nm	x 9.81
m/s	in km/h	x 3.6
at	in mm Hg	x 735.56
km/h	in mph (miles)	x 0.621
°F (Fahrenheit)	in °C	(°F - 32) x 0.555
l	in U.S. gal.	x 0.264
l	in Imp. gal.	x 0.22

The conversion factor 10 is applied for the conversion of tightening torque from kpm to Nm. This is more than sufficient for shop practice.

Chassis numbers

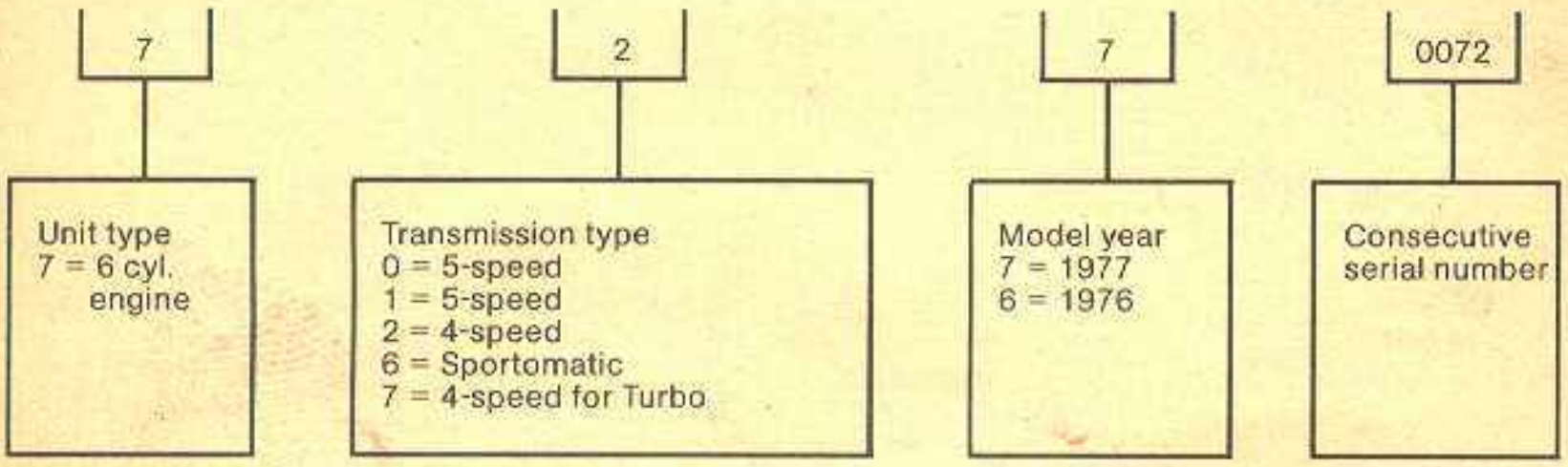


Engine numbers

Engine type designations

Year mfd.	Model year	Engine type designation Official	Internal	Displacement	HP/kw
1975/ 1976	1976	911	911/81	2.7 ltr.	165/121
		911 Sportomatic	911/86	2.7 ltr.	165/121
		911 S – USA	911/82	2.7 ltr.	165/121
		911 S – California	911/84	2.7 ltr.	165/121
		911 S – USA/ California (Sportomatic)	911/89	2.7 ltr.	165/121
		Carrera	930/02	3.0 ltr.	200/147
		Carrera Sportomatic	930/12	3.0 ltr.	200/147
		Turbo	930/50	3.0 ltr.	260/191
		Turbo – USA	930/51	3.0 ltr.	245/180
1976/ 1977	1977	911	911/81	2.7 ltr.	165/121
		911 Sportomatic	911/86	2.7 ltr.	165/121
		911 S – USA	911/85	2.7 ltr.	165/121
		911 S – USA Sportomatic	911/90	2.7 ltr.	165/121
		911 S – Japan	911/94	2.7 ltr.	165/121
		911 S – Japan Sportomatic	911/99	2.7 ltr.	165/121
		Carrera	930/02	3.0 ltr.	200/147
		Carrera Sportomatic	930/12	3.0 ltr.	200/147
		Turbo	930/52	3.0 ltr.	260/191
		Turbo – USA	930/53	3.0 ltr.	245/180
		Turbo – Japan	930/54	3.0 ltr.	245/180

Transmission numbers



Transmission type codes

Trans-mission type	Number of gears	1st gear	2nd gear	3rd gear	4th gear	5th gear	Pinion/ ring gear	As from chassis number	Remarks
1976 models									
915/44	5	11/35	18/33	23/29	26/26	28/23	8/31	7160001	Manual transm. 911, 911 S – USA, Carrera
915/49	4	11/35	20/32	25/27	28/23		8/31	7260001	Manual transm. 911, Carrera
930/30	4	16/36	23/30	28/25	32/21		9/38	7760001	Manual transm. Turbo
930/32	4	16/36	23/30	28/25	32/21		9/36	7761001	Manual transm. Turbo with 50% tires
925/09	3 SPM	15/36	21/30	27/25			8/27	7662001	Sportomatic 911
925/12	3 SPM	15/36	21/30	27/25			8/27	7660001	Sportomatic 911, 911 S – USA
925/13	3 SPM	15/36	21/30	27/25			8/27	7661001	Sportomatic Carrera
1977 models									
915/60	5	11/35	18/33	23/29	26/26	28/23	8/31	7070001	Manual transm. 911
915/61	5	11/35	18/33	23/29	26/26	28/23	8/31	7170001	Manual transm. 911, 911 S – USA, Carrera
915/65	4	11/35	20/32	25/27	28/23		8/31	7270001	Manual transm. 911
915/66	4	11/35	20/32	25/27	28/23		8/31	7271001	Manual transm. 911, Carrera
925/15	3 SPM	15/36	21/30	27/25			8/27	7670001	Sportomatic 911
925/16	3 SPM	15/36	21/30	27/25			8/27	7671001	Sportomatic Carrera
925/17	3 SPM	15/36	21/30	27/25			8/27	7670501	Sportomatic 911 S – USA
930/33	4	16/36	23/30	28/25	32/21		9/38	7770001	Manual transm. Turbo

Engine specifications for 1976/1977 models

Engine		911	Carrera 3.0	Turbo (Turbo-Carrera USA)
Design		4-stroke internal combustion flat engine (two banks of cylinders opposite each other)		
No. of cylinders		6	same as 911	same as 911
Bore	mm	90	95	95
Stroke	mm	70.4	same as 911	same as 911
Total displacement	cm^3	2687	2993	2993
Compression ratio	ε	8.5 : 1	8.5 : 1	6.5 : 1
Compression pressure	kp/cm^2 = bar	max. deviation among each other 1.5, engine temperature at least 60° C		
Max. output (DIN 70020)	HP/kW	165/121	200/147	260/191 (245/180)
At speed	rpm	5800	6000	5500
Max. torque	kpm/Nm	24/235	26/255	35/343
At speed	rpm	4000	4200	4000
Max. liter output	HP/l/kw/l	62/46	68/50	87/64 (82/58)
Mean piston speed at max. output	m/sec	13.6	14.1	12.9
Cut-off speed of speed governor in distributor	rpm	6500 ± 200	6800 ± 200	7000 ± 200

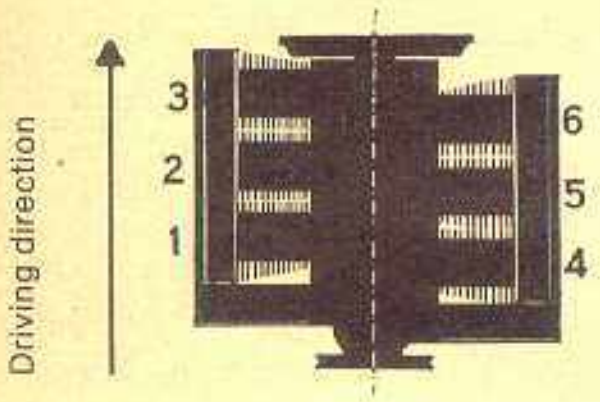
Engine		911	Carrera 3.0	Turbo (Turbo-Carrera USA)
Fuel octane	RON	91	91	96
Cooling system		Air-cooling from axial blower on alternator		
Blower drive		By V-belt off of crankshaft		
Crankshaft/blower ratio		1 : 1.8	1 : 1.8	1 : 1.67
Lubricating system		Dry sump lubrication		
Oil cooling		Oil cooler on crankcase in blower air stream, also cooling coil		
Oil pressure at 80° C	kp/cm^2 = bar	5000 rpm ca. 5	same as 911	5500 rpm ca. 4
Oil consumption	1/1000 km	1.5 to 2	1.5 to 2	1 to 2
Crankcase		Pressure cast al/mg alloy 2-piece	Al/si alloy 2-piece	same as Carrera 3.0
Crankshaft		Forged (tenifer treated)	same as 911	same as 911
Crankshaft bearings		8 plain brgs.	same as 911	same as 911
Connecting rods		Forged steel	same as 911	same as 911
Conrod bearings		Half shells	same as 911	same as 911

Engine		911	Carrera 3.0	Turbo (Turbo-Carrera USA)
Piston pin bearing		Press fit bronze bushing	same as 911	same as 911
Intermediate shaft bearings		Two plain bearings	same as 911	same as 911
Pistons		Cast aluminium	Cast aluminium	Forged aluminium
Piston pin		Floating installation, held by circlips		
Piston rings		2 compression rings, 1 oil scraper ring		
Cylinders		Alusil or nikasil cyl.	Nikasil cylinder	Nikasil cylinder
Cylinder head		Single alloy cyl. head	same as 911	same as 911
Valve seat insert		Shrink fit made of alloy gray cast iron	Shrink fit made of annealed sintered steel	same as Carrera 3.0
Valve guide		Thermohedul E or Thermohedul FS	same as 911	same as 911
Valve arrangement for each cylinder		1 intake and 1 exhaust valve in vee suspension		
Exhaust valve		Sodium filled with reinforced seat surface	As Turbo, but without sodium filling	Sodium filled with reinforced seat surface
Valve springs		2 coil springs per valve	same as 911	same as 911

Engine		911	Carrera 3.0	Turbo (Turbo-Carrera USA)
Valve timing		Left and right one each overhead camshaft		
Camshaft		Cast, 3 plain bearings direct in camshaft housing	Cast, 4 plain bearings	same as Carrera 3.0
Camshaft drive		By chain	same as 911	same as 911
Valve clearance on cold engine				
Intake Exhaust		0.10 mm measured betw. valve and rocker arm	same as 911	same as 911
Clutch		Single plate dry type	same as 911	same as 911
Diameter (manual transmission)	mm	225	225	240
Contact pressure	(kp) N	(795–866) 7800–8495	same as 911	(920–1020) 9025–10006
Diameter (sportomatic)	mm	190	190	–
Contact pressure	(kp) N	(800–880) 8000–8800	same as 911	–
Fuel supply		K-Jetronic	same as 911	same as 911
Fuel pump(s)		1 electric roller cell pump	same as 911	2 electric roller cell pumps

Engine		911	Carrera 3.0	Turbo (Turbo-Carrera USA)
Electrical system				
Battery voltage	V	12	same as 911	same as 911
Battery capacity	Ah	66	same as 911	same as 911
Alternator/output	A/W	70/980	same as 911	same as 911
Regulator switch		Matched to alternator, black plastic housing		
Ignition		CDI contact controlled	same as 911	CDI without contacts
Ignition transformer		Bosch	same as 911	same as 911
Firing order		1-6-2-4-3-5	same as 911	same as 911

Designation of cylinders on 6 cylinder engine



Firing order
1 – 6 – 2 – 4 – 3 – 5

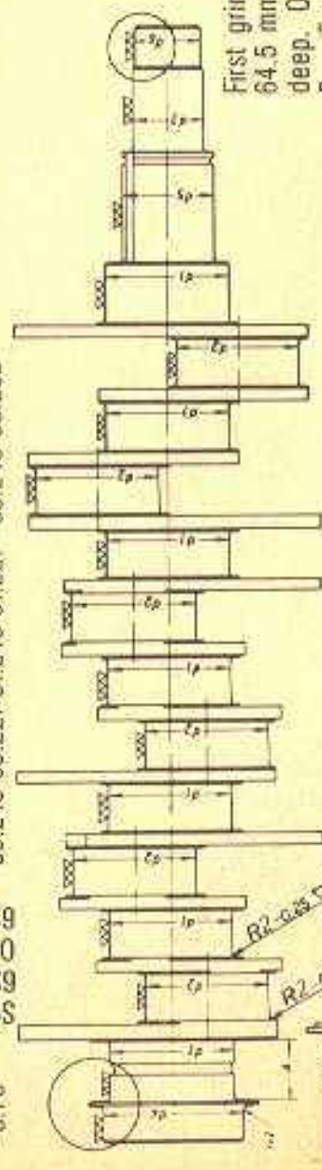
Engine tolerance and wear limit survey

Note: B = bore W = shaft

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (–) to	Wear limits in mm
Crankshaft – main bearing Bearings 1–7 (d 1)	B 57.020–57.059 W 56.971–56.990	+ 0.010	+ 0.072	visual inspection 56.960
Crankshaft – main bearing Bearing 8 (d 3)	B 31.041–31.084 W 30.980–30.993	+ 0.048	+ 0.104	visual inspection 30.970
Crankpin – conrod bearing (d 2)	B 52.020–52.059 W 51.971–51.990	+ 0.030	+ 0.088	visual inspection 51.960
Crankshaft runout (measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)				max. 0.04
Crankshaft unbalance				max. 10 cmg
Crankshaft – main bearing Axial play		+ 0.110	+ 0.195	0.30
Crankshaft – timing gear	B 41.975–42.000 W 42.002–42.013	– 0.002	– 0.038	
Crankshaft – disbributor drive	B 41.975–42.000 W 42.002–42.013	– 0.002	– 0.038	
Crankshaft – flywheel	B 65.000–65.030 W 64.981–65.000	0.0	+ 0.049	
Crankshaft – pulley	B 30.000–30.033 W 29.960–29.993	+ 0.007	+ 0.073	
Pulley: radial runout				max. 0.15
lateral runout				max. 0.20

Crankshaft – standard and repair sizes

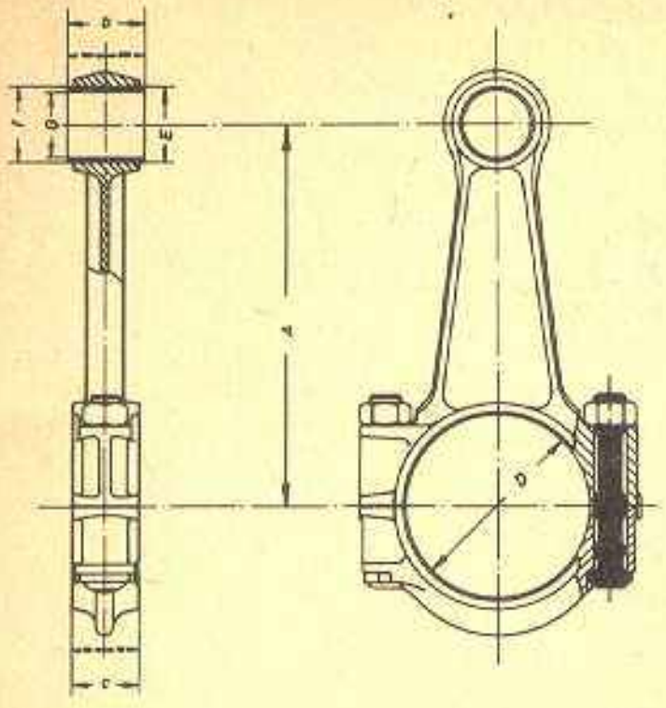
Size	Crankcase dia. brgs. 1-8	All main bearings d 1	Connecting rod bearings d 2	Main brg. dia. d 3 of crankshaft brg. 8	Collar dia. d 4	Seat for timing gear dia. d 5	Crankshaft pulley dia. d 6	Thrust bearing width A
Standard	Standard 62.000-62.019	56.990-56.971	51.990-51.971	30.993-30.980	65.000-64.981	42.013-42.002	29.993-29.960	28.000-28.060
- 0.25		56.740-56.721	51.740-51.721	30.743-30.730				
- 0.50		56.490-56.471	51.490-51.471	30.493-30.480	64.500-64.310		29.500-29.370	
- 0.75	Oversize 62.269-62.250	56.240-56.221	51.240-51.221	30.243-30.230				



First grind oil seal journals to 29.5 and 64.5 mm as specified, if scoring is too deep. Otherwise repolish as required: 2 ... 5 microns.

Note: After grinding, subject crankshaft to tenifer treatment; then polish bearing journals and thrust surfaces A; test crankshaft for cracks.
Max. radial runout: 0.04 mm as measured on bearings 4 and 8, with bearings 1 and 7 on V-blocks. Max. crankshaft imbalance: 10 cmg. Never straighten main bearings III and V after tenifer treatment.

Measuring point	Installation size with tolerances mm	Clearance or press fit from	(+) (–) to	Wear limit mm
Crankcase				
Case bore for main bearings:				
Bearings 1 – 8	62.000–62.019			
Oversize	62.250–62.269			
Case bor for intermediate shaft:				
Bearing 1 (thrust bearing)	27.500–27.521			
Bearing 2	26.500–26.521			
Spring for pressure relief and safety valve:				
Relaxed length	70.00			
Spring force at 52 mm	10.6 kp			
Spring force at 46 mm	14.1 kp			
Spring wire dia.	1.8			
Block length	33.3			
Connecting rods				
A Distance betw. centers	127.80			
b Width of conrod bush	26.00–25.98			
c Width at big end	23.80–23.70			
Width at crankpin	24.00–24.10	+ 0.200	+ 0.400	
D Conrod dia. (w/o bearing shell)	56.000–56.019			
E Small end dia.	25.000–25.021			
f Conrod bush removed	25.035–25.055			
Press fit of conrod bush in conrod		– 0.014	– 0.055	
G Conrod bush dia. installed in conrod (finished)	22.020–22.033			
Piston pin bushing/ piston pin clearance		+ 0.020	+ 0.039	0.055



Connecting rod weight groups

Connecting rods are grouped according to weights.

Final digits of the part number indicate the specified weight group.

These final digits are stamped on the connecting rod shank if it is supplied as a replacement part.

Weight Over grams	Under grams	Weight group for service	Service Conrod part number	Conrod code
645	654	1	911.103.015.31	31
654	663	2	911.103.015.32	32
663	672	3	911.103.015.33	33
672	681	4	911.103.015.34	34
681	690	5	911.103.015.35	35
690	699	6	911.103.015.36	36
699	708	7	911.103.015.37	37
708	717	8	911.103.015.38	38
718	727	9	911.103.015.39	39

Note

Connecting rods installed in a given engine must not differ in weight by more than 9 grams. To determine weight group, weigh the complete connecting rod without bearing shells.

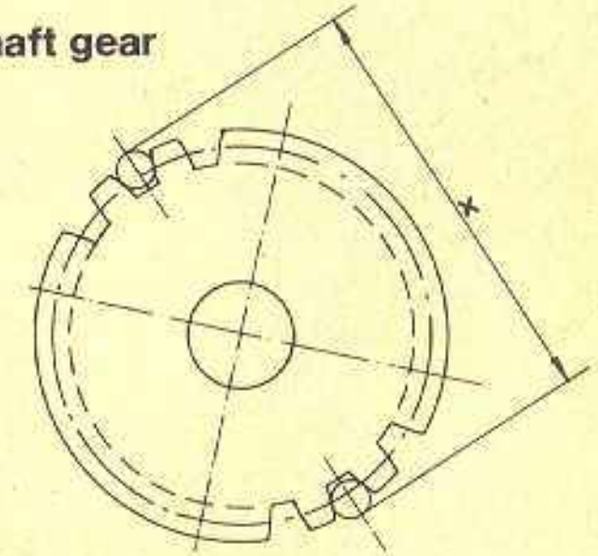
Matching intermediate shaft and crankcase

See marking on left half of crankcase below alternator support: 0 or 1.

Distance between centers mm	Crankcase mark	Crankshaft gear marking	Intermediate shaft gear marking	Backlash mm
103.975-103.990	0	0	0	0.029–0.049
		Installation	still possible	
		1	0	0.016–0.042
		0	1	0.017–0.043
103.990-104.000	1	1	1	0.012–0.041
		Installation	still possible	
		0	1	0.025–0.049
		1	0	0.025–0.048

Checking intermediate shaft gear

Use 4.5 mm dia. steel rollers to measure gear (see sketch).



Intermediate shaft gear (standard) – wear limit x 136.5 mm
Intermediate shaft gear (marked 1) – wear limit = 136.55 mm

Replace intermediate shaft gears and crankshaft gears in sets only.

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Intermediate shaft				
Bearing 1 Crankcase bore – shaft	B 27.500–27.521 W 25.000–24.980			
Bearing 2 Crankcase bore – shaft	B 26.500–26.521 W 23.980–23.967			
Intermediate shaft clearance		+ 0.030	+ 0.084	
Intermediate shaft axial play		+ 0.040	+ 0.133	0.16
Chain guide – bolt	B 8.000– 8.015 W 7.822– 7.837			
Pinion – distributor shaft	B 12.456–12.474 W 12.444–12.455	+ 0.001	+ 0.030	
Distributor – crankcase	B 27.000–27.021 W 26.947–26.980	+ 0.020	+ 0.074	
Flywheel – drive shaft steel bushing	B 25.000–25.021 W 25.022–25.035	– 0.001	– 0.035	
Flywheel				
Lateral runout				max. 0.10
Radial runout				max. 0.20

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Timing chain case				
Sprocket pivot shaft – chain tensioner housing	B 15.000–15.018 W 14.973–14.984	+ 0.016	+ 0.045	Visual inspection
Sprocket pivot shaft – sprocket carrier	B 15.000–15.018 W 14.973–14.984	+ 0.016	+ 0.045	
Sprocket carrier – sprocket pin	B 15.000–15.018 W 14.989–15.000	0.000	+ 0.029	
Sprocket – sprocket pin	B 15.032–15.050 W 14.989–15.000	+ 0.032	+ 0.610	Visual inspection
Pin – chain guide	B 8.000– 8.015 W 7.886– 7.895	+ 0.105	+ 0.129	
Pin – timing chain case	B 7.857– 7.872 W 7.886– 7.895	– 0.014	– 0.038	

Parallel alignment of both sprockets may not deviate by more than 0.25 mm.

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Camshaft housing – camshaft				
Camshaft bearings	B 46.967–46.992 (48.967–48.992)			
		+ 0.025	+ 0.066	0.010
Camshaft	W 46.926–46.942 (48.926–48.942)			
Camshaft – axial play		+ 0.150	+ 0.200	0.40
Camshaft – timing gear flange	B 30.000–30.013 W 29.979–30.000	0.000	+ 0.034	
Camshaft – runout, measured on center bearing (between points)				max. 0.02
Rocker arm shaft – camshaft case	B 18.000–18.018 W 17.992–18.000	Rocker arm shaft held firm by wedge effect		
Rocker arm – rocker arm shaft	B 18.016–18.027 W 17.992–18.000	+ 0.016	+ 0.035	0.080
Axial play		+ 0.100	+ 0.350	0.50

(values in brackets only for Turbo and Carrera 3.0)

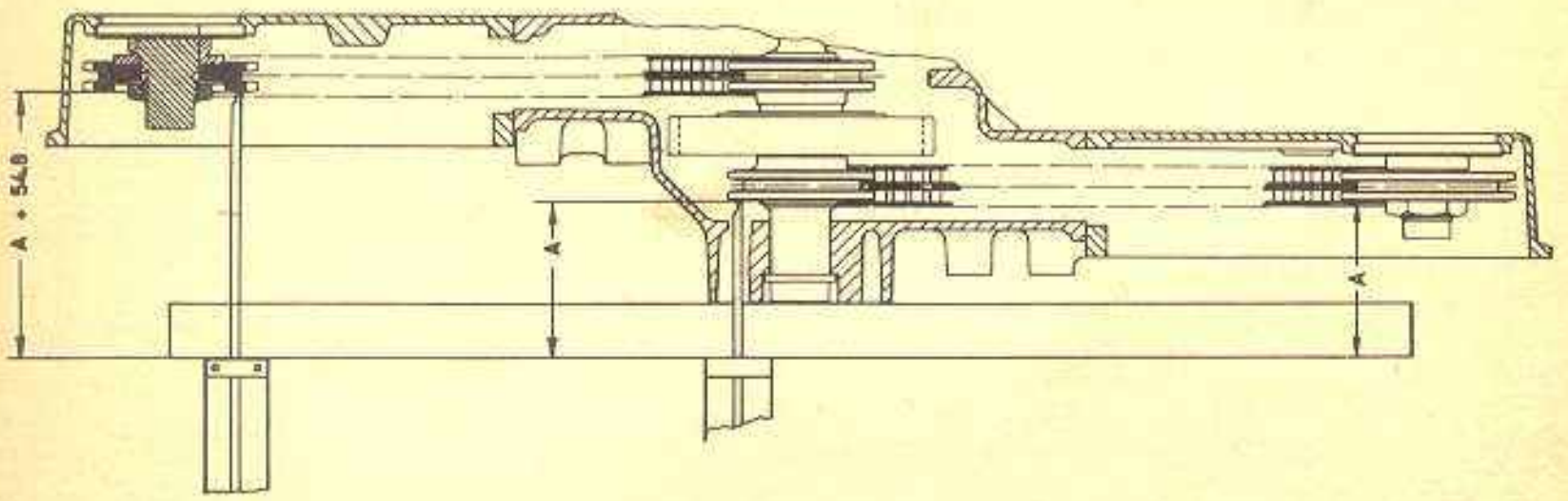
Checking parallel alignment of timing chain sprockets

Before measuring, push intermediate shaft and camshaft axially toward flywheel to set bearing thrust flanges in position.

Measurement is made through hole below intermediate shaft against side of forward chain sprocket on intermediate shaft (dimension A).

This dimension must also be achieved at sprocket for cylinders 4 – 6. Use shims if necessary (maximum permissible difference is 0.25 mm).

Sprocket for cylinders 1 – 3, mounted on intermediate shaft, is positioned 54.8 mm further to front. This 54.8 mm (design dimension) must be considered when determining dimension A. (maximum permissible difference is 0.25 mm).

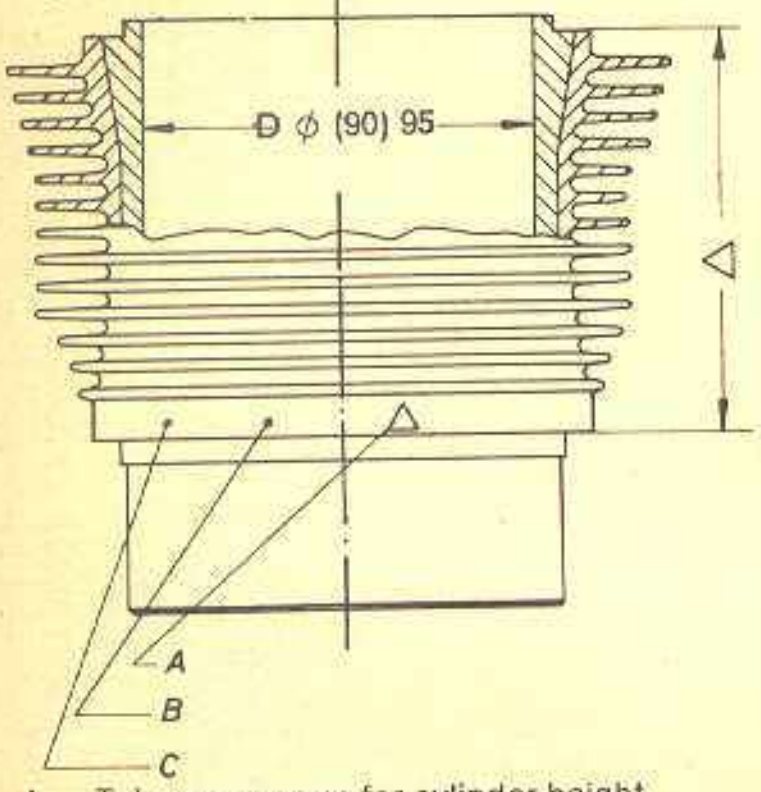


Example: measured dimension A = 78.7 mm
This means sprocket of cylinders 1 – 3 is A + 54.8 = 78.7 + 54.8 = 133.5 mm

Pistons and cylinders (sizes, weights and marks)

			911	Carrera 3.0	Turbo
Size	Code	Nominal dia.	**Piston dia. D**	**Piston LS dia. D**	**Piston dia. D**	**Piston dia. D**
Standard	0	90/95	89.965–89.975	89.952–89.967	94.963–94.977	94.933–94.947
	1		89.975–89.985	89.962–89.977	94.970–94.984	94.943–94.957
	2		89.985–89.995	89.972–89.987	94.977–94.991	94.953–94.967
	3		–	–	94.984–94.998	–
			Nikasil cylinder dia.	**Alusil cylinder dia.**	**Nikasil cylinder dia.**	**Nikasil cylinder dia.**
Standard	0	90/95	90.000–90.010	90.000–90.010	95.000–95.007	95.000–95.010
	1		90.010–90.020	90.010–90.020	95.007–95.014	95.010–95.020
	2		90.020–90.030	90.020–90.030	95.014–95.021	95.020–95.030
	3		–	–	95.021–95.028	–
Play between piston and cylinder			0.025–0.045	0.035–0.060	0.023–0.044	0.053–0.077
Piston weight			Max. difference in weight of pistons of one set: 6 g.			

Cylinder sizes



Cylinder height tolerances

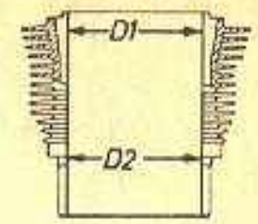
Code A	Cylinder height
5	85.400–85.425
6	85.425–85.450

A Tolerance group for cylinder height

B Tolerance group for cylinder diameter (refer to table)

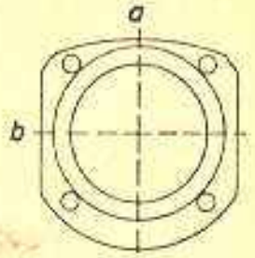
C Manufacturer's identification

Checking pistons and cylinders



Cylinders
D1 = Measuring point for wear and ovality

30 mm below cylinder upper edge
The cylinder is worn, if the distance at this measuring point is 0.08 mm more than the installation size. The ovality of a cylinder is determined by measuring in directions a and b. The difference between a and b must not exceed 0.04 mm.

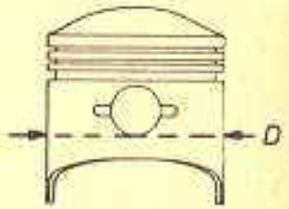


D2 = Measuring point for piston pin gap

Rings slid in at height of cylinder base gasket.

Pistons
D = Measuring point for wear

At height of piston pin bore lower edge.



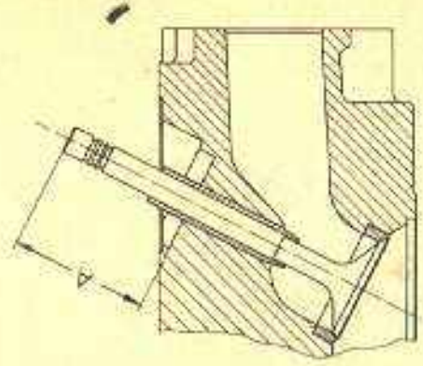
Note
Replace pistons and cylinders when running clearance exceeds 0.15 mm. This results from the difference between the max. cylinder dia. and the min. piston dia.

Piston ring gap

Piston ring	Gap mm (installation size)	Gap mm (wear limit)
M ring, I and II	0.1 – 0.2	0.8
Oil scraper ring, III	0.15 – 0.3	1.0
Oil scraper ring, III 3-piece „LS" ring (see measuring point „D2")	0.4 – 1.4	2.0

Piston ring height clearance

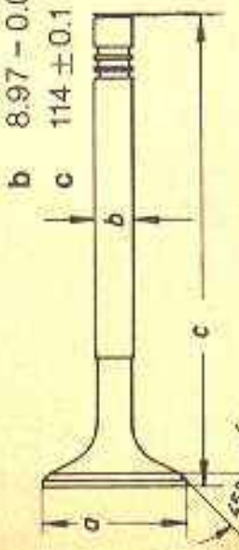
Piston ring	Height play mm (installation size)	Height play mm (wear limit)
M ring, I	0.070 – 0.102	0.2
M ring, II	0.040–0.072	0.2
Oil scraper ring, III	0.020–0.052	0.1



Distance A	
911	47.50 ± 0.6 mm
Carrera 3.0, Turbo	46.00 ± 0.3 mm

Valve size

	911		Carrera 3.0		Turbo	
	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust
a	46 ± 0.1	40 ± 0.1	49 ± 0.1	41.5±0.1	49 ± 0.1	41.5 ± 0.1
b	8.97 – 0.012	8.95 – 0.012	8.97 – 0.012	8.95 – 0.012	8.97–0.012	8.95-0.012
c	114 ± 0.1	113.5 ± 0.1	110.1 ± 0.25	108.4 ± 0.25	110.1 ± 0.25	108.4±0.25



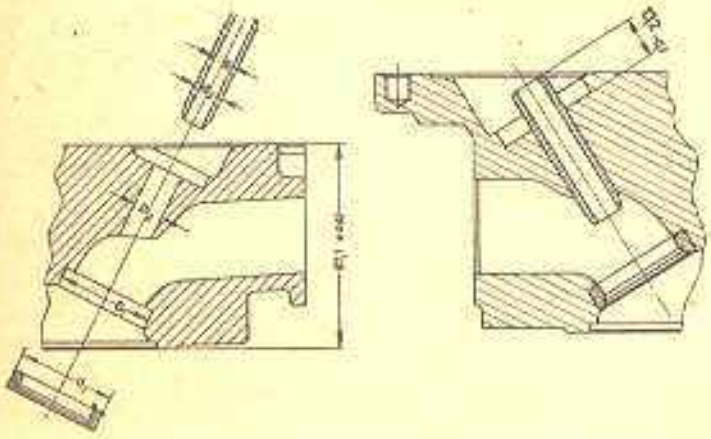
Checking valve seats

To check valve seat depth, insert respective valve into guide and measure distance between valve stem end and bottom of shim cavity, without shims (see distance A in sketch).

If dimension is greater than specified, measure again a new valve. If dimension is still beyond specifications, valve seat inserts have been cut too deep and should be replaced, or exchange cylinder head.

Valve guides (wear limits, installation sizes)

Measuring point	Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits mm
Valve guide, outside dia. d2 Cylinder head, bore dia. D2	13.049–13.060 13.000–13.018	– 0.031	– 0.060	
Intake valve guide, inside dia. g Intake valve stem, dia. b	9.000– 9.015 8.958– 8.970	+ 0.030	+ 0.057	0.15
Exhaust valve guide, inside dia. g Exhaust valve stem, dia. b	9.000– 9.015 8.938– 8.950	+ 0.050	+ 0.077	0.20

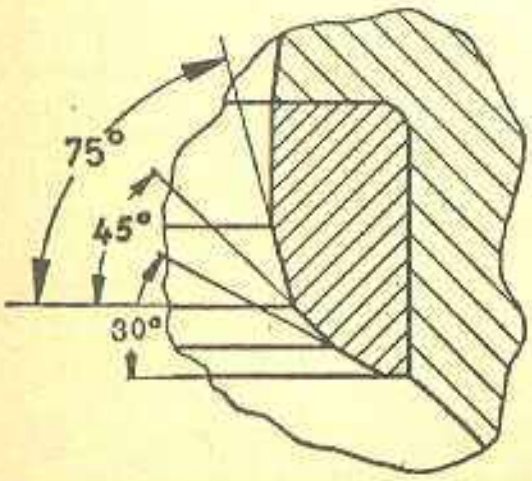


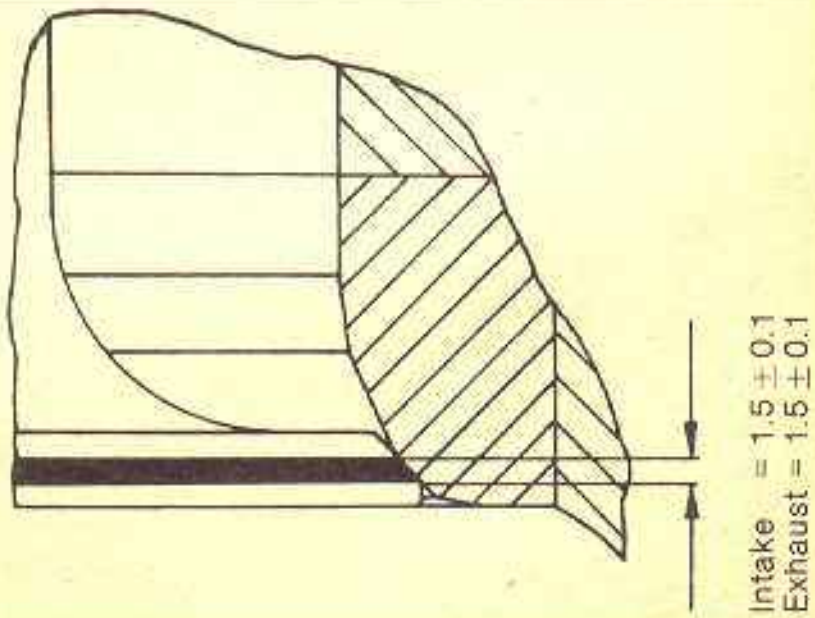
Machine 1st and 2nd oversize to correspond with bore in cylinder head.
Press fit: 0.06–0.09 mm.

Specifications for installation of valve seat inserts

		911		Turbo, Carrera 3.0	
		Outside dia. d1 valve seat insert	Bore D1 in cylinder head	Outside dia. d1 valve seat insert	Bore D1 in cylinder head
Standard size	Intake	48.180–48.164	48.000–48.025	51.680–51.661	51.500–51.530
Standard size	Exhaust	42.200–42.184	42.000–42.025	44.200–44.184	44.000–44.025
1st oversize	Intake	48.500–48.484	48.320–48.345	52.000–51.981	51.820–51.850
1st oversize	Exhaust	42.760–42.744	42.560–42.585	44.760–44.744	44.560–44.585

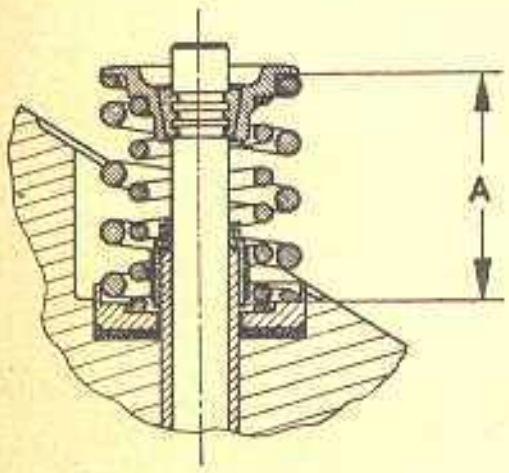
Angles and sizes of valve seat inserts





Installation lengths of valve springs

Check distance A with Special Tool P 10 C and, if necessary, correct by adding or removing shims.



	Intake	Exhaust
911	35.0 ± 0.3 mm	35.5 ± 0.3 mm
Carrera	34.5 ± 0.3 mm	34.5 ± 0.3 mm
Turbo	33.5 ± 0.3 mm	33.5 ± 0.3 mm

Camshafts, timing

	Type	Camshaft left Part No.	Camshaft right Part No.
911 engine	911/81 911/82 911/84 911/86 911/89 911/85	911.105.143.00	911.105.144.00
Carerra engine	930/02 930/12	930.105.147.08	930.105.148.08
Turbo engine	930/50 930/51 930/52 930/53 930/54	930.105.141.00 930.105.143.00	930.105.142.00

Clutch drive plate

Measuring point, type	Installation size with tolerances mm
911, Carrera	
Clutch drive plate	
Relaxed thickness (new)	8.1 ± 0.3
Max. lateral runout	0.6
Turbo	
Relaxed thickness (new)	10.1 ± 0.3
Max. lateral runout	0.5
Sportomatic	
Relaxed thickness (new)	7.3 ± 0.25
Max. lateral runout	0.5

Identification on face of camshaft Left	Right	Intake valve stroke in overlapping TDC with 0.1 mm valve clearance	Timing with 0.1 mm valve clearance
911.143.00	911.144.00	0.4 – 0.54	Intake opens 6° ATDC Intake closes 50° ABDC Exhaust opens 24° BBDC Exhaust closes 2° ATDC
930.147.08	930.148.08	0.9 – 1.1	Intake opens 1° BTDC Intake closes 53° ABDC Exhaust opens 43° BBDC Exhaust closes 3° ATDC
930.141.00 930.143.00	930.142.00	0.65 – 0.8	Intake opens 3° ATDC Intake closes 37° ABDC Exhaust opens 29° BBDC Exhaust closes 3° BTDC

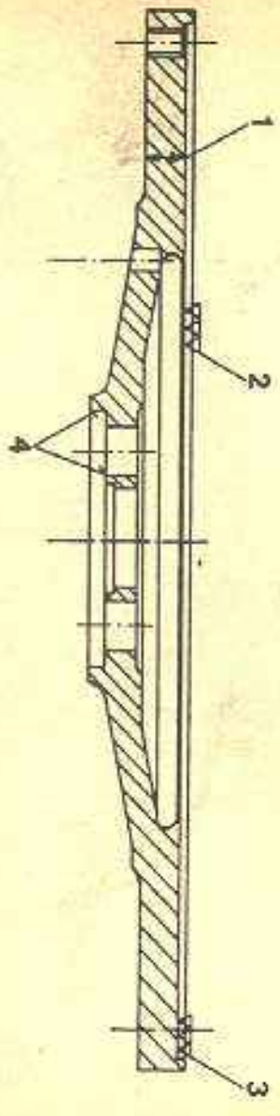
Wear limits mm
6.3 for symmetrical wear max. 0.6
8.5 for symmetrical wear max. 0.5
5.5 for symmetrical wear max. 0.5

Machining flywheel

The flywheel bearing surface on the drive plate can be machined on a lathe, if there is serious scoring or considerable burnt spots.

Keep lathe cut as small as possible.

Wear limit of flywheel thickness is 8.5 mm.



1 Wear limit 8.5 mm*
2 Smallest possible cut
3 Max. runout 0.1 mm
4 Lathe mounting points

*Turbo: wear limit of 9.9 mm.

Important engine adjusting data

Engine, type	**911** 76/77 models	**Carrera** 76/77 models	**Turbo** 76/77 models	**911 S (USA)** 1977 models	**911 S (Calif.)** 1977 models
Ignition timing **	5° ATDC	5° ATDC	29 + 2° BTDC	TDC ± 2°	15 ± 2° ATDC
at engine speed (rpm)	900	900	4000	950 – 1000	1000
Vacuum hose detached?	no	no	yes	no	no
Ignition timing control			TDC ± 4°		
at engine speed (rpm)			900 – 950		
Vacuum hose detached?			no		
Idle speed (rpm)	900 ± 50	900 ± 50	900 ± 50	900 – 1000*	950 – 1050*
CO level (%)	1.0 – 1.5	1.0 – 1.5	2.0 – 4.0*	1.5 – 3.0*	1.5 – 3.0*
(at idle speed)			(2 – 2.5 for 1976 models)		
Charge pressure (bar)	–	–	0.80 – 0.87	–	–
at engine speed (rpm)	–	–	4000	–	–
System pressure (bar)	4.5 – 5.2	4.5 – 5.2	6.0 – 6.7	4.5 – 5.2	4.5 – 5.2
Control pressure (bar) (warm-up regulator off) at idle speed/throttle valve closed	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15
With engine stopped – fuel pump running	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15
Valve clearance,					
intake (mm)	0.10	0.10	0.10	0.10	0.10
exhaust (mm)	0.10	0.10	0.10	0.10	0.10
Timing adjustment (mm)	0.40 – 0.54	0.90 – 1.10	0.65 – 0.80	0.40 – 0.54	0.40 – 0.54

*Detach hose at auxiliary air pump and plug, if CO level has to be checked or adjusted.

** At 80° C oil temperature.

Important engine adjusting data

Engine, type	911 S (Japan) 1977 models	Turbo (USA) 1977 models	Turbo (Japan) 1977 models	Turbo (USA) 1976 models	911 S (USA) 1976 models
Ignition timing**	15 ± 2° ATDC	7 ± 2° ATDC	15 ± 2° ATDC	5 ± 3° ATDC	5° ATDC
at engine speed (rpm)	950 – 1000	950 – 1050	950 – 1050	900 – 1000	900
Vacuum hose detached?	no	no	no	no	no
Ignition timing control	–	29 ± 3° BTDC	30 ± 3° BTDC	26 ± 3° BTDC	–
at engine speed (rpm)	–	4000	4000	4000	–
Vacuum hose detached?	–	yes	yes	yes	–
Idle speed (rpm)	950 – 1050*	950 – 1050*	950 – 1050*	900 + 50	900 ± 50
CO level (%) (at idle speed)	1.0 – 2.0*	2.0 – 4.0*	1.0 – 1.5*	1.0 – 3.0*	2.0 – 4.0*
Charge pressure (bar)	–	0.80 – 0.87	0.80 – 0.87	0.80 – 0.87	–
at engine speed (rpm)	–	4000	4000	4000	–
System pressure (bar)	4.5 – 5.2	6.0 – 6.7	6.0 – 6.7	6.0 – 6.7	4.5 – 5.2
Control pressure (bar) (warm-up regulator off) at idle speed/throttle valve closed	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15	3.6 ± 0.15
With engine stopped – fuel pump running	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15	2.9 ± 0.15
Valve clearance,					
intake (mm)	0.10	0.10	0.10	0.10	0.10
exhaust (mm)	0.10	0.10	0.10	0.10	0.10
Timing adjustment (mm)	0.40 – 0.54	0.65 – 0.80	0.65 – 0.80	0.65 – 0.80	0.40 – 0.54

*Detach hose at auxiliary air pump and plug, if CO level has to be checked or adjusted.

**At 80° C oil temperature.

		911	Carrera	Turbo
Dwell angle	Bosch	38 ± 3°/0.35 mm	same as 911	–
	Marelli	37 ± 3°/0.35 mm		
Spark plugs	Bosch	W 225 T 30 (0.7 mm)	W 260 T 2 (0.7 mm)	W 280 P 21 (0.6 mm)
(electrode gap)	Beru	225/14/3 (0.7 mm)	260/14/3 (0.7 mm)	

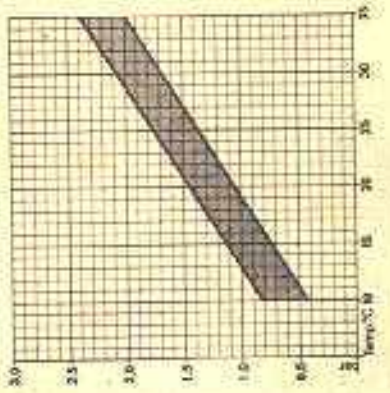
Battery charge condition	Normal climate zone Density	Freezing point	Tropics Density
Dead	1.12	– 11° C	1.08
Half charged	1.20	– 27° C	1.16
Charged	1.28	– 68° C	1.23

Tightening torque for engine

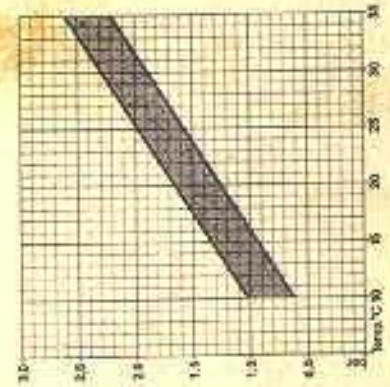
Location	Threads	Torque kpm	Nm
Crankcase bolts	M 10	3.5	35
All bolts on crankcase and camshaft housing	M 8	2.5	25
Flywheel mountings	M 12 x 1.5	15	150
Pulley to crankshaft	M 12 x 1.5	8	80
Double-belt pulley to crankshaft (air conditioner)	M 12 x 1.5	15	150
Connecting rod bolts	M 10 x 1.25	5 – 5.5	50 – 55
Cylinder head nuts	M 10 socket	3 – 3.3	30 – 33
Nuts con camshaft	M 27 x 2	14	140
Rocker arm shafts	M 6 socket	1.8	18
Wide clamp on blower housing	M 8	0.8	8
Pulley to alternator	M 16 x 1	4	40
Spark plugs	M 14 x 1.25	2.5 – 3	25 – 30
Adaptor on cylinder head (air injection)	M 10 x 1	1.0 – 1.2	10 – 12
Air line (coupling) to adaptor	M 14 x 1.5	2.2 – 2.4	22 – 24
Reactor to cylinder head	M 8	2.0 – 2.3	20 – 23

Warm-up regulator, fuel injectors (continuous fuel injection system)

Testing and adjusting data
911, Carrera, 911 S – USA **Turbo**

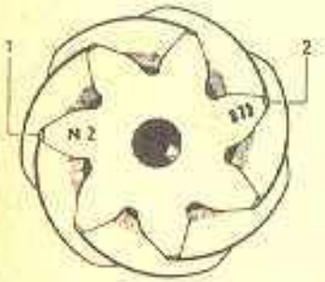


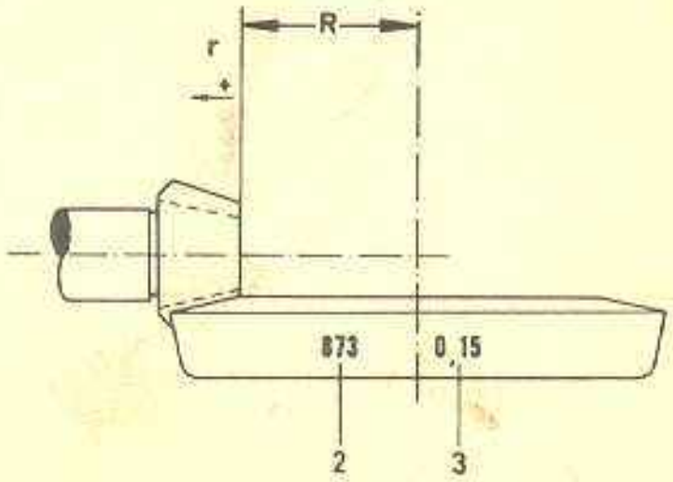
Control pressure cold (corresponding with outside temperature) 2.0 to 3.2 bar



Fuel injectors: opening pressure 2.5 to 3.6 bar

Adjustment of drive pinion

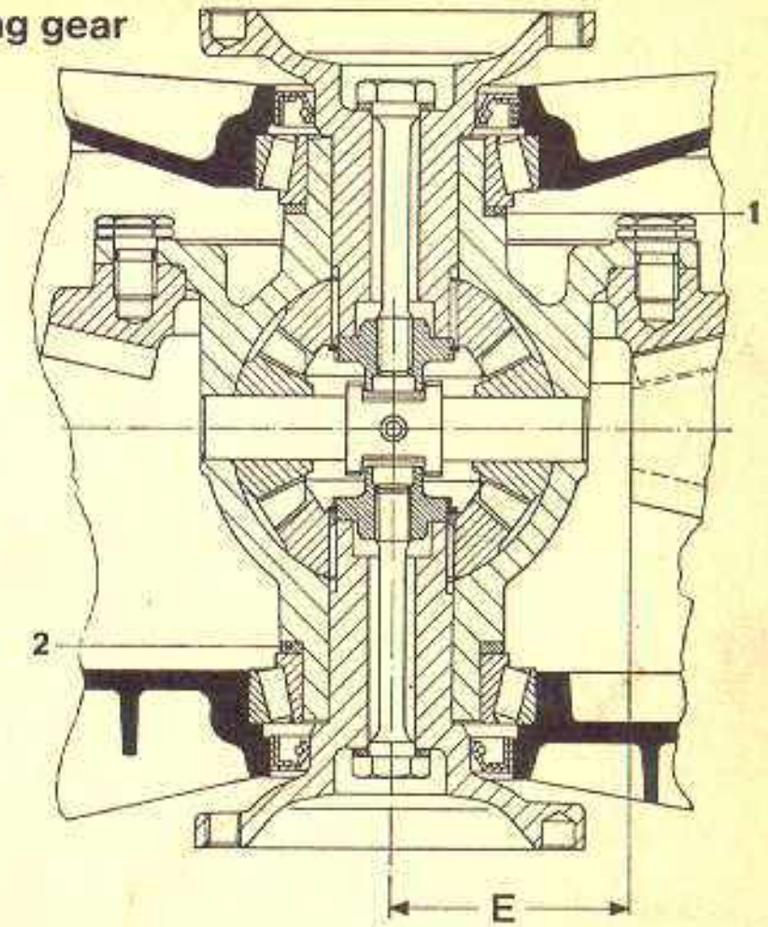




R = Design dimension
911, Carrera = 66.30 mm
Turbo = 81.69 mm (82.29 transm. type 930/30 and 930/33)
Sportomatic = 59.70 mm

r = Deviation from R given in + 1/100 mm (N 2 = + 0.02 mm)
1 = Deviation r
2 = Matching number
3 = Backlash

Adjustment of ring gear



The backlash between the ring gear and pinion can only be adjusted by changing the thickness of spacers and must be from 0.12 to 0.18 mm (measured at 4 different points).

Exception: the Turbo is measured at reverse gear III = 0.38 ± 0.1 mm equals 0.20 mm on the ring gear (930/30 = 0.33 ± 0.1 mm equals 0.16 mm).

Care and cleanliness are essential during all assembly operations and measurements to assure accurate results.

Press fit of taper roller bearings for differential in transmission case – for SKF bearings 2.5 – 3.5 Nm (25 – 35 kpcm), for Fag bearings 4.5 – 6.5 Nm (45 – 65 kpcm).

Important manual transmission adjusting data

2 examples for adjustment of pinion and ring gear on type 915 transmissions

	With transmission gauge P 258	With universal gauge VW 385
Design dimension	66.30 mm	66.30 mm
Deviation	+ 0.02 mm	+ 0.10 mm
	66.32 mm	66.40 mm
Dial gauge setting	66.61 mm	66.30 mm
Measured dimension (without shims)	- 0.39	- 0.29 mm
Distance to face end of pinion shaft	66.22 mm	66.01 mm
Adjustment dimension „E"	66.32 mm	66.40 mm
Distance to face end of pinion shaft	- 66.22 mm	- 66. 01 mm
Thickness of shims	0.10 mm	* 0.39 mm

*) Round off to nearest 0.05 mm.

Shims are available 0.10, 0.15 and 0.20 mm thick.

Recheck adjustment dimension „E" after installation of paper gaskets; a deviation of ±0.03 mm is permissible.

Important sportomatic transmission adjusting data

Transmission type 925

	With transmission gauge P 258	With universal gauge VW 385
Design dimension	59.70 mm	59.70 mm
Deviation	+ 0.18 mm	+ 0.04 mm
Adjustment dimension „E"	59.88 mm	59.74 mm
Basic dimension (without gasket)	60.70 mm	60.70 mm
Adjustment dimension	- 59.88 mm	- 59.74 mm
Thickness of shim	0.82 mm *	0.96 mm *
Measurement after installation of shims:		
Dial gauge setting	60.02 mm	59.70 mm
Measured dimension (without gasket)	- 0.37 mm	- 0.32 mm
Distance to face end of pinion shaft	59.65 mm	59.38 mm
Adjustment dimension „E"	59.88 mm	59.74 mm
Distance to face end of pinion shaft	- 59.65 mm	- 59.38 mm
Paper gasket	0.23 mm *	0.36 mm *

*) Round off to nearest 0.05 mm.

Paper gaskets are available 0.1, 0.15 and 0.20 mm thick.

Recheck adjustment dimension „E" after installation of paper gaskets; a deviation of ±0.03 mm is permissible.

Transmission tolerance survey

Measuring point	Type 915 Installation tolerance mm	Type 915 Wear limit mm	Type 930 Installation tolerance mm	Type 930 Wear limit mm
1. Backlash between gear I and II				
1st gear	0.05 – 0.13 (0.17)	0.22	0.055 – 0.13	0.22
2nd gear				
3rd gear				
4th gear				
5th gear				
2. Loose gears on pinion and drive shaft Axial clearance				
1st gear	0.3 – 0.4	0.5		
2nd gear	0.2 – 0.3	0.4		
3rd gear	0.2 – 0.3	0.4	same as 915	
4th gear	0.2 – 0.3	0.4		
5th gear	0.2 – 0.3	0.4		
3. Selector rods				
a) in guides radial clearance	0.195 – 0.236	0.4	same as 915	
b) Runout	–	0.1		

Measuring point	Installation tolerance mm	Wear limit mm	Installation tolerance mm	Wear limit mm
4. Selector forks in operating sleeve Axial clearance				
5th and reverse gear	0.1 – 0.3	0.5		
1st and 2nd gear	0.1 – 0.3	0.5	same as 915	
3rd and 4th gear	0.1 – 0.3	0.5		
5. Synchronizing rings Outside dia. installed				
1st gear	86.20 – 86.54	after	86.15 – 86.65	after
2nd gear	86.20 – 86.54	local wear	86.15 – 86.65	local wear
3 rd gear	76.12 – 76.48	through of	76.20 – 76.55	through of
4th gear	76.12 – 76.48	molybdenum	76.20 – 76.55	molybdenum
5th gear	76.12 – 76.48	layer	–	layer
6. Drive shaft			same as 915	
Max. runout at guidepin	0.1	0.1 (align)		

(in brackets: only 1st and 2nd gear of 5-speed transmissions)

Tightening torque for bolts and nuts of manual transmission 915

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Transmission case (oil drain)	Plug with magnet	M 24 taper	St 37	2.0 – 2.5	20-25
Gear box (oil filler)	Plug	M 24 taper	St 37	2.0 – 2.5	20-25
Gear box, side, front cover, shift cover	Mid-grip nut	M 8 x 1.25	X12CrNi 18.8	2.2 – 2.5	22-25
Front cover	Backup light switch	M 18 x 1.5	Ms	3.5 – 4.0	35-40
Drive shaft	Collared nut	M 30 x 1.5	8.8	16. 0 – 18. 0	160-180
Drive shaft	Castle nut	M 18 x 1.5	6.8	12. 0 – 14.0	120-140
Transmission support clamping plate and mountings	Hexagon nut	M 8 x 1.25	8	2.1 – 2.3	21-23
Drive pinion	Collared nut	M 24 x 1.5	8	14.0 – 16.0	140-160
Fork, gearshift	Hexagon nut	M 6 x 1.0	8	0.8 – 0.9	8-9
Shift lock, transmission case	Hexagon head bolt	M 10 x 1.5	8.8	1.5 – 1.8	15 – 18
Transmission case	Vent	M 16 x 1.5	9 S 20 K	2.3 – 3.0	20 – 30
Selector forks	Hexagon head bolt	M 8 x 1.25	8.8	2.4 – 2.6	24 – 26
Ring gear (differential)	Hexagon head bolt	M 12 x 1.25	11.9	11.5 – 12.0	115–120
Ring gear (locking differential)	Hexagon head bolt	M 12 x 1.25	11.9 12.9	14.0 – 15.0 15.0 – 16.0	140–150 150–160
Joint flange	Expansion bolt	M 10 x 1.5	8.8	2.6 – 3.0	26 – 30
Starter mountings	Hexagon nut	M 10 x 1.5	8	4.6 – 4.8	46 – 48
Pressure tube (drive pinion)	Hexagon head bolt M 6 x 35	M 6 x 1.0	8.8	0.8 – 0.9	8 – 9
Front cover	Pressure relief bolt	M 12 x 1.5	9 S 20 K	2.2 – 2.5	22 – 25
Oil pump cover	Mid-grip nut	M 6 x 1.0	X12CrNi 18.8	0.9 – 1.0	9 – 10
Suction tube	Fillister head bolt M 6 x 15	M 6 x 1.0	8.8	0.8 – 0.9	8 – 9
Pressure tube (gear box)	Hexagon head bolt M 6 x 12	M 6 x 1.0	8.8	0.8 – 0.9	8 – 9

Tightening torque for bolts and nuts of manual transmission 930

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Drive shaft	Collared nut	M 30x1.5	8.8	21.0	210
Drive shaft	Collared nut	M 20x1.5	C 35 V	16.0–18.0	160–180
Drive pinion	Collared nut	M 24x1.5	8	19.0–20.0	190–200
Joint flange	Expansion bolt	M 10x1.5	8.8	2.6–3.0	26–30
Transmission case	Vent	M 14x1.5	9 S 20 K	2.0–3.0	20–30
Connecting rod, gearshift	Conical bolt	M 8x1.25	8.8	2.3–2.6	23–26
Shift cover	Mid-grip nut	M 8x1.25	X12CrNi 18.8	2.2–2.5	22–25
Gear box	Backup light switch	M 18x1.5	Ms	2.5–3.5	25–35
Gearshift, fork	Hexagon nut	M 6x1.0	8.8	0.9–1.1	9–11
Clamping plate, gear box and transmission case, front and side transmission covers	Hexagon nut	M 8x1.25	8	2.2–2.5	22–25
Shift lock, transmission case	Hexagon head bolt	M 10x1.5	8.8	1.5–1.8	15–18
Selector forks	Hexagon head bolt	M 8x1.25	8.8	2.4–2.6	24–26
Ring gear (differential)	Hexagon head bolt	M 12x1.25	11.9	13.5–14.0	135–140
Locking differential	Hexagon head bolt	M 12x1.25	12.0	15.0–16.0	150–160
Transmission case (oil drain)	Plug with magnet	M 24 x 1.5 (taper 1:16)	St 37	2.0 – 2.5	20 – 25
Gear box (oil filler)	Plug	M 30x1.5	5.8	2.0 – 2.5	20 – 25
Reverse gear detent	Plug	M 16x1.5	5.8	2.0 – 2.5	20 – 25
Guide tube	Fillister head bolt	M 6x1.0	8.8	0.8 – 1.0	8 – 10
Clutch and gear ring mountings	Fillister head bolt	M 8x1.0	8.8	2.0 – 2.5	10 – 25
Starter mountings	Hexagon nut	M 10x1.5	8	4.6 – 5.0	46 – 50
Holder to shift base	Hexagon head bolt	M 6.	8.8	0.6	6
Shift base to tunnel	Fillister head bolt	M 8	8.8	2.1	21
Conical bolt in selector rod head	Conical bolt	M 8	8.8	1.5	15
Conical bolt on shift coupling	Conical bolt	M 8	8.8	1.5	15
Clamp mountings	Hexagon head bolt	M 8	8.8	2.5	25
Transmission cover	Fillister head bolt	M 6	8.8	1.4	14
Locking differential					

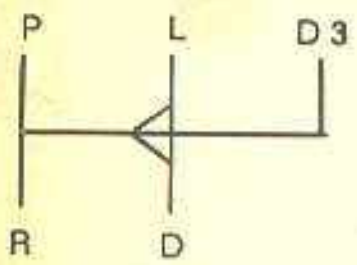
Tightening torque for bolts and nuts of sportomatic transmission

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Transmission case (on stud for side and front transmission cover as well as fork)	Hexagon nut	M 8x1.25	6.8	2.1 – 2.3	21 – 23
	Mid-grip nut	M 8x1.25	x12CrNi 18.8	2.2 – 2.5	22 – 25
Transmission case (oil filler)	Plug	M 24x1.5 (taper 1 : 16)	St 37	2.0 – 2.5	20 – 25
Transmission case (oil drain)	Plug with magnet	M 24x1.5 (taper 1 : 16)	St 37	2.0 – 2.5	20 – 25
Transmission case (vent)	Vent	M 14x1.5 (taper 1 : 16)	9 S 20 K	2.0 – 3.0	20 – 30
Transmission case	Backup light switch	M 18x1.5	Ms	3.5 – 4.0	35 – 40
Transmission case	Bridge-over switch	M 18x1.5	Ms	3.5 – 4.0	35 – 40
Transmission case (starter)	Hexagon nut	M 10x1.5	8.8	4.6 – 4.8	46 – 48
Transmission case (power motor support and mountings)	Hexagon nut	M 8x1.25	6.8	2.1 – 2.3	21 – 23
Converter housing to transmission case	Hexagon nut Hexagon nut	M 8x1.25 M 10x1.5	6.8 8.8 (SW15)	2.1 – 2.3 4.6 – 4.8	21 – 23 46 – 48
Converter housing (one-way clutch mountings)	Fillister head bolt	M 6x1.0	10.9	1.2 – 1.4	12 – 14
Converter housing	Threaded adaptor	M 24x1.5	6 S	3.0 – 3.5	30 – 35
Converter housing	Temperature transmitter	M 14x1.5	Ms	2.5 – 3.0	25 – 30
Converter housing	Temperature switch	M 14x1.5	Ms	2.5 – 3.0	25 – 30
Converter housing (clutch pressure plate)	Fillister head bolt	M 6x1.0	10.9	1.2 – 1.4	12 – 14
Converter drive plate	12-sided bolt	M 8x1.25	8.8	2.4 – 2.6	24 – 26
Intermediate plate (clamping)	Hexagon head bolt	M 8x1.25	8.8	2.1 – 2.3	21 – 23
Intermediate plate	Reversing lever shaft	M 8x1.25	9 S 20 K	2.1 – 2.3	21 – 23
Intermediate plate (shift lock)	Plug	M 14x1.5	4.6	2.2 – 2.5	22 – 25
Front transmission cover (speedometer drive lock)	Hexagon head bolt	M 8x1.25	8.8	1.6 – 1.8	16 – 18
Front transmission cover (9 mm parking lock ball dia.)	Plug	M 12x1.5	5.8	3.0 – 3.5	30 – 35
Angle drive in guide sleeve	Hollow bolt	M 24x1.5	6.8	2.2 – 2.4	22 – 24
Drive shaft	Hexagon nut	M 24x1.5	6.9	10.0 – 12.0	100–120
Drive shaft	Collared nut	M 18x1.5	5.8	11.0 – 13.0	110 – 130
Drive pinion	Expansion bolt	M 12x1.5	10.9	11.0 – 12.0	110–120
Selector forks	Hexagon head bolt	M 8x1.25	8.8	2.2 – 2.6	22 – 26
Differential (ring gear mtgs.)	Hexagon head bolt	M 12x1.25	11.9	11.5 – 12.0	115–120
Joint flange (differential)	Expansion bolt	M 10x1.5	8.8	3.5 – 4.0	35–40
Front transmission cover Transmission support mtgs.	Hexagon nut	M 8x1.25	6.8	2.1 – 2.3	21–23

Sportomatic transmission specifications

Clutch
Hydrodynamic torque converter and a vacuum operated single plate dry clutch
Manual transmission: Porsche locking synchromesh
No. of gears: 3 forward, 1 reverse and parking lock

Shift scheme



P = Parking lock
R = Reverse gear
L = Low (driving range for steep gradients)
D = Drive (driving range for city)
D3 = Drive 3 (driving range for open roads)

Final drive ratio	8/27
Towing speed	approx. 40 km/h
Stall speed	1900 ± 200 rpm
Converter ratio	1.8
Clutch speed (at full throttle)	3200 ± 200 rpm
Transmission oil	approx. 2.5 ltr.

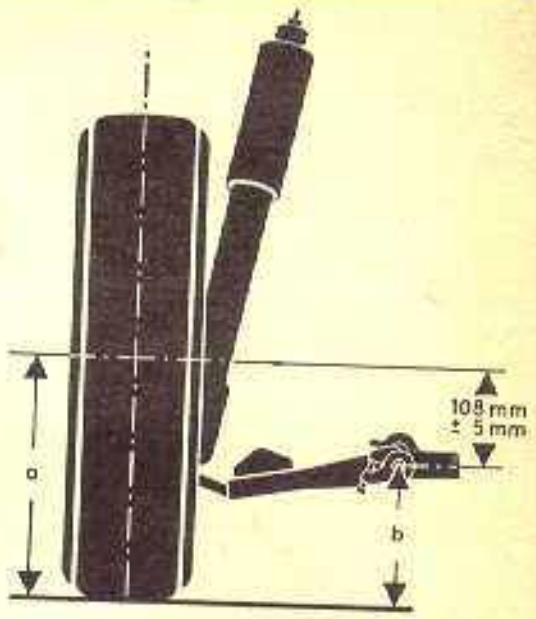
Front axle and steering specifications

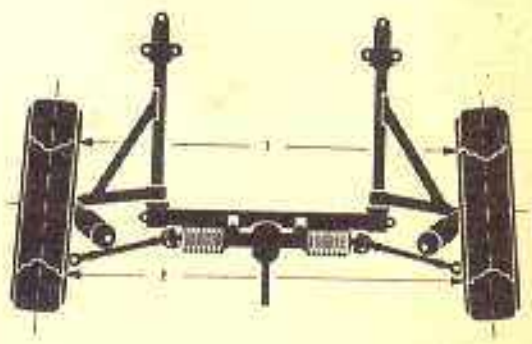
	911	Carrera 3.0	Turbo
Wheel suspension	Independent employing control arms and shock absorber struts		
Springs	One round torsion bar in driving direction for each wheel		
Track width	1369 mm	1369 mm	1438 mm

Specifications and tolerances

At curb weight according to DIN 70020
Car with full fuel tank, spare wheel and tools

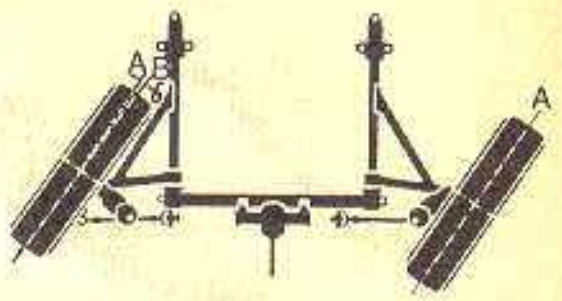
Designation	Adjustment data and tolerances	Max. difference between left and right
Front axle		
Height adjustment: Wheel center above middle of torsion bar		
911, Carrera	108 mm ± 5 mm	5 mm
911 S – USA (repair)	93 mm ± 5 mm	5 mm
Turbo	93.5 mm ± 5 mm (84.5 mm ± 5 mm USA)	5 mm
Total toe (pressed with 15 kp)	0°	–





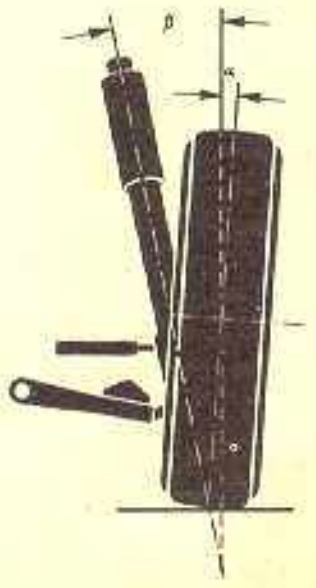
Designation	Adjustment data and tolerances	Max. difference between left and right
Difference angle at 20° lock (toward toe-in)	0° to 30'	Can only be influenced by exchanging steering arm

A' = Parallel to A
B = Centerline of wheel
Y = Difference angle



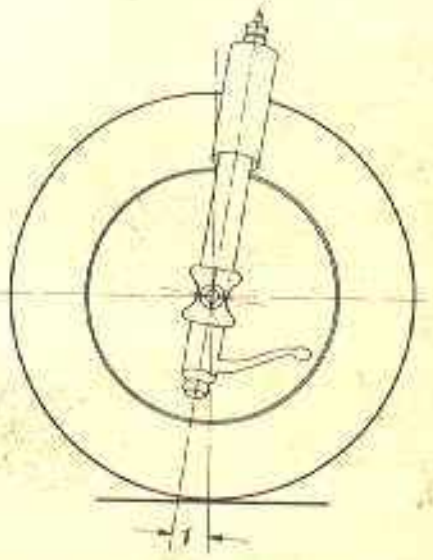
Camber of front wheels
(wheels pointing straight ahead)

a = Camber angle		
911, Carrera, Turbo	0° ± 10'	10'
911 S – USA, Turbo – USA	+ 30' ± 10'	10'
ß = Inclination of kingpin	11°	



Designation	Adjustment data and tolerances	Max. difference between left an right
y = Caster	6° 5' ± 15'	30'

Caster results from total camber difference at 20° left lock and 20° right lock x 1.5



These wheel alignment specifications can also be applied to earlier models.

Tightening torque for front axle and steering

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Support bearing to strut	Hexagon nut	M 14x1.5	8	8	80
Clamp to tie rod	Hexagon nut	M 8	8.8	1.5	15
Support bearing to body	Fillister head bolt (socket)	M 10	8.8	4.7	47
Auxiliary carrier to body	Hexagon head bolt	M 12x1.5	8.8	9	90
Guard mountings	Hexagon head bolt	M 10	8.8	4.7	47
Guard mountings	Hexagon head bolt	M 8	8.8	2.5	25
Flan block mountings	Hexagon head bolt	M 10	8.8	4.7	47
Auxiliary carrier mountings	Hexagon head bolt	M 10	8.8	4.7	47
Steering gear mountings	Hexagon head bolt	M 10x20	8.8	4.7	47
Tie rod to steering gear	Hexagon head bolt	M 10	8.8	4.7	47
Stabilizer bearing to body	Hexagon head bolt	M 8	8.8	2.5	25
Stabilizer lever to stabilizer	Hexagon head bolt	M 8	8.8	2.5	25

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Clamping nut on steering knuckle	Fillister head bolt (socket)	M 7	10.9	1.5	15
Ball joint to strut	Uni-stop nut	M 8	8	2.2	22
Ball joint to strut	Hexagon head bolt	M 10x30	10.9	4.5	45
Ball joint to control arm (threads lubricated)	Slotted nut	M 45x1.5	8.8	25	250
Plug for spring strut (Boge)	Plug			12 + 2	120+20
Plug for spring strut (Koni)	Plug			20	200
Wheel to wheel hub	Wheel nut	M 14 x 1.5	10.9	13	130
Brake disc to wheel hub	Hexagon nut	M 8	M 8	2.3	23
[illegible] to steering knuckle	Hexagon head bolt	M 8	M 8	1.0	10
Caliper to steering knuckle	Hexagon head bolt	M 12x1.5	8.8	7.0	70

Hollow bolt to caliper	Hollow bolt	M 10x1		2.0	20
Steering coupling to steering shaft	Hexagon head bolt	M 8	8.8	2.5	25
Steering shaft to steering gear	Hexagon head bolt	M 8	8.8	2.5	25
Steering shaft bearings	Fillister head bolt	M 8	8.8	2.5	25
Universal joint to steering shaft	Hexagon head bolt	M 8	8.8	2.5	25
Steering wheel	Hexagon nut	M 18x1.5	8	7.5	75
Dust cover holder to rack	Slotted nut	M 16x1.5	8	7.0	70
Ball joint to steering arm	Castle nut	M 10x1	8	4.5	45
Coupling flange to drive pinion	Hexagon nut (self-locking)	M 10	8	4.7	47
Case cover to steering gear	Hexagon head bolt	M 8x1	8.8	1.5	15
Tie rod to rack (only Turbo)	Ball joint	M 16x1.5	8.8	15	150

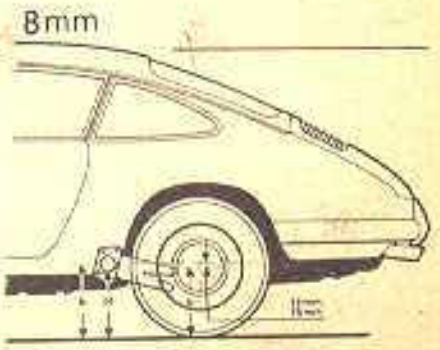
Rear axle specifications

	911	Carrera 3.0	Turbo
Wheel suspension	Independent, employing trailing arms, wheels driven by propeller shafts		
Springs	One round torsion bar in lateral direction for each wheel		
Track width (wheel center 12 mm below center of cross tube)	1354 mm with rim 6 J x 15	1380 mm with rim 7 J x 15	1511 mm with rim 8 J x 15 or 8 J x 16 (1977 models)
Shock absorbers	Double action, hydraulic shock absorbers		
Stabilizers front/rear dia. in mm	16/–	20/18	18/18 20/18 (1977 models)

Specifications and tolerances

(at curb weight according to DIN 70020; car with full fuel tank, spare wheel and tools)

Designation	Adjustment data and tolerances	Max. difference betw. left and right
Torsion bar specification		
Inclination of spring strut		
Coupe 911, Carrera	38°	
Coupe 911 S – USA	42°	
Targa	+ 0.5°	
Air conditioner	+ 0.5°	
Sportomatic	+ 0.5°	
911, Carrera with Bielstein shock absorbers	37°	
911 S – USA with Bielstein shock absorbers	41°	
Turbo	31°	
Turbo – USA	34°	
Camber of rear wheels		
911, Carrera	– 1° ± 10'	20'
Turbo	– 50' ± 10'	20'
911 S – Turbo – USA	0° ± 10'	20'
Track for all types	+ 10' ± 10' each wheel	20'
Height adjustment		
Wheel center below center of cross tube		8 mm
911, Carrera, Turbo	12 mm ± 5 mm	8 mm
911 S – Turbo – USA	37 mm ± 5 mm	



1° change in spring strut inclination = approx. 8 – 9 mm change in vehicle height.

Tightening torque for bolts and nuts of rear axle

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Bearing cover to body	Hexagon head bolt	M 10	8.8	4.7	47
Control arm to cross tube	Hexagon head bolt	M 14x1.5	10.9	6.0	60
Spring strut to contr. arm	Eccentric	M 12x1.5	8.8	6.0	60
Spring strut to contr. arm	Hexagon head bolt	M 12x1.5	10.9	9.5	95
Brake caliper to contr. arm	Hexagon head bolt	M 12x1.5	8.8	6.0	60
Shock absorber to contr. arm	Hexagon head bolt	M 14x1.5	8.8	12.5	125
Shock absorber to body	Hexagon nut	M 10x1	8	2.5	25
Brake hose to lines	Brake hose	M 10x1		1.5	15
Stabilizer to body	Hexagon head bolt	M 8	8.8	2.5	25
Propeller shaft flange	Fillister head bolt	M 10	12.9	8.3	83
Parking brake to contr. arm	Hexagon head bolt	M 8	8.8	2.5	25
Wheel to wheel hub	Wheel nut	M 14x1.5		13	130
Wheel hub to drive shaft	Castle nut	M 20x1.5	10.9	30–35	300–350
Brake disc to wheel hub	Countersunk bolt	M 6	8.8	0.5	5
Parking brake cable to control arm	Hexagon head bolt	M 6	8.8	0.5	5
Adjusting lever to spring strut	Hexagon head bolt	M 16x1.5	10.9	24.5	245
Adjusting lever to spring strut	Eccentric bolt	M 16x1.5	10.9	24.5	245

General technical data

Designation	Specification	Wear limit
Tandem brake master cylinder		
Bore	19.05 mm dia.	
Stroke	18/13 mm	
Ratio at brake pedal	5.8 : 1	
Operating linkage/piston play	1 mm	
Brake system with brake pressure booster T 52		
Tandem brake master cylinder		
Bore	20.64 mm dia.	
Stroke	20/12 mm	
Mean amplification factor	2.2 (Turbo 1.8)	
Play at brake pedal with bled brakes and engine stopped	min. 10 mm	
Ratio at brake pedal	5.2 : 1	

Designation	Specification	Wear limit
Front wheel brakes		
Brake disc outside dia.	282.5 mm, inboard vent	
New thickness	20.0 mm or 20.5 mm	
Min. thickness after machining*	18.6 mm	18.0 mm
Thickness tolerance	max. 0.03 mm	
Brake disc lateral runout	max. 0.05 mm	
Lateral runout when installed	0.2 mm	
Caliper piston dia.	48 mm	
Pad thickness	10 mm (13 mm Turbo)	2.0 mm
Clearance	0.2 mm	
Pad area on each wheel	76 cm^2	
Rear wheel brakes		
Brake disc outside dia.	290 mm, inboard vent	
New thickness	20.0 mm	
Min. thickness after machining*	18.6 mm	18.0 mm
Thickness tolerance	max. 0.03 mm	
Brake disc lateral runout	max. 0.05 mm	
Lateral runout when installed	max. 0.2 mm	
Surface finish of brake disc after machining	max. 0.006 mm	
Caliper piston dia.	38 mm	
Pad thickness	10 mm	2.0 mm
Clearance	0.2 mm	
Pad area on each wheel	52.5 cm^2	
Parking brake		
New brake drum dia.	180 mm	181.0 mm
Liner thickness		2.0 mm

Caliper versions

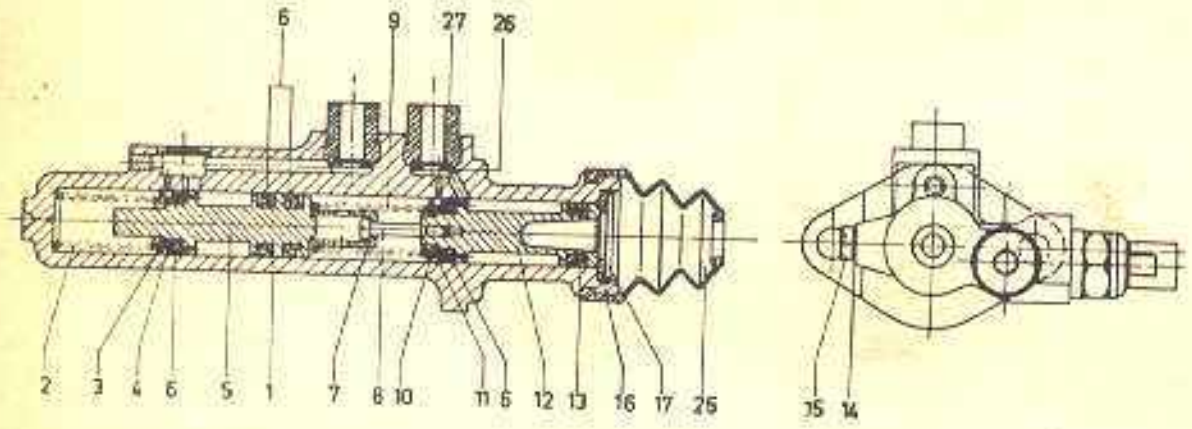
911, Carrera front: gray cast iron (A)
rear: gray cast iron

Turbo front: aluminium
rear: gray cast iron

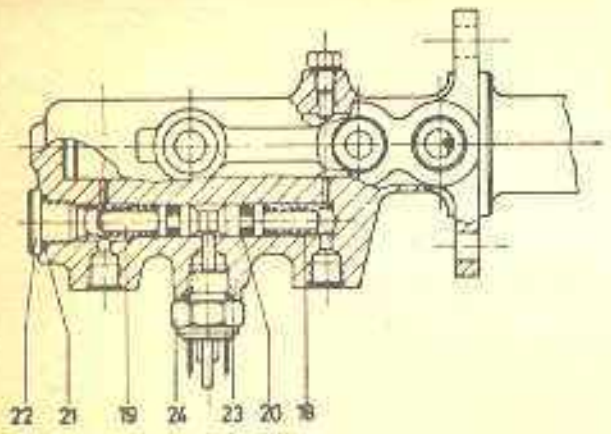
* Brake discs may only be machined symmetrically, i.e. evenly on both sides.

Cross section drawing of tandem brake master cylinder (with warning device)

(version without brake pressure booster and without permanent contact)



1 Housing
2 Spring for intermediate piston
3 Spring retainer
4 Support ring
5 Intermediate piston with filler disc
6 Primary cover
7 Stop sleeve
8 Stop screw for stroke limit
9 Spring for pressure piston



10 Spring retainer
11 Support ring
12 Pressure piston with filler disc
13 Grooved cover
14 Seal
15 Stop screw (outer)
16 Stop washer
17 Circlip
18 Spring
19 Piston
20 Cover
21 Round cord seal
22 Screw
23 Round cord seal
24 Brake warning switch
25 Guard
26 Washer
27 Container plug

Machining specifications and wear limits for brake discs and parking brake

Vehicle type	Type of brake disc	Location of brake disc	Distance „a" (in ref. to new brake disc thickness)	New brake disc thickness	Min. thickness of brake disc after machining	Wear limit of brake disc (for symmetr. wear)
All	Vented brake disc		35 ± 0.1 mm	20 – 0.2 mm*	18.6 mm	18.0 mm (1.0 mm each side)
All	Vented brake disc		76 + 0.2 mm	20 – 0.2 mm	18.6 mm	18.0 mm (1.0 mm each side)
All	Thickness tolerance of brake discs				max. 0.03 mm	
All	Lateral runout of brake discs				max. 0.05 mm	
All	Surface finish of brake discs after machining				max. 0.006 mm	

* Was increased to 20.5 – 0.2 mm.

Caution

Refinishing and wear specifications listed above are based on the assumption that the remaining thickness of the brake pad is not less than 2.0 mm. This pad thickness is required to assure perfect operation of brakes. (Installation of cross spring assures this.)

Only balanced brake discs are supplied. Brake discs are balanced by special clips in the cooling vents.

Caution! Never remove balance clips.

Parking brake

Brake drum dia. (new)	180 + 0.2 mm
Brake drum wear limit	max. 181.0 dia.
Brake liner width	25 mm

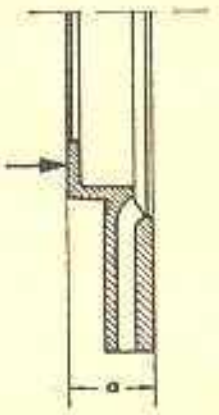
Caution!

Parking brake liners must be at least 2.0 mm thick.

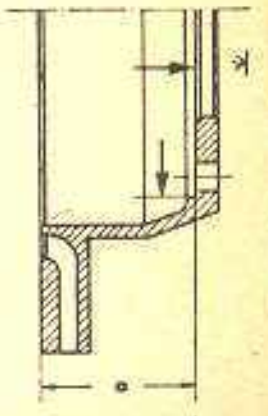
Caution

Machine brake disc symmetrically, i.e. uniformly on both sides. Arrows indicate brake disc reference or mounting points.

Front wheel brake disc



Rear wheel brake disc



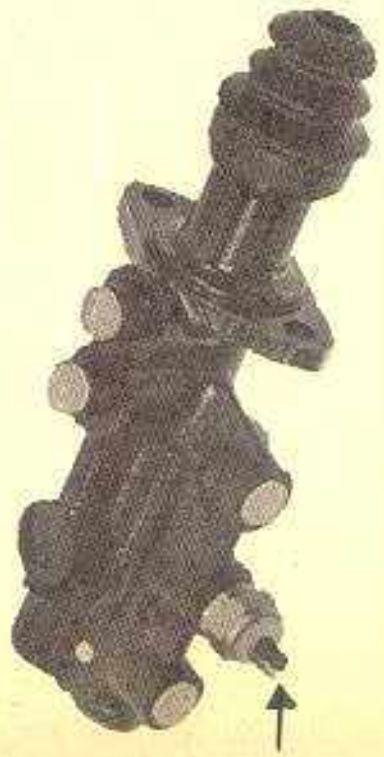
Tandem brake master cylinder with brake pressure booster

Each brake circuit has a stop light switch, which also fulfills the function of a brake warning switch. The brake indicator lamp comes on when a brake circuit fails.
After completion of repairs, the brake circuit failure indicator must be put out by detaching the battery.

Brake circuit failure indicator

Tandem brake master cylinder with permanent contact (as from January, 1976)

With the new brake failure warning switch the brake indicator lamp remains in action when a brake circuit fails, even after completion of repairs. Consequently after elimination of the defect or damage the release cap of the switch will have to be pressed back to normal position.

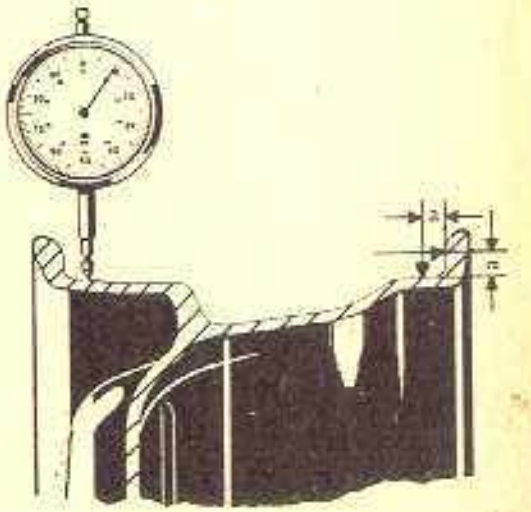


Checking wheel rims

Measuring points for radial and lateral runout on inner and outer shoulders of wheel rim

Distance „a" = 8 mm

Max. permissible radial runout for steel rims	1.25 mm
Max. permissible radial runout for aluminium rims	1.00 mm
Max. permissible lateral runout for steel rims	1.25 mm
Max. permissible lateral runout for aluminum rims	0.80 mm



Caution!

Distorted rims cannot be straightened.

Tire pressures (reference values)
Measured on cold tire

	Pressure in bar (kp/cm^2)	
	Front	Rear
All tire sizes	2.0	2.4

These values also apply to winter tires.

Rims and tires

Type	Standard rims	Tires	Approved rims	Tires
1976 Models				
911	LMg 6 J x 15	185/70 VR 15	Lmgs 6 J x 15	185/70 VR 15
			Winter tires	
			5 1/2 J x 15 6 J x 15	185/70 SR 15 M + S
			4 1/2 J x 15 5 1/2 J x 15	165 SR 15 M + S
			5 1/2 J x 14	185 SR 14 M + S
Carrera	front LMgs 6 J x 15 rear LMgs 7 J x 15	185/70 VR 15 215/60 VR 15	front LMgs 7 J x 15 rear LMgs 8 J x 15	185/70 VR 15 215/60 VR 15 or 185/70 VR 15
			front LMgs 6 J x 15 rear LMgs 7 J x 15	205/50 VR 15 225/50 VR 15*
			front LMgs 7 J x 15 rear LMgs 8 J x 15	205/50 VR 15 225/50 VR 15*
			Winter tires	
			5 1/2 J x 15	165 SR 15 M + S
			5 1/2 J x 14	185 SR 14 M + S
			5 1/2 J x 15 6 J x 15 7 J x 15	185/70 SR 15 M+S

*** with adapted speedometer**

Type	Standard rims	Tires	Approved rims	Tires
Turbo	front LMgs 7 J x 15 rear LMgs 8 J x 15	205/50 VR 15 225/50 VR 15	front LMgs 7 J x 15 rear LMgs 8 J x 15	185/70 VR 15 215/60 VR 15 (in conjunction with transmission 930/30 and adapted speedometer)
			Winter tires	
			51/2 J x 14	185 SR 14 M + S
			6 J x 15	185/70 SR 15 M + S
			rear 7 J x 15 51/2 J x 14	*185/70 SR 14 M + S

*Only for cars which are equipped with 15" series 50 summer tires.

1977 Models			**With wider fenders as Carrera**	
911	LMg 6 J x 15	185/70 VR 15	front 6 J x 15 rear 7 J x 15	185/70 VR 15
			front 7 J x 15 rear 7 J x 15	185/70 VR 15
			front 6 J x 15 rear 7 J x 15	185/70 VR 15 215/60 VR 15
			front 7 J x 15 rear 8 J x 15	185/70 VR 15 215/60 VR 15
			front 6 J x 16 rear 7 J x 16	205/55 VR 16 225/50 VR 16

Winter tires same as for 1976 models.

Rims and tires

Type	Standard rims	Tires	Approved rims	Tires
Carrera	front LMg 6 J x 15 rear LMg 7 J x 15	185/70 VR 15 215/60 VR 15	front 7 J x 15 rear 8 J x 15	185/70 VR 15 215/60 VR 15
			front 6 J x 16 rear 7 J x 16	205/55 VR 16 225/50 VR 16
Turbo	front LMgs 7 J x 16 rear LMgs 8 J x 16	205/55 VR 16 225/50 VR 16	front 7 J x 15 rear 8 J x 15	185/70 VR 15 215/60 VR 15
			Winter tires	
			51/2 J x 14	185 SR 14 M+S
			6 J x 15 rear 7 J x 15	185/70 SR 15 M+S

LMg = Cast aluminum
LMgs = Forged aluminum

Tightening torque for front and rear wheel brakes

Location	Designation	Threads	Material	Tightening torque kpm	Nm
Tandem brake master cylinder to cross panel	Hexagon nut	M 8	8.8	2.5	25
Piston rod to connector	Hexagon nut (flat)	M 10	C 45/6	1.0	10
Brake line	Hexagon hollow bolt	M 10 x 1	5.8	1.5	15
Hollow bolt to caliper	Hollow bolt	M 10 x 1		2.0	20
Caliper to steering knuckle	Hexagon head bolt	M 12 x 1.5	8.8	7.0	70
Clamping nut to steering knuckle	Fillister head bolt (socket)	M 7	10.9	1.5	15
Brake disc to wheel hub	Hexagon nut	M 8	8.8	2.3	23
Brake disc guard (front)	Hexagon head bolt	M 8	8.8	1.0	10
Case bolt for caliper (front)	Fillister head bolt	M 8	10.9	3.4	34
Case bolt for caliper (rear)	Fillister head bolt	M 6	12.9	2.2	22
Caliper to rear control arm	Hexagon head bolt	M 12 x 1.5	8.8	7.0	70
Brake disc to rear wheel hub	Countersunk bolt	M 6	8.8	0.5	5
Brake backplate to rear control arm	Hexagon head bolt	M 10		4.7	47
Guard to brake backplate	Hexagon head bolt	M 8	8.8	2.5	25
Parking brake cable to control arm	Hexagon head bolt	M 6	8.8	0.5	5
Wheel to wheel hub	Spherical collared nut	M 14 x 1.5		13.0	130
Bleeder valve in caliper (wrench size 7 mm)	–	–	–	0.3	3

Fuse chart for 911 and Carrera 3.0

Fuse no.	Fused equipment	Amps
1	Fog lights	16
2	License plate light, fog light indicator lamp and relay	5
3	Front and rear right marker lights	5
4	Front and rear left marker lights, engine compartment light	5
5	Right low beam headlight	8
6	Left low beam headlight	8
7	Right high beam headlight	8
8	Left high beam headlight, high beam indicator lamp	8
9	Right front turn signal	5
10	Left front turn signal	5
11	Left and right stop lights, flasher relay, backup lights	16
12	Rear window defogger relay, heater blower, rear window defogger indicator lamp	25
13	Windshield wipers, washer pump, air conditioner	25
14	Electric sliding roof, rear window wiper, outside mirror	25
15	Cigar lighter, blower switch indicator lamp	16
16	Electric window controls	25
17	Hazard lights	16
18	Courtesy light, clock, glove box light, trunk light	5
19	Headlight cleaners	16
20	Blower for air conditioner	25
21	Fuel pump	16
	Fuses in engine compartment	
1	Sportomatic, heater blower relay	5
2	Heater blower	25
3	Rear window defogger	25

Relays in fuse box

1 Air conditioner
2 Fog lights
3 Horn
4 Not occupied
5 Window controls
6 Not occupied
7 Fuel pump

Relays in engine compartment

1 Heater blower
2 Rear window defogger (for only one heating circuit)

Fuse chart for Turbo

Fuse no.	Fused equipment	Amps
1	Fog lights	16
2	License plate lights, fog light indicator lamp and relay	5
3	Front and rear right marker lights	5
4	Front and rear left marker lights, engine compartment light	5
5	Right low beam headlight	8
6	Left low beam headlight	8
7	Right high beam headlight	8
8	Left high beam headlight, high beam indicator lamp	8
9	Right front turn signal	5
10	Left front turn signal	5
11	Flasher relay, backup lights	16
12	Left and right stop lights, blower, rear window defogger indicator lamp, relay for windshield and rear window defoggers	25
13	Windshield wipers, washer pump, air conditioner	25
14	Electric sliding roof, rear window wiper, outside mirror	25
15	Cigar lighter, blower switch indicator lamp	16
16	Electric window controls	25
17	Hazard lights	16
18	Courtesy light, clock, glove box light, trunk light	5
19	Headlight cleaners	16
20	Air conditioner blower	25
21	Windshield defogger	16
	Rear window defogger (in engine compartment)	25

Relays in fuse box

1 Air conditioner
2 Fog lights
3 Horn
4 Not occupied
5 Window controls
6 Fuels pump 1
7 Fuel pump 2

Relays in engine compartment

Air sensor and charge pressure safety switch

Bulb chart

	Wattage	Base (DIN)
Main headlight (halogen) H 4	60/55 W	P 43 t – 38
Extra headlight (halogen) H 3	55 W	PK 22 S
Fog light (halogen) H 3	55 W	PK 22 S
Stop light/tail light	21/5 W	BAY 15 d
Turn signal	21 W	BA 15 S
Backup light	21 W	BA 15 S
Courtesy light, engine compartment light	10 W	SV 8.5 – 8
Tail fog light	18 W	SV 8.5 – 8
Trunk light	10 W	BA 15 S
Marker light	4 W	BA 9 S
Instrument light, indicator lamps	2 W	BA 7 S
Glass socket indicator lamps	1.2 W	W 2 x 4.6 d
License plate light	5 W	BA 15 S
		Base (SAE)
Sealed beam headlight, USA (right hand traffic)	60/50 W	6014
Sealed beam headlight (left hand traffic)	60/50 W	7002
Stop light/tail light (USA)	32/3 cp	1034
Turn signal/marker light (USA)	32/3 cp	1034
Turn signal (USA)	32 cp	1073
Backup light	15 cp	1003
Side marker light (USA), license plate light (USA)	2 cp	1895

Dimensions at curb weight according to DIN

		911	Carrera	Turbo
Wheelbase	mm	2272	2272	2272
Front track width	mm	1369	1369	1438
Rear track width	mm	1354	1380	1511
Length	mm	4291	4291	4291
Width	mm	1610	1652	1775
Height	mm	1320	1320	1320
Weights				
Curb weight acc. to DIN	ca. kg	1120	1120	1195
Gross vehicle weight	ca. kg	1440	1440	1525
Max. axle load, front/rear	kg	600/840	600/840	625/900
Max. trailer load, w/o brakes **	kg	480	480	–
Max. trailer load, with brakes**	kg	800	800	–
Max. roof load (only coupe)*	kg	35	35	35

* But without exceeding the gross vehicle weight.

** For gradients up to 16%.

Filling capacites

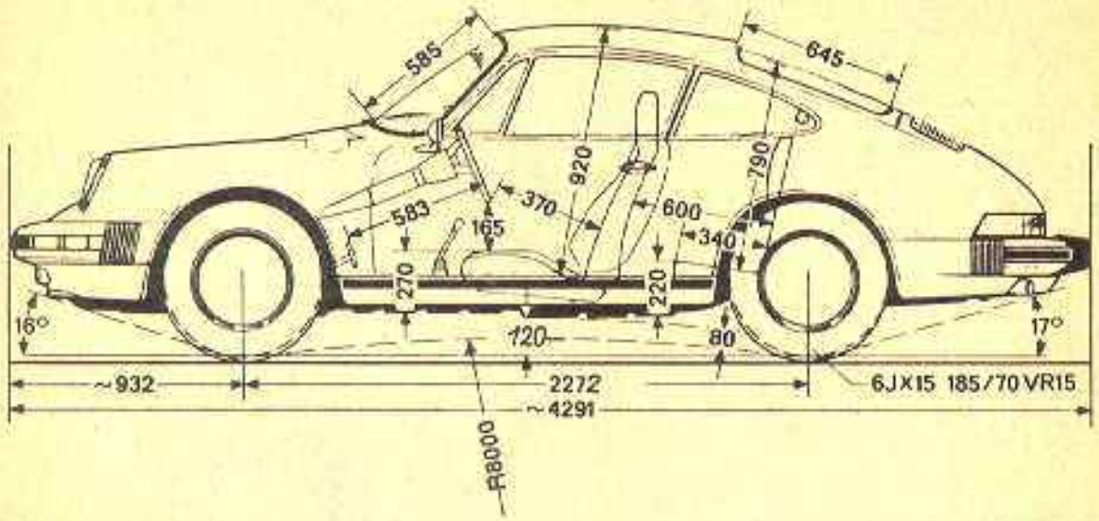
		911	Carrera	Turbo
Engine		Brand name heavy duty oils according to API classification SE of viscosity SAE 10 W/50, 15 W/50, 20 W/50. Only use well known oil makes, which have been tested and approved by Porsche. Single grade oils are also permissible, but then the oil must be changed according to the seasons of the year (temperature – summer/winter) in addition to the normal change intervals. Summer SAE 30, winter SAE 20, at permanent temperatures from – 15° C to 0° C SAE 20 W/20 or SAE 10 W at permanent temperatures below – 15°C.		
Total oil capacity	ca. ltr.	13	13	13
With sportomatic transmission	ca. ltr.	2 more	2 more	–
Oil change quantity	ca. ltr.	10	10	10
Transmission*	ca. ltr.	3.0	3.0	3.7
Sportomatic/manual transmission	ca. ltr.	2.5	2.5	–
Fuel tank	ca. ltr.	80	80	80
Brake fluid tank	ca. ltr.	0.2	0.2	0.2
Windshield washer	ca. ltr.	8.5	8.5	8.5

* SAE 90 meeting specifications of API-GL 5 or Mil-L 2105 B. For locking differential with **80% locking factor** oil meeting Ford Specification M 2 C 28 B.

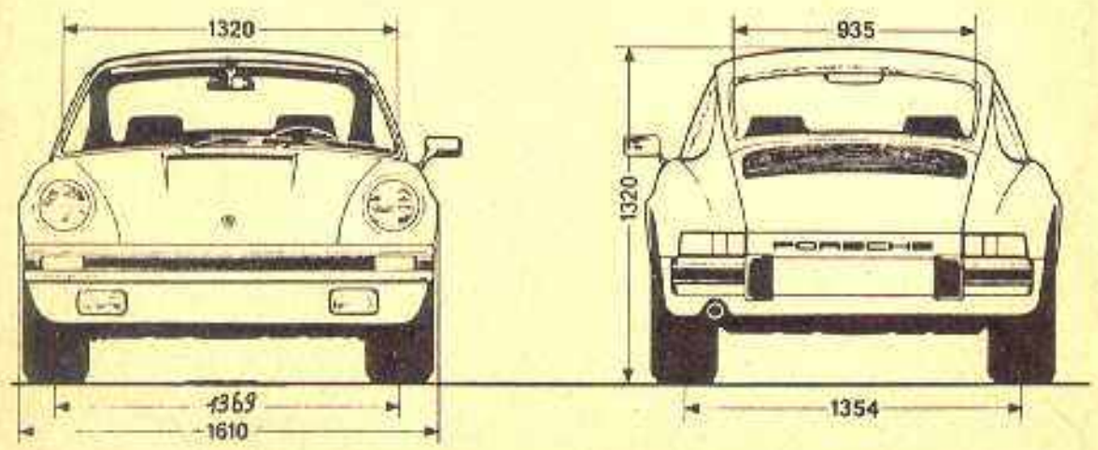
Performances, consumption of fuel and oil

		911	Carrera	Turbo
Top speed	km	above 210 only slight deviation for models with sportomatic transmission	above 230	above 250 –
Acceleration at DIN curb weight plus 1/2 payload	0-100 km/h	7.8 sec	6.5 sec	5.5 sec
Kilometer from standing start		29 sec	27 sec	24 sec
Fuel consumption in mixed traffic	ca. l/100 km	13 – 15	14 – 16	14 – 18
Engine oil consumption	ca. l/1000 km	1.5 to 2.0	1.5 to 2.0	1 to 2

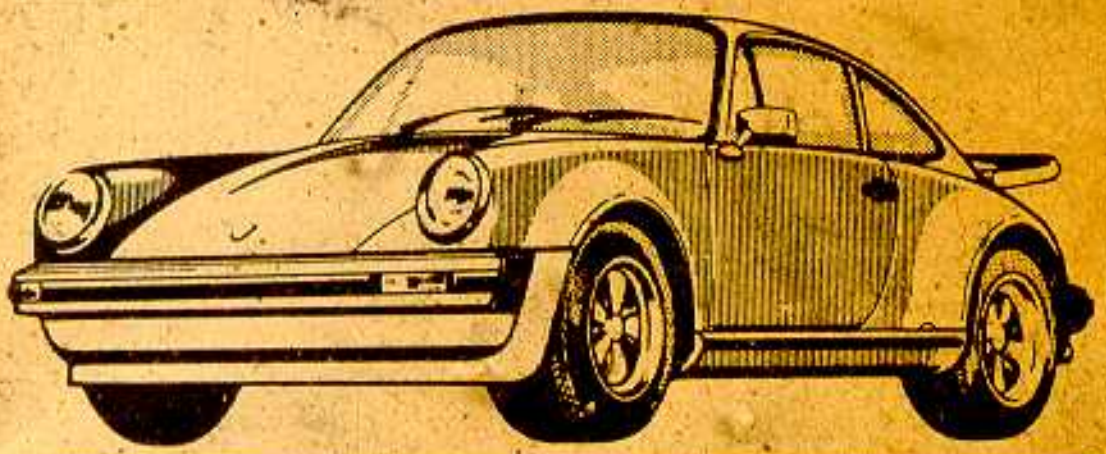
Dimensions for Type 911 – 1976/1977 models



The specifications for overhang angles, curved and normal ground clearances apply to cars at full load.



PORSCHE



911 SC, Turbo 3.3

78, 79 80, 81 Models



Technical Specifications

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Important conversion factors and new units of measurement

	Old units		New units
Pressure	tech. atmosphere at	(kp/cm^2)	Bar (bar)
Output	Horsepower	HP	Kilowatt (kW)
Force	Kilopond	kp	Newton (N)
Power	Kilopondmeter	kpm	Newtonmeter (Nm)

Conversion factors

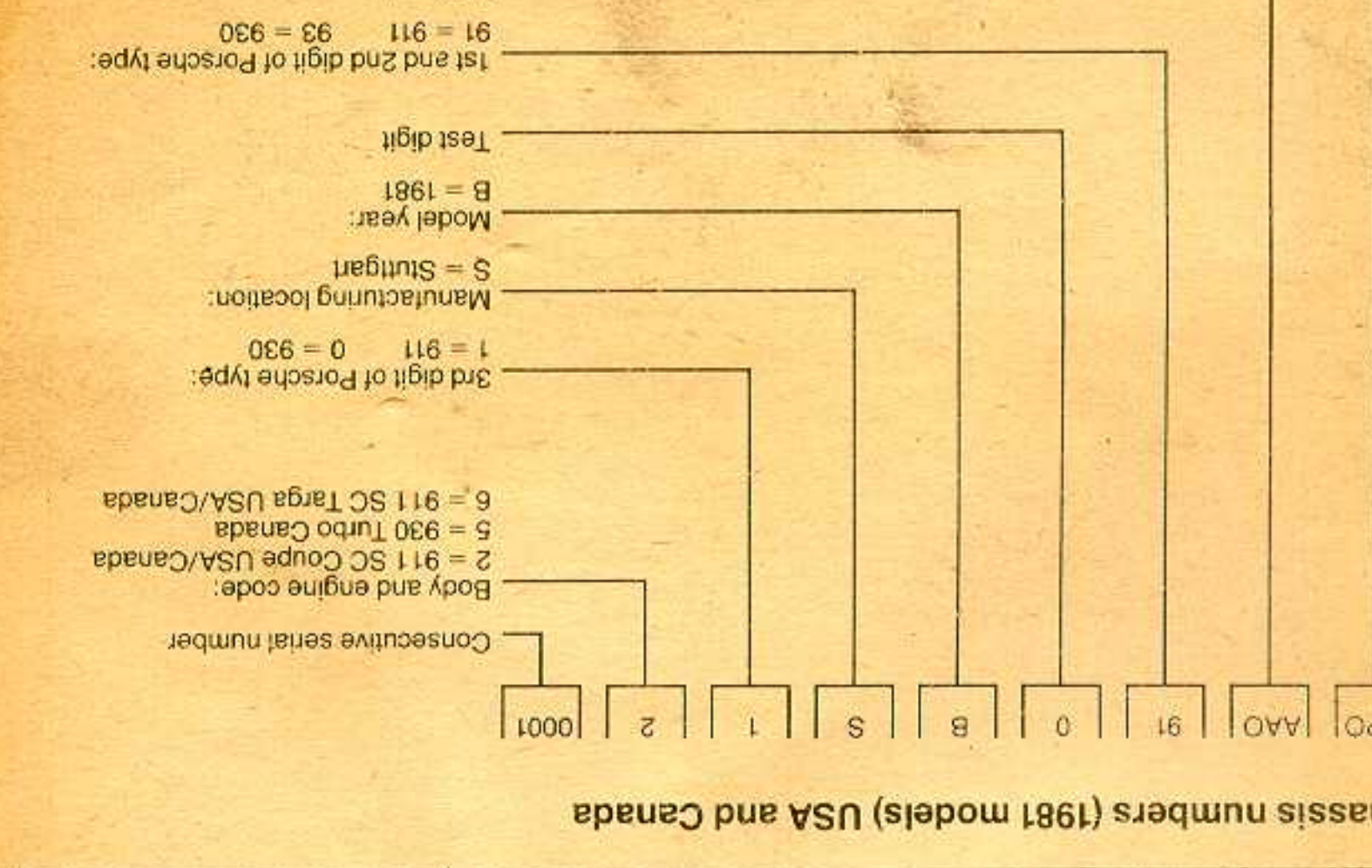
at (kp/cm^2)	in bar	x 0.981
kp	in N	x 9.81
HP	in kW	x 0.736
kpm	in Nm	x 9.81
m/s	in km/h	x 3.6
at	in mm Hg	x 735.56
km/h	in mph (miles)	x 0.621
°F (Fahrenheit)	in °C	(°F - 32) x 0.555
l	in U.S. gal.	x 0.264
l	in Imp. gal.	x 0.22

The conversion factor 10 is applied for the conversion of tightening torque from kpm to Nm. This is more than sufficient for shop practice.

Chassis numbers (1978 and 1979 models)

Chassis numbers (1980 models)

Chassis numbers (1981 models) Rest of World and Japan



Chassis numbers (1981 models) USA and Canada



Engine type designations

Year mfd.	Model year	Engine type designation Official		Internal	Displace-ment	kw/HP
1977/78	1978	911 SC	R. o. W.	930/03	3,0 ltr.	132/180
		911 SC	R. o. W. Spm.	930/13	3.0 ltr.	132/180
		911 SC	USA	930/04	3,0 ltr.	132/180
		911 SC	Japan	930/05	3,0 ltr.	132/180
		911 SC	Japan Spm.	930/15	3,0 ltr.	132/180
		911 SC	California	930/06	3,0 ltr.	132/180
		911 Turbo	R. o. W.	930/60	3,3 itr.	221/300
		911 Turbo	USA	930/61	3,3 ltr.	195/265
		911 Turbo	Japan	930/62	3,3 ltr.	195/265
		911 Turbo	California	930/63	3,3 ltr.	195/265
1979/80	1980	911 SC	USA	930/07	3,0 ltr.	132/180
		911 SC	Japan	930/08	3,0 ltr.	132/180
		911 SC	R. o. W.	930/09	3,0 lltr.	138/188
		911 Turbo	R. o. W.	930/60	3,3 ltr.	221/300
		911 Turbo	USA	930/64	3,3 ltr.	195/265
		911 Turbo	Japan	930/65	3,3 ltr.	195/265
1980/81	1981	911 SC	R. o. W.	930/10	3,0 ltr.	150/204
		911 SC	USA	930/16	3.0 ltr.	132/180
		911 SC	Japan	930/17	3,0 ltr.	132/180
		911 Turbo	R. o. W.	930/60	3,3 ltr.	221/300
		911 Turbo	Canada	930/60	3,3 ltr.	221/300

Engine numbers

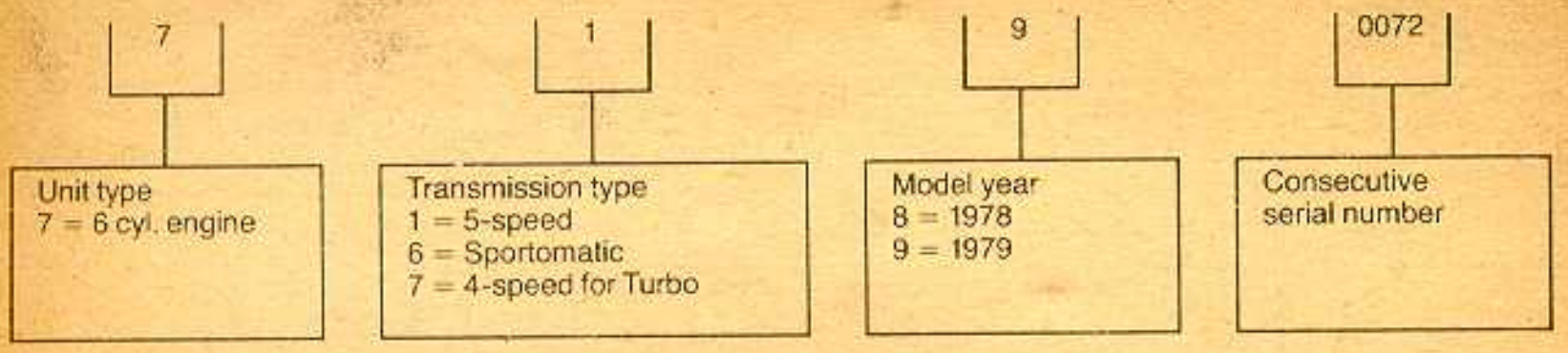
6 — Unit type
6 = 6 cyl. engine

1 — Engine type
1978/1979 models
1 = 911 SC - Japan 3,0 l 132 kW/180 HP
2 = 911 SC - USA 3,0 l 132 kW/180 HP
3 = 911 SC - R. o. W 3,0 l 132 kW/180 HP
5 = 911 SC - California 3,0 l 132 kW/180 HP
7 = 911 Turbo - R. o. W./Japan 3,3 l 221/195 kW/ 300/265 HP
8 = 911 Turbo - USA/California 3,3 l 195 kW/265 HP
1980 models
3 = 911 SC - R. o. W 3,0 l 138 kW/188 HP
4 = 911 SC - USA 3,0 l 132 kW/180 HP
7 = 911 Turbo - R. o. W./Japan 3,3 l 221/195 kW/ 300/265 HP
1981 models
3 = 911 SC - R. o. W 3,0 l 150 kW/204 HP
4 = 911 SC USA/Japan 3,0 l 132 kW/180 HP
7 = 911 Turbo - R. o. W./Canada 3,3 l 221 kW/300 HP

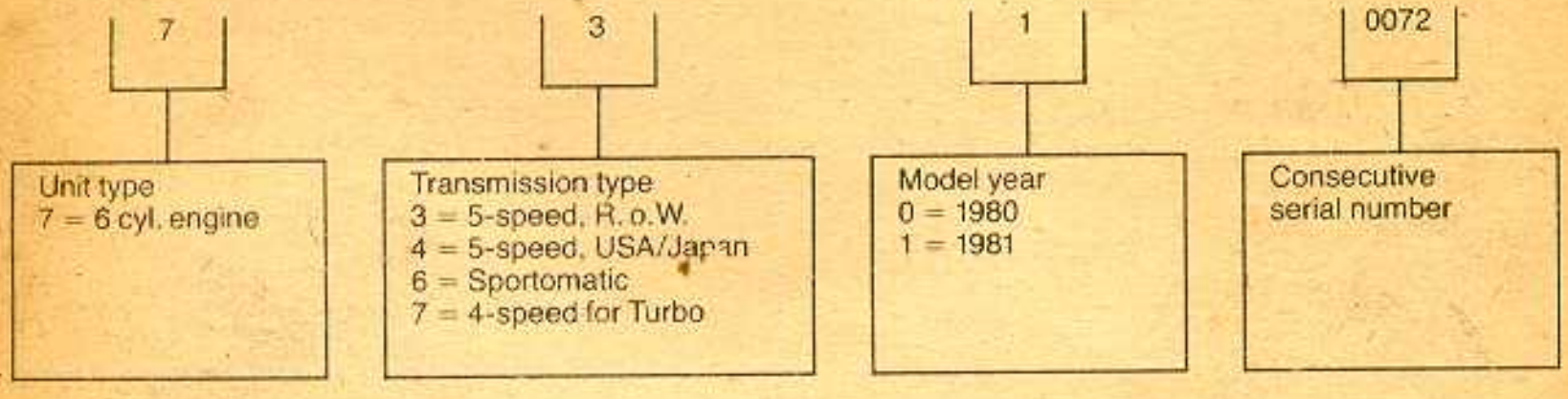
8 — Model year
8 = 1978 0 = 1980
9 = 1979 1 = 1981

0056 — Consecutive serial number usually starting with 0001
Exceptions:
Starting with 9001 = engine for sportomatic
Starting with 2001 = engine type 930/62 (Turbo model 1978 Japan)
Starting with 1001 = engine type 930/63 (Turbo model 1978/79 California)
Starting with 1001 = engine type 930/65 (Turbo model 1979 Japan)
Starting with 8001 = engine type 930/08 and 930/65 (model 1980 Japan)
Starting with 8001 = engine type 930/17 (model 1981 Japan)

Transmission numbers (1978/79 models)



Transmission numbers (1980/81 models)



Transmission type codes

Transmission type	Number of gears	1st gear	2nd gear	3rd gear	4th gear	5th gear	Pinion/ ring gear	As from chassis number	Remarks
1978 mod.									
915.61	5	11/35	18/33	23/29	26/26	28/23	8/31	718 0001	Manual transm. 911 worldwide
930.34	4	16/36	23/30	28/25	32/20	—	9/38	778 0001	Manual transm. Turbo worldwide
925.16	3	15/36	21/30	27/25	—	—	8/27	768 0001	Sportomatic worldwide
1979 mod.									
915.61	5	11/35	18/33	23/29	26/26	28/23	8/31	719 0001	Manual transm. 911 worldwide
930.34	4	16/36	23/30	28/25	32/20	—	9/38	779 0001	Manual transm. Turbo worldwide
925.16	3	15/36	21/30	27/25	—	—	8/27	769 0001	Sportomatic worldwide
1980 mod.									
915.62	5	11/35	18/33	23/29	26/26	28/22	8/31	730 0001	Manual transm. 911 R. o.W.
915.63	5	11/35	18/32	23/29	26/26	28/23	8/31	740 0001	Manual transm. 911 USA/Japan
930.34	4	16/36	23/30	28/25	32/20	—	9/38	770 0001	Manual transm. Turbo worldwide
925.16	3	15/36	21/30	27/25	—	—	8/27	760 0001	Sportomatic worldwide
1981 mod.									
915.62	5	11/35	18/33	23/29	26/26	28/22	8/31	731 0001	Manual transm. 911 R. o.W.
915.63	5	11/35	18/32	23/29	26/26	28/23	8/31	741 0001	Manual transm. 911 USA/Japan
930.34	4	16/36	23/30	28/25	32/20	—	9/38	771 0001	Manual transm. Turbo worldwide

Engine specifications for 1978, 1979, 1980 and 1981 models (911 SC)

Engine Internal engine code		911 SC 930/03/13/04/05/15 06/07/08/16/17		930/09/19	930/10
Design		Four stroke internal combustion engine (two banks of cylinders opposite each other)			
No. of cylinders		6		6	6
Bore	mm/inch	95,0/3.74		95,0/3.74	95,0/3,74
Stroke	mm/inch	70,4/2,77		70,4/2,77	70,4/2,77
Total displacement	$cm^3/inch^3$	2994/182,7		2994/182,7	2994/182,7
Compression ratio		8,5 : 1	9,3 : 1 (930/07/08/16/17)	8,6 : 1	9,8 : 1
Max. engine power acc. DIN 70020	kW/HP	132/180		138/188	150/204
Net power, SAE J 245	kW/HP	128/172		134/179	145/195
at engine speed	rpm	5500		5500	5900
Max. torque acc. DIN 70020	Nm/kpm	265/27	245/25 (930/04/06/05/15/07/08)	265/27	267/27
Net torque, SAE J 245	Nm/ft lbs	257/189	237/175 (930/04/06/05/15/07/08)	257/189	258/190
at engine speed	rpm	4200	4200	4200	4300
Max. liter output acc. DIN 70020	kW/l, HP/l	44/60		46,1/62,8	50,1/68,1
acc. SAE J 245	kW/l, HP/l	42/57		44,8/59,8	48,4/65,1
Max. permissible speed	rpm	7000		7000	7000

Engine Internal engine code		911 SC 930/03/13/04/05/15 06/07/08/16/17	930/09/19	930/10
Cut-off speed				
Speed governed by switching-off ignition	rpm	6800 ± 200 (930/03/13)	6500 ± 200	6800 ± 200
Speed governed by switching off fuel pump	rpm	6700 + 300 (930/04/05/15/06)		
	rpm	6500 + 200 (930/07/08/16/17)		
Engine weight (dry)	kp/lbs. approx.	200/441	190/419	190/419
		190/419 (930/07/08)		
Fuel octane	RON	91 91 lead-free (USA)	91	98
Cooling system		air-cooling from axial blower on alternator		
Blower drive		by v-belt off of crankshaft		
Crankshaft/blower ratio		1 : 1,81 1 : 1,68 for 930/16/17	1 : 1,68	1 : 1,68
Air delivery rate		1380 l/s at 6000 rpm of crankshaft	1500 l/s at 6000 rpm of crankshaft	1500 l/s at 6000 rpm of crankshaft
Drive belt		9,5 x 710	9,5 x 710	9,5 x 710

Engine		911 SC
Internal engine code		930 (all engine types)
Lubricating system		dry sump lubrication
Oil cooling		oil cooler on crankcase in blower air stream, plus cooling pipe coil or pipe oil cooler
Oil pressure at 90 ° C oil temperature and speed of 5000 rpm	bar	approx. 4,0
Oil consumption	ltr./1000 km	approx. 1,5
Crankcase		two-piece aluminum alloy
Crankshaft		forged (tenifer treated)
Crankshaft bearings		8 plain bearings
Connecting rods		forged (steel)
Connecting rod bearings		plain bearing half shells
Piston pin bearing in conrod		press-fit bronze bush
Pistons		cast aluminum
Piston pin		floating installation, held by circlips
Piston rings		2 compression rings, 1 oil scraper ring

Engine	911 SC
Internal engine code	930 (all engine types)
Cylinders	nikasil (Mahle) and alusil (KS)
Cylinder head	single alloy cylinder head
Valve seat insert	shrink-fit made of annealed sintered steel
Valve guide	thermohedul FS
Valve arrangement for each cylinder	1 intake and 1 exhaust valve in vee suspension
Exhaust valve	without sodium filling, with reinforced seat surface
Valve springs	2 coil springs per valve
Valve timing	left and right one each overhead camshaft
Camshaft	cast, 4 bearings direct in camshaft housing (no bearing shells)
Camshaft drive	by chain
Valve clearance on cold engine	
Intake	0,1 mm measured between valve and rocker arm
Exhaust	

Engine Internal engine code		911 SC 930 (all engine types)
Clutch		single plate dry type
Diameter (manual transmission	mm	225
Contact pressure	N (kp)	7800...8500 (775...866)
Diameter (sportomatic)	mm	190
Contact pressure	N (kp)	7848...8633 (800...880)
Fuel supply		K-Jetronic (CIS) 1 electric roller cell pump

Engine specifications for 1978, 1979, 1980 and 1981 models (911 Turbo)

Engine Internal engine code		911 Turbo 930/60	930/61/62/63/64/65
Design		four stroke internal combustion engine (two banks of cylinders opposite each other)	
No. of cylinders		6	6
Bore	mm/inch	97,0/3,82	97,0/3,82
Stroke	mm/inch	74,4/2,93	74,4/2,93
Total displacement	$cm^3/inch^3$	3299/201,3	3299/201,3
Compression ratio		7,0 : 1	7,0 : 1
Max. engine power	kW/HP	221/300	195/265
Net power at engine speed	kW/HP rpm	221/296 5500	195/261 5500
Max. torque	Nm/kpm	412/42	395/40,3
Net torque at engine speed	Nm/lbft rpm	412/304 4000	395/291 4000
Max. liter output	kW/l, HP/l	67/91	67/91
Max. permissible speed	rpm	6700	6700

Engine Internal engine code		911 Turbo 930/60	930/61/62/63/64/65
Max. permissible constant speed	rpm	6000	6000
Cut-off speed of speed governor in distributor	rpm	7000 ± 200	7000 ± 200
Engine weight (dry)	kg/lbs	230/507	240/529
Fuel octane	RON	98	96 lead-free

Engine Internal engine code		911 Turbo 930 (all engine types)
Cooling system		air-cooling from axial blower on alternator
Blower drive		by v-belt off of crankshaft
Crankshaft/blower ratio		1 : 1,68
Air delivery rate		1500 l/s at 6000 rpm of crankshaft
Blower drive belt		9,5 x710
Lubricating system		dry sump lubrication
Oil cooling		oil cooler on crankcase in blower air stream, plus cooling pipe coil or pipe oil cooler
Oil pressure at 90 ° C oil temperature and speed of 5000 rpm	bar	approx. 5,0
Oil consumption	l/1000 km	approx. 1,0 to 2,0
Crankcase		two-piece aluminum alloy
Crankshaft		forged (tenifer treated)
Crankshaft bearings		3 plain bearings
Connecting rods		forged steel

Engine	911 Turbo
Internal engine code	930 (all engine types)
Connecting rod bearings	plain bearing half shells
Piston pin bearing in conrod	press-fit bronze bush
Intermediate shaft bearing	2 plain bearings
Pistons	forged alloy
Piston pin	floating installation, held by circlips
Piston rings	2 compression rings, 1 oil scraper ring
Cylinders	nikasil (Mahle)
Cylinder head	light alloy single cylinder head
Valve seat insert	shrink-fit, made of annealed sintered steel
Valve guide	thermohedul FS
Arrangement of valves per cylinder	1 intake and 1 exhaust valve in vee suspension
Exhaust valve	sodium filled with reinforced seat surface
Valve springs	2 coil springs per valve
Valve timing	left and right one each overhead camshaft
Camshaft	cast, 4 bearings direct in camshaft housing (no bearing shells)

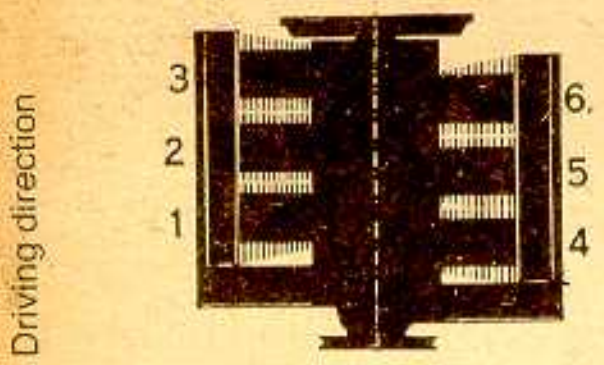
Engine	911 Turbo
Internal engine code	930 (all engine types)

Camshaft drive		by chain
Valve clearance on cold engine		
Intake Exhaust		0,10 mm, measured between valve and rocker arm
Clutch		single plate dry type
Diameter (manual transmission)	mm	240
Contact pressure	N (kp)	11200 to 12100 (1142 to 1233)
Fuel supply		K-Jetronic (CIS) 2 electric roller cell pumps in series
Supercharging		KKK exhaust gas turbocharger

Electrical system

Battery voltage	V	12
Battery capacity	Ah	66 (88 optional extra)
Alternator/output	A/W	70/980
Regulator switch		matched to alternator (black plastic housing)
Ignition		CDI without contacts
Ignition transformer		Bosch
Firing order		1 - 6 - 2 - 4 - 3 - 5

Designation of cylinders on 6 cylinder engine



Firing order
1 - 6 - 2 - 4 - 3 - 5

Engine tolerance and wear limit survey – 911 SC

Note: B = bore W = shaft

Measuring point		Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits in mm
Crankshaft Bearings 1 – 7	– main bearing (d 1)	B 60,020 – 60,059 W 59,971 – 59,990	+ 0,010	+ 0,072	visual inspect. 59,960
Crankshaft Bearing 8	– main bearing (d 3)	B 31,041 – 31,084 W 30,980 – 30,993	+ 0,048	+ 0,104	visual inspect. 30,970
Crankpin	– conrod bearing (d 2)	B 53,020 – 53,059 W 52,971 – 52,990	+ 0,030	+ 0,088	visual inspect. 52,960
Crankshaft runout (measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)					max. 0,04
Crankshaft unbalance					max. 10 cmg.
Crankshaft Axial play	– main bearing		+ 0,110	+ 0,195	0,30
Crankshaft	– timing gear	B 41,975 – 42,000 W 42,002 – 42,013	– 0,002	– 0,038	
Crankshaft	– distributor drive	B 41,975 – 42,000 W 42,002 – 42,013	– 0,002	– 0,038	
Crankshaft	– flywheel	B 50,002 – 50,021 W 50,000 – 50,030	+ 0,021	+ 0,028	
Crankshaft	– pulley	B 30,000 – 30,033 W 29,960 – 29,993	+ 0,007	+ 0,073	
Pulley: radial runout lateral runout					max. 0,15 max. 0,20

Engine tolerance and wear limit survey – 911 Turbo

Note: B = bore W = shaft

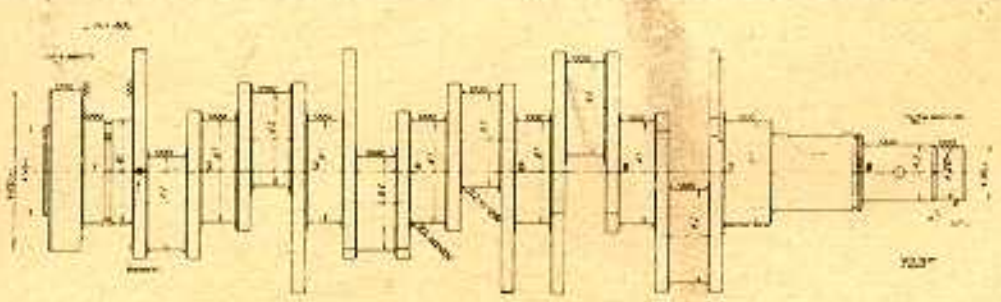
Measuring point		Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits in mm
Crankshaft – main bearing		B 60,020 – 60,059	+ 0,010	+ 0,072	visual inspect.
Bearings 1 – 7	(d 1)	W 59,971 – 59,990			59,960
Crankshaft – main bearing		B 31,041 – 31,084	+ 0,048	+ 0,104	visual inspect.
Bearing 8	(d 3)	W 30,980 – 30,993			30,970
Crankpin – conrod bearing		B 55,020 – 55,059	+ 0,030	+ 0,088	visual inspect.
	(d 2)	W 54,971 – 54,990			54,960
Crankshaft runout					max. 0,04
(measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)					
Crankshaft unbalance					max. 10 cmg.
Crankshaft – main bearing					
Axial play			+ 0,110	+ 0,195	0,30
Crankshaft – timing gear		B 41,975 – 42,000	– 0,002	– 0,038	
		W 42,002 – 42,013			
Crankshaft – distributor drive		B 41,975 – 42,000	– 0,002	– 0,038	
		W 42,002 – 42,013			
Crankshaft – flywheel		B 90,000 – 90,030	0,0	+ 0,049	
		W 89,780 – 90,000			
Crankshaft – pulley		B 30,000 – 30,033	+ 0,007	+ 0,073	
		W 29,960 – 29,993			
Pulley: radial runout					max. 0,15
lateral runout					max. 0,20

Crankshaft – standard and repair sizes – 911 SC

Size	Crankcase diameter bearings 1–8	All main bearings d 1	Connecting rod bearings d 2	Main bearing dia. d 3 of crankshaft bearing 8	Collar dia. d 4	Seat for timing gear dia. d 5	Crankshaft pulley dia. d 6	Thrust bearing width A
Stand.		59,971...59,990	52,971...52,990	30,980...30,993	89,780...90,000	42,002...42,013	29,960...29,993	28,000...28,060
- 0,25		59,721...59,740	52,721...52,740	30,730...30,743				
- 0,50		59,471...59,490	52,471...52,490	30,480...30,493	89,280...89,500		29,370...29,500	
- 0,75		59,221...59,240	52,221...52,240	30,230...30,243				
- 1,00		58,971...58,990	51,971...51,990	29,980...29,993				

Normal
65,000...65,019

Oversize
65,250...65,269



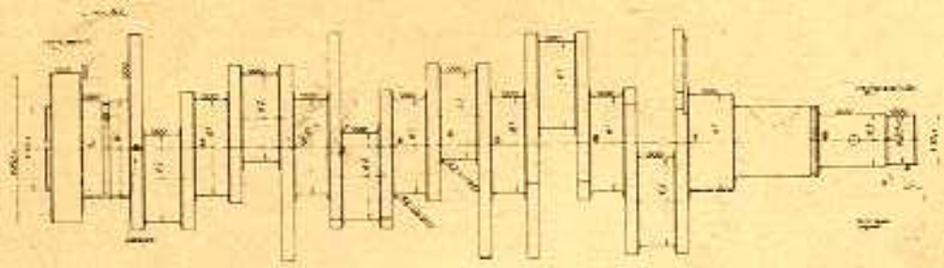
Only grind bearing surfaces for radial oil seals to 29,5 and 89,5 as specified here when scoring is too deep. Otherwise repolish as necessary: 3 microns.
After grinding give oil bores a 0,5 radius. Break sharp edges with 0,2 to 0,5 radius. Max. radial runout in reference to take-up in — —: max 0,04.
Specification for tenifer treatment according to Tenifer 120 W PN 1053 ferroflux.
Never straighten main bearings 3 and 5 after tenifer treatment. Straightening of the other main bearing journals through stemming in the radii is permitted.

Color codes for repair sizes

1st repair size yellow paint dot
2nd repair size green paint dot
3rd repair size yellow paint dot
4th repair size white paint dot

Crankshaft – standard and repair sizes – 911 Turbo

Size	Crankcase diameter bearings 1–8	All main bearings d 1	Connecting rod bearings d 2	Main bearing dia. d 3 or crankshaft bearing 8	Collar dia. d 4	Seat for timing gear dia. d 5	Crankshaft pulley dia. d 6	Thrust bearing width A
Stand.	Standard	59,971...59,990	54,971...54,990	30,980...30,993	89,780...90,000	42,002...42,013	29,960...29,993	28,000...28,060
- 0,25	65,000...65,019	59,721...59,740	54,721...54,740	30,730...30,743				
- 0,50	Oversize	59,471...59,490	54,471...54,490	30,480...30,493	89,280...89,500		29,370...29,500	
- 0,75	65,250...65,269	59,221...59,240	54,221...54,240	30,230...30,243				
- 1,00		58,971...58,990	53,971...53,990	29,980...29,993				



Only grind bearing surfaces for radial oil seals to 29,5 and 89,5 as specified here when scoring is too deep. Otherwise repolish as necessary: 3 microns.
After grinding give oil bores a 0,5 radius. Break sharp edges with 0,2 to 0,5 radius. Max. radial runout in reference to take-up in — · —: max. 0,04.
Specification for tenifer treatment according to Tenifer 120 W PN 1053 terroflux.
Never straighten main bearings 3 and 5 after tenifer treatment. Straightening of the other main bearing journals through stemming in the radii is permitted.

Color codes for repair sizes

1st repair size	blue	paint dot
2nd repair size	green	paint dot
3rd repair size	yellow	paint dot
4th repair size	white	paint dot

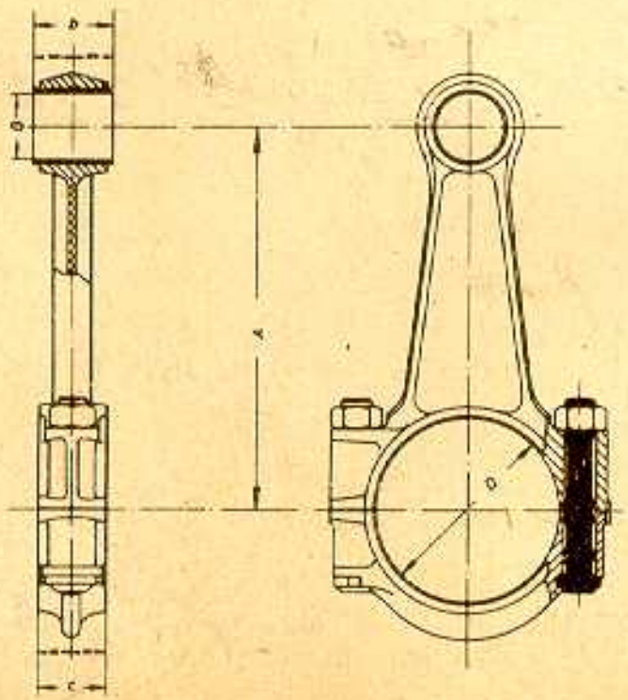
Measuring point	Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limit mm
Crankcase				
Case bore for main bearings:				
Bearing 1 – 8	65,000 . . . 65,019			
Oversize	65,250 . . . 65,269			
Case bore for intermediate shaft:				
Bearing 1 (thrust bearing)	27,500 . . . 27,521			
Bearing 2	26,500 . . . 26,521			
Spring for safety valve:				
Relaxed length	70,00			
Spring force at 52 mm	104 N/10,6 kp			
Spring force at 46 mm	138 N/14,1 kp			
Spring wire dia.	1,8			
Spring for pressure relief valve:				
Relaxed length	86,6			
Spring force at 50,5 mm	82,4 N/8,4 kp			
Spring force dia.	1,5			

Installation Note:

The pressure relief valve spring (86,8 mm long) may only be used in conjunction with a spring guide (safeguard against bending).

Never press springs flat.

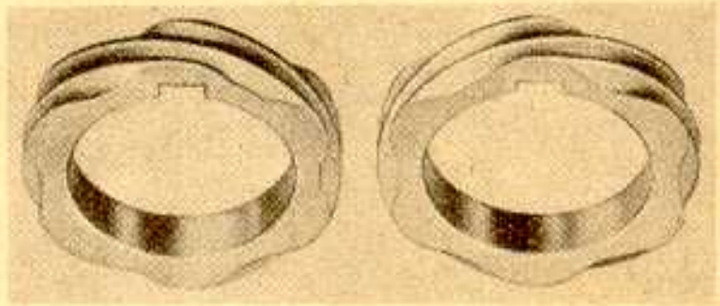
Measuring point	Install. size with tolerances mm 911 SC	911 Turbo	Clearance (+) or press fit (–) from	to	Wear limit mm
Connecting rods					
A Distance between centers	127,75-127,80	126,95-127,00			
b Width of conrod bush	24,8-25,0	24,5-25,0			
c Width at big end	21,7-21,8	21,7-21,8			
Width at crankpin	22,00-22,05	22,00-22,05	+0,200	+0,350	
D Conrod dia. (without bearing shell)	56,000-56,019	58,000-58,019			
G Conrod bush dia. installed in conrod (finished)	22,020-22,033	23,020-23,033			
Piston pin bushing/piston pin clearance			+0,020	+0,037	0,055



Installing drive gear for left-hand turning distributor on crankshaft

Remarks:

From 1978 models on the engines use a left-hand turning distributor and therefore required a new drive gear with modified teeth on the crankshaft.



For left-hand turning distributor (with Porsche manufacturing code stamped)

For right-hand turning distributor (with VW manufacturing code stamped)

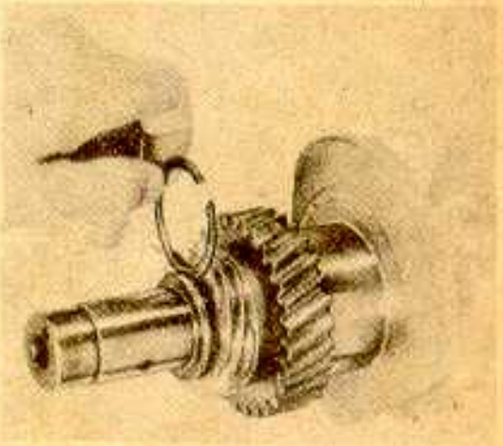
Installing circlip on crankshaft

To take up axial play on distributor drive gear, there are circlips in different thicknesses.

The following circlips are available:

Part No.	Thickness mm	Code
901.102.148.00	2,4	0
901.102.148.01	2,3	1
901.102.148.02	2,2	2
901.102.148.03	2,1	3

Install timing gear, intermediate ring and drive gear for left-hand turning distributor on crankshaft against stop. Find correct circlip thickness by inserting different circlips. Circlip must be installed without play.



Connecting rod weight groups → 911 SC

Connecting rods are grouped according to weights.

Final digits of the part number indicate the specified weight group.

These final digits are stamped on the connecting rod shank if it is supplied as a replacement part.

Weight Over grams	Under grams	Weight group for service	Service Conrod part number	Conrod code
633	642	1	930.103.015.51	51
642	651	2	930.103.015.52	52
651	660	3	930.103.015.53	53
660	669	4	930.103.015.54	54
669	678	5	930.103.015.55	55
678	687	6	930.103.015.56	56
687	696	7	930.103.015.57	57
696	705	8	930.103.015.58	58
705	714	9	930.103.015.59	59

Connecting rod weight groups – 911 Turbo

Weight Over grams	Under grams	Weight group for service	Service Conrod part number	Conrod code
624	633	4	930.103.020.74	74
633	642	5	930.103.020.75	75
642	651	6	930.103.020.76	76
651	660	7	930.103.020.77	77
660	669	8	930.103.020.78	78

Note:

Connecting rods installed in a given engine must not differ in weight by more than 9 grams. To determine weight group, weigh the complete connecting rod without bearing shells.

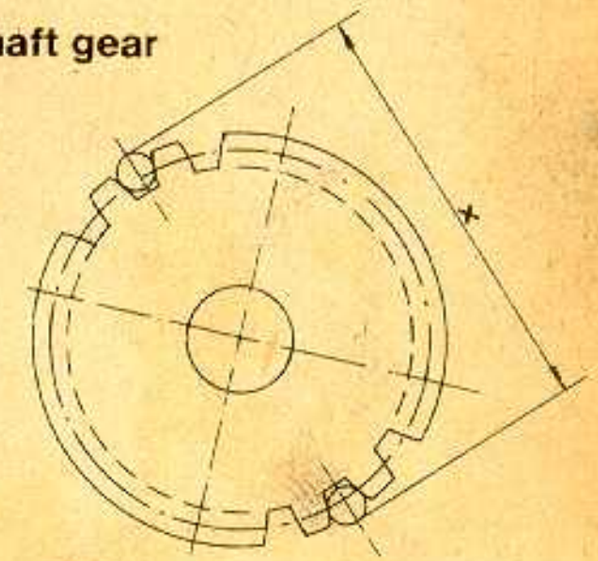
Matching intermediate shaft and crankcase

See marking on left half of crankcase below alternator support: 0 or 1.

Distance between centers mm	Crankcase mark	Crankshaft gear marking	Intermediate shaft gear marking	Backlash mm
103.975-103.990	0	0	0	0.029–0.049
		Installation	still possit.	
		1	0	0.016–0.042
		0	1	0.017–0.043
103.990-104.000	1	1	1	0.012–0.041
		Installation	still possible	
		0	1	0.025–0.049
		1	0	0.025–0.048

Checking intermediate shaft gear

Use 4.5 mm dia. steel rollers to measure gear (see sketch).



Intermediate shaft gear (standard) – wear limit x 136.5 mm
Intermediate shaft gear (marked 1) – wear limit = 136.55 mm

Replace intermediate shaft gears and crankshaft gears in sets only.

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Intermediate shaft				
Bearing 1 Crankcase bore – shaft	B 27.500–27.521 W 25.000–24.980			
Bearing 2 Crankcase bore – shaft	B 26.500–26.521 W 23.980–23.967			
Intermediate shaft clearance		+ 0.030	+ 0.084	
Intermediate shaft axial play		+ 0.040	+ 0.133	0.16
Chain guide – bolt	B 8.000– 8.015 W 7.822– 7.837			
Pinion – distributor shaft	B 12.456–12.474 W 12.444–12.455	+ 0.001	+ 0.030	
Distributor – crankcase	B 27.000–27.021 W 26.947–26.980	+ 0.020	+ 0.074	
Flywheel – drive shaft steel bushing	B 50.000–50.030 W 49.975–49.991	+ 0.009	+ 0.055	
Flywheel				
Lateral runout				max. 0.10
Radial runout				max. 0.20

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Timing chain case				
Sprocket pivot shaft – chain tensioner housing	B 15.000–15.018 W 14.973–14.984	+ 0.016	+ 0.045	Visual inspection
Sprocket pivot shaft – sprocket carrier	B 15.000–15.018 W 14.973–14.984	+ 0.016	+ 0.045	
Sprocket carrier – sprocket pin	B 15.000–15.018 W 14.989–15.000	0.000	+ 0.029	
Sprocket – sprocket pin	B 15.032–15.050 W 14.989–15.000	+ 0.032	+ 0.610	Visual inspection
Pin – chain guide	B 8.000– 8.015 W 7.886– 7.895	+ 0.105	+ 0.129	
Pin – timing chain case	B 7.857– 7.872 W 7.886– 7.895	– 0.014	– 0.038	

Parallel alignment of both sprockets may not deviate by more than 0.25 mm.

Measuring point	Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits mm
Camshaft housing – camshaft				
Camshaft bearings	B 48,967 - 48,992	+0,025	+0,066	0,10
Camshaft	W 48,926 - 48,942			
Camshaft – axial play		+0,150	+0,200	0,40
Camshaft – timing gear flange	B 30,000 - 30,013 W 29,979 - 30,000	0,000	+0,034	
Camshaft – runout, measured on center bearing (between points)				max. 0,02
Rocker arm shaft – camshaft case	B 18,000 - 18,018 W 17,992 - 18,000	Rocker arm shaft held firm by wedge effect		
Rocker arm – rocker arm shaft	B 18,016 - 18,027 W 17,992 - 18,000	+0,016	+0,035	0,080
Axial play		+0,100	+0,350	0,50

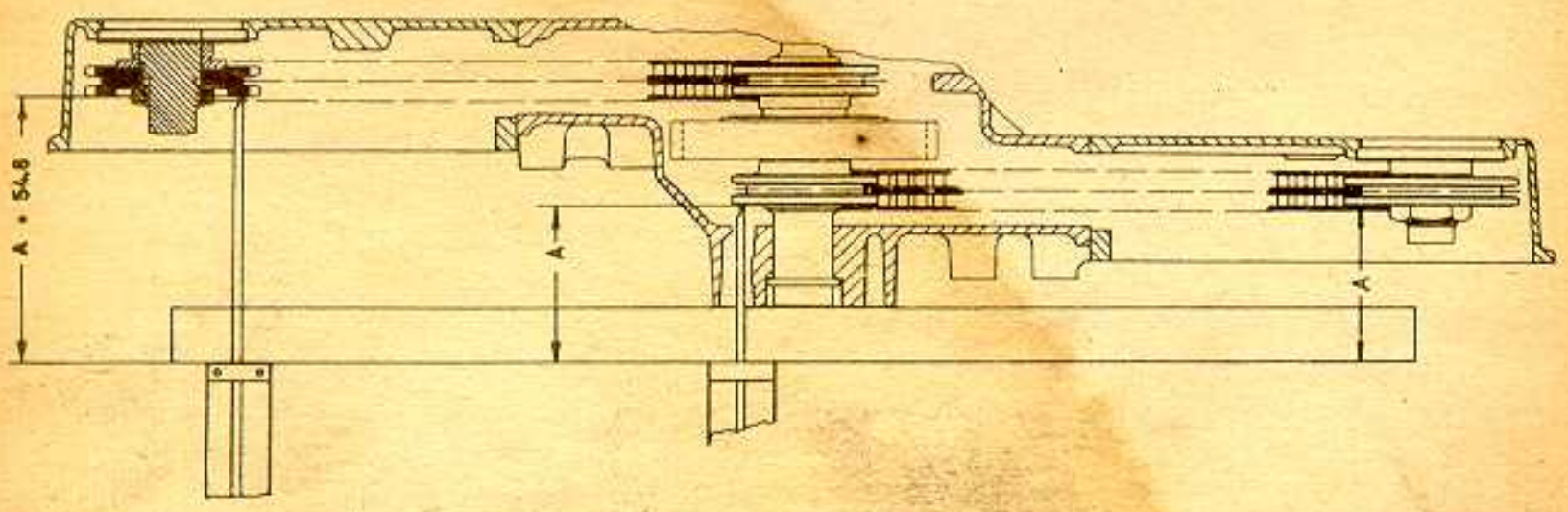
Checking parallel alignment of timing chain sprockets

Before measuring, push intermediate shaft and camshaft axially toward flywheel to set bearing thrust flanges in position.

Measurement is made through hole below intermediate shaft against side of forward chain sprocket on intermediate shaft (dimension A).

This dimension must also be achieved at sprocket for cylinders 4 – 6. Use shims if necessary (maximum permissible difference is 0.25 mm).

Sprocket for cylinders 1 – 3, mounted on intermediate shaft, is positioned 54.8 mm further to front. This 54.8 mm (design dimension) must be considered when determining dimension A. (maximum permissible difference is 0.25 mm).



Example: measured dimension A = 78.7 mm
This means sprocket of cylinders 1 – 3 is A + 54.8 = 78.7 + 54.8 = 133.5 mm

Pistons and cylinders (sizes, weights and marks)

Size	Code	Nominal dia.	911 SC Piston dia. D KS	Alusil cylinder dia.	911 Turbo Piston dia. D Mahle	Nikasil cylinder dia.
Standard	0	95/97	94,963 - 94,977	95,000 - 95,007	96,960 - 96,970	97,000 - 97,007
	1		94,970 - 94,984	95,007 - 95,014	96,967 - 96,977	97,007 - 97,014
	2		94,977 - 94,991	95,014 - 95,021	96,974 - 96,984	97,014 - 97,021
	3		94,984 - 94,998	95,021 - 95,028	96,981 - 96,991	97,021 - 97,028
Play between piston and cylinder			0,023 - 0,044		0,030 - 0,047	

Size	Code	Nominal dia.	911 SC Piston dia. D Mahle	Nikasil cylinder dia.
Standard	0	95/97	94,965 - 94,975	95,000 - 95,007
	1		94,972 - 94,982	95,007 - 95,014
	2		94,979 - 94,989	95,014 - 95,021
	3		94,986 - 94,996	95,021 - 95,028
Play between piston and cylinder			0,025 - 0,042	

Weight classes of pistons – 911 SC from 1980 models

Installation specifications:

1. Always only install pistons of same make and same weight class in one engine.
2. Piston pins must always remain with matching pistons and must not be mixed up even within an engine. Pay attention to this, marking pistons/pins if necessary, when disassembling and assembling engine.

Weight classes for MAHLE pistons
Pistons weighed with components (piston pin, piston rings, circlips)

	Total piston weight in grams Weight class within one set		Code
Engine type	930/09	930/07/08	
Standard production	660 to 664	636 to 640	– –
	664 to 668	640 to 644	–
Max. weight difference 4 grams	668 to 672	644 to 648	+
	672 to 676	648 to 652	+ +
For service sector	660 to 668	636 to 644	– – or –
Max. weight difference 8 grams	668 to 676	644 to 652	+ or + +

Weight classes for KS pistons
Pistons weighed with components (piston pin, piston rings, circlips)

	Total piston weight in grams Weight class within one set	Code
Engine type	930/09	
Standard production	695 to 699	– –
	699 to 703	–
Max. weight difference 4 grams	703 to 707	+
	707 to 711	+ +
For service sector	695 to 703	– – or –
Max. weight difference 8 grams	703 to 711	+ or + +

Weight classes of pistons – 911 SC from 1981 models

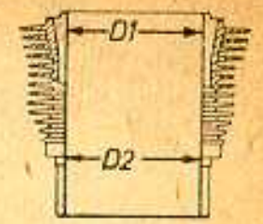
Weight classes for MAHLE pistons
Pistons weighed with components (piston pin, piston rings, circlips)

	Total piston weight in grams Weight class within one set		Code
Engine type	930/10 (R. o. W.)	930/16/17 (USA/Japan)	
Standard production	668 to 672	636 to 640	– –
	672 to 676	640 to 644	–
Max. weight difference 4 grams	676 to 680	644 to 648	+
	680 to 684	648 to 652	+ +
For service sector	668 to 676	636 to 644	– – or –
Max. weight difference 8 grams	676 to 684	644 to 652	+ or + +

Weight classes for KS pistons
Pistons weighed with components (piston pin, piston rings, circlips)

	Total piston weight in grams Weight class within one set	Code
Engine type	930/16/17	
Standard production	673 to 677	– –
	677 to 681	–
Max. weight difference 4 grams	681 to 685	+
	685 to 689	+ +
For service sector	673 to 681	– – or –
Max. weight difference 8 grams	681 to 689	+ or + +

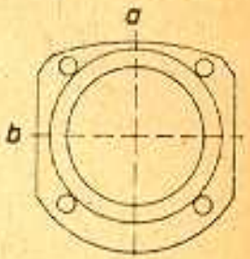
Checking pistons and cylinders



Cylinders
D1 = Measuring point for wear and ovality

30 mm below cylinder upper edge

The cylinder is worn, if the distance at this measuring point is 0,08 mm more than the installation size. The ovality of a cylinder is determined by measuring in directions a and b. The difference between a and b must not exceed 0,04 mm.

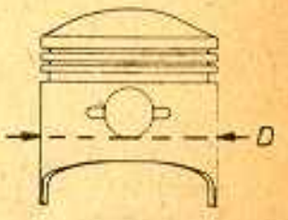


D 2 = Measuring point for piston pin gap

Rings slid in a height of cylinder base gasket.

Pistons
D = Measuring point for wear

At height of piston pin bore lower edge.



Note
Replace pistons and cylinders when running clearance exceeds 0,15 mm. This results from the difference between the max. cylinder dia. and the min. piston dia.

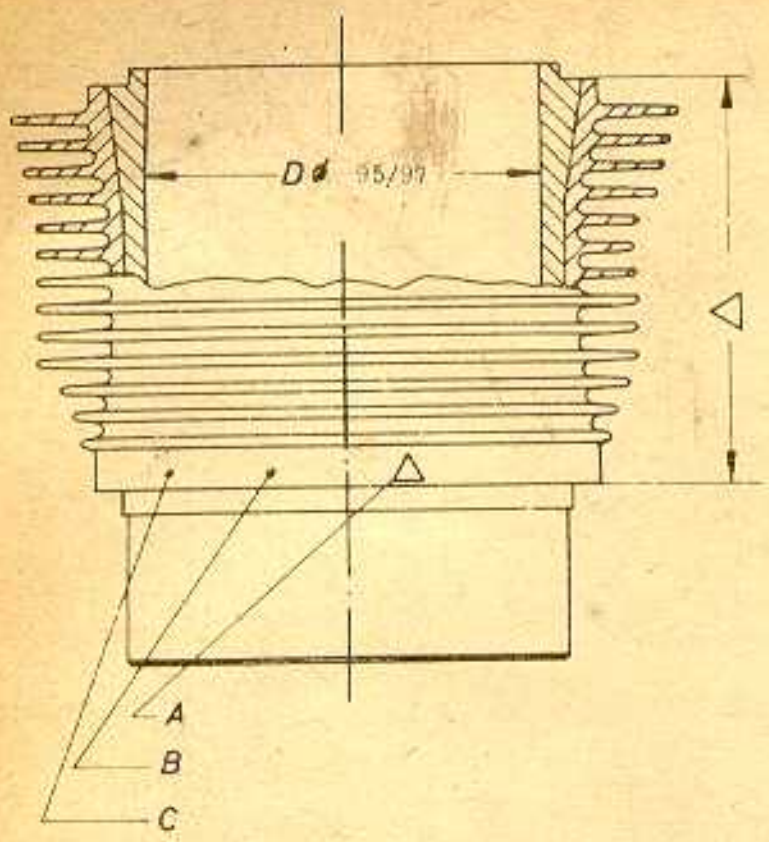
Piston ring gap

Piston ring	Gap mm (installation size)	Gap mm (wear limit)
Compression ring, I and II	0,15 - 0,3	0,8
Oil scraper ring, III	0,15 - 0,3	1,0
Oil scraper ring, III 3-piece "LS" ring (see measuring point "D 2")	0,4 - 1,4	2,0

Piston ring height clearance

Piston ring	Height play mm (installation size)	Height play mm (wear limit)
Compression ring, I	0,070 - 0,102	0,2
Compression ring, II	0,040 - 0,072	0,2
Oil scraper ring, III	0,020 - 0,052	0,1

Cylinder sizes



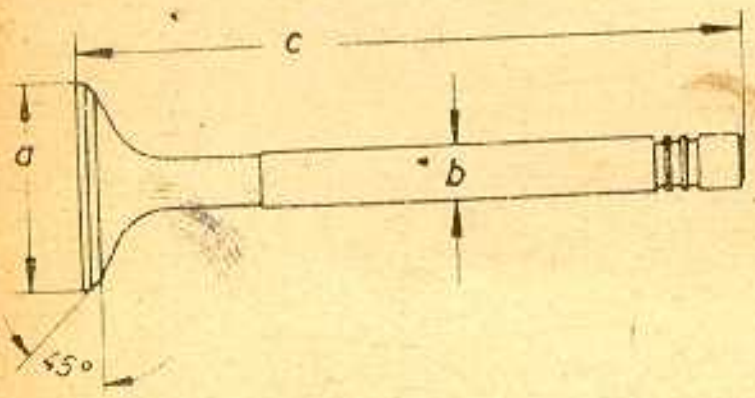
Cylinder height tolerances

Code A	Cylinder height	
5	85,400 - 85,425	911 SC
	85,600 - 85,625	911 Turbo
6	85,425 - 85,450	911 SC
	85,625 - 85,650	911 Turbo

A Tolerance group for cylinder height
B Tolerance group for cylinder diameter (refer to table)
C Manufacturer's identification

Valve size

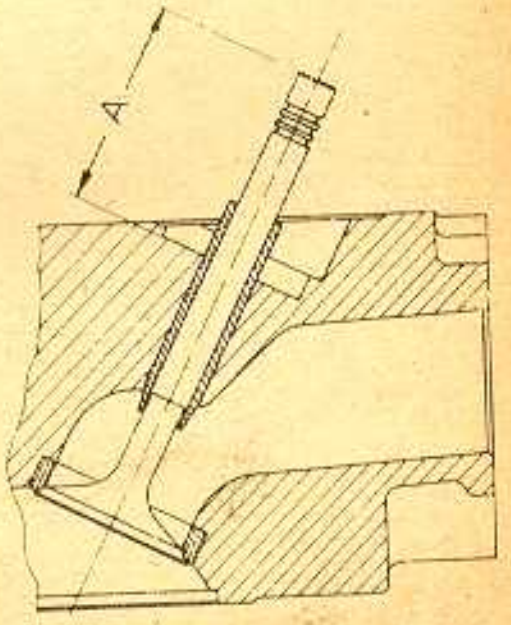
	911 SC Intake	Exhaust	911 Turbo Intake	Exhaust
a	49 ± 0,1	41,5 ± 0,1	49 ± 0,1	41,5 ± 0,1
b	8,97 – 0,012	8,95 – 0,012	8,97 – 0,012	8,95 – 0,012
c	110,1 ± 0,25	108,4 ± 0,25	110,1 ± 0,25	103,4 ± 0,25



Checking valve seats

To check valve seat depth, insert respective valve into guide and measure distance between valve stem end and bottom of shim cavity, without shims (see distance A in sketch).

If dimension is greater than specified, measure again a new valve. If dimension is still beyond specifications, valve seat inserts have been cut to deep and should be replaced, or exchange cylinder head.

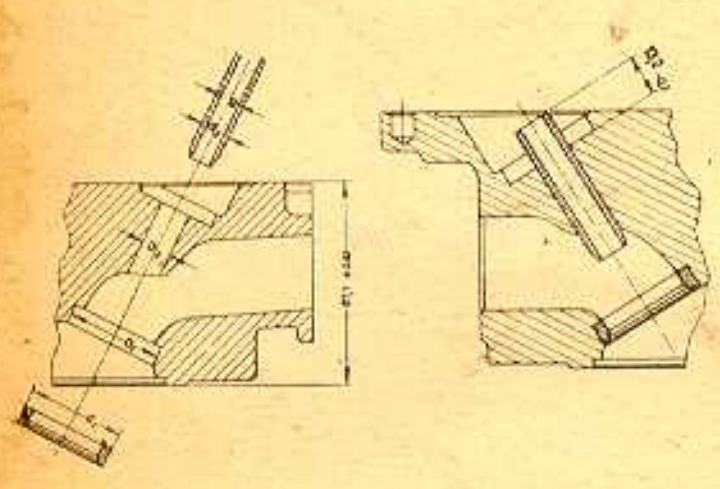


Distance A

911 SC, 911 Turbo 46,0 + 0,3 mm

Valve guides (wear limits, installation sizes)

Measuring point	Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits mm
Valve guide, outside dia. d2 Cylinder head, bore dia. D2	13.049–13.060 13.000–13.018	– 0.031	– 0.060	
Intake valve guide, inside dia. g intake valve stem, dia. b	9.000– 9.015 8.958– 8.970	+ 0.030	+ 0.057	0.15
Exhaust valve guide, inside dia. g Exhaust valve stem, dia. b	9.000– 9.015 8.938– 8.950	+ 0.050	+ 0.077	0.20



Machine 1st and 2nd oversize to correspond with bore in cylinder head.
Press fit: 0.06–0.09 mm.

Size table for pulling in valve guides

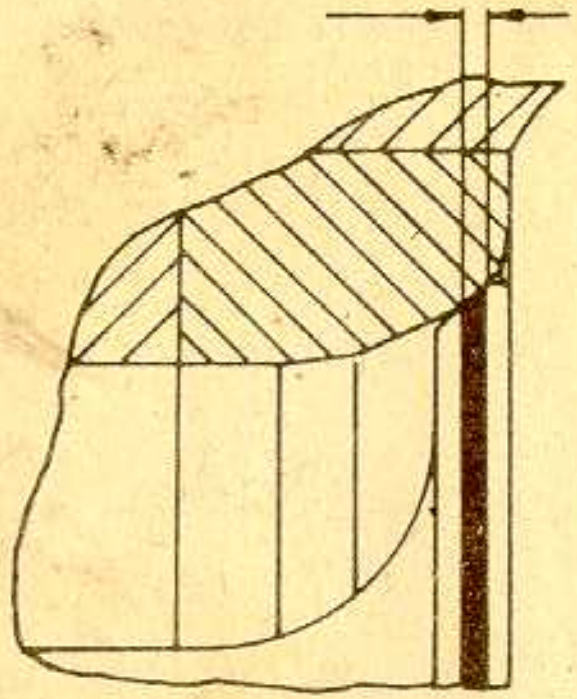
Valve guide	Outside dia. d 2 Valve guide *	Bore dia. D 2 Cylinder head
Standard size	13,060	13,000 - 13,018
1st oversize	13,260	13,000 - 13,200
2nd oversize	13,460	13,201 - 13,400

* Grind valve guides on diameter d 2 according to pertinent bore diameter D 2 – remembering press-fit – 0,06 . . . 0,09 mm.

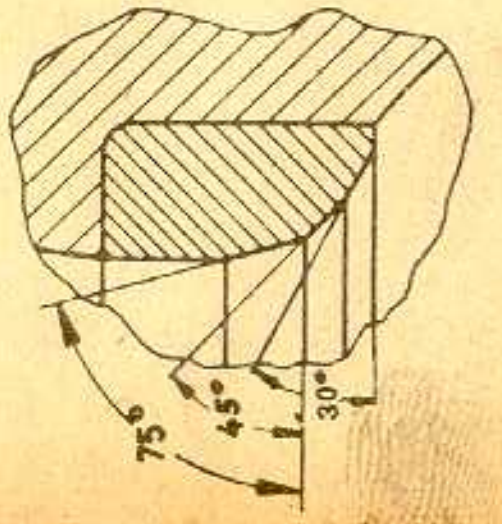
Specifications for installation of valve seat inserts

911 SC and 911 Turbo		Outside dia. d 1 valve seat insert	Bore D 1 in cylinder head
Standard size	Intake	51,660 – 51,661	51,500 – 51,530
Standard size	Exhaust	44,200 – 44,184	44,000 – 44,025
1st oversize	Intake	52,000 – 51,981	51,820 – 51,850
1st oversize	Exhaust	44,760 – 44,744	44,560 – 44,585

Intake = 1,3 ± 0,1
Exhaust = 1,5 ± 0,1



Angles and sizes of valve seat inserts



Important manual transmission adjusting data 915 and 930

2 examples for adjustment of pinion and ring gear

	Transm. Type 915	Transm. Type 930
Design dimension "R"	66,30 mm	82,29 mm
Deviation "r"	+ 0,10 mm	+ 0,02 mm
Adjustment dimension "E"	66,40 mm	82,31 mm
Dial gauge setting	66,30 mm	82,29 mm
Measured dimension (without shims)	– 0,29 mm	– 0,14 mm
Distance to face end of pinion shaft	66,01 mm	82,15 mm
Adjustment dimension "E"	66,40 mm	82,31 mm
Distance to face end of pinion shaft	– 66,01 mm	– 82,15 mm
Thickness of shims	0,39 mm *)	0,16 mm *)

*) Round off the nearest 0,05 mm.

Shims are available 0,10, 0,15 and 0,20 mm thick.

Recheck adjustment dimension "E" after installation of shims; a deviation of ± 0,03 mm is permissible.

Transmission tolerance survey

Measuring point	Type 915		Type 930	
	Installation tolerance mm	Wear limit mm	Installation tolerance mm	Wear limit mm
1. Backlash between gear I and II				
1st gear	0,17	0,22	0,055 - 0,13	0,22
2nd gear	0,17			
3rd gear	0,05 - 0,13			
4th gear	0,05 - 0,13			
5th gear	0,05 - 0,13			
2. Loose gears on pinion and drive shaft Axial clearance				
1st gear	0,3 - 0,4	0,5		
2nd gear	0,2 - 0,3	0,4		
3rd gear	0,2 - 0,3	0,4	same as 915	
4th gear	0,2 - 0,3	0,4		
5th gear	0,2 - 0,3	0,4		
3. Selector rods				
a) in guides radial clearance	0,195 - 0,236	0,4	same as 915	
b) Runout	--	0,1		

Measuring point	Typ 915		Typ 930	
	Installation tolerance mm	Wear limit mm	Installation tolerance mm	Wear limit mm
4. Selector forks in operating sleeve Axial clearance				
5th and reverse gear	0,1 - 0,3	0,5		
1st and 2nd gear	0,1 - 0,3	0,5	same as 915	
3rd and 4th gear	0,1 - 0,3	0,5		
5. Synchronizing rings Outside dia. installed				
1st gear	86,20 - 86,54	after	86,15 - 86,65	after
2nd gear	86,20 - 86,54	local wear	86,15 - 86,65	local wear
3rd gear	76,12 - 76,48	through of	76,20 - 76,55	through of
4th gear	76,12 - 76,48	molybdenum	76,20 - 76,55	molybdenum
5th gear	76,12 - 76,48	layer	—	layer
6. Drive shaft Max. runout at guidepin	0,1	0,1 (align)	same as 915	

Tightening torque for bolts and nuts of manual transmission 915

Location	Designation	Threads	Material	Tightening torque Nm	Tightening torque kpm
Transmission case (oil drain)	Plug with magnet	M 24 taper	St 37	20-25	2,0-2,5
Gear box (oil filler)	Plug	M 24 taper	St 37	20-25	2,0-2,5
Gear box, side, front cover, shift cover	Mid-grip nut	M 8x1,25	X 12 CrNi 18.8	22-25	2,2-2,5
Front cover	Backup light switch	M 18x1,5	Ms	25-35	2,5-3,5
Drive shaft	Collared nut	M 30x1,5	8.8	160-180	16-18
Drive shaft	Castle nut	M 18x1,5	6.8	120-140	12-14
Transm. support clamping plate and mountings	Hexagon nut	M 8x1,25	8	21-23	2,1-2,3
Drive pinion	Collared nut	M 24x1,5	8	240-260	24-26
Fork, gearshift	Hexagon nut	M 6x1,0	8	8-9	0,8-0,9
Shift lock, transmission case	Hexagon head bolt	M 10x1,5	8.8	15-18	1,5-1,8
Transmission case	Vent	M 16x1,5	9 S 20 K	20-30	2-3
Selector forks	Hexagon head bolt	M 8x1,25	8.8	24-26	2,4-2,6
Ring gear (differential)	Hexagon head bolt	M 12x1,25	11.9	115-120	11,5-12
Ring gear (locking differential)			11.9	140-150	14-15
			12.9	150-160	15-16
Joint flange	Expansion bolt	M 10x1,5	8.8	26-30	2,6-3
Joint flange	Hexagon head bolt	M 10x1,5	8.8	39-46	3,9-4,6
Starter mountings	Hexagon nut	M 10x1,5	8	46-48	4,6-4,8
Pressure tube (drive pinion)	Hexagon head bolt M 6x35	M 6x1,0	8.8	8-9	0,8-0,9
Front cover	Pressure relief bolt	M 12x1,5	9 S 20 K	22-25	2,2-2,5
Oil pump cover	Mid-grip nut	M 6x1,0	X 12 CrNi 18.8	9-10	0,9-1
Suction tube	Fillister head bolt M 6x15	M 6x1,0	8.8	8-9	0,8-0,9
Pressure tube (gear box)	Hexagon head bolt M 6x12	M 6x1,0	8.8	8-9	0,8-0,9
Guide tube for release bearing	Phillips screw	M 6x1,0	8.8	8-9	0,8-0,9

Tightening torque for bolts and nuts of manual transmission 930

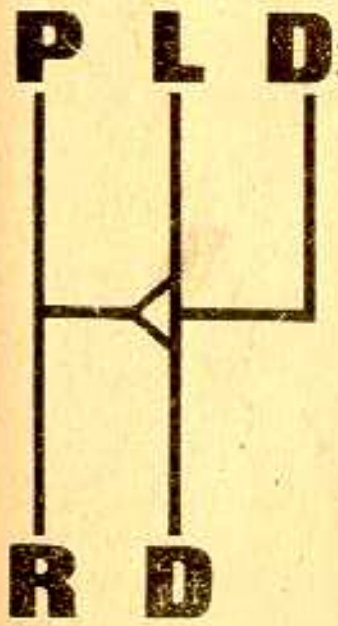
Location	Designation	Threads	Material	Tightening torque Nm	Tightening torque kpm
Drive shaft	Collared nut	M 30 x 1,5	8.8	210 - 230	21,0 - 23,0
Drive shaft	Collared nut	M 20 x 1,5	C 35 V	160 - 180	16,0 - 18,0
Drive pinion	Collared nut	M 24 x 1,5	8	240 - 260	24,0 - 26,0
Transmission case	Vent	M 14 x 1,5	9 S 20 K	20 - 30	2,0 - 3,0
Connecting rod, gearshift	Conical bolt	M 8 x 1,25	8.8	23 - 26	2,3 - 2,6
Shift cover	Mid-grip nut	M 8 x 1,25	X 12 CrNi 18.8	22 - 25	2,2 - 2,5
Gear box	Backup light switch	M 18 x 1,5	Ms	25 - 35	2,5 - 3,5
Gearshift, fork	Hexagon nut	M 6 x 1,0	8.8	9 - 11	0,9 - 1,1
Clamping plate, gear box and transmission case, front and side transmission covers	Hexagon nut	M 8 x 1,25	8	22 - 25	2,2 - 2,5
Shift lock transmission case	Hexagon head bolt	M 10 x 1,5	8.8	15 - 18	1,5 - 1,8
Selector forks	Hexagon head bolt	M 8 x 1,25	8.8	24 - 26	2,4 - 2,6
Ring gear (differential)	Hexagon head bolt	M 12 x 1,25	11.9	135 - 140	13,5 - 14,0
Locking differential	Hexagon head bolt	M 12 x 1,25	12.9	150 - 160	15,0 - 16,0
Joint flange	Expansion bolt	M 10 x 1,5	8.8	26 - 30	2,6 - 3,0
Joint flange	Hexagon head bolt	M 10 x 1,5	8.8	39 - 46	3,9 - 4,6

Transmission case (oil drain)	Plug with magnet	M 24 x 1,5 (taper 1 : 16)	St 37	20 - 25	2,0 - 2,5
Gear box (oil filler)	Plug	M 30 x 1,5	5.8	20 - 25	2,0 - 2,5
Reverse gear detent	Plug	M 16 x 1,5	5.8	20 - 25	2,0 - 2,5
Guide tube (Transmission case)	Fillister head bolt	M 6 x 1,0	8.8	8 - 10	0,8 - 1,0
Clutch and gear ring mountings	Fillister head bolt	M 8 x 1,0	8.8	20 - 25	2,0 - 2,5
Starter mountings	Hexagon nut	M 10 x 1,5	8	46 - 50	4,6 - 5,0
Holder to shift base	Hexagon head bolt	M 6	8.8	6,0	0,6
Shift base to tunnel	Fillister head bolt	M 8	8.8	21	2,1
Conical bolt in selector rod head	Conical bolt	M 8	8.8	15	1,5
Conical bolt on shift coupling	Conical bolt	M 8	8.8	15	1,5
Clamp mountings	Hexagon head bolt	M 8	8.8	25	2,5
Transmission cover Locking differential	Fillister head bolt	M 6	8.8	14	1,4

Sportomatic transmission specifications

Clutch
Hydrodynamic torque converter and a vacuum operated single plate dry clutch
Manual transmission: Porsche locking synchromesh
No. of gears: 3 forward, 1 reverse and parking lock

Shift scheme



P = Parking lock
R = Reverse gear
L = Low (driving range for steep gradients)
D = Drive (driving range for city)
D3 = Drive 3 (driving range for open roads)

Final drive ratio	8/27
Towing speed	approx. 40 km/h
Stall speed	1900 ± 200 rpm
Converter ratio	1.8
Clutch speed (at full throttle)	3200 ± 200 rpm
Transmission oil	approx. 2.5 ltr.

Tightening torque for bolts and nuts of sportomatic transmission

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Transmission case (on stud for side and front transmission cover as well as fork)	Hexagon nut	M 8x1.25	6.8	21 – 23	2.1 – 2.3
	Mid-grip nut	M 8x1.25	18.8 x12CrNi	22 – 25	2.2 – 2.5
Transmission case (oil filler)	Plug	M 24x1.5 (taper 1 : 16)	St 37	20 – 25	2.0 – 2.5
Transmission case (oil drain)	Plug with magnet	M 24x1.5 (taper 1 : 16)	St 37	20 – 25	2.0 – 2.5
Transmission case (vent)	Vent	M 14x1.5 (taper 1 : 16)	9 S 20 K	20 – 30	2.0 – 3.0
Transmission case	Backup light switch	M 18x1.5	Ms	35 – 40	3.5 – 4.0
Transmission case	Bridge-over switch	M 18x1.5	Ms	35 – 40	3.5 – 4.0
Transmission case (starter)	Hexagon nut	M 10x1.5	8.8	46 – 48	4.6 – 4.8
Transmission case (power motor support and mountings)	Hexagon nut	M 8x1.25	6.8	21 – 23	2.1 – 2.3
Converter housing to transmission case	Hexagon nut Hexagon nut	M 8x1.25 M 10x1.5	6.8 8.8 (SW15)	21 – 23 46 – 48	2.1 – 2.3 4.6 – 4.8
Converter housing (one-way clutch mountings)	Fillister head bolt	M 6x1.0	10.9	12 – 14	1.2 – 1.4
Converter housing	Threaded adaptor	M 24x1.5	6 S	30 – 35	3.0 – 3.5
Converter housing	Temperature transmitter	M 14x1.5	Ms	25 – 30	2.5 – 3.0
Converter housing	Temperature switch	M 14x1.5	Ms	25 – 30	2.5 – 3.0
Converter housing (clutch pressure plate)	Fillister head bolt	M 6x1.0	10.9	12 – 14	1.2 – 1.4
Converter drive plate	12-sided bolt	M 8x1.25	8.8	24 – 26	2.4 – 2.6
Intermediate plate (clamping)	Hexagon head bolt	M 8x1.25	8.8	21 – 23	2.1 – 2.3
Intermediate plate	Reversing lever shaft	M 8x1.25	9 S 20 K	21 – 23	2.1 – 2.3
Intermediate plate (shift lock)	Plug	M 14x1.5	4.6	22 – 25	2.2 – 2.5
Front transmission cover (speedometer drive lock)	Hexagon head bolt	M 8x1.25	8.8	16 – 18	1.6 – 1.8
Front transmission cover (9 mm parking lock ball dia.)	Plug	M 12x1.5	5.8	30 – 35	3.0 – 3.5
Angle drive in guide sleeve	Hollow bolt	M 24x1.5	6.8	22 – 24	2.2 – 2.4
Drive shaft	Hexagon nut	M 24x1.5	6.9	100–120	10.0 – 12.0
Drive shaft	Collared nut	M 18x1.5	5.8	110 – 130	11.0 – 13.0
Drive pinion	Expansion bolt	M 12x1.5	10.9	110–120	11.0 – 12.0
Selector forks	Hexagon head bolt	M 8x1.25	8.8	22 – 26	2.2 – 2.6
Differential (ring gear mtgs.)	Hexagon head bolt	M 12x1.25	11.9	115–120	11.5 – 12.0
Joint flange (differential)	Expansion bolt	M 10x1.5	8.8	35–40	3.5 – 4.0
Front transmission cover Transmission support mtgs.	Hexagon nut	M 8x1.25	6.8	21–23	2.1 – 2.3

Front axle and steering specifications

	911 SC	911 SC - USA, Canada, Japan	Turbo
Wheel suspension	Independent employing control arms and shock absorber struts		
Springs	One round torsion bar in driving direction for each wheel 18,8 mm dia.		
Track width	1369 mm with rim 6 J x 15	1361 mm with rim 6 J x 15	1432 mm with rim 7 J x 16
Shock absorbers	Double action, hydraulic shock absorber struts		
Stabilizers front/rear dia. in mm	20/18	20/18	20/18

Adjustment of ZF rack and pinion steering

Frictional moment of steering (measured on flange of steering gear with tie rods detached)	0,8 to 1,4 Nm = 8 to 14 kpcm

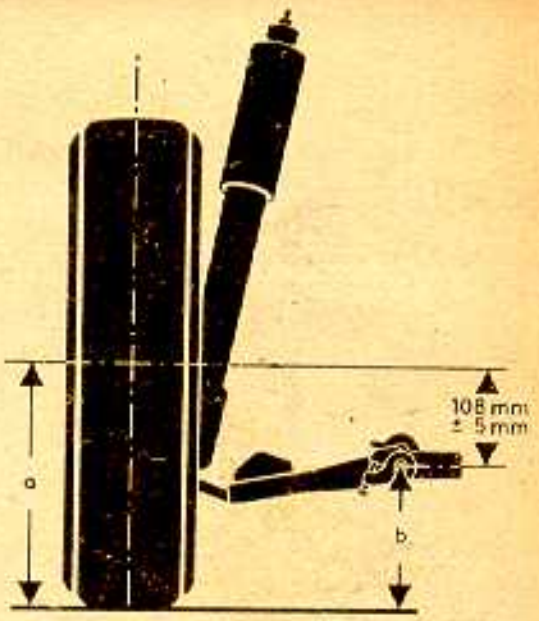
ZF steering specifications

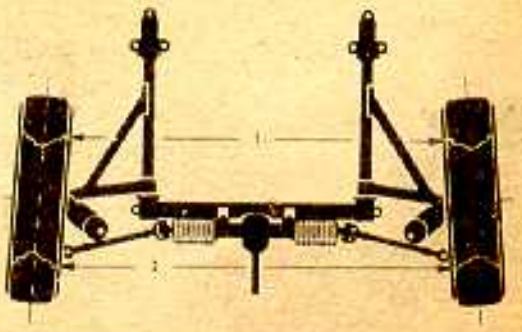
Steering ratio (in center)	17,78 : 1
No. of steering wheel turns from lock to lock	approx. 3,0

Specifications and tolerances

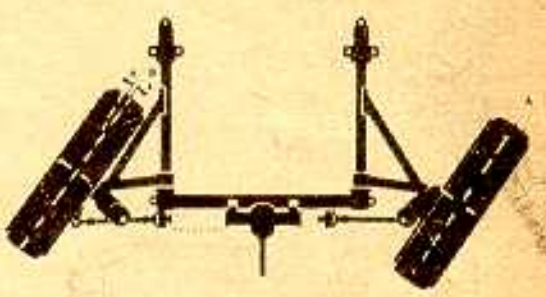
At curb weight according to DIN 70020
Car with full fuel tank, spare wheel and tools

Designation	Adjustment data and tolerances	Max. difference between left and right
Front axle		
Height adjustment: Wheel center above middle of torsion bar		
911 SC	108 mm ± 5 mm	5 mm
911 SC - USA, Canada, Japan	99 mm ± 5 mm	5 mm
Turbo	94 mm ± 5 mm	5 mm
Turbo - USA, Canada, Japan	85 mm ± 5 mm	5 mm
Total toe (pressed with 150 N)	0°	—



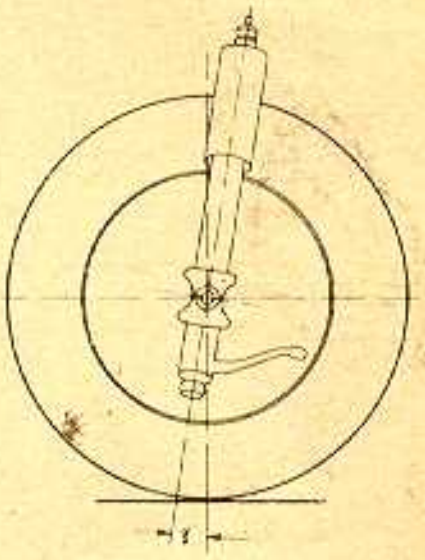


Designation	Adjustment data and tolerances	Max. difference between left and right
Difference angle at 20° lock	0° to + 30'	Can only be influenced by exchanging steering arm
A' = Parallel to A B = Centerline of wheel γ = Difference angle		
Camber of front wheels (wheels pointing straight ahead)		
α = Camber angle		
911 SC, Turbo	0° ± 10'	10'
911 SC, Turbo USA, Canada, Japan	+ 30' ± 10'	10'
β = Inclination of kingpin	11°	





Designation	Adjustment data and tolerances	Max. difference between left and right
y = Caster	6° 5' ± 15'	30'



Caster results from total camber difference at 20° left lock and 20° right lock x 1.5

These wheel alignment specifications can also be applied to earlier models.

Tightening torque for front axle and steering

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Support to spring strut	Hexagon nut	M 14 x 1,5	8	80	8,0
Support to body	Socket head screw	M 10	8.8	47	4,7
Auxiliary carrier to body	Hexagon head bolt	M 12 x 1,5	8.8	90	9,0
Stabilizer to auxiliary carrier strut	Hexagon head bolt	M 8	8.8	25	2,5
Auxiliary carrier strut, shield, stabilizer to body	Fillister head screw	M 10	8.8	47	4,7
Auxiliary carrier strut and shield to auxiliary carrier	Hexagon nut	M 10	8	28	2,8
Steering gear	Hexagon head bolt	M 10	8,8	47	4,7
Steering tie rod to steering gear	Hexagon head bolt	M 10	8.8	47	4,7

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Joint ball and pivot to tie rod (lock nut)	Hexagon nut	M 14 x 1,5	0,4	45	4,5
Tie rod to rack (Turbo)	Ball socket pivot	M 16 x 1,5	C 35 K	150	15
Nut on steering knuckle	Socket head screw	M 7	10.9	15	1,5
Ball joint to spring strut	Uni stopnut	M 8	8	22	2,2
Ball joint to control arm	Slotted nut	M 45 x 1,5	8.8	250	25
Control arm to body	Hexagon head bolt	M 10	8.8	47	4,7
Plug for spring strut cartridge	Plug			120+20	12+2
Wheel to wheel hub	Wheel nut	M 14 x 1,5	10.9/F 53	130	13
Brake disc to wheel hub	Hexagon nut	M 8	8.8	23	2,3
Guard to steering knuckle	Hexagon head bolt	M 8	8.8	10	1,0
Caliper to steering knuckle	Hexagon head bolt/ fillister head bolt	M 12 x 1,5	8.8	70	7,0

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Brake line connection	Coupling nut	M 10 x 1		14	1,4
Steering coupling to steering shaft	Hexagon head bolt	M 8	8.8	25	2,5
Steering shaft to steering gear	Hexagon head bolt	M 8	8.8	25	2,5
Steering shaft bearings	Fillister head bolt	M 8	8.8	25	2,5
Universal joint to steering shaft (lubricated with Optimoly HT)	Hexagon head bolt	M 8	8.8	20	2,0
Steering wheel	Hexagon nut	M 18 x 1,5	8	75	7,5
Dust cover to rack	Slotted nut	M 16 x 1,5		70	7,0
Ball joint to steering arm	Castle nut	M 10 x 1	8	45	4,5
Clutch flange to drive pinion (self-locking)	Hexagon nut	M 10	8	45	4,5
Housing cover to steering gear	Hexagon head bolt	M 8 x 1	8.8	15	1,5

Rear axle specifications

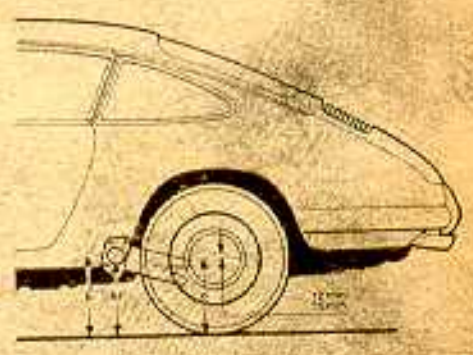
	911 SC	911 SC USA, Japan, Canada	Turbo
Wheel suspension	Independent, employing trailing arms, wheels driven by propeller shafts		
Springs	One round torsion bar in lateral direction for each wheel		
Torsion bar dia.	24,1 mm	24,1 mm	26 mm
Track width	1379 mm with rim 7 J x 15	1367 mm with rim 7 J x 15	1501 mm with rim 8 J x 16
Shock absorbers	Double action, hydraulic shock absorbers		
Stabilizers front/rear dia. in mm	20/18	20/18	20/18

Specifications and tolerances

(at curb weight according to DIN 70020; car with full fuel tank, spare wheel and tools)

Designation	Adjustment data and tolerances
Torsion bar specification Inclination of spring strut	
Coupe 911 SC	35° with Bielstein-shock absorbers 34°
Coupe 911 SC USA, Canada, Japan	40° with Bielstein-shock absorbers 39°

Designation	Adjustment data and tolerances	Max. difference between left and right
Targa	+ 0,5 °	
Air conditioner	+ 0,5°	
Sportomatic	+ 0,5°	
Turbo	33°	
Turbo - USA, Canada, Japan	37°	
Camber of rear wheels		
911 SC	– 1° ± 10'	20'
Turbo	– 30' ± 10'	20'
911 SC/Turbo – USA, Canada, Japan	0° ± 10'	20'
Track for all types	+ 10' ± 10' each wheel	20'
Height adjustment		
Wheel center below center of cross tube		
911 SC	16 mm ± 5 mm	8 mm
Turbo	12 mm ± 5 mm	8 mm
911 SC/Turbo - USA, Canada, Japan	37 mm ± 5 mm	8 mm



1° change in spring strut inclination = approx. 7 – 9 mm change in vehicle height.

Tightening torque for bolts and nuts for rear axle

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Bearing cover to body	Hexagon head bolt	M 10	8.8	47	4,7
Control arm to cross tube	Hexagon head bolt	M 14 x 1,5	10.9	60	6,0
Spring strut to control arm	Eccentric	M 12 x 1,5	8.8	60	6,0
Spring strut to control arm	Hexagon head bolt	M 12 x 1,5	10.9	95	9,5
Brake caliper to control arm	Hexagon socket screw	M 12 x 1,5	8.8	60	6,0
Shock absorber to control arm	Hexagon head bolt	M 14 x 1,5	8.8	125	12,5
Shock absorber to body	Hexagon nut	M 10 x 1	8	25	2,5
Brake line	Coupling nut	M 10 x 1		14	1,4
Stabilizer to body	Hexagon head bolt	M 8	8.8	25	2,5
Axle shafts to transmission and drive shaft	Fillister head bolt	M 10	12.9	83	8,3
		M 8	12.9	42	4,2
Stabilizer to stabilizer suspender	Hexagon nut	M 12 x 1,5	8/8.8	85	8,5
Stabilizer suspender to rear axle trailing arm	Hexagon head bolt	M 12 x 1,5	8.8	85	8,5
Wheel to wheel hub	Wheel nut	M 14 x 1,5		130	13
Wheel hub to drive shaft	Castle nut	M 20 x 1,5	10.9	300-320	30-32
Brake disc to wheel hub	Countersunk bolt	M 6	8.8	5	0,5
Adjusting lever to spring strut	Hexagon head bolt	M 16 x 1,5	10.9	245	24,5
Adjusting lever to spring strut	Eccentric bolt	M 16 x 1,5	10.9	245	24,5

Brakes – Specifications

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Brake booster				
Tandem master cyl. dia.	20,64 mm	23,81 mm		
Brake booster dia.	7"	8"		
Play on brake pedal with brakes bled and engine stopped	10 mm	10 mm		
Brake circuit division	front axle/ rear axle	front axle/ rear axle		
Front wheel brakes				
Brake disc outside dia.	282,5 mm inboard venting	304 mm inboard venting perforated evolent-shaped inboard venting ports		
Effective brake disc dia.	228 mm	247 mm		
Brake disc thickness (new)	20,5 mm	32 mm		

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Min. brake disc thickness* after machining	19,1 mm	30,6 mm	18,5 mm	30 mm
Max. brake disc surface-to-valley surface finish after machining	0,006 mm	0,006 mm		
Max. brake disc thickness tolerance	0,02 mm	0,02 mm		
Max. brake disc lateral runout	0,05 mm	0,05 mm		
Max. lateral runout installed	0,1 mm	0,1 mm		
Pistons in brake caliper	48 mm dia. 2 pistons per caliper	38 mm dia. 4 pistons per caliper		
Brake pad area per wheel	76 cm^2	94 cm^2		
Brake pad thickness	10 mm	13 mm	2 mm	2 mm
Brake pad recess play	brake liner has easy movement in recess	0,4 to 0,6 mm		
Rear wheel brakes				
Brake disc outside dia.	290 mm inboard venting	309 mm inboard venting perforated evolvent-shaped inboard venting ports		
Effective brake disc dia.	244 mm	251 mm		

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Brake disc thickness (new)	20 mm	28 mm		
Min. brake disc thickness* after machining	18,6 mm	26,6 mm	18 mm	26 mm
Max. brake disc peak-to-valley surface finish after machining	0,006 mm	0,006 mm		
Max. brake disc thickness tolerance	0,02 mm	0,02 mm		
Max. brake disc lateral runout	0,05 mm	0,05 mm		
Max. lateral runout installed	0,1 mm	0,1 mm		
Pistons in caliper	38 mm dia. 2 pistons per caliper	30 mm dia. 4 pistons per caliper		
Brake pad area per wheel	52,5 cm^2	94 cm^2		
Brake pad thickness	10 mm	13 mm	2 mm	2 mm
Brake pad recess play	brake pads move easily in recess	0,4 to 0,6 mm		
Parking brake				
Brake drum dia.	180 mm	180 mm	181 mm	181 mm
Brake shoe width	25 mm	25 mm		
Liner area per wheel	85 cm^2	85 cm^2		
Brake liner thickness	4,5 mm	4,5 mm	2 mm	2 mm

Caliper version

911 SC: gray cast iron front and rear Turbo: light alloy front and rear

* Brake disc should only be machined symmetrically, i. e. uniform on both sides.

Machining specifications and wear limits for brake discs and parking brake

Vehicle type	Type of brake disc	Location of brake disc	Distance "a" (in ref. to new brake disc thickness	New brake disc thickness	Min. thickness of brake disc after machining	Wear limit of brake disc (for symmetric wear)
911 SC	Vented brake disc	Front wheel	35,25 ± 0,1 mm	20,5 – 0,2 mm	19,1 mm	18,5 mm
Turbo	Vented, perforated brake disc	Front wheel	35,7 + 0,25 mm* – 0,35 mm from model 1981	32 – 0,2 mm	30,6 mm	30 mm
			56,7 ± 0,1 mm	32 – 0,2 mm	30,6 mm	30 mm
911 SC	Vented brake disc	Rear wheel	76 + 0,2 mm	20,0 – 0,2 mm	18,6 mm	18,0 mm
Turbo	Vented perforated brake disc	Rear wheel	76 + 0,2 mm	28 – 0,2 mm	26,6 mm	26 mm
All	Thickness tolerance of brake discs				max. 0,02 mm	
All	Lateral runout of brake discs				max. 0,05 mm	
All	Surface finish of brake discs after machining				max. 0,006 mm	

* From brake flange bearing surface on wheel hub (brake disc, ring, brake flange assembly) to inside brake disc friction surface.

Caution

Refinishing and wear specifications listed above are based on the assumption that remaining thickness of the brake pad is not less than 2.0 mm.
This pad thickness is required to assure perfect operation of brakes. (Installation of cross spring assures this.)

Only balanced brake discs are supplied. Brake discs are balanced by special clips in the cooling vents.

Caution! Never remove balance clips.

Parking brake

Brake drum dia. (new)	180 + 0.2 mm
Brake drum wear limit	max. 181.0 mm dia.
Brake liner width	25 mm

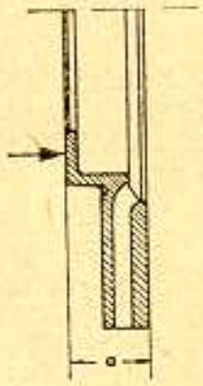
Caution!

Parking brake liners must be at least 2.0 mm thick.

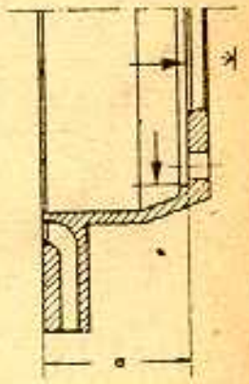
Caution

Machine brake disc symmetrically, i. e. uniformly on both sides.
Arrows indicate brake disc reference or mounting points.

Front wheel brake disc



Rear wheel brake disc

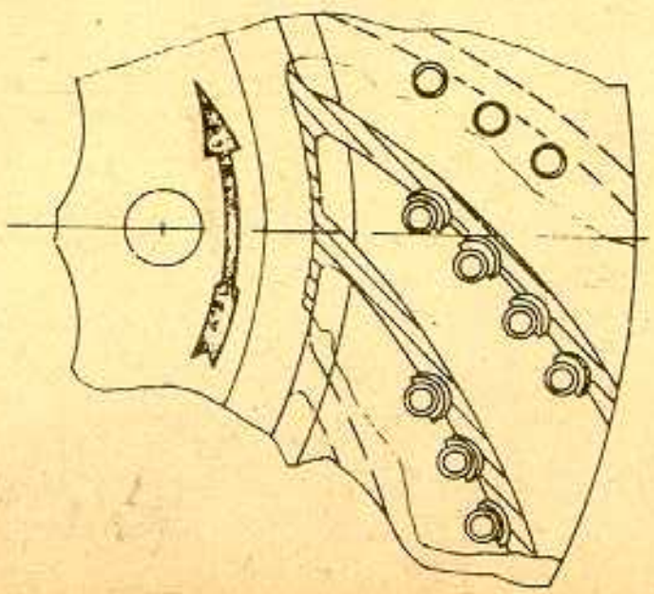


Arrangement of brake disc venting ports (assembly information)

The inboard venting ports of brake discs **on Turbo** are arranged in evolvent-shape. Don't mix up left and right sides when assembling.

Identification: Evolvent shape and part number.

Part number is located on brake disc.



Left side part number:
3 group number
uneven

Right side part number:
3 group number
even

Example:
930.351 **04700** = left side
930 351 **04800** = right side

Forward direction

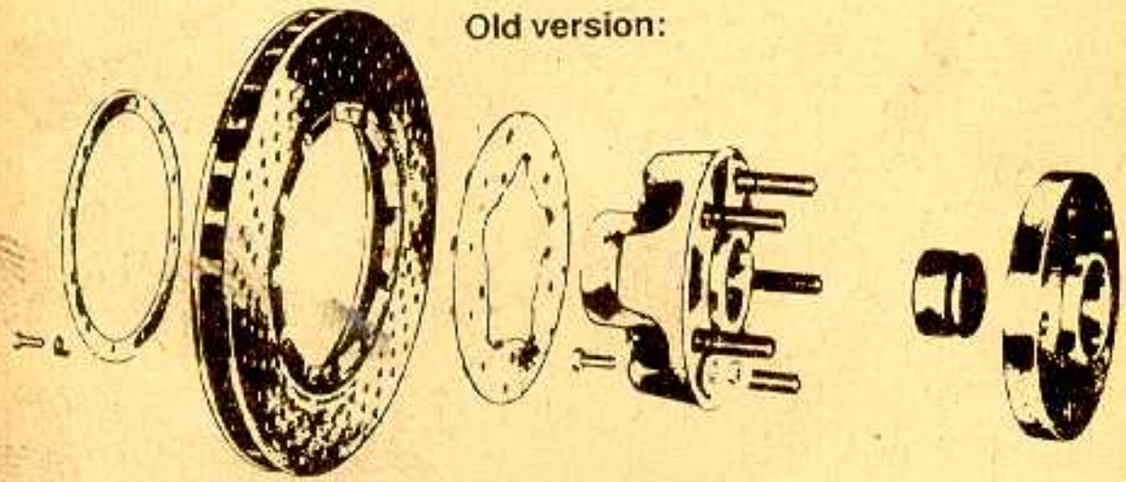
Modification of front wheel brakes – 911 Turbo (assembly information)

Since the beginning of production of 1981 models the front wheel brake disc to hub connection has been changed on the Type 911 Turbo. Instead of the old connection with flange and ring, it has been changed to the brake disc shell connection (same as 911).

Modified parts:
Brake discs, wheel hubs, grease caps

Deleted parts:
Brake flange, ring, M 6 screws with lockplates, spacer (21 mm)

Old version:

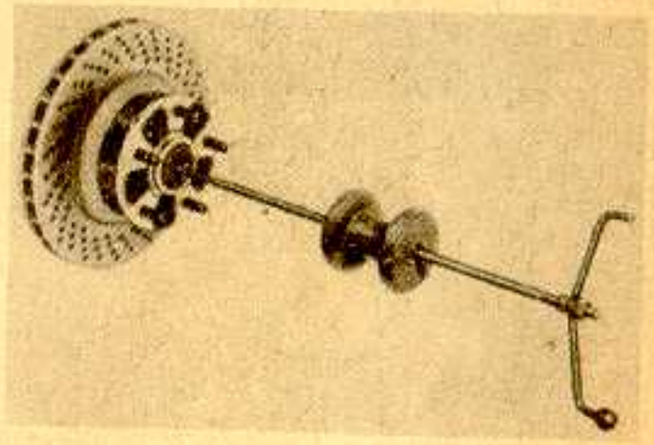


New version:



Modification of front wheel brakes – 911 Turbo (assembly information)

Brake discs are mounted on hubs with M 8 bolts and nuts as for Type 911 SC cars. Because of the new brake disc with shell design the total distance (brake disc – hub) is 21 mm longer. Consequently the 21 mm spacers need not be installed. An additional installation of spacers with the wheel hub is not approved.
When replacing parts a conversion to new brake discs/wheel hubs is only permitted on both sides for 911 Turbo 3,3 ltr. cars before 1981 model year.
Due to the modified hubs it is not quite so simple to take off wheel hub grease caps with Special Tool VW 771 in conjunction with Special Tool 9165 (see Repair Manual 930 Turbo, page 46-5) or with screwdrivers due to the deeper installed position.
As from Chassis No. 93 Z BS 000094 (October, 1980) hub grease caps with welded adapters are used. These grease caps can be knocked off with Special Tool VW 771 (without Special Tool 9165).
A piece of pipe should be used to knock in the grease caps to protect threads on the adapters.



Note: Grease caps without adapters were still used on 1981 model Turbos up to the above mentioned chassis number. These caps have been machined to the smallest possible diameter at the pressing-in point, in order to have a slight load. These caps can only be removed with screwdrivers.

Brake circuit failure indicator

Each of both brake circuits has a stop light switch on the brake master cylinder, which also acts as a brake function warning switch.

An indicator lamp installed in the instrument panel comes on when a brake circuit fails.

After repairing the brake system the brake indicator lamp must be switched off by disconnecting the battery.

Tightening torque for hydraulic and mechanical brake parts

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Nut on steering knuckle	Fillister head screw	M 7	10.9	15	1,5
Brake caliper to steering knuckle	Fillister head screw/ hexagon head bolt	M 12 x 1,5	8.8	70	7,0
Brake flange to wheel hub	Hexagon head bolt	M 8	8.8	23	2,3
Brake disc to brake flange	Hexagon head bolt	M 6	8.8	10	1,0
Brake disc to wheel hub	Hexagon head bolt	M 8	8.8	23	2,3
Guard to steering knuckle	Hexagon head bolt	M 8	8.8	10	1,0
Guard and brake backplate to trailing arm	Fillister head screw	M 8	8.8	25	2,5
Guard to brake backplate	Hexagon head bolt	M 8	8.8	25	2,5
Brake disc to wheel hub	Countersunk screw	M 6	8.8	5	0,5
Brake caliper to trailing arm	Fillister head screw/ hexagon head screw	M 12 x 1,5	8.8	60	6,0
Wheel to wheel hub	Wheel nut	M 14 x 1,5	F 53/10 K	130	13

Brake master cylinder to vacuum booster	Hexagon nut	M 8	8	25	2,5
Stop light switch to master cylinder	Stop light switch	M 10 x 1		15 + 4	1,5 + 0,4
Brake booster to console	Hexagon nut	M 8	8	25	2,5
Brake fluid tank	Hexagon head bolt	M 6	8.8	2	0,2
Pivot and joint shell to push rod	Hexagon nut	M 10	8	35	3,5
Brake booster to trunk floor	Hexagon nut	M 8	8	25	2,5
Strut to console	Hexagon head bolt	M 10	8.8	46	4,6
Brake lines to master cylinder, branch brake hoses and brake calipers	Coupling	M 10 x 1		14	1,4
Branch to cover and rear axle cross tube	Hexagon head bolt	M 6	8.8	6	0,6
Bleeder screws on brake calipers (Turbo)	Bleeder screw	M 10 x 1		8 to 11	0,8 to 1,1
Brake caliper sections to bridge (Turbo)	Fillister head bolt	M 12 x 1,5	8.8	60	6
Spring plate to bridge (Turbo)	Countersunk screw	M 5		4	0,4
Ring adapter to brake caliper (Turbo)	Hollow union bolt	M 10 x 1		16	1,6
Bleeder valve in brake caliper	Bleeder screw			3	0,3

Rims and tires

Type	Standard rims	tires	Optional extra * rims	tires
911 SC	front LM g 6 J x 15 rear LM g 7 J x 15	185/70 VR 15 215/60 VR 15	front LM gs 6 J x 16 rear LM gs 7 J x 16	205/55 VR 16 225/50 VR 16
			Winter tires**	
			5 ½ J x 15***	165 R 15 M+S***
			5 ½ J x 14	185 R 14 M+S
			5 ½ J x 15*** 6 J x 15 7 J x 15 6 J x 15 front/ 7 J x 15 rear	185/70 R 15 M+S
			6 J x 16 6 J x 16 front/ 7 J x 16 rear	205/55 R 16 M+S
Turbo	front LM gs 7 J x 16 rear LM gs 8 J x 16	205/55 VR 16 225/50 VR 16		
			Winter tires**	
			6 J x 15 7 J x 15 6 J x 15 front/ 7 J x 15 rear	185/70 R 15 M+S
			6 J x 16 7 J x 16 6 J x 16 front/ 7 J x 16 rear	205/55 R 16 M+S

Tire inflation pressure (reference values)

(measured on cold tires)

	911 SC	Turbo	Turbo - USA, Japan, Canada
Front	2,0 bar	2,0 bar	2,0 bar
Rear	2,4 bar	3,0 bar	2,4 bar
Spare wheel	2,2 bar	2,2 bar	2,2 bar

These values also apply to winter tires.

LM g = Cast light alloy
LM gs = Forged light alloy

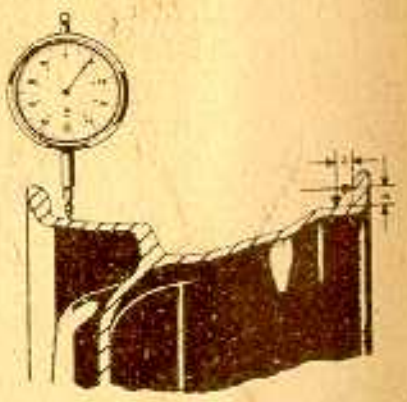
* Other wheel rim/tire combinations are possible in addition to optional extra tires (Technical Information).
** SR or HR version.
*** Not recommended.

Checking wheel rims

- Measuring points for lateral and radial runout on inner and outer rim flanges

Distance "a" = 8 mm.

Max. permissible radial runout for steel rims	1,25 mm
Max. permissible radial runout for alloy rims	1,0 mm
Max. permissible lateral runout for steel rims	1,25 mm
Max. permissible lateral runout for alloy rims	0,8 mm
Max. permissible radial and lateral runout for rim + tire	1,5 mm



Note:
Straightening of deformed rims is not permitted.

The rim flanges of light alloy wheel rims can be checked for wear. Inner rim flanges more subject to wear.

Use a conventional 8 mm radius gauge to check, but first remove any sharp edges and burrs.

Wear limit 1 mm. If necessary, replace wheel rim.

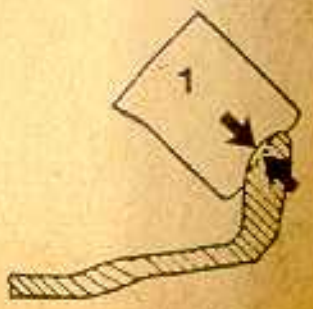
Checking rim flange shape:

——— New condition

- - - - - - - Worn

→ ← Max. wear 1 mm

1 8 mm radius gauge



Ignition timing values 911 SC and 911 Turbo

Engine type	911 SC	911 SC (USA/ Japan) 1978/79 models	911 SC 1980 model	911 SC (USA/ Japan) 1980/81 models	911 SC 1981 model	911 Turbo (Europe, R.o.W.) from 1978 model	911 Turbo (USA) from 1978 model	911 Turbo (California, Japan) from 1978 model
Ignition timing	5° BTDC	5° BTDC	5° BTDC	5° BTDC	25° BTDC	29° BTDC	10°±2° ATDC	5° ±1° ATDC
at engine speed (rpm)	900 ± 50	900 ± 50	900 ± 50	900 ± 50	4000	4000	1000 ± 50	1000 ± 50
Vacuum control detached	yes	yes	yes	yes	yes	yes	no	no
Ignition timing control	24°...31° BTDC	24°...28° BTDC	23°...29° BTDC	19°...25° BTDC	not above 25° BTDC	0° ± 2° BTDC	26° ± 4° BTDC	31° ± 4° BTDC
at engine speed (rpm)	6000	6000	6000	6000	6000	1000 ± 50	4000	4000
Vacuum control detached	yes	yes	yes	yes	yes	no	yes	yes

Spark plug survey 911 SC and 911 Turbo

	911 SC 78 - 79 mod.	911 SC (USA) 78 - 79 mod.	911 SC 80 - 81 mod.	911 SC (USA) 80 - 81 mod.	911 Turbo 78 - 81 mod.
Spark plugs Bosch	W 5 D (W 225 T 30)	W 8 D (W 145 T 30)	W 4 C 1 (W 260 T 2)	W 5 D (W 225 T 30)	W 3 DP (W 280 P 21)
Beru	14-5 D (225/14/3 A)	14-8 C (145/14/3 A)	14-4 C 1 (260/14/3)	14-5 D (225/14/3 A)	
Electrode gap	0,8 mm	0,8 mm	0,8 mm	0,8 mm	0,6 mm

Battery charge condition	Normal Climates Density	Tropics Density	Temperature Protection
Discharged (dead)	1,12	1,08	– 11 °C
Half charged	1,20	1,16	– 27 °C
Charged	1,28	1,23	– 68 °C

Fuse and relay chart for 911 SC, 1978 - 80 models

Fuse no.	Fused equipment	Amps
1	Fog lights	16
2	License plate light, fog light indicator lamp and relay	5
3	Front and rear right marker lights	5
4	Front and rear left marker lights, engine compartment light	5
5	Right low beam headlight	8
6	Left low beam headlight	8
7	Right high beam headlight	8
8	Left high beam headlight, high beam indicator lamp	8
9	Right front turn signal	5
10	Left front turn signal	5
11	Left and right stop lights, flasher relay, backup lights, tempostat	16
12	Rear window defogger relay, heater blower, rear window defogger indicator lamp	25
13	Windshield wipers, washer pump	25
14	Electric sliding roof, rear window wiper, outside mirror	16
15	Cigar lighter, blower switch indicator lamp	16
16	Fuel pump	25
17	Hazard lights	16
18	Courtesy light, clock, glove box light, trunk light	5
19	Headlight cleaners	16
20	Blower for air conditioner	25
21	Electric window controls	25

Fuses in engine compartment

1	Heater blower relay	5
2	Heater blower	25
3	Rear window defogger, rear wiper return	25

Relays in fuse box

1 Not occupied
2 Fog lights
3 Horn
4 Not occupied
5 Window controls
6 Not occupied
7 Fuel pump

Relays in engine compartment

1 Heater blower
2 Rear window defogger

Fuse and relay chart for 911 Turbo, 1978 - 80 models

Fuse no.	Fused equipment	Amps
1	Fog lights	16
2	License plate lights, fog light indicator lamp and relay	5
3	Front and rear right marker lights	5
4	Front and rear left marker lights, engine compartment light	5
5	Right low beam headlight	8
6	Left low beam headlight	8
7	Right high beam headlight	8
8	Left high beam headlight, high beam indicator lamp	8
9	Right front turn signal	5
10	Left front turn signal	5
11	Flasher relay, backup lights, left and right stop lights	16
12	Electric sliding roof, rear window wiper, outside mirror	25
13	Windshield wipers, washer pump	25
14	Blower, relay and indicator lamp for windshield and rear window defoggers	16
15	Cigar lighter, blower switch indicator lamp	16
16	Fuel pumps	25
17	Hazard lights, windshield defogger	16
18	Courtesy light, clock, glove box light, trunk light	5
19	Headlight cleaners	25
20	Air conditioner blower	25
21	Electric window controls	25
	In engine compartment	
	Rear window defogger, rear wiper return	25

Relays in fuse box

1 Air conditioner
2 Fog lights
3 Horn
4 Not occupied
5 Window controls
6 Fuel pump 1
7 Fuel pump 2

Relays in engine compartment

1 Air sensor and charge pressure safety switch
2 Rear window defogger

Fuse and relay chart for 911 SC, 1981 model

Fused equipment,	Amps
1 Fog lights	25
2 License plate lights, fog light indicator lamp and relay	5
3 Front and rear right marker lights	5
4 Front and rear left marker lights, engine compartment light	5
5 Right low beam headlight	8
6 Left low beam headlight	8
7 Right high beam headlight	8
8 Left high beam headlight, high beam indicator lamp	8
9 Right front turn signal	5
10 Left front turn signal	5
11 Flasher, backup lights	16
12 Rear window defogger relay, heater blower, rear window defogger indicator lamp, automatic heater control	25
13 Windshield wipers, washer pump, cigar lighter	25
14 Electric sliding roof, rear window wiper, outside mirror	16
15 Stop light, tempostat	8
16 Fuel pump	25
17 Hazard lights, windshield defogger	16
18 Courtesy light, clock, glove box light, trunk light	5
19 Headlight cleaners	25
20 Air conditioner blower	25
21 Electric window controls	25
Fuses in engine compartment	
1 Rear window defogger, rear wiper return	25
2 Heater blower	25
3 Heater blower relay	5

Relays in fuse box

I Air conditioner
II Fog lights
III Horn
IV Tempostat
V Window controls
VI Not occupied
VII Fuel pump

Relays in engine compartment

I Single-step rear window defogger
II Heater blower
III Double-step rear window defogger

Fuse and relay chart for 911 Turbo, 1981 model

Fused equipment	Amps
1 Fog lights	16
2 License plate lights, fog light indicator lamp and relay	5
3 Front and rear right marker lights	5
4 Front and rear left marker lights, engine compartment light	5
5 Right low beam headlight	8
6 Left low beam headlight	8
7 Right high beam headlight	8
8 Left high beam headlight, high beam indicator lamp	8
9 Right front turn signal	5
10 Left front turn signal	5
11 Flasher relay, backup lights, outside mirror	16
12 Electric sliding roof, rear window wiper	25
13 Windshield wipers, washer pump, cigar lighter	25
14 Blower, relay and indicator lamp for windshield and rear window defoggers, automatic rear window control	16
15 Stop light	8
16 Fuel pumps	25
17 Hazard lights, windshield defogger	16
18 Courtesy light, clock, glove box light, trunk light	5
19 Headlight cleaners	25
20 Air conditioner blower	25
21 Electric window controls	25
In engine compartment	
Rear window defogger, rear wiper return	25

Relays in fuse box

I Air conditioner
II Fog lights
III Horn
IV Not occupied
V Window controls
VI Fuel pump 1
VII Fuel pump 2

Relays in engine compartment

II Air sensor and charge pressure safety switch
III Rear window defogger
IV Delay relay

Bulb chart – 1978 - 1980 models (911 SC and 911 Turbo)

Location	Wattage	Base DIN (SAE)	Remarks
Main headlights H 4	60/55 W	P 43 t-38	
Additional headlights H 3 Front fog lights H 3	55 W	PK 22 S	
Main headlights "AS"	45/40 W	P 45 t	Japan
Stop/tail lights	21/5 W	BAY 15 d	
Turn signals Backup lights	21 W	BA 15 s	
Side marker lights License plate light	4 W	BA 9 s	
Rear fog light	18 W	SV 8,5 - 8	
Trunk light	10 W	BA 15 s	
Passenger compartment light Engine compartment light	10 W	SV 8,5 - 8	
Instrument indicator lamps	2 W	BA 7 s	
Glass base indicator lamp	1,2 W	W 2 x 4,6 d	
License plate light	5 W	BA 15 s	
Sealed beam headlights (RHD)	60/50 W	(6014)	USA
Sealed beam headlight (LHD)	60/50 W	(7002)	
Stop/tail lights Turn signals/side marker lights	32/3 cp	(1034)	USA
Turn signals Backup lights	32 cp	(1073)	USA
Side marker lights License plate light	2 cp	(1895)	USA
Marker lights (rear)	6 cp	(89)	USA

Bulb chart from 1981 models (911 SC and 911 Turbo)

Location	Wattage	Base DIN (SAE)	Remarks
Main headlights H 4	60/55 W	P 43 t-38	
Additional headlights H 3 Front fog lights H 3	55 W	PK 22 S	
Main headlights "AS"	45/40 W	P 45 t	Japan
Stop/tail lights	21/5 W	BAY 15 d	
Turn signals Backup lights Rear fog light	21 W	BA 15 s	
Side marker lights License plate light	4 W	BA 9 s	
Trunk light	10 W	BA 15 s	
Passenger compartment light Engine compartment light	10 W	SV 8,5-8	
Lamps for instruments and ashtray	2 W	BA 7 s	
Glass base indicator lamps	1,2 W	W 2 x 4,6 d	
License plate light	5 W	BA 15 s	
Side turn signals	5 W	3,5 x 9,5	
Sealed beam headlights (RHD)	60/50 W	(6014)	USA
Sealed beam halogen headlights	60/50 W	(6014)	USA
Stop/tail lights Turn signals/marker lights	32/3 cp	(1034)	USA
Turn signals Backup lights	32 cp	(1073)	USA
Sign light	1,2 W	2,9 x 4,6	USA
Side marker/license plate light	2 cp	(1895)	USA

Dimensions at curb weight according to DIN

	911	Turbo	
Wheelbase ..... mm	2272	2272	
Front track width ..... mm	1369	(1361)	1432
Rear track width ..... mm	1379	(1367)	1501
Length ..... mm	4291		4291
Width ..... mm	1652		1775
Height ..... mm	1320	(1340)	1310 (1328)

USA values in brackets.

Weights

		911 SC USA 81 mod.	911 SC USA 80 mod.	Turbo R. o. w. 78-81 mod.	Turbo USA 78-80 mod.	Turbo Canada 81 mod.
Curb weight acc. to DIN	kg	1250	1160	1300	1295	1300
Gross vehicle weight	kg	1550	1460	1680	1500	1600
Max. axle load, front/rear	kg	650/950	650/880	700/1050	625/900	675/1000
Max. trailer load, without brakes**	kg	480	480	—	—	—
with brakes**	kg	800	800	—	—	—
Max. roof load (only coupe)*	kg	35	35	35	35	35

		911 SC R. o. w. 78-81 mod.	911 SC USA 78-79 mod.
Curb weight acc. to DIN	kg	1160	1160
Gross vehicle weight	kg	1500	1400
Max. axle load, front/rear	kg	650/930	600/840
Max. trailer load, without brakes**	kg	480	480
with brakes**	kg	800	800
Max. roof load (only coupe)*	kg	35	35

* But without exceeding the gross vehicle weight.
** For gradients up to 16 %.

Filling capacities

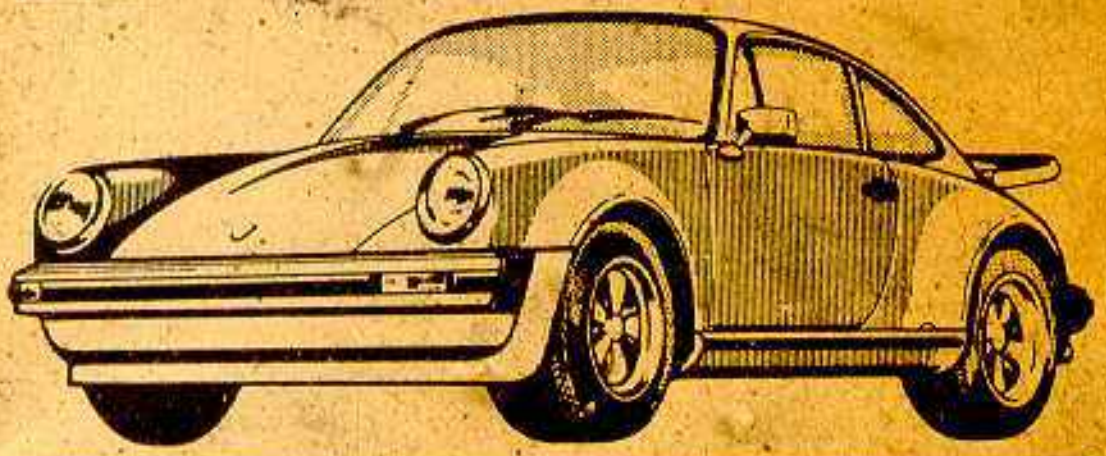
		911	Turbo
Motor		Brand name heavy duty oil of API Classification SE or SF. SAE 10 W/50, 15 W/40 or 20 W/50 multigrade oil for year around operation. Latter oil not for constant temperatures below – 15° C. Only use brand name oils which had been tested and approved by Porsche. Only when multigrade oil is not available and operating conditions are normal, may brand name single-grade oils be used, but then oil must be changed at specified intervals to avoid damage as specified by the season of the year. Use SAE 30 in summer and SAE 20 W in winter (adequate only for temperatures below + 5° C).	
Total oil volume of system	ltr. approx.	13	13
With Sportomatic	ltr. approx.	2 more	—
Oil change volume	ltr. approx.	10	10
Manual transmission *	ltr. approx.	3	3,7
Sportomatic transmission *	ltr. approx.	2,5	—
Fuel tank	ltr. approx.	80	80
Brake fluid tank	ltr. approx.	0,2	0,2
Washing fluid tank	ltr. approx.	8,5	8,5

* SAE 90 of Specification API-GL 5 (or Mil-L 2105 B)

Performances, consumption of fuel and oil

		911 SC 78-80 mod.	911 SC 81 mod.	911 Turbo
Top speed with manual transmission	km/h	225	235 (225 USA)	260 (250 USA, 78/79 mod.)
with Sportomatic	km/h	220	—	
Acceleration 0 – 100 km/h	s	7,0	6,8 (7,0 USA)	5,4 (5,6 USA, 78/79 mod.)
Kilometer from standing start	s	27,5	26,8 (27,5 USA)	24
Fuel consumption (acc. DIN 70030, part 1)				
at 90 km/h	l/100 km	9,2	8,0	8,1
at 120 km/h	l/100 km	11,4	9,7	15,3
City test	l/100 km	17,3	13,4	20,0
Oil consumption	l/1000 km	ca. 1,5	ca. 1,5	1,0-2,0

PORSCHE



78, 79 80, 81 Models

911 SC, Turbo 3.3

Tech-nical Specifi-cations



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Important conversion factors and new units of measurement

	Old units		New units
Pressure	tech. atmosphere at	(kp/cm^2)	Bar (bar)
Output	Horsepower	HP	Kilowatt (kW)
Force	Kilopond	kp	Newton (N)
Power	Kilopondmeter	kpm	Newtonmeter (Nm)

Conversion factors

at (kp/cm^2)	in bar	x 0.981
kp	in N	x 9.81
HP	in kW	x 0.736
kpm	in Nm	x 9.81
m/s	in km/h	x 3.6
at	in mm Hg	x 735.56
km/h	in mph (miles)	x 0.621
°F (Fahrenheit)	in °C	(°F - 32) x 0.555
l	in U.S. gal.	x 0.264
l	in Imp. gal.	x 0.22

The conversion factor 10 is applied for the conversion of tightening torque from kpm to Nm. This is more than sufficient for shop practice.

Chassis numbers (1978 and 1979 models)

911 / 930 — Vehicle type

8 — Model year: 8 = 1978, 9 = 1979

3 — Engine type: 2 = 911 SC USA 3,0 l; 3 = 911 R. o.W. and Japan 3,0 l; 7 = 930 Turbo R. o.W. and Japan 3,3 l; 8 = 930 Turbo USA 3,3 l

0 — Body: 0 = Coupe, 1 = Targa

0001 — Consecutive serial number

Chassis numbers (1980 models)

91 — Vehicle type: 91 = 911, 93 = 930

A — Model year: A = 1980

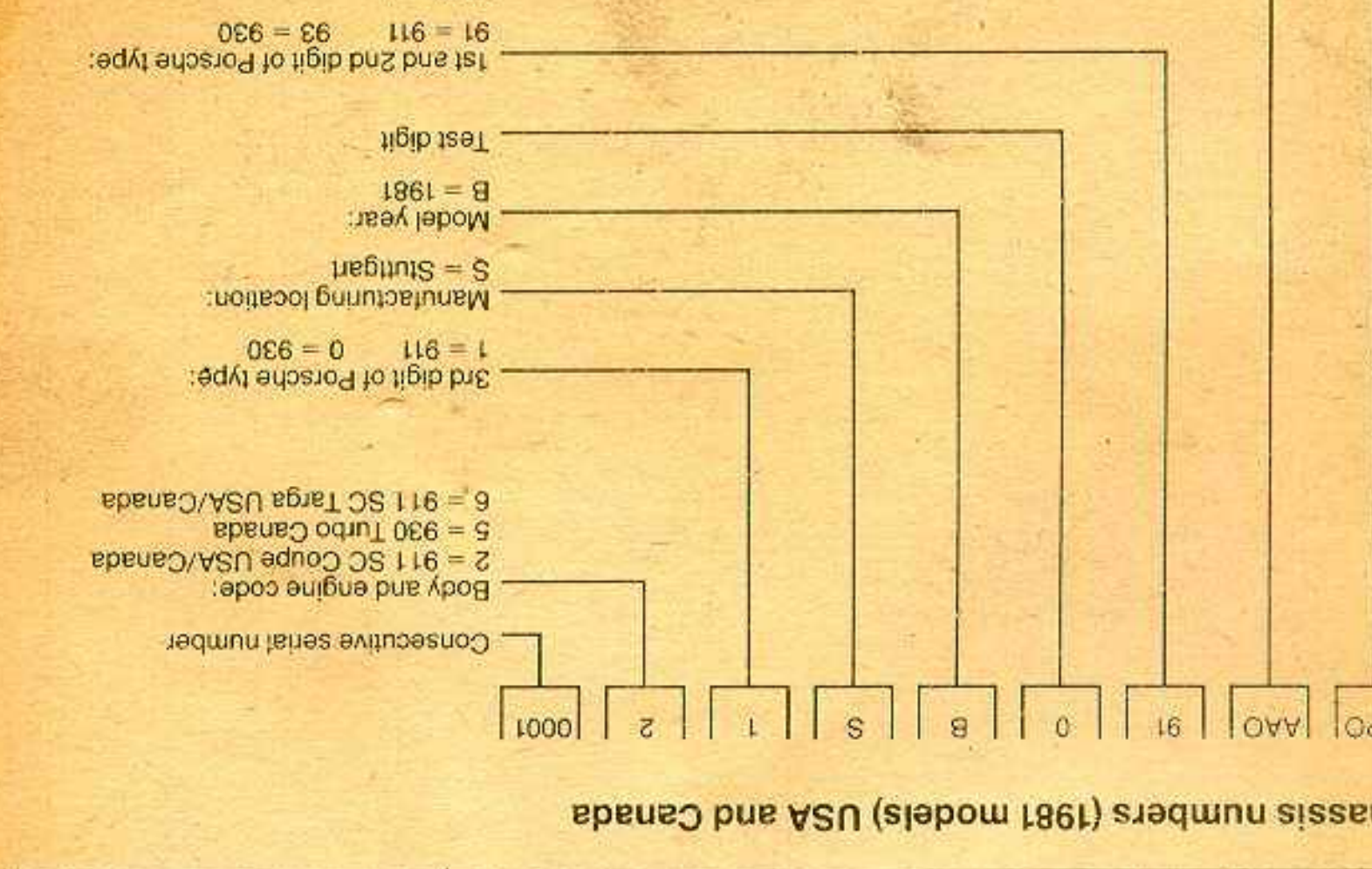
0 — Manufacturing plant

1 — Type supplement: 1 = 911, 0 = 930

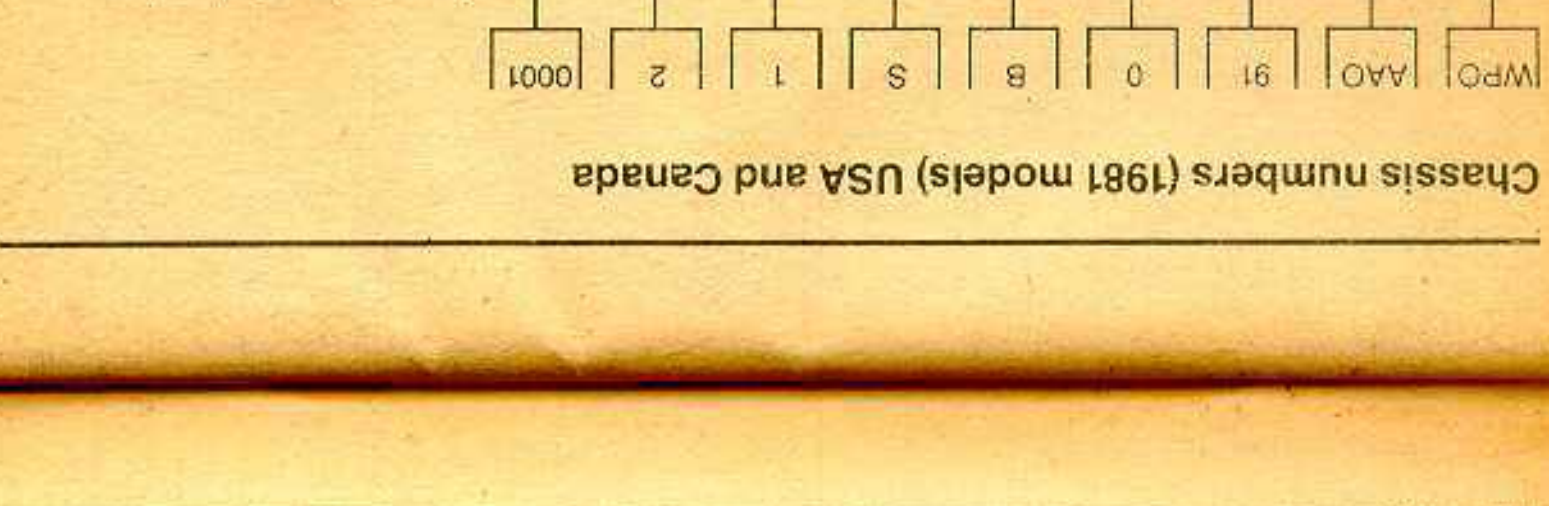
3 — Engine version: 3 = 911; 3,0 l R. o.W.; 4 = 911; 3,0 l USA R. o.W.; 7 = 930; 3,3 l R. o.W.

0001 — Consecutive serial number

Chassis numbers (1981 models) Rest of World and Japan



Chassis numbers (1981 models) USA and Canada



Engine type designations

Year mfd.	Model year	Engine type designation Official		Internal	Displace-ment	kw/HP
1977/78	1978	911 SC	R. o. W.	930/03	3,0 ltr.	132/180
		911 SC	R. o. W. Sprm.	930/13	3.0 ltr.	132/180
		911 SC	USA	930/04	3,0 ltr.	132/180
		911 SC	Japan	930/05	3,0 ltr.	132/180
		911 SC	Japan Sprm.	930/15	3,0 ltr.	132/180
		911 SC	California	930/06	3,0 ltr.	132/180
		911 Turbo	R. o. W.	930/60	3,3 itr.	221/300
		911 Turbo	USA	930/61	3,3 ltr.	195/265
		911 Turbo	Japan	930/62	3,3 ltr.	195/265
		911 Turbo	California	930/63	3,3 ltr.	195/265
1979/80	1980	911 SC	USA	930/07	3,0 ltr.	132/180
		911 SC	Japan	930/08	3,0 ltr.	132/180
		911 SC	R. o. W.	930/09	3,0 ltr.	138/188
		911 Turbo	R. o. W.	930/60	3,3 ltr.	221/300
		911 Turbo	USA	930/64	3,3 ltr.	195/265
		911 Turbo	Japan	930/65	3,3 ltr.	195/265
1980/81	1981	911 SC	R. o. W.	930/10	3,0 ltr.	150/204
		911 SC	USA	930/16	3.0 ltr.	132/180
		911 SC	Japan	930/17	3,0 ltr.	132/180
		911 Turbo	R. o. W.	930/60	3,3 ltr.	221/300
		911 Turbo	Canada	930/60	3.3 ltr.	221/300

Engine numbers

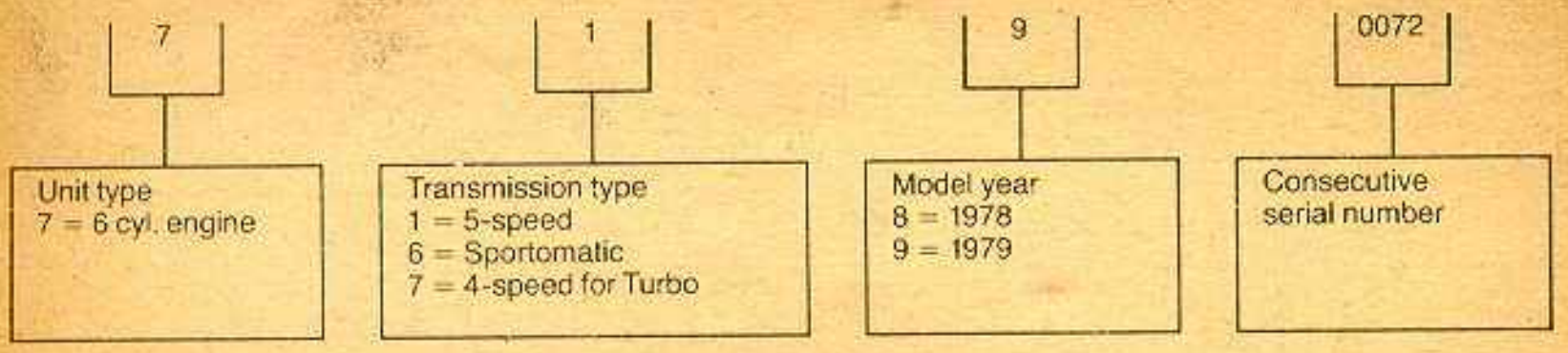
6 — Unit type
6 = 6 cyl. engine

1 — Engine type
1978/1979 models
1 = 911 SC - Japan — 3,0 l — 132 kW/180 HP
2 = 911 SC - USA — 3,0 l — 132 kW/180 HP
3 = 911 SC - R. o. W — 3,0 l — 132 kW/180 HP
5 = 911 SC - California — 3,0 l — 132 kW/180 HP
7 = 911 Turbo - R. o. W./Japan — 3,3 l — 221/195 kW/ 300/265 HP
8 = 911 Turbo - USA/California — 3,3 l — 195 kW/265 HP
1980 models
3 = 911 SC - R. o. W — 3,0 l — 138 kW/188 HP
4 = 911 SC - USA — 3,0 l — 132 kW/180 HP
7 = 911 Turbo - R. o. W./Japan — 3,3 l — 221/195 kW/ 300/265 HP
1981 models
3 = 911 SC - R. o. W — 3,0 l — 150 kW/204 HP
4 = 911 SC USA/Japan — 3,0 l — 132 kW/180 HP
7 = 911 Turbo - R. o. W./Canada — 3,3 l — 221 kW/300 HP

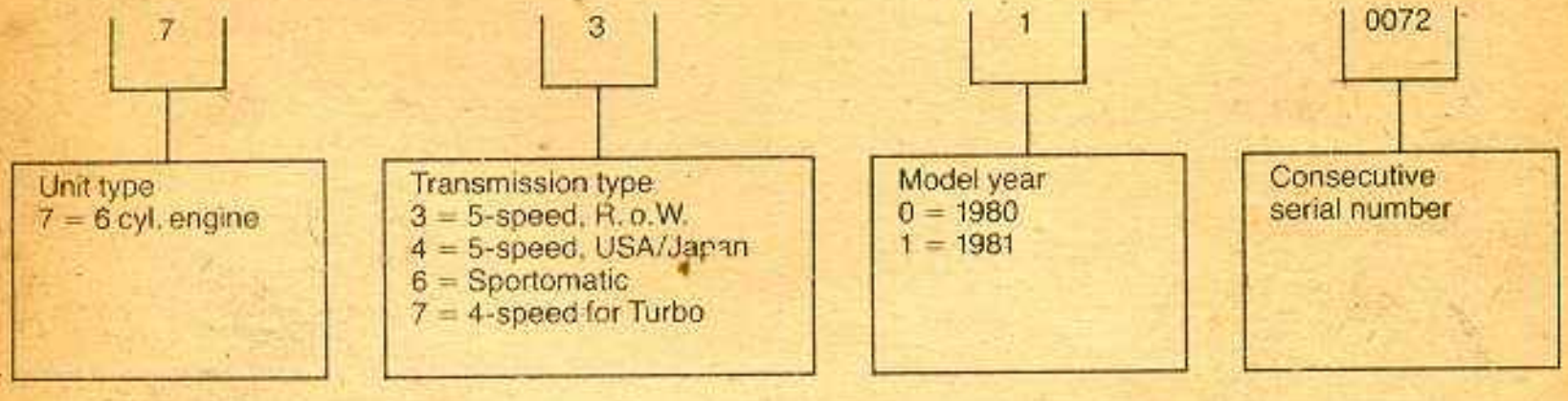
8 — Model year
8 = 1978 0 = 1980
9 = 1979 1 = 1981

0056 — Consecutive serial number usually starting with 0001
Exceptions:
Starting with 9001 = engine for sportomatic
Starting with 2001 = engine type 930/62 (Turbo model 1978 Japan)
Starting with 1001 = engine type 930/63 (Turbo model 1978/79 California)
Starting with 1001 = engine type 930/65 (Turbo model 1979 Japan)
Starting with 8001 = engine type 930/08 and 930/65 (model 1980 Japan)
Starting with 8001 = engine type 930/17 (model 1981 Japan)

Transmission numbers (1978/79 models)



Transmission numbers (1980/81 models)



Transmission type codes

Transmission type	Number of gears	1st gear	2nd gear	3rd gear	4th gear	5th gear	Pinion/ ring gear	As from chassis number	Remarks
1978 mod.									
915.61	5	11/35	18/33	23/29	26/26	28/23	8/31	718 0001	Manual transm. 911 worldwide
930.34	4	16/36	23/30	28/25	32/20	—	9/38	778 0001	Manual transm. Turbo worldwide
925.16	3	15/36	21/30	27/25	—	—	8/27	768 0001	Sportomatic worldwide
1979 mod.									
915.61	5	11/35	18/33	23/29	26/26	28/23	8/31	719 0001	Manual transm. 911 worldwide
930.34	4	16/36	23/30	28/25	32/20	—	9/38	779 0001	Manual transm. Turbo worldwide
925.16	3	15/36	21/30	27/25	—	—	8/27	769 0001	Sportomatic worldwide
1980 mod.									
915.62	5	11/35	18/33	23/29	26/26	28/22	8/31	730 0001	Manual transm. 911 R. o.W.
915.63	5	11/35	18/32	23/29	26/26	28/23	8/31	740 0001	Manual transm. 911 USA/Japan
930.34	4	16/36	23/30	28/25	32/20	—	9/38	770 0001	Manual transm. Turbo worldwide
925.16	3	15/36	21/30	27/25	—	—	8/27	760 0001	Sportomatic worldwide
1981 mod.									
915.62	5	11/35	18/33	23/29	26/26	28/22	8/31	731 0001	Manual transm. 911 R. o.W.
915.63	5	11/35	18/32	23/29	26/26	28/23	8/31	741 0001	Manual transm. 911 USA/Japan
930.34	4	16/36	23/30	28/25	32/20	—	9/38	771 0001	Manual transm. Turbo worldwide

Engine specifications for 1978, 1979, 1980 and 1981 models (911 SC)

Engine Internal engine code		911 SC 930/03/13/04/05/15 06/07/08/16/17		930/09/19	930/10
Design		Four stroke internal combustion engine (two banks of cylinders opposite each other)			
No. of cylinders		6		6	6
Bore	mm/inch	95,0/3,74		95,0/3,74	95,0/3,74
Stroke	mm/inch	70,4/2,77		70,4/2,77	70,4/2,77
Total displacement	$cm^3/inch^3$	2994/182,7		2994/182,7	2994/182,7
Compression ratio		8,5 : 1	9,3 : 1 (930/07/08/16/17)	8,6 : 1	9,8 : 1
Max. engine power acc. DIN 70020	kW/HP	132/180		138/188	150/204
Net power, SAE J 245 at engine speed	kW/HP rpm	128/172 5500		134/179 5500	145/195 5900
Max. torque acc. DIN 70020	Nm/kpm	265/27	245/25 (930/04/06/05/15/07/08)	265/27	267/27
Net torque, SAE J 245	Nm/ft lbs	257/189	237/175 (930/04/06/05/15/07/08)	257/189	258/190
at engine speed	rpm	4200	4200	4200	4300
Max. liter output acc. DIN 70020 acc. SAE J 245	kW/l, HP/l kW/l, HP/l	44/60 42/57		46,1/62,8 44,8/59,8	50,1/68,1 48,4/65,1
Max. permissible speed	rpm	7000		7000	7000

Engine Internal engine code		911 SC 930/03/13/04/05/15 06/07/08/16/17	930/09/19	930/10
Cut-off speed				
Speed governed by switching-off ignition	rpm	6800 ± 200 (930/03/13)	6500 ± 200	6800 ± 200
Speed governed by switching off fuel pump	rpm rpm	6700 + 300 (930/04/05/15/06) 6500 + 200 (930/07/08/16/17)		
Engine weight (dry)	kp/lbs. approx.	200/441 190/419 (930/07/08)	190/419	190/419
Fuel octane	RON	91 91 lead-free (USA)	91	98
Cooling system		air-cooling from axial blower on alternator		
Blower drive		by v-belt off of crankshaft		
Crankshaft/blower ratio		1 : 1,81 1 : 1,68 for 930/16/17	1 : 1,68	1 : 1,68
Air delivery rate		1380 l/s at 6000 rpm of crankshaft	1500 l/s at 6000 rpm of crankshaft	1500 l/s at 6000 rpm of crankshaft
Drive belt		9,5 x 710	9,5 x 710	9,5 x 710

Engine		911 SC
Internal engine code		930 (all engine types)
Lubricating system		dry sump lubrication
Oil cooling		oil cooler on crankcase in blower air stream, plus cooling pipe coil or pipe oil cooler
Oil pressure at 90 ° C oil temperature and speed of 5000 rpm	bar	approx. 4,0
Oil consumption	ltr./1000 km	approx. 1,5
Crankcase		two-piece aluminum alloy
Crankshaft		forged (tenifer treated)
Crankshaft bearings		8 plain bearings
Connecting rods		forged (steel)
Connecting rod bearings		plain bearing half shells
Piston pin bearing in conrod		press-fit bronze bush
Pistons		cast aluminum
Piston pin		floating installation, held by circlips
Piston rings		2 compression rings, 1 oil scraper ring

Engine	911 SC
Internal engine code	930 (all engine types)
Cylinders	nikasil (Mahle) and alusil (KS)
Cylinder head	single alloy cylinder head
Valve seat insert	shrink-fit made of annealed sintered steel
Valve guide	thermohedul FS
Valve arrangement for each cylinder	1 intake and 1 exhaust valve in vee suspension
Exhaust valve	without sodium filling, with reinforced seat surface
Valve springs	2 coil springs per valve
Valve timing	left and right one each overhead camshaft
Camshaft	cast, 4 bearings direct in camshaft housing (no bearing shells)
Camshaft drive	by chain
Valve clearance on cold engine	
Intake	0,1 mm measured between valve and rocker arm
Exhaust	

Engine Internal engine code		911 SC 930 (all engine types)
Clutch		single plate dry type
Diameter (manual transmission	mm	225
Contact pressure	N (kp)	7800...8500 (775...866)
Diameter (sportomatic)	mm	190
Contact pressure	N (kp)	7848...8633 (800...880)
Fuel supply		K-Jetronic (CIS) 1 electric roller cell pump

Engine specifications for 1978, 1979, 1980 and 1981 models (911 Turbo)

Engine Internal engine code		911 Turbo 930/60	930/61/62/63/64/65
Design		four stroke internal combustion engine (two banks of cylinders opposite each other)	
No. of cylinders		6	6
Bore	mm/inch	97,0/3,82	97,0/3,82
Stroke	mm/inch	74,4/2,93	74,4/2,93
Total displacement	$cm^3/inch^3$	3299/201,3	3299/201,3
Compression ratio		7,0 : 1	7,0 : 1
Max. engine power	kW/HP	221/300	195/265
Net power at engine speed	kW/HP rpm	221/296 5500	195/261 5500
Max. torque	Nm/kpm	412/42	395/40,3
Net torque at engine speed	Nm/lbft rpm	412/304 4000	395/291 4000
Max. liter output	kW/l, HP/l	67/91	67/91
Max. permissible speed	rpm	6700	6700

Engine Internal engine code		911 Turbo 930/60	930/61/62/63/64/65
Max. permissible constant speed	rpm	6000	6000
Cut-off speed of speed governor in distributor	rpm	7000 ± 200	7000 ± 200
Engine weight (dry)	kg/lbs	230/507	240/529
Fuel octane	RON	98	96 lead-free

Engine Internal engine code		911 Turbo 930 (all engine types)
Cooling system		air-cooling from axial blower on alternator
Blower drive		by v-belt off of crankshaft
Crankshaft/blower ratio		1 : 1,68
Air delivery rate		1500 l/s at 6000 rpm of crankshaft
Blower drive belt		9,5 x710
Lubricating system		dry sump lubrication
Oil cooling		oil cooler on crankcase in blower air stream, plus cooling pipe coil or pipe oil cooler
Oil pressure at 90 ° C oil temperature and speed of 5000 rpm	bar	approx. 5,0
Oil consumption	l/1000 km	approx. 1,0 to 2,0
Crankcase		two-piece aluminum alloy
Crankshaft		forged (tenifer treated)
Crankshaft bearings		3 plain bearings
Connecting rods		forged steel

Engine	911 Turbo
Internal engine code	930 (all engine types)
Connecting rod bearings	plain bearing half shells
Piston pin bearing in conrod	press-fit bronze bush
Intermediate shaft bearing	2 plain bearings
Pistons	forged alloy
Piston pin	floating installation, held by circlips
Piston rings	2 compression rings, 1 oil scraper ring
Cylinders	nikasil (Mahle)
Cylinder head	light alloy single cylinder head
Valve seat insert	shrink-fit, made of annealed sintered steel
Valve guide	thermohedul FS
Arrangement of valves per cylinder	1 intake and 1 exhaust valve in vee suspension
Exhaust valve	sodium filled with reinforced seat surface
Valve springs	2 coil springs per valve
Valve timing	left and right one each overhead camshaft
Camshaft	cast, 4 bearings direct in camshaft housing (no bearing shells)

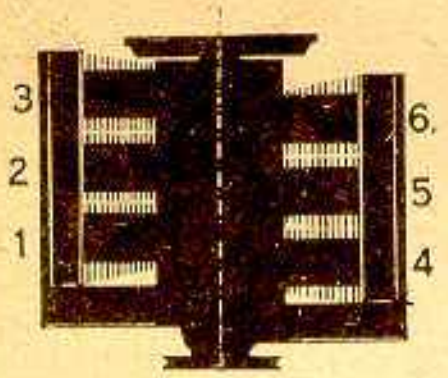
Engine
Internal engine code
911 Turbo
930 (all engine types)

Camshaft drive		by chain
Valve clearance on cold engine		
Intake Exhaust		0,10 mm, measured between valve and rocker arm
Clutch		single plate dry type
Diameter (manual transmission)	mm	240
Contact pressure	N (kp)	11200 to 12100 (1142 to 1233)
Fuel supply		K-Jetronic (CIS) 2 electric roller cell pumps in series
Supercharging		KKK exhaust gas turbocharger

Electrical system

Battery voltage	V	12
Battery capacity	Ah	66 (88 optional extra)
Alternator/output	A/W	70/980
Regulator switch		matched to alternator (black plastic housing)
Ignition		CDI without contacts
Ignition transformer		Bosch
Firing order		1 - 6 - 2 - 4 - 3 - 5

Designation of cylinders on 6 cylinder engine



Driving direction

Firing order
1 - 6 - 2 - 4 - 3 - 5

Engine tolerance and wear limit survey – 911 SC

Note: B = bore W = shaft

Measuring point		Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits in mm
Crankshaft	– main bearing	B 60,020 – 60,059	+ 0,010	+ 0,072	visual inspect.
Bearings 1 – 7	(d 1)	W 59,971 – 59,990			59,960
Crankshaft	– main bearing	B 31,041 – 31,084	+ 0,048	+ 0,104	visual inspect.
Bearing 8	(d 3)	W 30,980 – 30,993			30,970
Crankpin	– conrod bearing	B 53,020 – 53,059	+ 0,030	+ 0,088	visual inspect.
	(d 2)	W 52,971 – 52,990			52,960
Crankshaft runout (measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)					max. 0,04
Crankshaft unbalance					max. 10 cmg.
Crankshaft	– main bearing				
Axial play			+ 0,110	+ 0,195	0,30
Crankshaft	– timing gear	B 41,975 – 42,000	– 0,002	– 0,038	
		W 42,002 – 42,013			
Crankshaft	– distributor drive	B 41,975 – 42,000	– 0,002	– 0,038	
		W 42,002 – 42,013			
Crankshaft	– flywheel	B 50,002 – 50,021	+ 0,021	+ 0,028	
		W 50,000 – 50,030			
Crankshaft	– pulley	B 30,000 – 30,033	+ 0,007	+ 0,073	
		W 29,960 – 29,993			
Pulley: radial runout					max. 0,15
lateral runout					max. 0,20

Engine tolerance and wear limit survey – 911 Turbo

Note: B = bore W = shaft

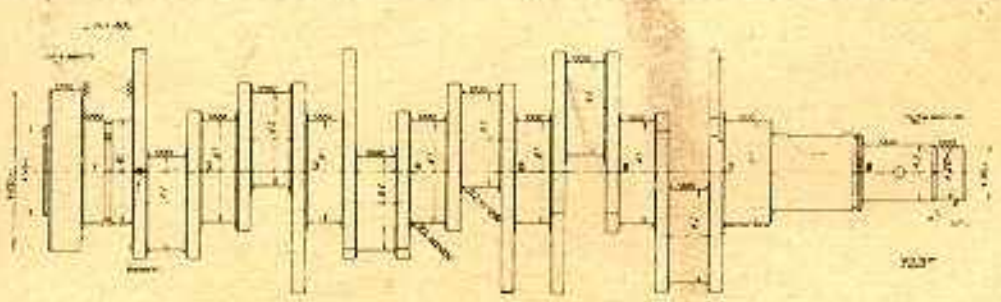
Measuring point		Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits in mm
Crankshaft Bearings 1 – 7	– main bearing (d 1)	B 60,020 – 60,059 W 59,971 – 59,990	+ 0,010	+ 0,072	visual inspect. 59,960
Crankshaft Bearing 8	– main bearing (d 3)	B 31,041 – 31,084 W 30,980 – 30,993	+ 0,048	+ 0,104	visual inspect. 30,970
Crankpin	– conrod bearing (d 2)	B 55,020 – 55,059 W 54,971 – 54,990	+ 0,030	+ 0,088	visual inspect. 54,960
Crankshaft runout (measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)					max. 0,04
Crankshaft unbalance					max. 10 cmg.
Crankshaft Axial play	– main bearing		+ 0,110	+ 0,195	0,30
Crankshaft	– timing gear	B 41,975 – 42,000 W 42,002 – 42,013	– 0,002	– 0,038	
Crankshaft	– distributor drive	B 41,975 – 42,000 W 42,002 – 42,013	– 0,002	– 0,038	
Crankshaft	– flywheel	B 90,000 – 90,030 W 89,780 – 90,000	0,0	+ 0,049	
Crankshaft	– pulley	B 30,000 – 30,033 W 29,960 – 29,993	+ 0,007	+ 0,073	
Pulley: radial runout lateral runout					max. 0,15 max. 0,20

Crankshaft – standard and repair sizes – 911 SC

Size	Crankcase diameter bearings 1–8	All main bearings d 1	Connecting rod bearings d 2	Main bearing dia. d 3 of crankshaft bearing 8	Collar dia. d 4	Seal for timing gear dia. d 5	Crankshaft pulley dia. d 6	Thrust bearing width A
Stand.		59,971...59,990	52,971...52,990	30,980...30,993	89,780...90,000	42,002...42,013	29,960...29,993	28,000...28,050
- 0,25		59,721...59,740	52,721...52,740	30,730...30,743				
- 0,50		59,471...59,490	52,471...52,490	30,480...30,493	89,280...89,500		29,370...29,500	
- 0,75		59,221...59,240	52,221...52,240	30,230...30,243				
- 1,00		58,971...58,990	51,971...51,990	29,980...29,993				

Normal
65,000...65,019

Oversize
65,250...65,269



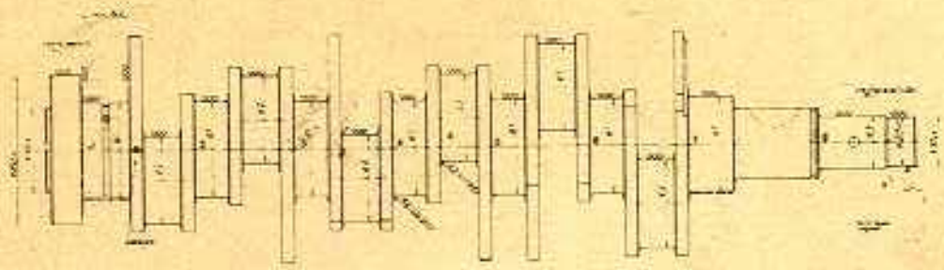
Only grind bearing surfaces for radial oil seals to 29,5 and 89,5 as specified here when scoring is too deep. Otherwise repolish as necessary: 3 microns.
After grinding give oil bores a 0,5 radius. Break sharp edges with 0,2 to 0,5 radius. Max. radial runout in reference to take-up in — —: max 0,04.
Specification for tenifer treatment according to Tenifer 120 W PN 1053 ferroflux.
Never straighten main bearings 3 and 5 after tenifer treatment. Straightening of the other main bearing journals through stemming in the radii is permitted.

Color codes for repair sizes

1st repair size yellow paint dot
2nd repair size green paint dot
3rd repair size yellow paint dot
4th repair size white paint dot

Crankshaft – standard and repair sizes – 911 Turbo

Size	Crankcase diameter bearings 1–8	All main bearings d 1	Connecting rod bearings d 2	Main bearing dia. d 3 or crankshaft bearing 8	Collar dia. d 4	Seat for timing gear dia. d 5	Crankshaft pulley dia. d 6	Thrust bearing width A
Stand.	Standard	59,971...59,990	54,971...54,990	30,980...30,993	89,780...90,000	42,002...42,013	29,960...29,993	28,000...28,060
- 0,25	65,000...65,019	59,721...59,740	54,721...54,740	30,730...30,743				
- 0,50	Oversize	59,471...59,490	54,471...54,490	30,480...30,493	89,280...89,500		29,370...29,500	
- 0,75	65,250...65,269	59,221...59,240	54,221...54,240	30,230...30,243				
- 1,00		58,971...58,990	53,971...53,990	29,980...29,993				



Only grind bearing surfaces for radial oil seals to 29,5 and 89,5 as specified here when scoring is too deep. Otherwise repolish as necessary: 3 microns.
After grinding give oil bores a 0,5 radius. Break sharp edges with 0,2 to 0,5 radius. Max. radial runout in reference to take-up in — · —: max. 0,04.
Specification for tenifer treatment according to Tenifer 120 W PN 1053 terroflux.
Never straighten main bearings 3 and 5 after tenifer treatment. Straightening of the other main bearing journals through stemming in the radii is permitted.

Color codes for repair sizes

1st repair size	blue	paint dot
2nd repair size	green	paint dot
3rd repair size	yellow	paint dot
4th repair size	white	paint dot

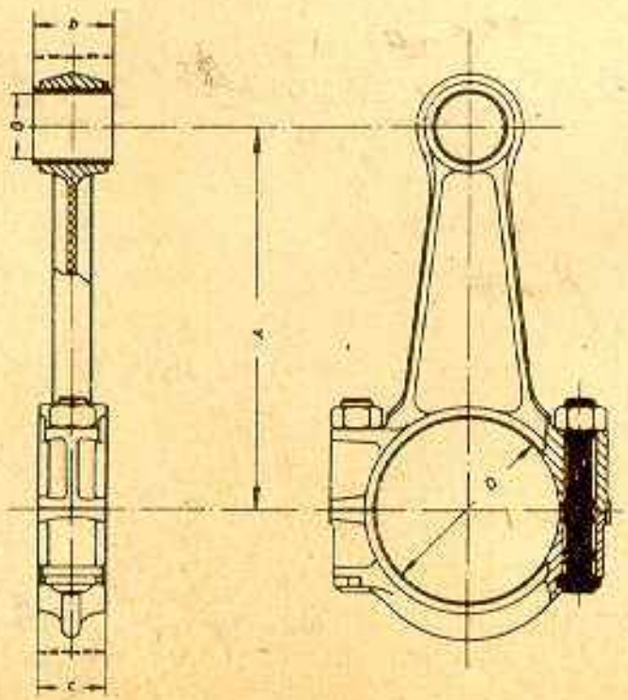
Measuring point	Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limit mm
Crankcase				
Case bore for main bearings:				
Bearing 1 – 8	65,000 . . . 65,019			
Oversize	65,250 . . . 65,269			
Case bore for intermediate shaft:				
Bearing 1 (thrust bearing)	27,500 . . . 27,521			
Bearing 2	26,500 . . . 26,521			
Spring for safety valve:				
Relaxed length	70,00			
Spring force at 52 mm	104 N/10,6 kp			
Spring force at 46 mm	138 N/14,1 kp			
Spring wire dia.	1,8			
Spring for pressure relief valve:				
Relaxed length	86,6			
Spring force at 50,5 mm	82,4 N/8,4 kp			
Spring force dia.	1,5			

Installation Note:

The pressure relief valve spring (86,8 mm long) may only be used in conjunction with a spring guide (safeguard against bending).

Never press springs flat.

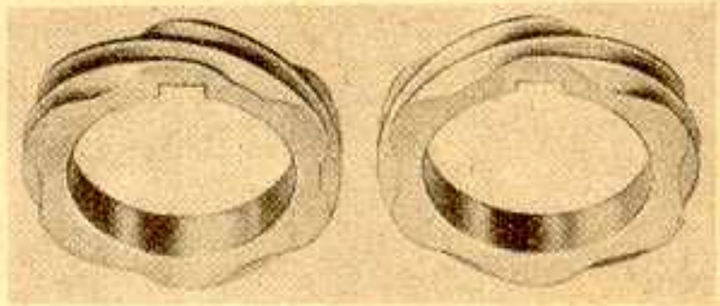
Measuring point	Install. size with tolerances mm 911 SC	911 Turbo	Clearance (+) or press fit (–) from	to	Wear limit mm
Connecting rods					
A Distance between centers	127,75-127,80	126,95-127,00			
b Width of conrod bush	24,8-25,0	24,5-25,0			
c Width at big end	21,7-21,8	21,7-21,8			
Width at crankpin	22,00-22,05	22,00-22,05	+0,200	+0,350	
D Conrod dia. (without bearing shell)	56,000-56,019	58,000-58,019			
G Conrod bush dia. installed in conrod (finished)	22,020-22,033	23,020-23,033			
Piston pin bushing/piston pin clearance			+0,020	+0,037	0,055



Installing drive gear for left-hand turning distributor on crankshaft

Remarks:

From 1978 models on the engines use a left-hand turning distributor and therefore required a new drive gear with modified teeth on the crankshaft.



For left-hand turning distributor (with Porsche manufacturing code stamped)

For right-hand turning distributor (with VW manufacturing code stamped)

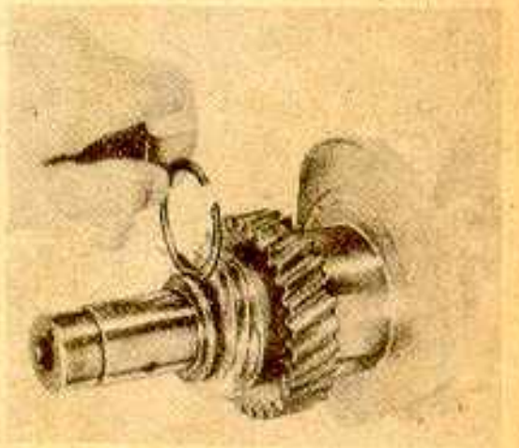
Installing circlip on crankshaft

To take up axial play on distributor drive gear, there are circlips in different thicknesses.

The following circlips are available:

Part No.	Thickness mm	Code
901.102.148.00	2,4	0
901.102.148.01	2,3	1
901.102.148.02	2,2	2
901.102.148.03	2,1	3

Install timing gear, intermediate ring and drive gear for left-hand turning distributor on crankshaft against stop. Find correct circlip thickness by inserting different circlips. Circlip must be installed without play.



Connecting rod weight groups → 911 SC

Connecting rods are grouped according to weights.

Final digits of the part number indicate the specified weight group.

These final digits are stamped on the connecting rod shank if it is supplied as a replacement part.

Weight Over grams	Under grams	Weight group for service	Service Conrod part number	Conrod code
633	642	1	930.103.015.51	51
642	651	2	930.103.015.52	52
651	660	3	930.103.015.53	53
660	669	4	930.103.015.54	54
669	678	5	930.103.015.55	55
678	687	6	930.103.015.56	56
687	696	7	930.103.015.57	57
696	705	8	930.103.015.58	58
705	714	9	930.103.015.59	59

Connecting rod weight groups – 911 Turbo

Weight Over grams	Under grams	Weight group for service	Service Conrod part number	Conrod code
624	633	4	930.103.020.74	74
633	642	5	930.103.020.75	75
642	651	6	930.103.020.76	76
651	660	7	930.103.020.77	77
660	669	8	930.103.020.78	78

Note:

Connecting rods installed in a given engine must not differ in weight by more than 9 grams. To determine weight group, weigh the complete connecting rod without bea g shells.

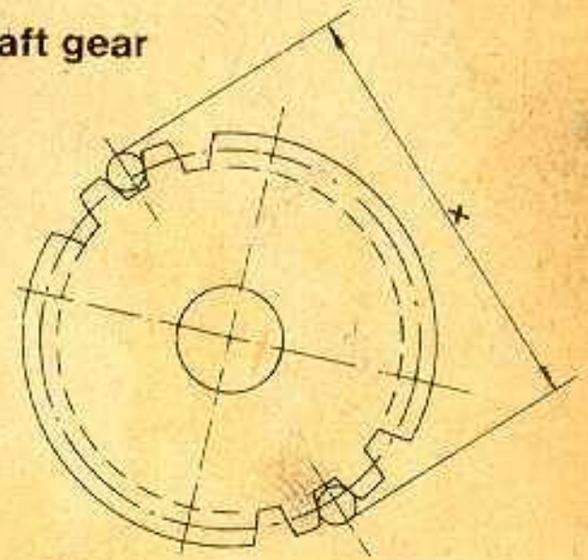
Matching intermediate shaft and crankcase

See marking on left half of crankcase below alternator support: 0 or 1.

Distance between centers mm	Crankcase mark	Crankshaft gear marking	Intermediate shaft gear marking	Backlash mm
103.975-103.990	0	0	0	0.029–0.049
		Installation	still possit.	
		1	0	0.016–0.042
		0	1	0.017–0.043
103.990-104.000	1	1	1	0.012–0.041
		Installation	still possible	
		0	1	0.025–0.049
		1	0	0.025–0.048

Checking intermediate shaft gear

Use 4.5 mm dia. steel rollers to measure gear (see sketch).



Intermediate shaft gear (standard) – wear limit x 136.5 mm
Intermediate shaft gear (marked 1) – wear limit = 136.55 mm

Replace intermediate shaft gears and crankshaft gears in sets only.

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Intermediate shaft				
Bearing 1 Crankcase bore – shaft	B 27.500–27.521 W 25.000–24.980			
Bearing 2 Crankcase bore – shaft	B 26.500–26.521 W 23.980–23.967			
Intermediate shaft clearance		+ 0.030	+ 0.084	
Intermediate shaft axial play		+ 0.040	+ 0.133	0.16
Chain guide – bolt	B 8.000– 8.015 W 7.822– 7.837			
Pinion – distributor shaft	B 12.456–12.474 W 12.444–12.455	+ 0.001	+ 0.030	
Distributor – crankcase	B 27.000–27.021 W 26.947–26.980	+ 0.020	+ 0.074	
Flywheel – drive shaft steel bushing	B 50.000–50.030 W 49.975–49.991	+ 0.009	+ 0.055	
Flywheel				
Lateral runout				max. 0.10
Radial runout				max. 0.20

Measuring point	Installation size with tolerances mm	Clearance press fit from	(+) or (−) to	Wear limits mm
Timing chain case				
Sprocket pivot shaft – chain tensioner housing	B 15.000–15.018 W 14.973–14.984	+ 0.016	+ 0.045	Visual inspection
Sprocket pivot shaft – sprocket carrier	B 15.000–15.018 W 14.973–14.984	+ 0.016	+ 0.045	
Sprocket carrier – sprocket pin	B 15.000–15.018 W 14.989–15.000	0.000	+ 0.029	
Sprocket – sprocket pin	B 15.032–15.050 W 14.989–15.000	+ 0.032	+ 0.610	Visual inspection
Pin – chain guide	B 8.000– 8.015 W 7.886– 7.895	+ 0.105	+ 0.129	
Pin – timing chain case	B 7.857– 7.872 W 7.886– 7.895	– 0.014	– 0.038	

Parallel alignment of both sprockets may not deviate by more than 0.25 mm.

Measuring point	Instaliation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits mm
Camshaft housing – camshaft				
Camshaft bearings	B 48,967 - 48,992	+0,025	+0,066	0,10
Camshaft	W 48,926 - 48,942			
Camshaft – axial play		+0,150	+0,200	0,40
Camshaft – timing gear flange	B 30,000 - 30,013 W 29,979 - 30,000	0,000	+0,034	
Camshaft – runout, measured on center bearing (between points)				max. 0,02
Rocker arm shaft – camshaft case	B 18,000 - 18,018 W 17,992 - 18,000	Rocker arm shaft held firm by wedge effect		
Rocker arm – rocker arm shaft	B 18,016 - 18,027 W 17,992 - 18,000	+0,016	+0,035	0,080
Axial play		+0,100	+0,350	0,50

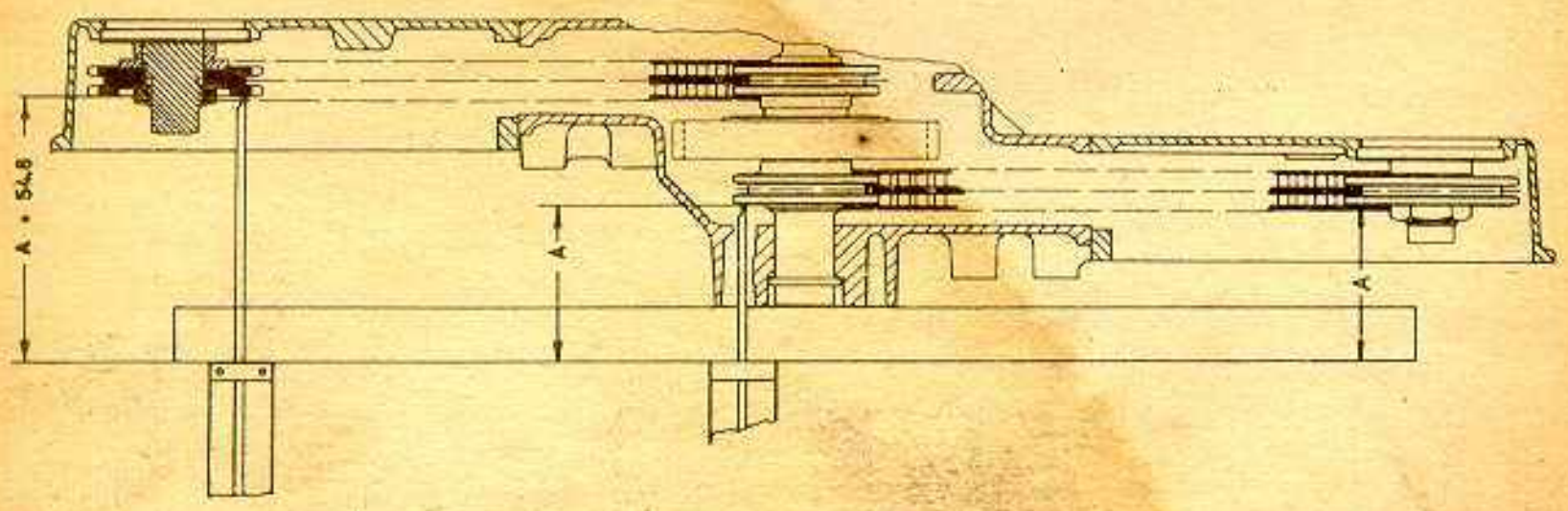
Checking parallel alignment of timing chain sprockets

Before measuring, push intermediate shaft and camshaft axially toward flywheel to set bearing thrust flanges in position.

Measurement is made through hole below intermediate shaft against side of forward chain sprocket on intermediate shaft (dimension A).

This dimension must also be achieved at sprocket for cylinders 4 – 6. Use shims if necessary (maximum permissible difference is 0.25 mm).

Sprocket for cylinders 1 – 3, mounted on intermediate shaft, is positioned 54.8 mm further to front. This 54.8 mm (design dimension) must be considered when determining dimension A. (maximum permissible difference is 0.25 mm).



Example: measured dimension A = 78.7 mm
This means sprocket of cylinders 1 – 3 is A + 54.8 = 78.7 + 54.8 = 133.5 mm

Pistons and cylinders (sizes, weights and marks)

Size	Code	Nominal dia.	911 SC Piston dia. D KS	Alusil cylinder dia.	911 Turbo Piston dia. D Mahle	Nikasil cylinder dia.
Standard	0	95/97	94,963 - 94,977	95,000 - 95,007	96,960 - 96,970	97,000 - 97,007
	1		94,970 - 94,984	95,007 - 95,014	96,967 - 96,977	97,007 - 97,014
	2		94,977 - 94,991	95,014 - 95,021	96,974 - 96,984	97,014 - 97,021
	3		94,984 - 94,998	95,021 - 95,028	96,981 - 96,991	97,021 - 97,028
Play between piston and cylinder			0,023 - 0,044		0,030 - 0,047	

Size	Code	Nominal dia.	911 SC Piston dia. D Mahle	Nikasil cylinder dia.
Standard	0	95/97	94,965 - 94,975	95,000 - 95,007
	1		94,972 - 94,982	95,007 - 95,014
	2		94,979 - 94,989	95,014 - 95,021
	3		94,986 - 94,996	95,021 - 95,028
Play between piston and cylinder			0,025 - 0,042	

Weight classes of pistons – 911 SC from 1980 models

Installation specifications:

1. Always only install pistons of same make and same weight class in one engine.
2. Piston pins must always remain with matching pistons and must not be mixed up even within an engine. Pay attention to this, marking pistons/pins if necessary, when disassembling and assembling engine.

Weight classes for MAHLE pistons
Pistons weighed with components (piston pin, piston rings, circlips)

	Total piston weight in grams Weight class within one set		Code
Engine type	930/09	930/07/08	
Standard production	660 to 664	636 to 640	– –
	664 to 668	640 to 644	–
Max. weight difference 4 grams	668 to 672	644 to 648	+
	672 to 676	648 to 652	+ +
For service sector	660 to 668	636 to 644	– – or –
Max. weight difference 8 grams	668 to 676	644 to 652	+ or + +

Weight classes for KS pistons
Pistons weighed with components (piston pin, piston rings, circlips)

	Total piston weight in grams Weight class within one set	Code
Engine type	930/09	
Standard production	695 to 699	– –
	699 to 703	–
Max. weight difference 4 grams	703 to 707	+
	707 to 711	+ +
For service sector	695 to 703	– – or –
Max. weight difference 8 grams	703 to 711	+ or + +

Weight classes of pistons – 911 SC from 1981 models

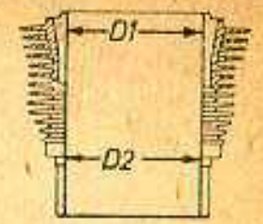
Weight classes for MAHLE pistons
Pistons weighed with components (piston pin, piston rings, circlips)

	Total piston weight in grams Weight class within one set		Code
Engine type	930/10 (R. o. W.)	930/16/17 (USA/Japan)	
Standard production	668 to 672	636 to 640	– –
	672 to 676	640 to 644	–
Max. weight difference 4 grams	676 to 680	644 to 648	+
	680 to 684	648 to 652	+ +
For service sector	668 to 676	636 to 644	– – or –
Max. weight difference 8 grams	676 to 684	644 to 652	+ or + +

Weight classes for KS pistons
Pistons weighed with components (piston pin, piston rings, circlips)

	Total piston weight in grams Weight class within one set	Code
Engine type	930/16/17	
Standard production	673 to 677	– –
	677 to 681	–
Max. weight difference 4 grams	681 to 685	+
	685 to 689	+ +
For service sector	673 to 681	– – or –
Max. weight difference 8 grams	681 to 689	+ or + +

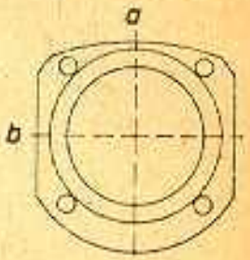
Checking pistons and cylinders



Cylinders
D1 = Measuring point for wear and ovality

30 mm below cylinder upper edge

The cylinder is worn, if the distance at this measuring point is 0,08 mm more than the installation size. The ovality of a cylinder is determined by measuring in directions a and b. The difference between a and b must not exceed 0,04 mm.

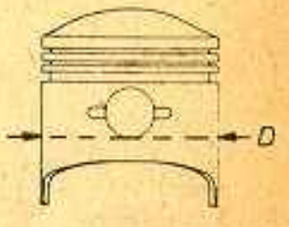


D 2 = Measuring point for piston pin gap

Rings slid in a height of cylinder base gasket.

Pistons
D = Measuring point for wear

At height of piston pin bore lower edge.



Note
Replace pistons and cylinders when running clearance exceeds 0,15 mm. This results from the difference between the max. cylinder dia. and the min. piston dia.

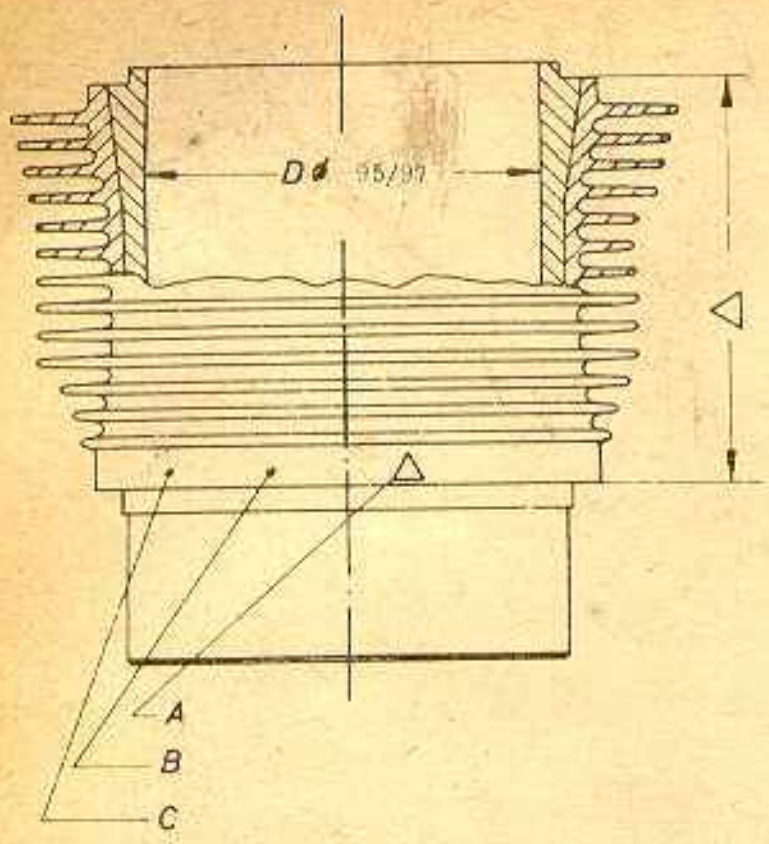
Piston ring gap

Piston ring	Gap mm (installation size)	Gap mm (wear limit)
Compression ring, I and II	0,15 - 0,3	0,8
Oil scraper ring, III	0,15 - 0,3	1,0
Oil scraper ring, III 3-piece "LS" ring (see measuring point "D 2")	0,4 - 1,4	2,0

Piston ring height clearance

Piston ring	Height play mm (installation size)	Height play mm (wear limit)
Compression ring, I	0,070 - 0,102	0,2
Compression ring, II	0,040 - 0,072	0,2
Oil scraper ring, III	0,020 - 0,052	0,1

Cylinder sizes



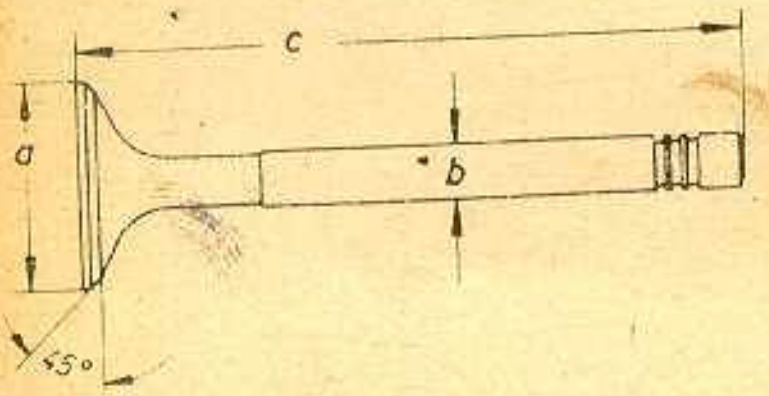
Cylinder height tolerances

Code A	Cylinder height	
5	85,400 - 85,425	911 SC
	85,600 - 85,625	911 Turbo
6	85,425 - 85,450	911 SC
	85,625 - 85,650	911 Turbo

A Tolerance group for cylinder height
B Tolerance group for cylinder diameter (refer to table)
C Manufacturer's identification

Valve size

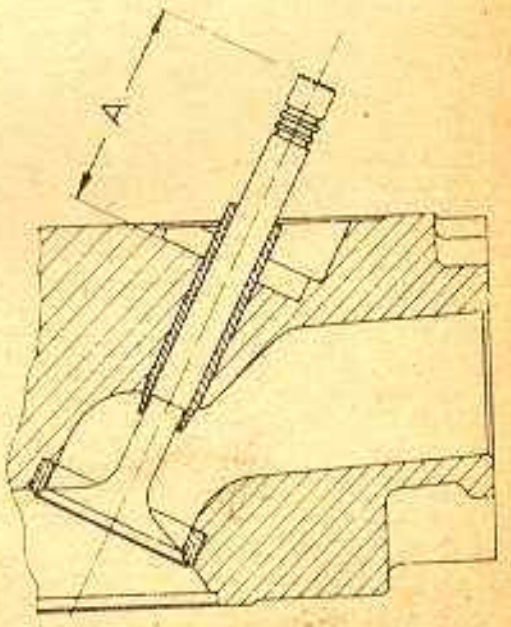
	911 SC Intake	Exhaust	911 Turbo Intake	Exhaust
a	49 ± 0,1	41,5 ± 0,1	49 ± 0,1	41,5 ± 0,1
b	8,97 – 0,012	8,95 – 0,012	8,97 – 0,012	8,95 – 0,012
c	110,1 ± 0,25	108,4 ± 0,25	110,1 ± 0,25	108,4 ± 0,25



Checking valve seats

To check valve seat depth, insert respective valve into guide and measure distance between valve stem end and bottom of shim cavity, without shims (see distance A in sketch).

If dimension is greater than specified, measure again a new valve. If dimension is still beyond specifications, valve seat inserts have been cut to deep and should be replaced, or exchange cylinder head.

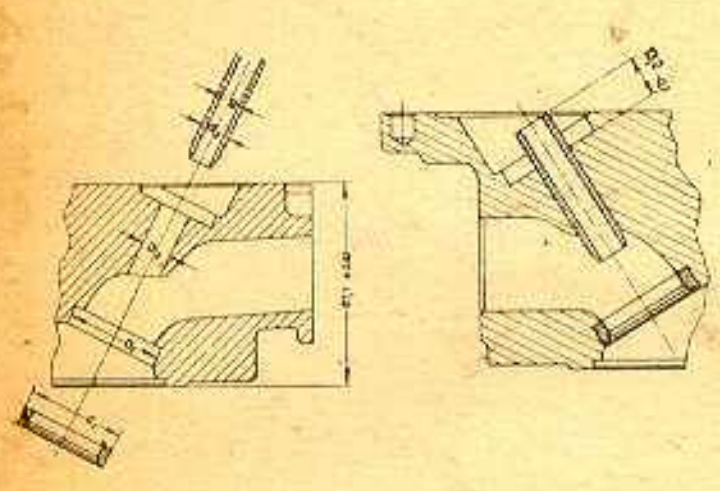


Distance A

911 SC, 911 Turbo 46,0 + 0,3 mm

Valve guides (wear limits, installation sizes)

Measuring point	Installation size with tolerances mm	Clearance (+) or press fit (–) from	to	Wear limits mm
Valve guide, outside dia. d2 Cylinder head, bore dia. D2	13.049–13.060 13.000–13.018	– 0.031	– 0.060	
Intake valve guide, inside dia. g intake valve stem, dia. b	9.000– 9.015 8.958– 8.970	+ 0.030	+ 0.057	0.15
Exhaust valve guide, inside dia. g Exhaust valve stem, dia. b	9.000– 9.015 8.938– 8.950	+ 0.050	+ 0.077	0.20



Machine 1st and 2nd oversize to correspond with bore in cylinder head.
Press fit: 0.06–0.09 mm.

Size table for pulling in valve guides

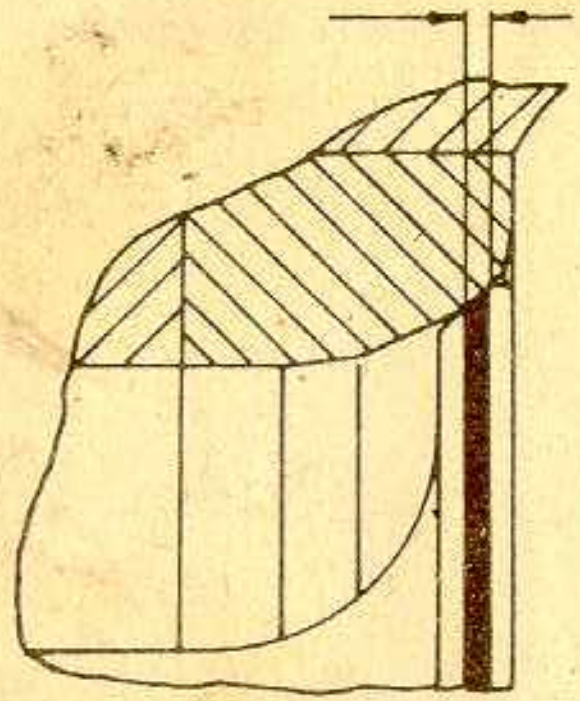
Valve guide	Outside dia. d 2 Valve guide *	Bore dia. D 2 Cylinder head
Standard size	13,060	13,000 - 13,018
1st oversize	13,260	13,000 - 13,200
2nd oversize	13,460	13,201 - 13,400

* Grind valve guides on diameter d 2 according to pertinent bore diameter D 2 – remembering press-fit – 0,06 . . . 0,09 mm.

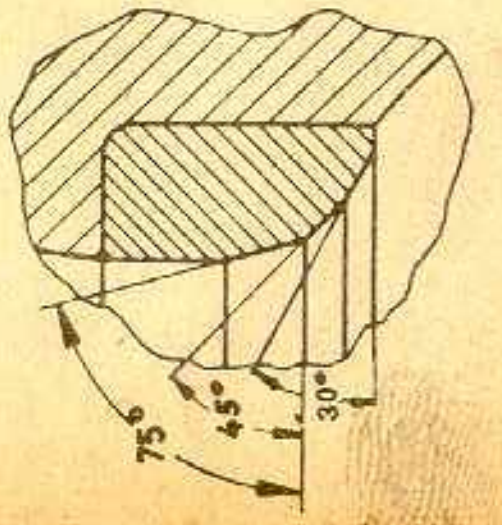
Specifications for installation of valve seat inserts

911 SC and 911 Turbo		Outside dia. d 1 valve seat insert	Bore D 1 in cylinder head
Standard size	Intake	51,680 – 51,661	51,500 – 51,530
Standard size	Exhaust	44,200 – 44,184	44,000 – 44,025
1st oversize	Intake	52,000 – 51,981	51,820 – 51,850
1st oversize	Exhaust	44,760 – 44,744	44,560 – 44,585

Intake = 1,3 ± 0,1
Exhaust = 1,5 ± 0,1



Angles and sizes of valve seat inserts



Important manual transmission adjusting data 915 and 930

2 examples for adjustment of pinion and ring gear

	Transm. Type 915	Transm. Type 930
Design dimension "R"	66,30 mm	82,29 mm
Deviation "r"	+ 0,10 mm	+ 0,02 mm
Adjustment dimension "E"	66,40 mm	82,31 mm
Dial gauge setting	66,30 mm	82,29 mm
Measured dimension (without shims)	– 0,29 mm	– 0,14 mm
Distance to face end of pinion shaft	66,01 mm	82,15 mm
Adjustment dimension "E"	66,40 mm	82,31 mm
Distance to face end of pinion shaft	– 66,01 mm	– 82,15 mm
Thickness of shims	0,39 mm *)	0,16 mm *)

*) Round off the nearest 0,05 mm.

Shims are available 0,10, 0,15 and 0,20 mm thick.

Recheck adjustment dimension "E" after installation of shims; a deviation of ± 0,03 mm is permissible.

Transmission tolerance survey

Measuring point	Type 915		Type 930	
	Installation tolerance mm	Wear limit mm	Installation tolerance mm	Wear limit mm
1. Backlash between gear I and II				
1st gear	0,17	0,22	0,055 - 0,13	0,22
2nd gear	0,17			
3rd gear	0,05 - 0,13			
4th gear	0,05 - 0,13			
5th gear	0,05 - 0,13			
2. Loose gears on pinion and drive shaft Axial clearance				
1st gear	0,3 - 0,4	0,5		
2nd gear	0,2 - 0,3	0,4		
3rd gear	0,2 - 0,3	0,4	same as 915	
4th gear	0,2 - 0,3	0,4		
5th gear	0,2 - 0,3	0,4		
3. Selector rods				
a) in guides radial clearance	0,195 - 0,236	0,4	same as 915	
b) Runout	--	0,1		

Measuring point	Typ 915		Typ 930	
	Installation tolerance mm	Wear limit mm	Installation tolerance mm	Wear limit mm
4. Selector forks in operating sleeve Axial clearance				
5th and reverse gear	0,1 - 0,3	0,5		
1st and 2nd gear	0,1 - 0,3	0,5	same as 915	
3rd and 4th gear	0,1 - 0,3	0,5		
5. Synchronizing rings Outside dia. installed				
1st gear	86,20 - 86,54	after	86,15 - 86,65	after
2nd gear	86,20 - 86,54	local wear	86,15 - 86,65	local wear
3rd gear	76,12 - 76,48	through of	76,20 - 76,55	through of
4th gear	76,12 - 76,48	molybdenum	76,20 - 76,55	molybdenum
5th gear	76,12 - 76,48	layer	—	layer
6. Drive shaft Max. runout at guidepin	0,1	0,1 (align)	same as 915	

Tightening torque for bolts and nuts of manual transmission 915

Location	Designation	Threads	Material	Tightening torque Nm	Tightening torque kpm
Transmission case (oil drain)	Plug with magnet	M 24 taper	St 37	20-25	2,0-2,5
Gear box (oil filler)	Plug	M 24 taper	St 37	20-25	2,0-2,5
Gear box, side, front cover, shift cover	Mid-grip nut	M 8x1,25	X 12 CrNi 18.8	22-25	2,2-2,5
Front cover	Backup light switch	M 18x1,5	Ms	25-35	2,5-3,5
Drive shaft	Collared nut	M 30x1,5	8.8	160-180	16-18
Drive shaft	Collared nut	M 18x1,5	6.8	120-140	12-14
Transm. support clamping plate and mountings	Hexagon nut	M 8x1,25	8	21-23	2,1-2,3
Drive pinion	Collared nut	M 24x1,5	8	240-260	24-26
Fork, gearshift	Hexagon nut	M 6x1,0	8	8-9	0,8-0,9
Shift lock, transmission case	Hexagon head bolt	M 10x1,5	8.8	15-18	1,5-1,8
Transmission case	Vent	M 16x1,5	9 S 20 K	20-30	2-3
Selector forks	Hexagon head bolt	M 8x1,25	8.8	24-26	2,4-2,6
Ring gear (differential)	Hexagon head bolt	M 12x1,25	11.9	115-120	11,5-12
Ring gear (locking differential)			11.9	140-150	14-15
			12.9	150-160	15-16
Joint flange	Expansion bolt	M 10x1,5	8.8	26-30	2,6-3
Joint flange	Hexagon head bolt	M 10x1,5	8.8	39-46	3,9-4,6
Starter mountings	Hexagon nut	M 10x1,5	8	46-48	4,6-4,8
Pressure tube (drive pinion)	Hexagon head bolt M 6x35	M 6x1,0	8.8	8-9	0,8-0,9
Front cover	Pressure relief bolt	M 12x1,5	9 S 20 K	22-25	2,2-2,5
Oil pump cover	Mid-grip nut	M 6x1,0	X 12 CrNi 18.8	9-10	0,9-1
Suction tube	Fillister head bolt M 6x15	M 6x1,0	8.8	8-9	0,8-0,9
Pressure tube (gear box)	Hexagon head bolt M 6x12	M 6x1,0	8.8	8-9	0,8-0,9
Guide tube for release bearing	Phillips screw	M 6x1,0	8.8	8-9	0,8-0,9

Tightening torque for bolts and nuts of manual transmission 930

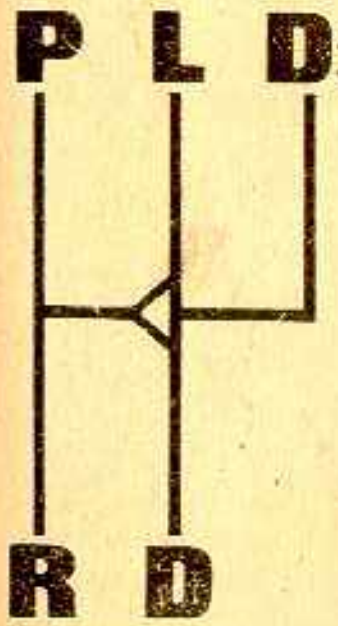
Location	Designation	Threads	Material	Tightening torque Nm	Tightening torque kpm
Drive shaft	Collared nut	M 30 x 1,5	8.8	210 - 230	21,0 - 23,0
Drive shaft	Collared nut	M 20 x 1,5	C 35 V	160 - 180	16,0 - 18,0
Drive pinion	Collared nut	M 24 x 1,5	8	240 - 260	24,0 - 26,0
Transmission case	Vent	M 14 x 1,5	9 S 20 K	20 - 30	2,0 - 3,0
Connecting rod, gearshift	Conical bolt	M 8 x 1,25	8.8	23 - 26	2,3 - 2,6
Shift cover	Mid-grip nut	M 8 x 1,25	X 12 CrNi 18.8	22 - 25	2,2 - 2,5
Gear box	Backup light switch	M 18 x 1,5	Ms	25 - 35	2,5 - 3,5
Gearshift, fork	Hexagon nut	M 6 x 1,0	8.8	9 - 11	0,9 - 1,1
Clamping plate, gear box and transmission case, front and side transmission covers	Hexagon nut	M 8 x 1,25	8	22 - 25	2,2 - 2,5
Shift lock transmission case	Hexagon head bolt	M 10 x 1,5	8.8	15 - 18	1,5 - 1,8
Selector forks	Hexagon head bolt	M 8 x 1,25	8.8	24 - 26	2,4 - 2,6
Ring gear (differential)	Hexagon head bolt	M 12 x 1,25	11.9	135 - 140	13,5 - 14,0
Locking differential	Hexagon head bolt	M 12 x 1,25	12.9	150 - 160	15,0 - 16,0
Joint flange	Expansion bolt	M 10 x 1,5	8.8	26 - 30	2,6 - 3,0
Joint flange	Hexagon head bolt	M 10 x 1,5	8.8	39 - 46	3,9 - 4,6

Transmission case (oil drain)	Plug with magnet	M 24 x 1,5 (taper 1 : 16)	St 37	20 - 25	2,0 - 2,5
Gear box (oil filler)	Plug	M 30 x 1,5	5.8	20 - 25	2,0 - 2,5
Reverse gear detent	Plug	M 16 x 1,5	5.8	20 - 25	2,0 - 2,5
Guide tube (Transmission case)	Fillister head bolt	M 6 x 1,0	8.8	8 - 10	0,8 - 1,0
Clutch and gear ring mountings	Fillister head bolt	M 8 x 1,0	8.8	20 - 25	2,0 - 2,5
Starter mountings	Hexagon nut	M 10 x 1,5	8	46 - 50	4,6 - 5,0
Holder to shift base	Hexagon head bolt	M 6	8.8	6,0	0,6
Shift base to tunnel	Fillister head bolt	M 8	8.8	21	2,1
Conical bolt in selector rod head	Conical bolt	M 8	8.8	15	1,5
Conical bolt on shift coupling	Conical bolt	M 8	8.8	15	1,5
Clamp mountings	Hexagon head bolt	M 8	8.8	25	2,5
Transmission cover Locking differential	Fillister head bolt	M 6	8.8	14	1,4

Sportomatic transmission specifications

Clutch
Hydrodynamic torque converter and a vacuum operated single plate dry clutch
Manual transmission: Porsche locking synchromesh
No. of gears: 3 forward, 1 reverse and parking lock

Shift scheme



P = Parking lock
R = Reverse gear
L = Low (driving range for steep gradients)
D = Drive (driving range for city)
D3 = Drive 3 (driving range for open roads)

Final drive ratio	8/27
Towing speed	approx. 40 km/h
Stall speed	1900 ± 200 rpm
Converter ratio	1.8
Clutch speed (at full throttle)	3200 ± 200 rpm
Transmission oil	approx. 2.5 ltr.

Tightening torque for bolts and nuts of sportomatic transmission

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Transmission case (on stud for side and front transmission cover as well as fork)	Hexagon nut	M 8x1.25	6.8	21 – 23	2.1 – 2.3
	Mid-grip nut	M 8x1.25	18.8 x12CrNi	22 – 25	2.2 – 2.5
Transmission case (oil filler)	Plug	M 24x1.5 (taper 1 : 16)	St 37	20 – 25	2.0 – 2.5
Transmission case (oil drain)	Plug with magnet	M 24x1.5 (taper 1 : 16)	St 37	20 – 25	2.0 – 2.5
Transmission case (vent)	Vent	M 14x1.5 (taper 1 : 16)	9 S 20 K	20 – 30	2.0 – 3.0
Transmission case	Backup light switch	M 18x1.5	Ms	35 – 40	3.5 – 4.0
Transmission case	Bridge-over switch	M 18x1.5	Ms	35 – 40	3.5 – 4.0
Transmission case (starter)	Hexagon nut	M 10x1.5	8.8	46 – 48	4.6 – 4.8
Transmission case (power motor support and mountings)	Hexagon nut	M 8x1.25	6.8	21 – 23	2.1 – 2.3
Converter housing to transmission case	Hexagon nut Hexagon nut	M 8x1.25 M 10x1.5	6.8 8.8 (SW15)	21 – 23 46 – 48	2.1 – 2.3 4.6 – 4.8
Converter housing (one-way clutch mountings)	Fillister head bolt	M 6x1.0	10.9	12 – 14	1.2 – 1.4
Converter housing	Threaded adaptor	M 24x1.5	6 S	30 – 35	3.0 – 3.5
Converter housing	Temperature transmitter	M 14x1.5	Ms	25 – 30	2.5 – 3.0
Converter housing	Temperature switch	M 14x1.5	Ms	25 – 30	2.5 – 3.0
Converter housing (clutch pressure plate)	Fillister head bolt	M 6x1.0	10.9	12 – 14	1.2 – 1.4
Converter drive plate	12-sided bolt	M 8x1.25	8.8	24 – 26	2.4 – 2.6
Intermediate plate (clamping)	Hexagon head bolt	M 8x1.25	8.8	21 – 23	2.1 – 2.3
Intermediate plate	Reversing lever shaft	M 8x1.25	9 S 20 K	21 – 23	2.1 – 2.3
Intermediate plate (shift lock)	Plug	M 14x1.5	4.6	22 – 25	2.2 – 2.5
Front transmission cover (speedometer drive lock)	Hexagon head bolt	M 8x1.25	8.8	16 – 18	1.6 – 1.8
Front transmission cover (9 mm parking lock ball dia.)	Plug	M 12x1.5	5.8	30 – 35	3.0 – 3.5
Angle drive in guide sleeve	Hollow bolt	M 24x1.5	6.8	22 – 24	2.2 – 2.4
Drive shaft	Hexagon nut	M 24x1.5	6.9	100–120	10.0 – 12.0
Drive shaft	Collared nut	M 18x1.5	5.8	110 – 130	11.0 – 13.0
Drive pinion	Expansion bolt	M 12x1.5	10.9	110–120	11.0 – 12.0
Selector forks	Hexagon head bolt	M 8x1.25	8.8	22 – 26	2.2 – 2.6
Differential (ring gear mtgs.)	Hexagon head bolt	M 12x1.25	11.9	115–120	11.5 – 12.0
Joint flange (differential)	Expansion bolt	M 10x1.5	8.8	35–40	3.5 – 4.0
Front transmission cover Transmission support mtgs.	Hexagon nut	M 8x1.25	6.8	21–23	2.1 – 2.3

Front axle and steering specifications

	911 SC	911 SC - USA, Canada, Japan	Turbo
Wheel suspension	Independent employing control arms and shock absorber struts		
Springs	One round torsion bar in driving direction for each wheel 18,8 mm dia.		
Track width	1369 mm with rim 6 J x 15	1361 mm with rim 6 J x 15	1432 mm with rim 7 J x 16
Shock absorbers	Double action, hydraulic shock absorber struts		
Stabilizers front/rear dia. in mm	20/18	20/18	20/18

Adjustment of ZF rack and pinion steering

Frictional moment of steering (measured on flange of steering gear with tie rods detached) 0,8 to 1,4 Nm = 8 to 14 kpcm

ZF steering specifications

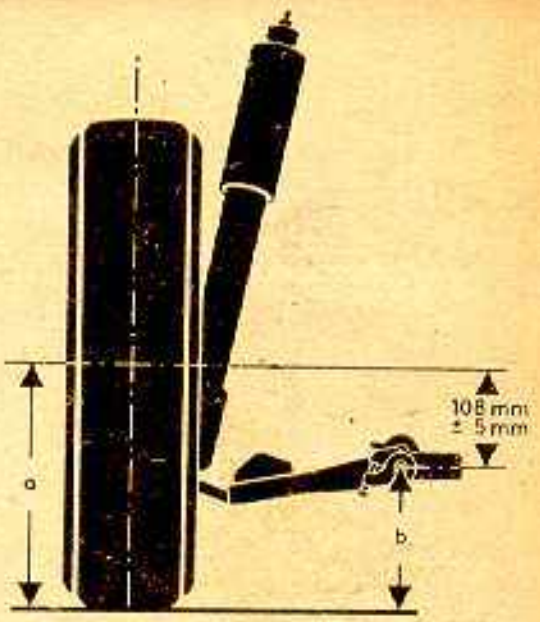
Steering ratio (in center) 17,78 : 1

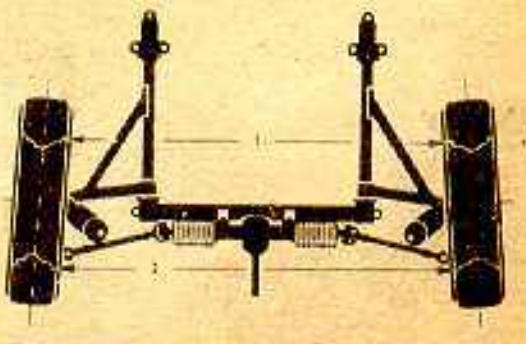
No. of steering wheel turns from lock to lock approx. 3,0

Specifications and tolerances

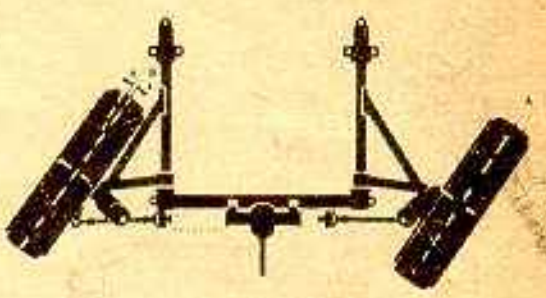
At curb weight according to DIN 70020
Car with full fuel tank, spare wheel and tools

Designation	Adjustment data and tolerances	Max. difference between left and right
Front axle		
Height adjustment: Wheel center above middle of torsion bar		
911 SC	108 mm ± 5 mm	5 mm
911 SC - USA, Canada, Japan	99 mm ± 5 mm	5 mm
Turbo	94 mm ± 5 mm	5 mm
Turbo - USA, Canada, Japan	85 mm ± 5 mm	5 mm
Total toe (pressed with 150 N)	0°	—





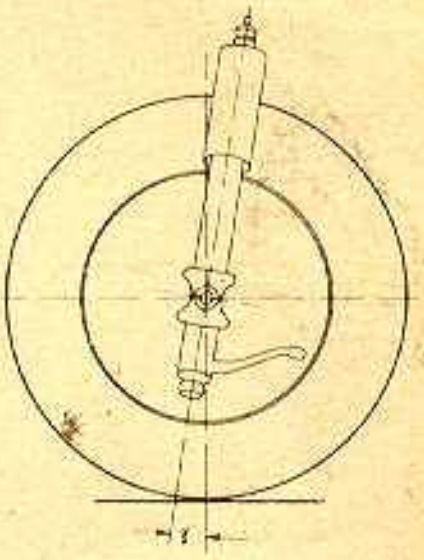
Designation	Adjustment data and tolerances	Max. difference between left and right
Difference angle at 20° lock	0° to + 30'	Can only be influenced by exchanging steering arm
A' = Parallel to A B = Centerline of wheel γ = Difference angle		
Camber of front wheels (wheels pointing straight ahead)		
α = Camber angle		
911 SC, Turbo	0° ± 10'	10'
911 SC, Turbo USA, Canada, Japan	+ 30' ± 10'	10'
β = Inclination of kingpin	11°	





Designation	Adjustment data and tolerances	Max. difference between left and right
y = Caster	6° 5' ± 15'	30'

Caster results from total camber difference at 20° left lock and 20° right lock x 1.5



These wheel alignment specifications can also be applied to earlier models.

Tightening torque for front axle and steering

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Support to spring strut	Hexagon nut	M 14 x 1,5	8	80	8,0
Support to body	Socket head screw	M 10	8.8	47	4,7
Auxiliary carrier to body	Hexagon head bolt	M 12 x 1,5	8.8	90	9,0
Stabilizer to auxiliary carrier strut	Hexagon head bolt	M 8	8.8	25	2,5
Auxiliary carrier strut, shield, stabilizer to body	Fillister head screw	M 10	8.8	47	4,7
Auxiliary carrier strut and shield to auxiliary carrier	Hexagon nut	M 10	8	28	2,8
Steering gear	Hexagon head bolt	M 10	8,8	47	4,7
Steering tie rod to steering gear	Hexagon head bolt	M 10	8.8	47	4,7

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Joint ball and pivot to tie rod (lock nut)	Hexagon nut	M 14 x 1,5	0,4	45	4,5
Tie rod to rack (Turbo)	Ball socket pivot	M 16 x 1,5	C 35 K	150	15
Nut on steering knuckle	Socket head screw	M 7	10.9	15	1,5
Ball joint to spring strut	Uni stopnut	M 8	8	22	2,2
Ball joint to control arm	Slotted nut	M 45 x 1,5	8.8	250	25
Control arm to body	Hexagon head bolt	M 10	8.8	47	4,7
Plug for spring strut cartridge	Plug			120+20	12+2
Wheel to wheel hub	Wheel nut	M 14 x 1,5	10.9/F 53	130	13
Brake disc to wheel hub	Hexagon nut	M 8	8.8	23	2,3
Guard to steering knuckle	Hexagon head bolt	M 8	8.8	10	1,0
Caliper to steering knuckle	Hexagon head bolt/ fillister head bolt	M 12 x 1,5	8.8	70	7,0

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Brake line connection	Coupling nut	M 10 x 1		14	1,4
Steering coupling to steering shaft	Hexagon head bolt	M 8	8.8	25	2,5
Steering shaft to steering gear	Hexagon head bolt	M 8	8.8	25	2,5
Steering shaft bearings	Fillister head bolt	M 8	8.8	25	2,5
Universal joint to steering shaft (lubricated with Optimoly HT)	Hexagon head bolt	M 8	8.8	20	2,0
Steering wheel	Hexagon nut	M 18 x 1,5	8	75	7,5
Dust cover to rack	Slotted nut	M 16 x 1,5		70	7,0
Ball joint to steering arm	Castle nut	M 10 x 1	8	45	4,5
Clutch flange to drive pinion (self-locking)	Hexagon nut	M 10	8	45	4,5
Housing cover to steering gear	Hexagon head bolt	M 8 x 1	8.8	15	1,5

Rear axle specifications

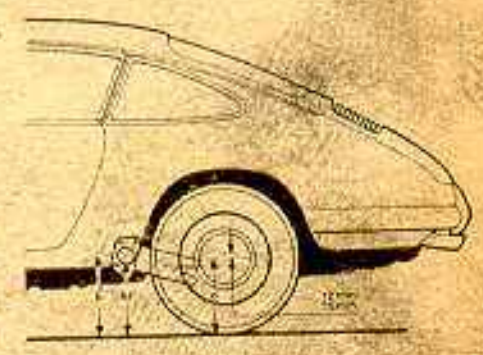
	911 SC	911 SC USA, Japan, Canada	Turbo
Wheel suspension	Independent, employing trailing arms, wheels driven by propeller shafts		
Springs	One round torsion bar in lateral direction for each wheel		
Torsion bar dia.	24,1 mm	24,1 mm	26 mm
Track width	1379 mm with rim 7 J x 15	1367 mm with rim 7 J x 15	1501 mm with rim 8 J x 16
Shock absorbers	Double action, hydraulic shock absorbers		
Stabilizers front/rear dia. in mm	20/18	20/18	20/18

Specifications and tolerances

(at curb weight according to DIN 70020; car with full fuel tank, spare wheel and tools)

Designation	Adjustment data and tolerances
Torsion bar specification Inclination of spring strut	
Coupe 911 SC	35° with Bielstein-shock absorbers 34°
Coupe 911 SC USA, Canada, Japan	40° with Bielstein-shock absorbers 39°

Designation	Adjustment data and tolerances	Max. difference between left and right
Targa	+ 0,5 °	
Air conditioner	+ 0,5°	
Sportomatic	+ 0,5°	
Turbo	33°	
Turbo - USA, Canada, Japan	37°	
Camber of rear wheels		
911 SC	– 1° ± 10'	20'
Turbo	– 30' ± 10'	20'
911 SC/Turbo – USA, Canada, Japan	0° ± 10'	20'
Track for all types	+ 10' ± 10' each wheel	20'
Height adjustment		
Wheel center below center of cross tube		
911 SC	16 mm ± 5 mm	8 mm
Turbo	12 mm ± 5 mm	8 mm
911 SC/Turbo - USA, Canada, Japan	37 mm ± 5 mm	8 mm



1° change in spring strut inclination = approx. 7 – 9 mm change in vehicle height.

Tightening torque for bolts and nuts for rear axle

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Bearing cover to body	Hexagon head bolt	M 10	8.8	47	4,7
Control arm to cross tube	Hexagon head bolt	M 14 x 1,5	10.9	60	6,0
Spring strut to control arm	Eccentric	M 12 x 1,5	8.8	60	6,0
Spring strut to control arm	Hexagon head bolt	M 12 x 1,5	10.9	95	9,5
Brake caliper to control arm	Hexagon socket screw	M 12 x 1,5	8.8	60	6,0
Shock absorber to control arm	Hexagon head bolt	M 14 x 1,5	8.8	125	12,5
Shock absorber to body	Hexagon nut	M 10 x 1	8	25	2,5
Brake line	Coupling nut	M 10 x 1		14	1,4
Stabilizer to body	Hexagon head bolt	M 8	8.8	25	2,5
Axle shafts to transmission and drive shaft	Fillister head bolt	M 10	12.9	83	8,3
		M 8	12.9	42	4,2
Stabilizer to stabilizer suspender	Hexagon nut	M 12 x 1,5	8/8.8	85	8,5
Stabilizer suspender to rear axle trailing arm	Hexagon head bolt	M 12 x 1,5	8.8	85	8,5
Wheel to wheel hub	Wheel nut	M 14 x 1,5		130	13
Wheel hub to drive shaft	Castle nut	M 20 x 1,5	10.9	300-320	30-32
Brake disc to wheel hub	Countersunk bolt	M 6	8.8	5	0,5
Adjusting lever to spring strut	Hexagon head bolt	M 16 x 1,5	10.9	245	24,5
Adjusting lever to spring strut	Eccentric bolt	M 16 x 1,5	10.9	245	24,5

Brakes – Specifications

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Brake booster				
Tandem master cyl. dia.	20,64 mm	23,81 mm		
Brake booster dia.	7"	8"		
Play on brake pedal with brakes bled and engine stopped	10 mm	10 mm		
Brake circuit division	front axle/ rear axle	front axle/ rear axle		
Front wheel brakes				
Brake disc outside dia.	282,5 mm inboard venting	304 mm inboard venting perforated evolent-shaped inboard venting ports		
Effective brake disc dia.	228 mm	247 mm		
Brake disc thickness (new)	20,5 mm	32 mm		

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Min. brake disc thickness* after machining	19,1 mm	30,6 mm	18,5 mm	30 mm
Max. brake disc surface-to-valley surface finish after machining	0,006 mm	0,006 mm		
Max. brake disc thickness tolerance	0,02 mm	0,02 mm		
Max. brake disc lateral runout	0,05 mm	0,05 mm		
Max. lateral runout installed	0,1 mm	0,1 mm		
Pistons in brake caliper	48 mm dia. 2 pistons per caliper	38 mm dia. 4 pistons per caliper		
Brake pad area per wheel	76 cm^2	94 cm^2		
Brake pad thickness	10 mm	13 mm	2 mm	2 mm
Brake pad recess play	brake liner has easy movement in recess	0,4 to 0,6 mm		
Rear wheel brakes				
Brake disc outside dia.	290 mm inboard venting	309 mm inboard venting perforated evolvent-shaped inboard venting ports		
Effective brake disc dia.	244 mm	251 mm		

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Brake disc thickness (new)	20 mm	28 mm		
Min. brake disc thickness* after machining	18,6 mm	26,6 mm	18 mm	26 mm
Max. brake disc peak-to-valley surface finish after machining	0,006 mm	0,006 mm		
Max. brake disc thickness tolerance	0,02 mm	0,02 mm		
Max. brake disc lateral runout	0,05 mm	0,05 mm		
Max. lateral runout installed	0,1 mm	0,1 mm		
Pistons in caliper	38 mm dia. 2 pistons per caliper	30 mm dia. 4 pistons per caliper		
Brake pad area per wheel	52,5 cm^2	94 cm^2		
Brake pad thickness	10 mm	13 mm	2 mm	2 mm
Brake pad recess play	brake pads move easily in recess	0,4 to 0,6 mm		
Parking brake				
Brake drum dia.	180 mm	180 mm	181 mm	181 mm
Brake shoe width	25 mm	25 mm		
Liner area per wheel	85 cm^2	85 cm^2		
Brake liner thickness	4,5 mm	4,5 mm	2 mm	2 mm

Caliper version

911 SC: gray cast iron front and rear Turbo: light alloy front and rear

* Brake disc should only be machined symmetrically, i. e. uniform on both sides.

Machining specifications and wear limits for brake discs and parking brake

Vehicle type	Type of brake disc	Location of brake disc	Distance "a" (in ref. to new brake disc thickness	New brake disc thickness	Min. thickness of brake disc after machining	Wear limit of brake disc (for symmetric wear)
911 SC	Vented brake disc	Front wheel	35,25 ± 0,1 mm	20,5 – 0,2 mm	19,1 mm	18,5 mm
Turbo	Vented, perforated brake disc	Front wheel	35,7 + 0,25 mm* – 0,35 mm from model 1981	32 – 0,2 mm	30,6 mm	30 mm
			56,7 ± 0,1 mm	32 – 0,2 mm	30,6 mm	30 mm
911 SC	Vented brake disc	Rear wheel	76 + 0,2 mm	20,0 – 0,2 mm	18,6 mm	18,0 mm
Turbo	Vented perforated brake disc	Rear wheel	76 + 0,2 mm	28 – 0,2 mm	26,6 mm	26 mm
All	Thickness tolerance of brake discs				max. 0,02 mm	
All	Lateral runout of brake discs				max. 0,05 mm	
All	Surface finish of brake discs after machining				max. 0,006 mm	

* From brake flange bearing surface on wheel hub (brake disc, ring, brake flange assembly) to inside brake disc friction surface.

Caution

Refinishing and wear specifications listed above are based on the assumption that remaining thickness of the brake pad is not less than 2.0 mm.
This pad thickness is required to assure perfect operation of brakes. (Installation of cross spring assures this.)

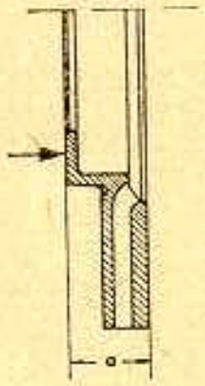
Only balanced brake discs are supplied. Brake discs are balanced by special clips in the cooling vents.

Caution! Never remove balance clips.

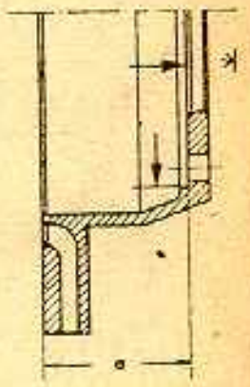
Caution

Machine brake disc symmetrically, i. e. uniformly on both sides.
Arrows indicate brake disc reference or mounting points.

Front wheel brake disc



Rear wheel brake disc



Parking brake

Brake drum dia. (new)	180 + 0.2 mm
Brake drum wear limit	max. 181.0 mm dia.
Brake liner width	25 mm

Caution!

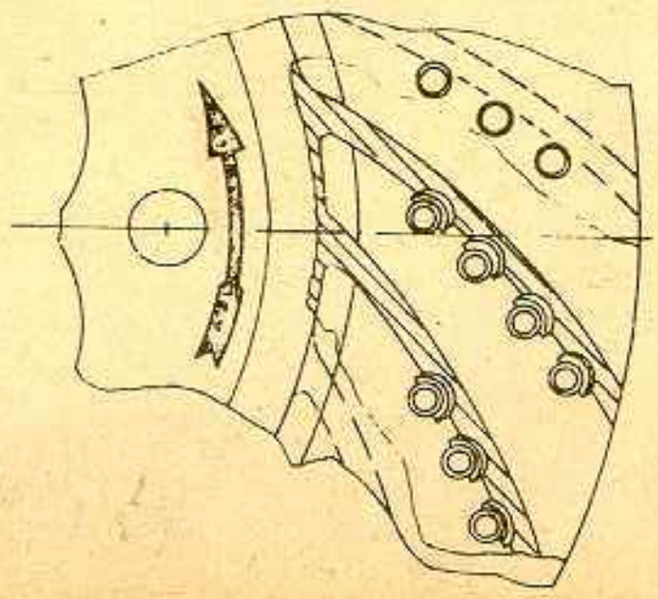
Parking brake liners must be at least 2.0 mm thick.

Arrangement of brake disc venting ports (assembly information)

The inboard venting ports of brake discs **on Turbo** are arranged in evolvent-shape. Don't mix up left and right sides when assembling.

Identification: Evolvent shape and part number.

Part number is located on brake disc.



Left side part number:
3 group number
uneven

Right side part number:
3 group number
even

Example:
930.351 **04700** = left side
930 351 **04800** = right side

Forward direction

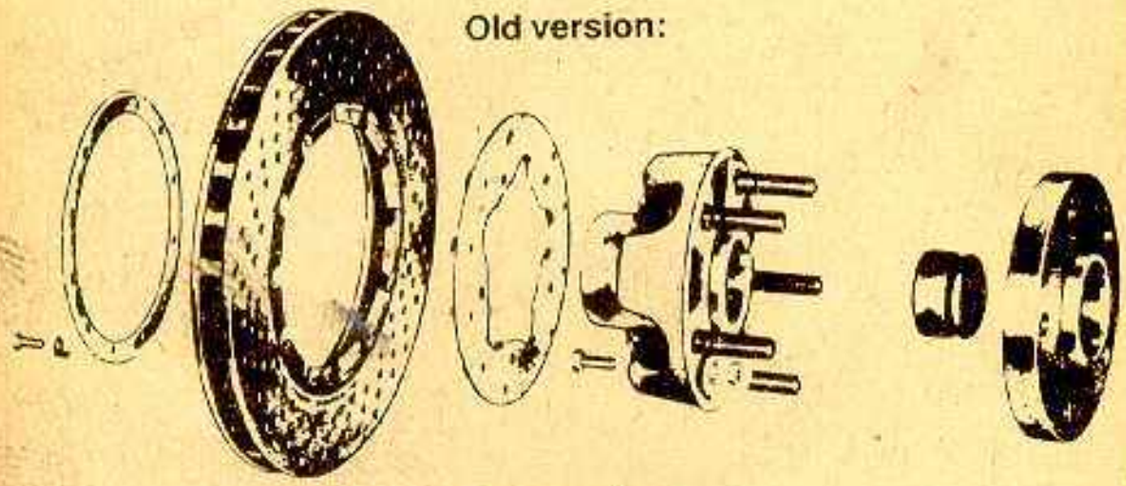
Modification of front wheel brakes – 911 Turbo (assembly information)

Since the beginning of production of 1981 models the front wheel brake disc to hub connection has been changed on the Type 911 Turbo. Instead of the old connection with flange and ring, it has been changed to the brake disc shell connection (same as 911).

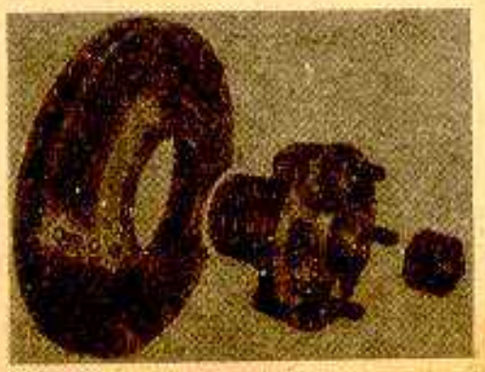
Modified parts:
Brake discs, wheel hubs, grease caps

Deleted parts:
Brake flange, ring, M 6 screws with lockplates, spacer (21 mm)

Old version:

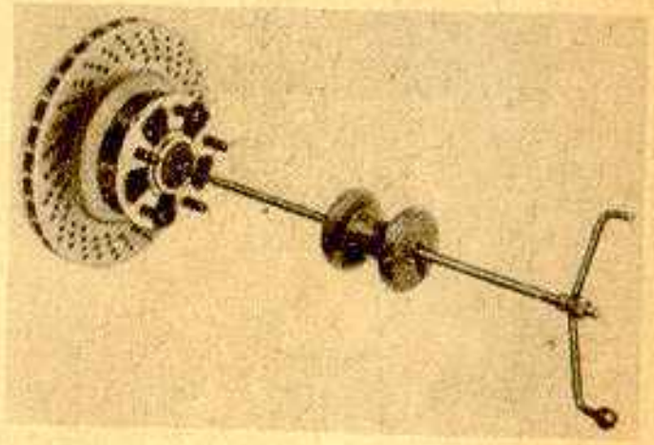


New version:



Modification of front wheel brakes – 911 Turbo (assembly information)

Brake discs are mounted on hubs with M 8 bolts and nuts as for Type 911 SC cars. Because of the new brake disc with shell design the total distance (brake disc – hub) is 21 mm longer. Consequently the 21 mm spacers need not be installed. An additional installation of spacers with the wheel hub is not approved.
When replacing parts a conversion to new brake discs/wheel hubs is only permitted on both sides for 911 Turbo 3,3 ltr. cars before 1981 model year.
Due to the modified hubs it is not quite so simple to take off wheel hub grease caps with Special Tool VW 771 in conjunction with Special Tool 9165 (see Repair Manual 930 Turbo, page 46-5) or with screwdrivers due to the deeper installed position.
As from Chassis No. 93 Z BS 000094 (October, 1980) hub grease caps with welded adapters are used. These grease caps can be knocked off with Special Tool VW 771 (without Special Tool 9165).
A piece of pipe should be used to knock in the grease caps to protect threads on the adapters.



Note: Grease caps without adapters were still used on 1981 model Turbos up to the above mentioned chassis number. These caps have been machined to the smallest possible diameter at the pressing-in point, in order to have a slight load. These caps can only be removed with screwdrivers.

Brake circuit failure indicator

Each of both brake circuits has a stop light switch on the brake master cylinder, which also acts as a brake function warning switch.

An indicator lamp installed in the instrument panel comes on when a brake circuit fails.

After repairing the brake system the brake indicator lamp must be switched off by disconnecting the battery.

Tightening torque for hydraulic and mechanical brake parts

Location	Designation	Threads	Material	Tightening torque Nm	kpm
Nut on steering knuckle	Fillister head screw	M 7	10.9	15	1,5
Brake caliper to steering knuckle	Fillister head screw/ hexagon head bolt	M 12 x 1,5	8.8	70	7,0
Brake flange to wheel hub	Hexagon head bolt	M 8	8.8	23	2,3
Brake disc to brake flange	Hexagon head bolt	M 6	8.8	10	1,0
Brake disc to wheel hub	Hexagon head bolt	M 8	8.8	23	2,3
Guard to steering knuckle	Hexagon head bolt	M 8	8.8	10	1,0
Guard and brake backplate to trailing arm	Fillister head screw	M 8	8.8	25	2,5
Guard to brake backplate	Hexagon head bolt	M 8	8.8	25	2,5
Brake disc to wheel hub	Countersunk screw	M 6	8.8	5	0,5
Brake caliper to trailing arm	Fillister head screw/ hexagon head screw	M 12 x 1,5	8.8	60	6,0
Wheel to wheel hub	Wheel nut	M 14 x 1,5	F 53/10 K	130	13

Brake master cylinder to vacuum booster	Hexagon nut	M 8	8	25	2,5
Stop light switch to master cylinder	Stop light switch	M 10 x 1		15 + 4	1,5 + 0,4
Brake booster to console	Hexagon nut	M 8	8	25	2,5
Brake fluid tank	Hexagon head bolt	M 6	8.8	2	0,2
Pivot and joint shell to push rod	Hexagon nut	M 10	8	35	3,5
Brake booster to trunk floor	Hexagon nut	M 8	8	25	2,5
Strut to console	Hexagon head bolt	M 10	8.8	46	4,6
Brake lines to master cylinder, branch brake hoses and brake calipers	Coupling	M 10 x 1		14	1,4
Branch to cover and rear axle cross tube	Hexagon head bolt	M 6	8.8	6	0,6
Bleeder screws on brake calipers (Turbo)	Bleeder screw	M 10 x 1		8 to 11	0,8 to 1,1
Brake caliper sections to bridge (Turbo)	Fillister head bolt	M 12 x 1,5	8.8	60	6
Spring plate to bridge (Turbo)	Countersunk screw	M 5		4	0,4
Ring adapter to brake caliper (Turbo)	Hollow union bolt	M 10 x 1		16	1,6
Bleeder valve in brake caliper	Bleeder screw			3	0,3

Rims and tires

Type	Standard rims	tires	Optional extra * rims	tires
911 SC	front LM g 6 J x 15 rear LM g 7 J x 15	185/70 VR 15 215/60 VR 15	front LM gs 6 J x 16 rear LM gs 7 J x 16	205/55 VR 16 225/50 VR 16
			Winter tires**	
			5 ½ J x 15***	165 R 15 M+S***
			5½ J x 14	185 R 14 M+S
			5 ½ J x 15*** 6 J x 15 7 J x 15 6 J x 15 front/ 7 J x 15 rear	185/70 R 15 M+S
			6 J x 16 6 J x 16 front/ 7 J x 16 rear	205/55 R 16 M+S
Turbo	front LM gs 7 J x 16 rear LM gs 8 J x 16	205/55 VR 16 225/50 VR 16		
			Winter tires**	
			6 J x 15 7 J x 15 6 J x 15 front/ 7 J x 15 rear	185/70 R 15 M+S
			6 J x 16 7 J x 16 6 J x 16 front/ 7 J x 16 rear	205/55 R 16 M+S

Tire inflation pressure (reference values)

(measured on cold tires)

	911 SC	Turbo	Turbo - USA, Japan, Canada
Front	2,0 bar	2,0 bar	2,0 bar
Rear	2,4 bar	3,0 bar	2,4 bar
Spare wheel	2,2 bar	2,2 bar	2,2 bar

These values also apply to winter tires.

LM g = Cast light alloy
LM gs = Forged light alloy

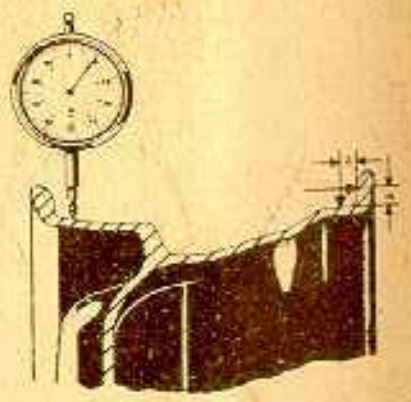
* Other wheel rim/tire combinations are possible in addition to optional extra tires (Technical Information).
** SR or HR version.
*** Not recommended.

Checking wheel rims

- Measuring points for lateral and radial runout on inner and outer rim flanges

Distance "a" = 8 mm.

Max. permissible radial runout for steel rims	1,25 mm
Max. permissible radial runout for alloy rims	1,0 mm
Max. permissible lateral runout for steel rims	1,25 mm
Max. permissible lateral runout for alloy rims	0,8 mm
Max. permissible radial and lateral runout for rim + tire	1,5 mm



Note:
Straightening of deformed rims is not permitted.

The rim flanges of light alloy wheel rims can be checked for wear. Inner rim flanges more subject to wear.

Use a conventional 8 mm radius gauge to check, but first remove any sharp edges and burrs.

Wear limit 1 mm. If necessary, replace wheel rim.

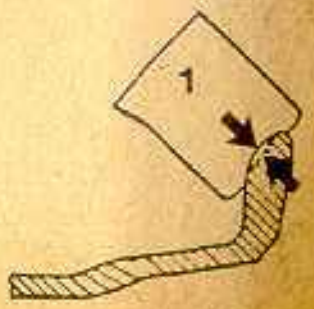
Checking rim flange shape:

——— New condition

- - - - - - - Worn

→ ← Max. wear 1 mm

1 8 mm radius gauge



Ignition timing values 911 SC and 911 Turbo

Engine type	911 SC 1978/79 models	911 SC (USA/ Japan) 1978/79 models	911 SC 1980 model	911 SC (USA/ Japan) 1980/81 models	911 SC 1981 model	911 Turbo (Europe, R.o.W.) from 1978 model	911 Turbo (USA) from 1978 model	911 Turbo (California, Japan) from 1978 model
Ignition timing	5° BTDC	5° BTDC	5° BTDC	5° BTDC	25° BTDC	29° BTDC	10°±2° ATDC	5° ±1° ATDC
at engine speed (rpm)	900 ± 50	900 ± 50	900 ± 50	900 ± 50	4000	4000	1000 ± 50	1000 ± 50
Vacuum control detached	yes	yes	yes	yes	yes	yes	no	no
Ignition timing control	24°...31° BTDC	24°...28° BTDC	23°...29° BTDC	19°...25° BTDC	not above 25° BTDC	0° ± 2° BTDC	26° ± 4° BTDC	31° ± 4° BTDC
at engine speed (rpm)	6000	6000	6000	6000	6000	1000 ± 50	4000	4000
Vacuum control detached	yes	yes	yes	yes	yes	no	yes	yes

Spark plug survey 911 SC and 911 Turbo

	911 SC 78 - 79 mod.	911 SC 80 - 81 mod.
Spark plugs Bosch	W 5 D (W 225 T 30)	W 4 C 1 (W 260 T 2)
Beru	14-5 D (225/14/3 A)	14-4 C 1 (260/14/3)
Electrode gap	0,8 mm	0,8 mm

Battery charge condition	Normal Climates Density
Discharged (dead)	1,12
Half charged	1,20
Charged	1,28

	911 SC (USA) 78 - 79 mod.	911 SC (USA) 80 - 81 mod.	911 Turbo 78 - 81 mod.
Spark plugs Bosch	W 8 D (W 145 T 30)	W 5 D (W 225 T 30)	W 3 DP (W 280 P 21)
Beru	14-8 C (145/14/3 A)	14-5 D (225/14/3 A)	
Electrode gap	0,8 mm	0,8 mm	0,6 mm

Battery charge condition	Tropics Density	Temperature Protection
Discharged (dead)	1,08	– 11 °C
Half charged	1,16	– 27 °C
Charged	1,23	– 68 °C

Fuse and relay chart for 911 SC, 1978 - 80 models

Fuse no.	Fused equipment	Amps
1	Fog lights	16
2	License plate light, fog light indicator lamp and relay	5
3	Front and rear right marker lights	5
4	Front and rear left marker lights, engine compartment light	5
5	Right low beam headlight	8
6	Left low beam headlight	8
7	Right high beam headlight	8
8	Left high beam headlight, high beam indicator lamp	8
9	Right front turn signal	5
10	Left front turn signal	5
11	Left and right stop lights, flasher relay, backup lights, tempostat	16
12	Rear window defogger relay, heater blower, rear window defogger indicator lamp	25
13	Windshield wipers, washer pump	25
14	Electric sliding roof, rear window wiper, outside mirror	16
15	Cigar lighter, blower switch indicator lamp	16
16	Fuel pump	25
17	Hazard lights	16
18	Courtesy light, clock, glove box light, trunk light	5
19	Headlight cleaners	16
20	Blower for air conditioner	25
21	Electric window controls	25

Fuses in engine compartment

1	Heater blower relay	5
2	Heater blower	25
3	Rear window defogger, rear wiper return	25

Relays in fuse box

1 Not occupied
2 Fog lights
3 Horn
4 Not occupied
5 Window controls
6 Not occupied
7 Fuel pump

Relays in engine compartment

1 Heater blower
2 Rear window defogger

Fuse and relay chart for 911 Turbo, 1978 - 80 models

Fuse no.	Fused equipment	Amps
1	Fog lights	16
2	License plate lights, fog light indicator lamp and relay	5
3	Front and rear right marker lights	5
4	Front and rear left marker lights, engine compartment light	5
5	Right low beam headlight	8
6	Left low beam headlight	8
7	Right high beam headlight	8
8	Left high beam headlight, high beam indicator lamp	8
9	Right front turn signal	5
10	Left front turn signal	5
11	Flasher relay, backup lights, left and right stop lights	16
12	Electric sliding roof, rear window wiper, outside mirror	25
13	Windshield wipers, washer pump	25
14	Blower, relay and indicator lamp for windshield and rear window defoggers	16
15	Cigar lighter, blower switch indicator lamp	16
16	Fuel pumps	25
17	Hazard lights, windshield defogger	16
18	Courtesy light, clock, glove box light, trunk light	5
19	Headlight cleaners	25
20	Air conditioner blower	25
21	Electric window controls	25
	In engine compartment	
	Rear window defogger, rear wiper return	25

Relays in fuse box

1 Air conditioner
2 Fog lights
3 Horn
4 Not occupied
5 Window controls
6 Fuel pump 1
7 Fuel pump 2

Relays in engine compartment

1 Air sensor and charge pressure safety switch
2 Rear window defogger

Fuse and relay chart for 911 SC, 1981 model

Fuse no.	Fused equipment	Amps
1	Fog lights	25
2	License plate lights, fog light indicator lamp and relay	5
3	Front and rear right marker lights	5
4	Front and rear left marker lights, engine compartment light	5
5	Right low beam headlight	8
6	Left low beam headlight	8
7	Right high beam headlight	8
8	Left high beam headlight, high beam indicator lamp	8
9	Right front turn signal	5
10	Left front turn signal	5
11	Flasher, backup lights	16
12	Rear window defogger relay, heater blower, rear window defogger indicator lamp, automatic heater control	25
13	Windshield wipers, washer pump, cigar lighter	25
14	Electric sliding roof, rear window wiper, outside mirror	16
15	Stop light, tempostat	8
16	Fuel pump	25
17	Hazard lights, windshield defogger	16
18	Courtesy light, clock, glove box light, trunk light	5
19	Headlight cleaners	25
20	Air conditioner blower	25
21	Electric window controls	25
	Fuses in engine compartment	
1	Rear window defogger, rear wiper return	25
2	Heater blower	25
3	Heater blower relay	5

Relays in fuse box

I Air conditioner
II Fog lights
III Horn
IV Tempostat
V Window controls
VI Not occupied
VII Fuel pump

Relays in engine compartment

I Single-step rear window defogger
II Heater blower
III Double-step rear window defogger

Fuse and relay chart for 911 Turbo, 1981 model

Fused equipment	Amps
1 Fog lights	16
2 License plate lights, fog light indicator lamp and relay	5
3 Front and rear right marker lights	5
4 Front and rear left marker lights, engine compartment light	5
5 Right low beam headlight	8
6 Left low beam headlight	8
7 Right high beam headlight	8
8 Left high beam headlight, high beam indicator lamp	8
9 Right front turn signal	5
10 Left front turn signal	5
11 Flasher relay, backup lights, outside mirror	16
12 Electric sliding roof, rear window wiper	25
13 Windshield wipers, washer pump, cigar lighter	25
14 Blower, relay and indicator lamp for windshield and rear window defoggers, automatic rear window control	16
15 Stop light	8
16 Fuel pumps	25
17 Hazard lights, windshield defogger	16
18 Courtesy light, clock, glove box light, trunk light	5
19 Headlight cleaners	25
20 Air conditioner blower	25
21 Electric window controls	25
In engine compartment	
Rear window defogger, rear wiper return	25

Relays in fuse box

I Air conditioner
II Fog lights
III Horn
IV Not occupied
V Window controls
VI Fuel pump 1
VII Fuel pump 2

Relays in engine compartment

II Air sensor and charge pressure safety switch
III Rear window defogger
IV Delay relay

Bulb chart – 1978 - 1980 models (911 SC and 911 Turbo)

Location	Wattage	Base DIN (SAE)	Remarks
Main headlights H 4	60/55 W	P 43 t-38	
Additional headlights H 3 Front fog lights H 3	55 W	PK 22 S	
Main headlights "AS"	45/40 W	P 45 t	Japan
Stop/tail lights	21/5 W	BAY 15 d	
Turn signals Backup lights	21 W	BA 15 s	
Side marker lights License plate light	4 W	BA 9 s	
Rear fog light	18 W	SV 8,5 - 8	
Trunk light	10 W	BA 15 s	
Passenger compartment light Engine compartment light	10 W	SV 8,5 - 8	
Instrument indicator lamps	2 W	BA 7 s	
Glass base indicator lamp	1,2 W	W 2 x 4,6 d	
License plate light	5 W	BA 15 s	
Sealed beam headlights (RHD)	60/50 W	(6014)	USA
Sealed beam headlight (LHD)	60/50 W	(7002)	
Stop/tail lights Turn signals/side marker lights	32/3 cp	(1034)	USA
Turn signals Backup lights	32 cp	(1073)	USA
Side marker lights License plate light	2 cp	(1895)	USA
Marker lights (rear)	6 cp	(89)	USA

Bulb chart from 1981 models (911 SC and 911 Turbo)

Location	Wattage	Base DIN (SAE)	Remarks
Main headlights H 4	60/55 W	P 43 t-38	
Additional headlights H 3 Front fog lights H 3	55 W	PK 22 S	
Main headlights "AS"	45/40 W	P 45 t	Japan
Stop/tail lights	21/5 W	BAY 15 d	
Turn signals Backup lights Rear fog light	21 W	BA 15 s	
Side marker lights License plate light	4 W	BA 9 s	
Trunk light	10 W	BA 15 s	
Passenger compartment light Engine compartment light	10 W	SV 8,5-8	
Lamps for instruments and ashtray	2 W	BA 7 s	
Glass base indicator lamps	1,2 W	W 2 x 4,6 d	
License plate light	5 W	BA 15 s	
Side turn signals	5 W	3,5 x 9,5	
Sealed beam headlights (RHD)	60/50 W	(6014)	USA
Sealed beam halogen headlights	60/50 W	(6014)	USA
Stop/tail lights Turn signals/marker lights	32/3 cp	(1034)	USA
Turn signals Backup lights	32 cp	(1073)	USA
Sign light	1,2 W	2,9 x 4,6	USA
Side marker/license plate light	2 cp	(1895)	USA

Dimensions at curb weight according to DIN

	911	Turbo	
Wheelbase ..... mm	2272	2272	
Front track width ..... mm	1369	(1361)	1432
Rear track width ..... mm	1379	(1367)	1501
Length ..... mm	4291		4291
Width ..... mm	1652		1775
Height ..... mm	1320	(1340)	1310 (1328)

USA values in brackets.

Weights

		911 SC R. o. w. 78-81 mod.	911 SC USA 81 mod.	Turbo R. o. w. 78-81 mod.	Turbo USA 78-80 mod.	Turbo Canada 81 mod.
Curb weight acc. to DIN	kg	1160	1250	1300	1295	1300
Gross vehicle weight	kg	1500	1460	1680	1500	1600
Max. axle load, front/rear	kg	650/930	650/880	700/1050	625/900	675/1000
Max. trailer load, without brakes**	kg	480	480	—	—	—
with brakes**	kg	800	800	—	—	—
Max. roof load (only coupe)*	kg	35	35	35	35	35

* But without exceeding the gross vehicle weight.
** For gradients up to 16 %.

Filling capacities

		911	Turbo
Motor		Brand name heavy duty oil of API Classification SE or SF. SAE 10 W/50, 15 W/40 or 20 W/50 multigrade oil for year around operation. Latter oil not for constant temperatures below – 15° C. Only use brand name oils which had been tested and approved by Porsche. Only when multigrade oil is not available and operating conditions are normal, may brand name single-grade oils be used, but then oil must be changed at specified intervals to avoid damage as specified by the season of the year. Use SAE 30 in summer and SAE 20 W in winter (adequate only for temperatures below + 5° C).	
Total oil volume of system	ltr. approx.	13	13
With Sportomatic	ltr. approx.	2 more	—
Oil change volume	ltr. approx.	10	10
Manual transmission *	ltr. approx.	3	3,7
Sportomatic transmission *	ltr. approx.	2,5	—
Fuel tank	ltr. approx.	80	80
Brake fluid tank	ltr. approx.	0,2	0,2
Washing fluid tank	itr. approx.	8,5	8,5

* SAE 90 of Specification API-GL 5 (or Mil-L 2105 B)

Performances, consumption of fuel and oil

		911 SC 78-80 mod.	911 SC 81 mod.	911 Turbo
Top speed with manual transmission	km/h	225	235 (225 USA)	260 (250 USA, 78/79 mod.)
with Sportomatic	km/h	220	—	
Acceleration 0 – 100 km/h	s	7,0	6,8 (7,0 USA)	5,4 (5,6 USA, 78/79 mod.)
Kilometer from standing start	s	27,5	26,8 (27,5 USA)	24
Fuel consumption (acc. DIN 70030, part 1)				
at 90 km/h	l/100 km	9,2	8,0	8,1
at 120 km/h	l/100 km	11,4	9,7	15,3
City test	l/100 km	17,3	13,4	20,0
Oil consumption	l/1000 km	ca. 1,5	ca. 1,5	1,0-2,0

PORSCHE



82, 83 Models

911 SC, 911 Turbo



Technical Specifications

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Important conversion factors and new units of measurement

	Old units		New units
Pressure	tech. atmosphere	at (kp/cm²)	Bar (bar)
Output	Horsepower	HP	Kilowatt (kW)
Force	Kilopond	kp	Newton (N)
Power	Kilopondmeter	kpm	Newtonmeter (Nm)

Conversion factors

at (kp/cm²)	in bar	× 0.981
kp	in N	× 9.81
HP	in kW	× 0.736
kpm	in Nm	× 9.81
m/s	in km/h	× 3.6
at	in mm Hg	× 735.56
km/h	in mph (miles)	× 0.621
° F (Fahrenheit)	in ° C	(° F − 32) × 0.555
l	in U.S. gal	× 0.264
l	in Imp. gal	× 0.22

The conversion factor 10 is applied for the conversion of tightening torque from kpm to Nm. This is more than sufficient for shop practice.

Chassis numbers — 1982 model

Explanation of digits:

1 2 3 — World manufacturing code

4 5 6 — VDS Code USA

7 8 — 1st and 2nd digits of type

9 — Test digit

10 — Model year

11 — Production site

12 — 3rd digit of type

13 — Code for body and engine

14 15 16 17 — Serial number

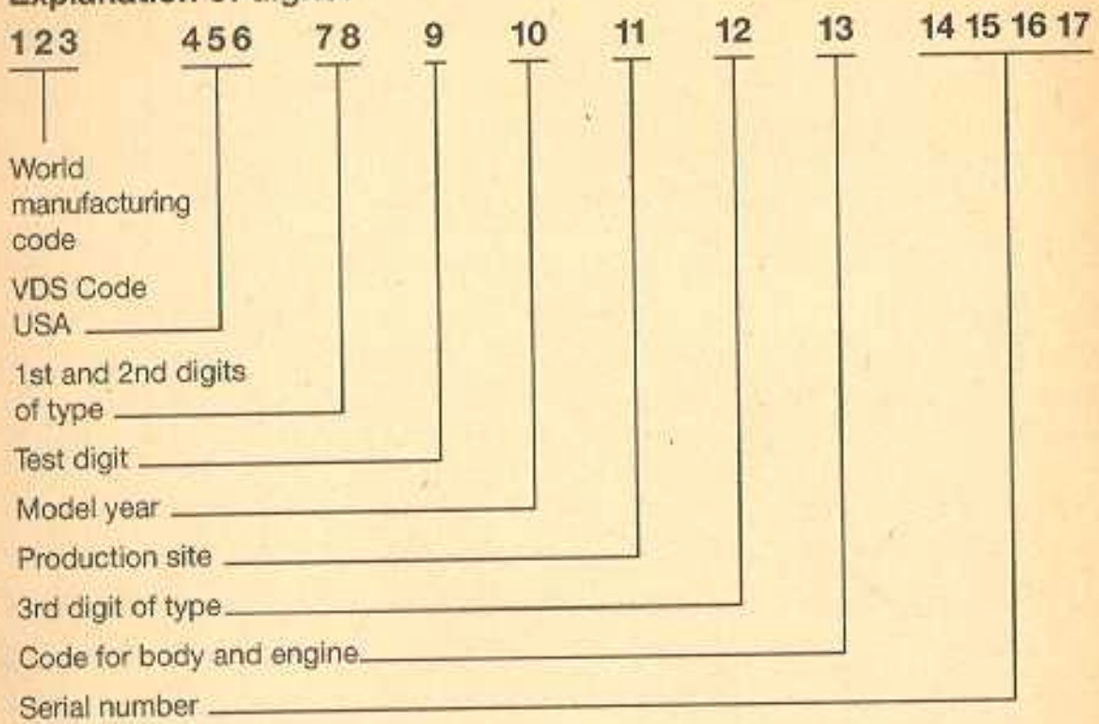
Chassis number ranges

Vehicle type		Engine type	Number range
911 SC-Coupé	R.o.W.	930/10	WPO ZZZ 91 Z CS 10 0001 – 5000
911 SC-Coupé	Japan	930/17	WPO ZZZ 91 Z CS 10 9501 – 9999
911 SC-Targa	R.o.W.	930/10	WPO ZZZ 91 Z CS 14 0001 – 5000
911 SC-Targa	Japan	930/17	WPO ZZZ 91 Z CS 14 9501 – 9999
911 SC-Coupé	USA	930/16	WPO AAO 91 – CS 12 0001 – 5000
911 SC-Targa	USA	930/16	WPO EAO 91 – CS 16 0001 – 5000
930 Turbo	R.o.W.	930/60	WPO ZZZ 93 Z CS 00 0001 – 2000
930 Turbo	Canada	930/60	WPO JAO 93 – CS 05 0001 – 2000

Chassis numbers

1983 model

Explanation of digits:



Chassis number ranges

Vehicle type		Engine type	Number range
911 SC-Coupé	R.o.W.	930/10	WPO ZZZ 91 Z DS 10 0001 – 5000
911 SC-Coupé	Japan	930/17	WPO ZZZ 91 Z DS 10 9501 – 9999
911 SC-Targa	R.o.W.	930/10	WPO ZZZ 91 Z DS 14 0001 – 5000
911 SC-Targa	Japan	930/17	WPO ZZZ 91 Z DS 14 9501 – 9999
911 SC-Coupé	USA	930/16	WPO AAO 91 – DS 12 0001 – 5000
911 SC-Targa	USA	930/16	WPO EAO 91 – DS 16 0001 – 5000
911 Turbo	R.o.W.	930/66	WPO ZZZ 93 Z DS 00 0001 – 2000
911 Turbo	Canada	930/66	WPO JAO 93 – DS 05 0001 – 2000

Engine type designations

Year mfd.	Model year	Engine type designation Official		Internal	Displace-ment	kW/HP
1981/82	**1982**	911 SC	R. o. W.	930/10	3.0 l	150/204
		911 SC	Japan	930/16	3.0 l	132/180
		911 SC	USA	930/17	3.0 l	132/180
		911 Turbo	R. o. W.	930/60	3.3 l	221/300
		911 Turbo	Canada	930/60	3.3 l	221/300
1982/83	**1983**	911 SC	R. o. W.	930/10	3.0 l	150/204
		911 SC	Japan	930/16	3.0 l	132/180
		911 SC	USA	930/17	3.0 l	132/180
		911 Turbo	R. o. W.	930/66	3.3 l	221/300
		911 Turbo	Canada	930/66	3.3 l	221/300

Engine numbers

1982 model

Explanation of digits Example: 63 C 2701

1	2		3	4 5 6 7
Unit type	Engine types		Model year	Serial number
6 = 6 cyl. engine	3 = 911 SC	R. o. W.	**C = 1982**	
	4 = 911 SC	USA		
	7 = 911 Turbo	R. o. W.		

Engine number ranges

Engine type	Technical data	Installed in model		Number range
930/10	3.0 l 150 kW	911 SC	R. o. W.	63 C 0001 – 8000
930/17	3.0 l 132 kW	911 SC	Japan	63 C 8001 – 9000
930/16	3.0 l 132 kW	911 SC	USA	64 C 0001 – 9999
930/60	3.3 l 221 kW	911 Turbo	R. o. W. and Canada	67 C 0001 – 1000

Engine numbers

1983 model

Explanation of digits Example: 63 D 2701

1	2		3	4 5 6 7
Unit type	Engine types		Model year	Serial number
6 = 6 cyl. engine	3 = 911 SC	R. o. W.	**D = 1983**	
	4 = 911 SC	USA		
	7 = 911 Turbo	R. o. W./Canada		

Engine number ranges

Engine type	Technical data	Installed in model		Number range
930/10	3.0 l 150 kW	911 SC	R. o. W.	63 D 0001 – 8000
930/17	3.0 l 132 kW	911 SC	Japan	63 D 8001 – 9000
930/16	3.0 l 132 kW	911 SC	USA	64 D 0001 – 9999
930/66	3.3 l 221 kW	911 Turbo	R. o. W. and Canada	67 D 0001 – 1000

Transmission numbers — 1982 model

Explanation of digits Example: 73 C 3495

1	2		3	4 5 6 7
Unit type	Transmission types		Model year	Serial number
7 = Transmission for 6 cyl. engine	3 = 5-gear 911 4 = 5-gear 911 7 = 911 Turbo	R. o. W. USA, Japan	**C = 1982**	

Transmission number ranges

Transmission type	Technical data	Installed in model		Number range
915/62	5-gear	911 SC	R. o. W.	73 C 0001 – 9999
915/63	5-gear	911 SC	USA, Japan	74 C 0001 – 9999
930/34	4-gear	911 Turbo		77 C 0001 – 2000

Transmission numbers — 1983 model

Explanation of digits Example: 73 D 3495

1	2		3	4 5 6 7
Unit type	Transmission types		Model year	Serial number
7 = Transmission for 6 cyl. engine	3 = 5-gear 911 4 = 5-gear 911 7 = 911 Turbo	R. o. W. USA, Japan	**D = 1983**	

Transmission number ranges

Transmission type	Technical data	Installed in model		Number range
915/62	5-gear	911 SC	R. o. W.	73 D 0001 – 9999
915/63	5-gear	911 SC	USA, Japan	74 D 0001 – 9999
930/34	4-gear	911 Turbo		77 D 0001 – 2000

Transmission type codes

Trans-mission Type	No. of Gears	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	Pinion/ Ring Gear	As from Transmission Number	Remarks
915.62	5	11/35	18/33	23/29	26/26	28/22	8/31	731 0001	Manual transm. 911 R.o.W.
915.63	5	11/35	18/32	23/29	26/26	28/23	8/31	741 0001	Manual transm. 911 USA/Japan
930.34	4	16/36	23/30	28/25	32/20	—	9/38	771 0001	Manual transm. 911 Turbo Worldwide

Since 1983 models the 911 Turbo transmission 930/34 for cars in Switzerland has a longer second gear:

24 : 30, i = 1.250
was (23 : 30, i = 1.304)

The shift cover on the transmission has a dot of paint for identification.

Engine specifications 911 SC — 1982 and 1983 models

Engine Internal engine code		911 SC 930/16/17	930/10
Design		Four stroke internal combustion engine (two banks of cylinders opposite each other)	
No. of cylinders		6	6
Bore	mm/inch	95.0/3.74	95.0/3.74
Stroke	mm/inch	70.4/2.77	70.4/2.77
Total displacement	cm^3/$inch^3$	2994/182.7	2994/182.7
Compression ratio		9.3 : 1	9.8 : 1
Max. engine power acc. DIN 70020	kW/HP	132/180	150/204
Net power, SAE J 245	kW/HP	128/172	145/195
at engine speed	rpm	5500	5900
Max. torque acc. DIN 70020	Nm/kpm	265/27	267/27
Net torque, SAE J 245	Nm/ft lbs	257/189	258/190
at engine speed	rpm	4200	4300
Max. liter output acc. DIN 70020	kW/l, HP/l	44/60	50.1/68.1
acc. SAE J 245	kW/l, HP/l	42/57	48.4/65.1
Max. permissible speed	rpm	6700	7000

Engine Internal engine code		911 SC 930/16/17	930/10
Cut-off speed			
Speed governed by switching-off ignition	rpm		6800 ± 200
Speed governed by switching-off fuel pump	rpm	6500 + 200	
Engine weight (dry)	kg/lbs. approx.	200/441	190/419
Fuel octane	RON	91 91 lead-free (USA)	98
Cooling system		air-cooling from axial blower on alternator	
Blower drive		by v-belt off of crankshaft	
Crankshaft/blower ratio		1 : 1.68	1 : 1.68
Air delivery rate		1500 l/s at 6000 rpm of crankshaft	1500 l/s at 6000 rpm of crankshaft
Drive belt		9.5 × 710	9.5 × 710

Engine		911 SC
Internal engine code		930 (all engine types)
Lubricating system		dry sump lubrication
Oil cooling		oil cooler on crankcase in blower air stream, plus cooling pipe coil or pipe oil cooler
Oil pressure at 90° C oil temperature and speed of 5000 rpm	bar	approx. 4.0
Oil consumption	ltr./1000 km	approx. 1.5
Crankcase		two-piece aluminum alloy
Crankshaft		forged (tenifer treated)
Crankshaft bearings		8 plain bearings
Connecting rods		forged (steel)
Connecting rod bearings		plain bearing half shells
Piston pin bearing in conrod		press-fit bronze bush
Pistons		cast or forged aluminum
Piston pin		floating installation, held by circlips
Piston rings		2 compression rings, 1 oil scraper ring

Engine	911 SC
Internal engine code	930 (all engine types)
Cylinders	Nikasil (Mahle) and Alusil (KS)
Cylinder head	single alloy cylinder head
Valve seat insert	shrink-fit made of annealed sintered steel
Valve guide	thermohedul FS 15
Valve arrangement for each cylinder	1 intake and 1 exhaust valve in vee suspension
Exhaust valve	without sodium filling, with reinforced seat surface
Valve springs	2 coil springs per valve
Valve timing	left and right one each overhead camshaft
Camshaft	cast, 4 bearings direct in camshaft housing (no bearing shells)
Camshaft drive	by chain
Valve clearance on cold engine	
Intake	0.1 mm measured between valve stem end surface and
Exhaust	cap of valve adjusting screw

Engine		911 SC
Internal engine code		930 (all engine types)
Clutch		single plate dry type
Diameter	mm	225
Contact pressure	N (kp)	7800...8500 (775...866)
Fuel supply		K-Jetronic 1 electric roller cell pump, EKP 4, with exchangable pressure holding valve, steel fuel and injection pipes

Engine specifications 911 Turbo — 1982 and 1983 models

Engine		911 Turbo
Internal engine code		930/60/66
Design		Four stroke internal combustion engine (two banks of cylinders opposite each other)
No. of cylinders		6
Bore	mm/inch	97.0/3.82
Stroke	mm/inch	74.4/2.93
Total displacement	cm^3/$inch^3$	3299/201.3
Compression ratio		7.0 : 1
Max. engine power	kW/HP kW/HP	221/300 221/296
at engine speed	rpm	5500
Max. torque	Nm/kpm Nm/lbft	412/42 412/304
at engine speed	rpm	4000
Max. liter output	kW/l, HP/l	67/91
Max. permissible speed	rpm	6700

Engine Internal engine code		911 Turbo 930/60/66	
Max. permissible constant speed	rpm	6000	
Cut-off speed of speed governor in distributor	rpm	7000 ± 200	
Engine weight (dry)		930/60	930/66
	kg/lbs	230/507	269/593
Fuel octane	RON/MON (leaded premium grade gasoline to DIN 51 600)	98/88	

Engine Internal engine code		911 Turbo 930 (all engine types)
Cooling system		air-cooling from axial blower on alternator
Blower drive		by v-belt off of crankshaft
Crankshaft/blower ratio		1 : 1.68
Air delivery rate		1500 l/s at 6000 rpm of crankshaft
Blower drive belt		9.5 × 710
Lubricating system		dry sump lubrication
Oil cooling		oil cooler on crankcase in blower air stream, plus cooling pipe coil or oil cooler
Oil pressure at 90° C oil temperature and speed of 5000 rpm	bar	approx. 5.0
Oil consumption	l/1000 km	approx. 1.0 to 2.0
Crankcase		two-piece aluminum alloy
Crankshaft		forged (tenifer treated)
Crankshaft bearings		8 plain bearings
Connecting rods		forged steel

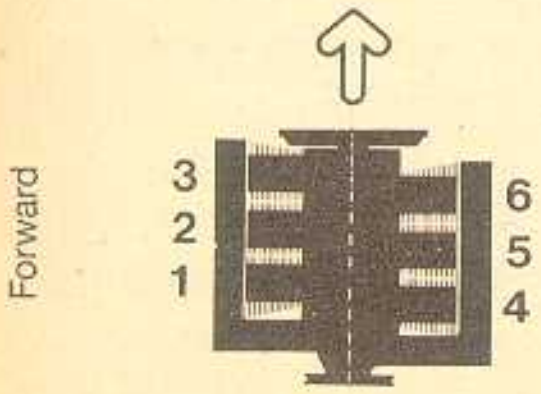
Engine Internal engine code	911 Turbo 930 (all engine types)
Connecting rod bearings	plain bearings half shells
Piston pin bearing in conrod	press-fit bronze bush
Intermediate shaft bearing	two plain bearings
Pistons	forged alloy (Mahle)
Piston pins	floating installation, held by circlips
Piston rings	2 compression rings, 1 oil scraper ring
Cylinders	Nikasil (Mahle)
Cylinder head	light alloy single cylinder head
Valve seat insert	shrink-fit, made of annealed sintered steel
Valve guide	thermohedul FS 15
Arrangement of valves per cylinder	1 intake and 1 exhaust valve in vee suspension
Exhaust valve	sodium filled with reinforced seat surface
Valve springs	2 coil springs per valve
Valve timing	left and right one each overhead camshaft
Camshaft	cast, 4 bearings direct in camshaft housing (no bearing shells)
Camshaft drive	by chain

Engine Internal engine code		911 Turbo 930 (all engine types)
Valve clearance on cold engine		
Intake Exhaust		0.1 mm measured between valve stem end surface and cap of valve adjustment screw
Clutch		single plate dry type
Diameter (manual transmission)	mm	240
Contact pressure	N (kp)	11200 – 12100 (1142 – 1233)
Fuel supply		K-Jetronic (CIS) since 1983 models fuel distributor with capsule valve, Bosch 0438 100 037 data plate color: blue/green
Supercharging		KKK exhaust gas turbocharger, charge pressure regulated via bypass valve, charged air cooling

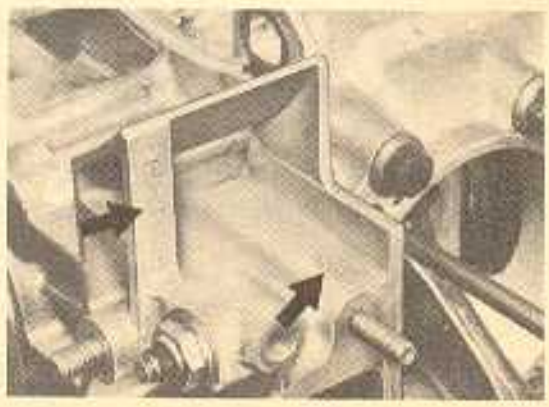
Electrical system		
Battery voltage	V	12
Battery capacity	Ah	66 (88 optional extra)
Alternator/output	A/W	70/980
Regulator switch		matched to alternator (black plastic housing screwed on alternator)
Ignition		CDI without contacts
Ignition transformer		Bosch
Firing order		1 - 6 - 2 - 4 - 3 - 5

Designation of cylinders on 6 cylinder engine

Firing order
1 - 6 - 2 - 4 - 3 - 5



Engine number and
engine type designation



Engine tolerance and wear limit survey – 911 SC

Note: B = bore W = shaft

Measuring point		Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits in mm
Crankshaft	– main bearing	B 60.020 – 60.059	+0.010	+0.072	visual inspection
Bearings 1 – 7	(d 1)	W59.971 – 59.990			59.960
Crankshaft	– main bearing	B 31.041 – 31.084	+0.048	+0.104	visual inspection
Bearing 8	(d 3)	W30.980 – 30.993			30.970
Crankpin	– conrod bearing	B 53.020 – 53.059	+0.030	+0.088	visual inspection
	(d 2)	W52.971 – 52.990			52.960
Crankshaft runout (measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)					max. 0.04
Crankshaft unbalance					max. 10 cmg.
Crankshaft	– main bearing				
Axial play			+0.110	+0.195	0.30
Crankshaft	– timing gear	B 41.975 – 42.000	–0.002	–0.038	
		W42.002 – 42.013			
Crankshaft	– distributor drive	B 41.975 – 42.000	–0.002	–0.038	
		W42.002 – 42.013			
Crankshaft	– flywheel	B 50.002 – 50.021	+0.021	+0.028	
		W50.000 – 50.030			
Crankshaft	– pulley	B 30.000 – 30.033	+0.007	+0.073	
		W29.960 – 29.993			
Pulley: radial runout					max. 0.15
lateral runout					max. 0.20

Engine tolerance and wear limit survey – 911 Turbo

Note: B = bore W = shaft

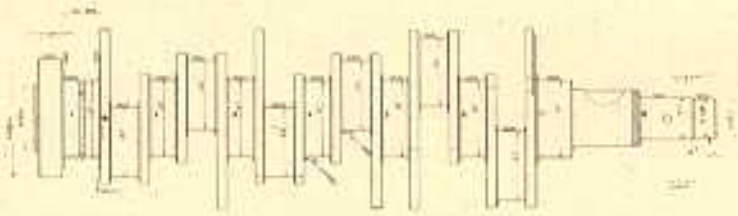
Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits in mm
Crankshaft – main bearing Bearings 1–7 (d 1)	B 60.020–60.059 W59.971–59.990	+0.010	+0.072	visual inspection 59.960
Crankshaft – main bearing Bearing 8 (d 3)	B 31.041–31.084 W30.980–30.993	+0.048	+0.104	visual inspection 30.970
Crankpin – conrod bearing (d 2)	B 55.020–55.059 W54.971–52.990	+0.030	+0.088	visual inspection 54.960
Crankshaft runout (measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)				max. 0.04
Crankshaft unbalance				max. 10 cmg.
Crankshaft – main bearing Axial play		+0.110	+0.195	0.30
Crankshaft – timing gear	B 41.975–42.000 W42.002–42.013	–0.002	–0.038	
Crankshaft – distributor drive	B 41.975–42.000 W42.002–42.013	–0.002	–0.038	
Crankshaft – flywheel	B 90.000–90.030 W89.780–90.000	0.0	+0.049	
Crankshaft – pulley	B 30.000–30.033 W29.960–29.993	+0.007	+0.073	
Pulley: radial runout				max. 0.15
lateral runout				max. 0.20

Crankshaft – standard and repair sizes – 911 SC

Size	Crankcase diameter bearings 1–8	All main bearings d 1	Connecting rod bearings d 2	Main bearing diameter d 3 of crankshaft bearing 8	Collar diameter d 4	Seat for timing gear diameter d 5	Crankshaft pulley diameter d 6	Thrust bearing width A
Stand.		59.971...59.990	52.971...52.990	30.980...30.993	89.780...90.000	42.002...42.013	29.960...29.993	28.000...28.060
–0.25		59.721...59.740	52.721...52.740	30.730...30.743				
–0.50		59.471...59.490	52.471...52.490	30.480...30.493	89.280...89.500		29.370...29.500	
–0.75		59.221...59.240	52.221...52.240	30.230...30.243				
–1.00		58.971...58.990	51.971...51.990	29.980...29.993				

Normal
65.000...65.019

Oversize
65.250...65.269



Only grind bearing surface for radial oil seals to 29.5 and 89.5 as specified here when scoring is too deep. Otherwise repolish as necessary: 3 microns.
After grinding give oil bores a 0.5 radius. Break sharp edges with 0.2 to 0.5 radius. Max. radial runout in reference to take-up in —.—: max. 0.04.
Specification for tenifer treatment according to Tenifer 120 W PN 1053 ferroflux.
Never straighten main bearings 3 and 5 after tenifer treatment. Straightening of the other main bearing journals through stemming in the radii is permitted.

Color codes for repair sizes

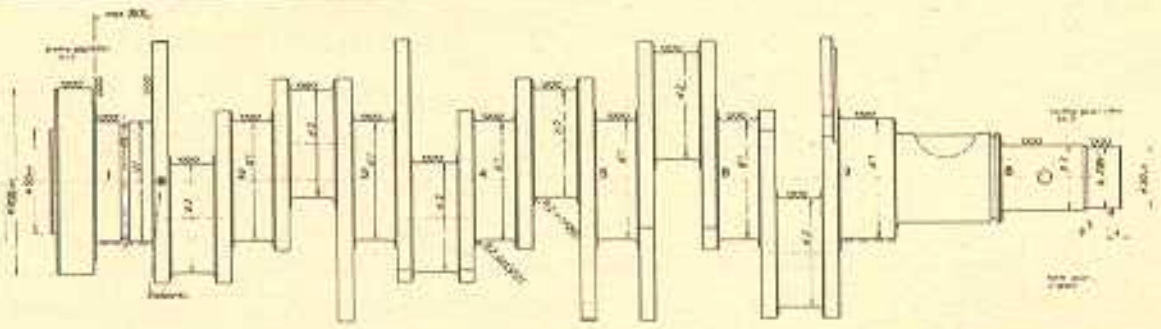
1st repair size	blue	paint dot
2nd repair size	green	paint dot
3rd repair size	yellow	paint dot
4th repair size	white	paint dot

Crankshaft – standard and repair sizes – 911 Turbo

Size	Crankcase diameter bearings 1–8	All main bearings d 1	Connecting rod bearings d 2	Main bearing diameter d 3 of crankshaft bearing 8	Collar diameter d 4	Seat for timing gear diameter d 5	Crankshaft pulley diameter d 6	Thrust bearing width A
Stand.		59.971...59.990	54.971...54.990	30.980...30.993	89.780...90.000	42.002...42.013	29.960...29.993	28.000...28.060
–0.25		59.721...59.740	54.721...54.740	30.730...30.743				
–0.50		59.471...59.490	54.471...54.490	30.480...30.493	89.280...89.500		29.370...29.500	
–0.75		59.221...59.240	54.221...54.240	30.230...30.243				
–1.00		58.971...58.990	53.971...53.990	29.980...29.993				

Normal
65.000...65.019

Oversize
65.250...65.269



Only grind bearing surface for radial oil seals to 29.5 and 89.5 as specified here when scoring is too deep. Otherwise repolish as necessary: 3 microns.
After grinding give oil bores a 0.5 radius. Break sharp edges with 0.2 to 0.5 radius. Max. radial runout in reference to take-up in —.—: max. 0.04.
Specification for tenifer treatment according to Tenifer 120 W PN 1053 ferroflux.
Never straighten main bearings 3 and 5 after tenifer treatment. Straightening of the other main bearing journals through stemming in the radii is permitted.

Color codes for repair sizes

1st repair size	blue	paint dot
2nd repair size	green	paint dot
3rd repair size	yellow	paint dot
4th repair size	white	paint dot

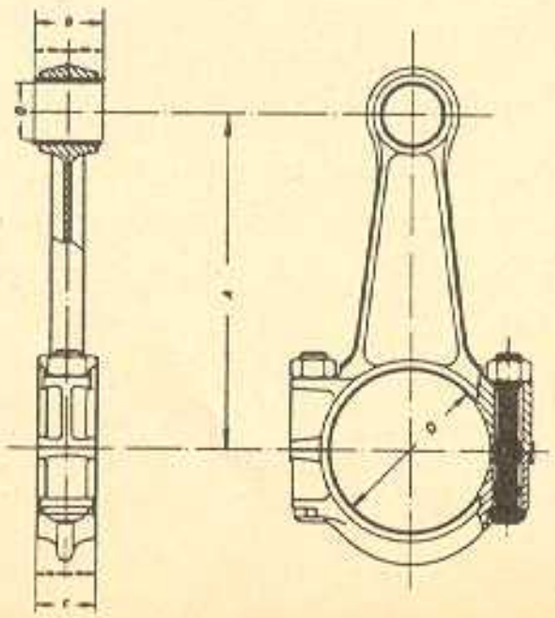
Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limit mm
Crankcase				
Case bore for main bearings:				
Bearings 1 – 8	65.000 – 65.019			
Oversize	65.250 – 65.269			
Case bore for intermediate shaft:				
Bearing 1 (thrust bearing)	27.500 – 27.521			
Bearing 2	26.500 – 26.521			
Spring for safety valve:				
Relaxed length	approx. 69			
Spring force at 52 mm	104 N/10.6 kp			
Spring force at 46 mm	138 N/14.1 kp			
Spring wire dia.	1.8			
Spring for pressure relief valve:				
Relaxed length	approx. 87			
Spring force at 50.5 mm	82.4 N/8.4 kp			
Spring wire dia.	1.5			

Installation note:

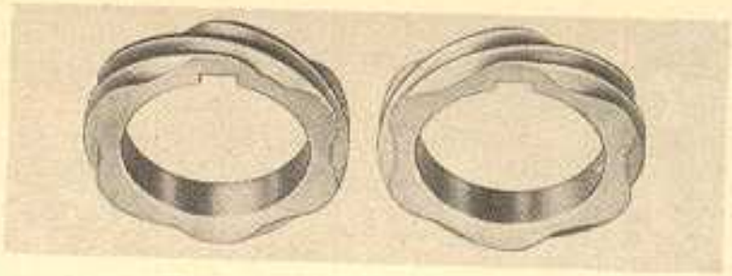
The pressure relief valve spring (approx. 87 mm long) may only be used in conjunction with a spring guide (safeguard against bending).

Never press springs flat.

Measuring point	Installation size with tolerances mm 911 SC	911 Turbo	Clearance (+) or press-fit (–) from	to	Wear limit mm
Connecting rods					
A Distance between centers	127.75–127.80	126.95–127.00			
b Width of conrod bush	24.8–25.0	24.5–25.0			
c Width at big end	21.7–21.8	21.7–21.8			
Width at crankpin	22.00–22.05	22.00–22.05	+0.200	+0.350	
D Conrod dia. (without bearing shell)	56.000–56.019	58.000–58.019			
G Conrod bush dia. installed in conrod (finished)	22.020–22.033	23.020–23.033			
Piston pin bushing/piston pin clearance			+0.020	+0.037	0.055



Installing drive gear for left-hand turning distributor on crankshaft



For left-hand turning distributor (with Porsche manufacturing code stamped)
Part No. 930 102 115 01

For right-hand turning distributor

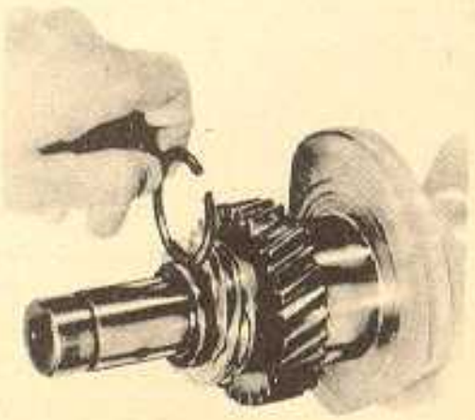
Installing circlips on crankshaft

To take up axial play on distributor drive gear, there are circlips in different thicknesses.

The following circlips are available:

Part No.	Thick-ness	Code
901.102.148.00	2.4 mm	0
901.102.148.01	2.3 mm	1
901.102.148.02	2.2 mm	2
901.102.148.03	2.1mm	3

Install timing gear, intermediate ring and drive gear for left-hand turning distributor on crankshaft against stop. Find correct circlip thickness by inserting different circlips. Circlip must be installed without play.



Connecting rod weight groups – 911 SC

Connecting rods are grouped according to weights.

Final digits of the part number indicate the specified weight group.

These final digits are stamped on the connecting rod shank if it is supplied as a replacement part.

Weight Over g	Weight Under g	Weight group for service	Service Conrod part number	Conrod code
633	642	1	930.103.015.51	51
642	651	2	930.103.015.52	52
651	660	3	930.103.015.53	53
660	669	4	930.103.015.54	54
669	678	5	930.103.015.55	55
678	687	6	930.103.015.56	56
687	696	7	930.103.015.57	57
696	705	8	930.103.015.58	58
705	714	9	930.103.015.59	59

Connecting rod weight groups – 911 Turbo

Weight Over g	Weight Under g	Weight group for service	Service Conrod part number	Conrod code
615	624	3	930.103.020.73	73
624	633	4	930.103.020.74	74
633	642	5	930.103.020.75	75
642	651	6	930.103.020.76	76
651	660	7	930.103.020.77	77
660	669	8	930.103.020.78	78
669	678	9	930.103.020.79	79
678	687	10	930.103.020.80	80
687	696	11	930.103.020.81	81

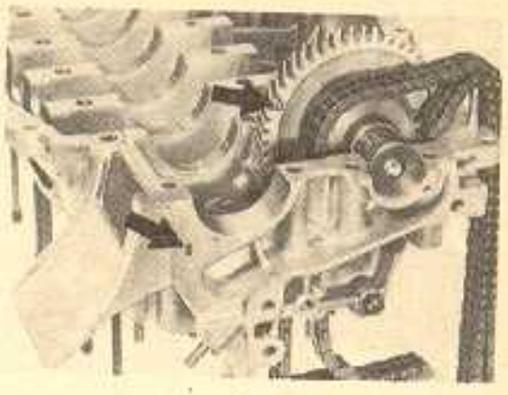
Note:

Connecting rods installed in a given engine must not differ in weight by more than 9 grams. To determine weight group, weigh the complete connecting rod without bearing shells.

Matching intermediate shaft and crankcase

Gears and crankcase may only be matched with each other as shown in the table below.

Code (0 or 1) is die-stamped on left-hand side of crankcase below the alternator holder.

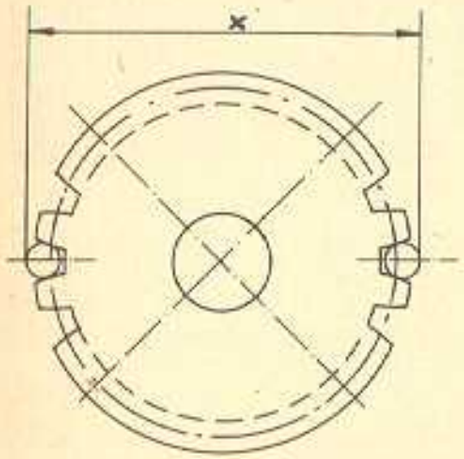


Distance Betw. Centers mm	Crankcase Code	Drive Gear on Crankshaft Code	Intermediate Shaft Gear Code	Backlash mm
103.975 – 103.990	0	0	0	0.029 – 0.049
		Installation still possible		
		1	0	0.016 – 0.042
		0	1	0.017 – 0.043
103.990 – 104.000	1	1	1	0.012 – 0.041
		Installation still possible		
		0	1	0.025 – 0.049
		1	0	0.025 – 0.048

Checking and installing intermediate shaft

Checking

1. Inspect intermediate shaft gear for wear. Measure intermediate shaft gear with help of 4.5 mm diameter steel rollers.

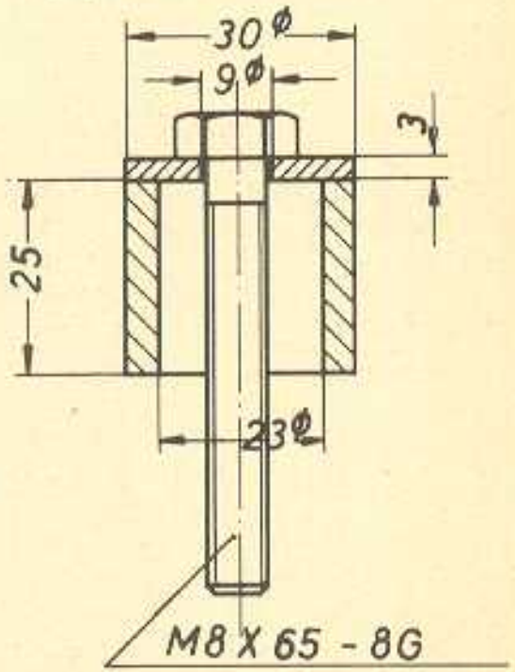


If distance x is less than 136.5 mm, intermediate shaft gear and drive gear on crankshaft must be replaced.

If it concerns an intermediate shaft gear with code 1, distance x must not be less than 135.55 mm. Visual inspection for signs of wear is very important in addition to this measuring test. The intermediate shaft and drive gear on the crankshaft must always be replaced.

2. Remove aluminum plug on face of intermediate shaft and clean oil bore to remove residue, if engine has been operated a long time or when reconditioning an engine (also for bearing damage).

3. Drill a 6.4 mm diameter hole in center of aluminum plug and tap M 8 threads. Pull out aluminum plug with a suitable tool and clean oil bore in intermediate shaft. Press in a new aluminum plug afterwards.



Note:

An intermediate shaft with bolted gear is one replacement part and can only be replaced complete.
Sprockets can be replaced separately.

Measuring point	Installation size with tolerances mm	Tolerance (+) or press-fit (–) from	to	Wear limits mm
Intermediate shaft				
Bearing 1 Crankcase bore – shaft	B 27.500 – 27.521 W 25.000 – 24.980	+ 0.030	+ 0.084	
		+ 0.040	+ 0.133	0.16
Bearing 2 Crankcase bore – shaft	B 26.500 – 26.521 W 23.980 – 23.967	+ 0.030	+ 0.084	
		+ 0.040	+ 0.133	0.16
Intermediate shaft clearance				
Intermediate shaft axial play				
Chain guide – bolt	B 8.000 – 8.015 W 7.822 – 7.837	+ 0.001	+ 0.030	
Pinion – distributor shaft	B 12.456 – 12.474 W 12.444 – 12.455	+ 0.001	+ 0.030	
Distributor – crankcase	B 27.000 – 27.021 W 26.947 – 26.980	+ 0.020	+ 0.074	
Flywheel				
Lateral runout				max. 0.10
Radial runout				max. 0.20

Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits mm
Timing chain case				
Sprocket carrier shaft – chain tensioner housing	B 15.000 – 15.018 W 14.973 – 14.984	+0.016	+0.045	Visual inspection
Sprocket carrier shaft – sprocket carrier	B 15.000 – 15.018 W 14.973 – 14.984	+0.016	+0.045	
Sprocket carrier – sprocket pin	B 15.000 – 15.018 W 14.989 – 15.000	0.000	+0.029	
Sprocket – sprocket pin	B 15.032 – 15.050 W 14.989 – 15.000	+0.032	+0.610	Visual inspection
Pin – chain guide	B 8.000 – 8.015 W 7.886 – 7.895	+0.105	+0.129	
Pin – timing chain case	B 7.857 – 7.872 W 7.886 – 7.895	–0.014	–0.038	

Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits mm
Camshaft housing – camshaft				
Camshaft bearings Camshaft	B 48.967 – 48.992 W 48.926 – 48.942	+0.025	+0.066	0.10
Camshaft – axial play		+0.150	+0.200	0.40
Camshaft – sprocket flange	B 30.000 – 30.013 W 29.979 – 30.000	0.000	+0.034	
Camshaft – runout measured on center bearing (between points)				max. 0.02
Rocker arm shaft – camshaft housing	B 18.000 – 18.018 W 17.992 – 18.000	Rocker arm shaft held firm by wedge effect		
Rocker arm – rocker arm shaft	B 18.016 – 18.027 W 17.992 – 18.000	+0.016	+0.035	0.080
Axial play		+0.100	+0.350	0.50

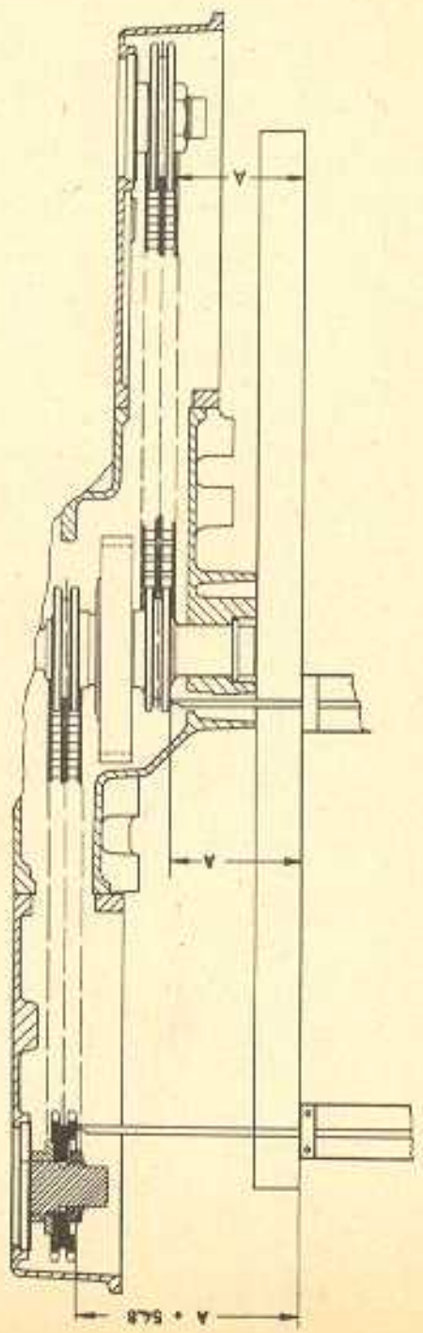
Checking parallel alignment of timing chain sprockets (old crankcase until March, 1983)

Before measuring, push intermediate shaft and camshaft axially toward flywheel to set bearing thrust flanges in position.

Measurement is made through hole below intermediate shaft against side of forward chain sprocket on intermediate shaft (dimension A).

This dimension must also be achieved at sprocket for cylinders 4 – 6. Use shims if necessary (maximum permissible difference is 0.25 mm).

Sprocket for cylinders 1 – 3, mounted on intermediate shaft, is positioned 54.8 mm further to front. This 54.8 mm (design dimension) must be considered when determining dimension A (maximum permissible difference is 0.25 mm).



Example: measured dimension A = 78.7 mm
This means sprocket of cylinders 1 – 3 is A + 54.8 = 133.5 mm

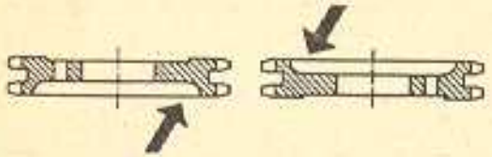
Checking parallel alignment of sprockets (modified crankcase since March, 1983)

Identification: oil filter screen ommitted, oil drain plug on left side of crankcase.

Preparations

1. Install thrust washer and quantity of removed shims on the camshaft (sprocket flange is same for both ends).

2. Sprocket on camshaft is same for both ends, however the chain running center from the take-up flange of the sprocket is offset. Sprocket for cylinder bank side 1 - 3 is mounted in such a manner, that the deep cut faces back. When mounting the sprocket for cylinder bank side 4 - 6 the deep cut must face forward.



Cylinder bank side 1 – 3 | Cylinder bank side 4 – 6

3. Hold sprockets with Special .Tool 9191 and torque the hexagon head bolts to 120 Nm.

Note:

First give threads of hexagon head bolts a thin coat of Optimoly HT.

Deviation in parallel alignment between the driving sprocket on the intermediate shaft and driven sprocket on the camshaft may be max. ± 0.25 mm. Before measuring, push intermediate shaft and camshaft axially toward flywheel to set bearing thrust collar in position.

Sprockets are adjusted by installing or removing shims, Part No. 901.105.561.00, 0.5 mm shim thickness. Normally 3 shims will be required underneath the left sprocket (cylinder bank 1 - 3) and 4 shims underneath the right sprocket (cylinder bank 4 - 6).

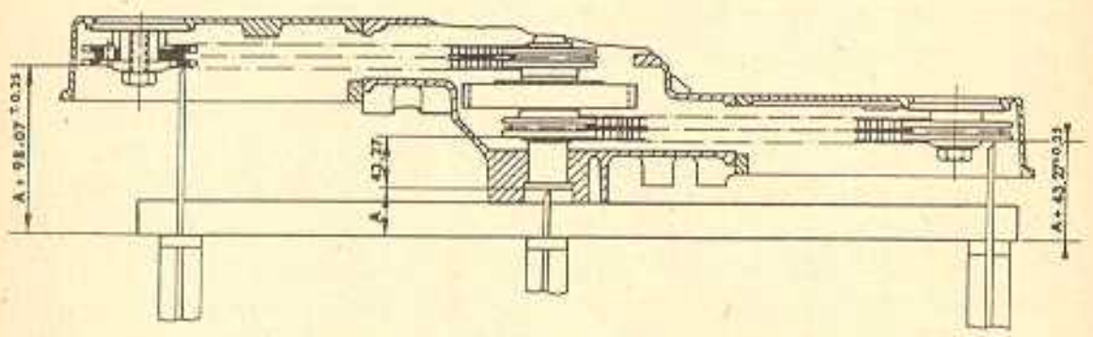
Adjustment

1. Measure distance "A" from front edge of crankcase or a steel ruler to face of intermediate shaft.



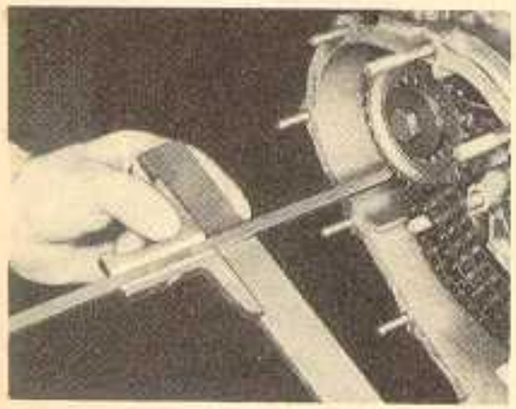
Design size of drive gears on intermediate shaft:
from face of intermediate shaft –
to face of rear intermediate shaft sprocket (cylinders 1 - 3) = 98.07 mm or
to face of front intermediate shaft sprocket (cylinders 4 – 6) = 43.27 mm

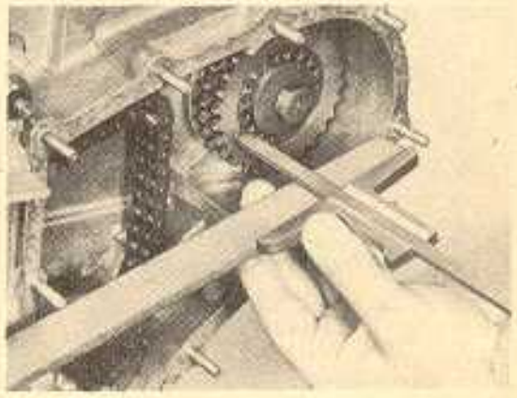
Design size + measured distance "A" produce position of sprockets on camshafts (max. permissible deviation ± 0.25 mm).



Example:
Measured distance "A" = 35.5 mm
For sprocket of cylinders 1 - 3 we then have

A + 98.07 =
35.5 + 98.07 = 133.57 ± 0.25 mm





For sprocket of cylinders 4 - 6 we then have

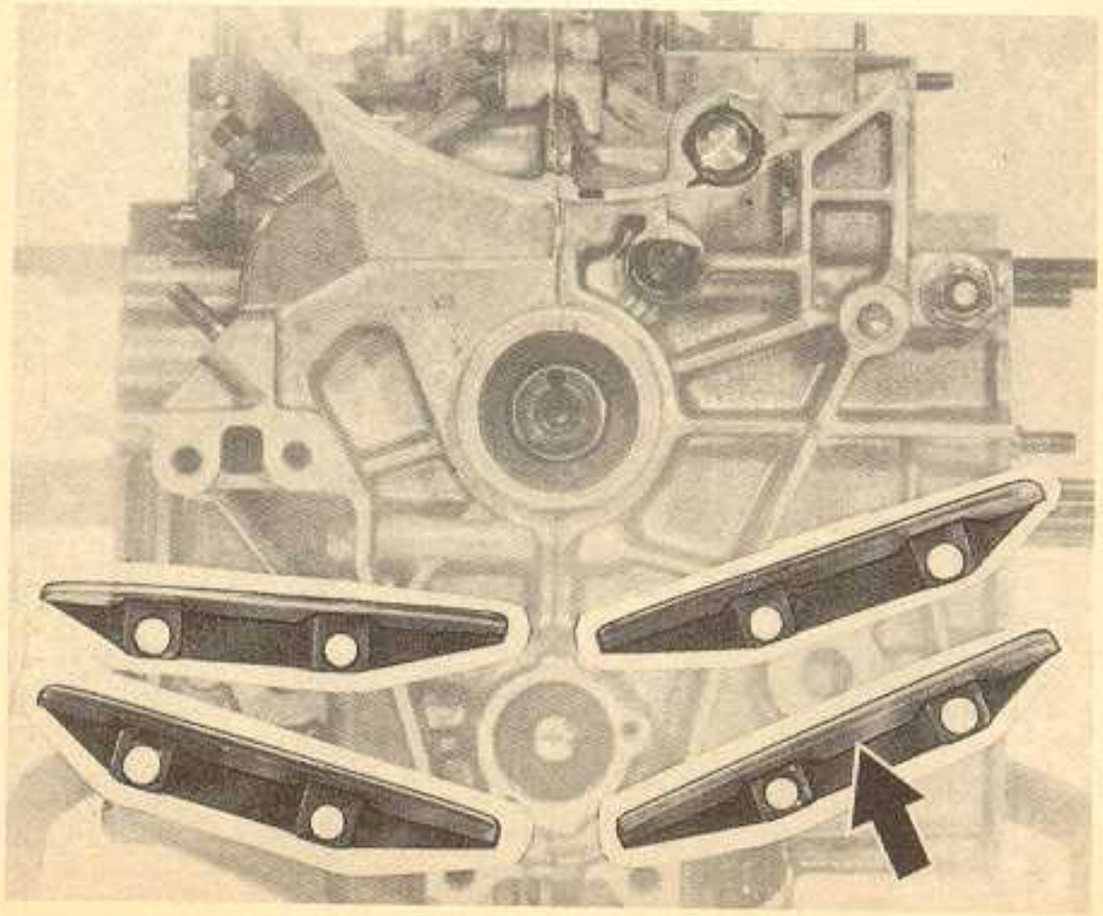
A + 43.27 =
35.5 + 43.27 = 78.77 ± 0.25 mm

Survey of guide rails on crankcase

Three black guide rails,
Part No. 911 105 222 06, and
one brown guide rail,
Part No. 911 105 222 05

Brown guide rail must be mounted from underneath (arrow) on right half of the crankcase.

Longer end of guide rails faces chain drive gears of the intermediate shaft.



Pistons and cylinders (sizes, weights and marks) — 911 SC / 911 Turbo

Size	Code	Nominal dia.	911 SC Piston dia. D KS	911 Turbo Piston dia. D Mahle
Standard	0	95/97	94.963 – 94.977	96.960 – 96.970
	1		94.970 – 94.984	96.967 – 96.977
	2		94.977 – 94.991	96.974 – 96.984
	3		94.984 – 94.998	96.981 – 96.991
			Cylinder dia. Alusil	Cylinder dia. Nikasil
Standard	0	95/97	95.000 – 95.007	97.000 – 97.007
	1		95.007 – 95.014	97.007 – 97.014
	2		95.014 – 95.021	97.014 – 97.021
	3		95.021 – 95.028	97.021 – 97.028
Play between piston and cylinder			0.023 – 0.044	0.030 – 0.047
			0.025 – 0.042	

Weight classes of pistons – 911 SC

Weight classes for **Mahle pistons**
Pistons weighed with components (piston pin, piston rings, circlips).

	Total piston weight in grams Weight class within one set		Code
Engine type	930/10 (R. o. W.)	930/16/17 (USA/Japan)	
Standard production	668 – 672 672 – 676	636 – 640 640 – 644	– – –
Max. weight difference 4 grams	676 – 680 680 – 684	644 – 648 648 – 652	+ + +
For service sector Max. weight difference 8 grams	668 – 676 676 – 684	636 – 644 644 – 652	– – or – + or + +

Weight classes for **KS pistons**
Pistons weighed with components (piston pin, piston rings, circlips).

	Total piston weight in grams Weight class within one set	Code
Engine type	930/16/17	
Standard production	673 – 677 677 – 681	– – –
Max. weight difference 4 grams	681 – 685 685 – 689	+ + +
For service sector Max. weight difference 8 grams	673 – 681 681 – 689	– – or – + or + +

Weight classes of pistons – 911 Turbo

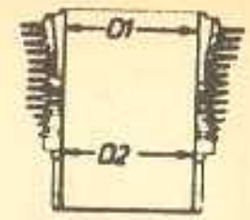
Installation specifications

1. Always only install pistons of same make and same weight class in one engine.
2. Piston pins must always remain with matching pistons and must not be mixed up even within an engine. Pay attention to this, marking pistons/pins if necessary, when disassembling and assembling engine.

Weight classes for **Mahle Pistons**
Pistons weighed with components (piston pin, piston rings, circlips).

	Total piston weight in grams Weight class within one set	Code
Engine type	930/60/66	
Standard production	616 – 620	– –
	620 – 624	–
Max. weight difference 4 grams	624 – 628	+
	628 – 632	+ +
For service sector Max weight difference 8 grams	616 – 624 624 – 632	– – or – + or + +

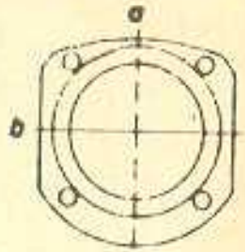
Checking pistons and cylinders



Cylinders
D 1 = measuring point for wear and ovality

30 mm below cylinder upper edge

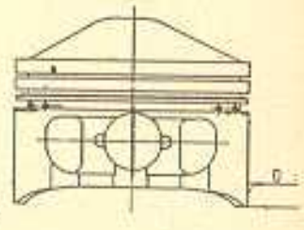
The cylinder is worn, if the distance at this measuring point is 0.08 mm more than the installation size. The ovality of a cylinder is determined by measuring in directions a and b. The difference between a and b must not exceed 0.04 mm.



D 2 = measuring point for piston ring end clearance

Rings slid in at height of cylinder base gasket.

Pistons
D = measuring point for wear



Mahle pistons = 18 mm
KS pistons = 10 mm

Replace pistons and cylinders when running clearance exceeds 0.12 mm. This results from the difference between the maximum cylinder diameter and minimum piston diameter.

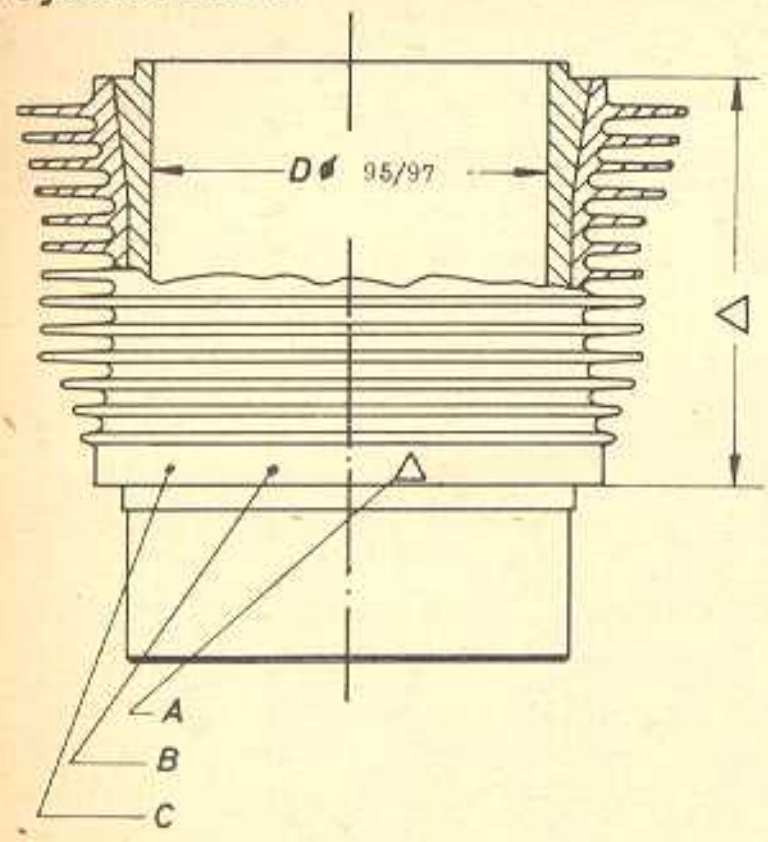
Piston ring end clearance

Piston ring	Clearance in mm (installation size)	Clearance in mm (wear limit)
Compression ring I	0.2 – 0.4	0.8
Compression ring II	0.2 – 0.4	1.0
Oil control ring III	0.3 – 0.6	2.0

Piston ring side clearance

Piston ring	Clearance in mm (installation size)	Clearance in mm (wear limit)
Compression ring I	0.070 – 0.102	0.2
Compression ring II	0.040 – 0.072	0.2
Oil control ring III	0.020 – 0.052	0.1

Cylinder sizes



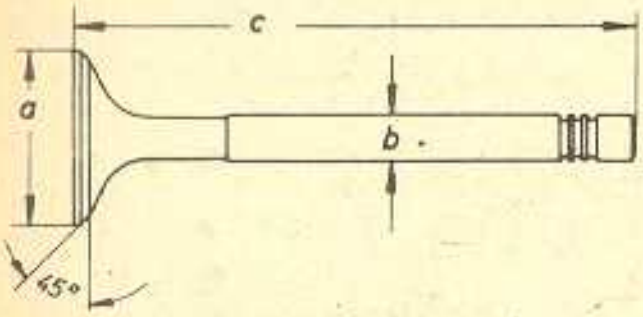
A Tolerance group for cylinder height
B Tolerance group for cylinder diameter (refer to table)
C Manufacturer's identification

Cylinder height tolerances

Code A	Cylinder height	
5	85.400 – 85.425	911 SC
	85.600 – 85.625	911 Turbo
6	85.425 – 85.450	911 SC
	85.625 – 85.650	911 Turbo

Valve sizes

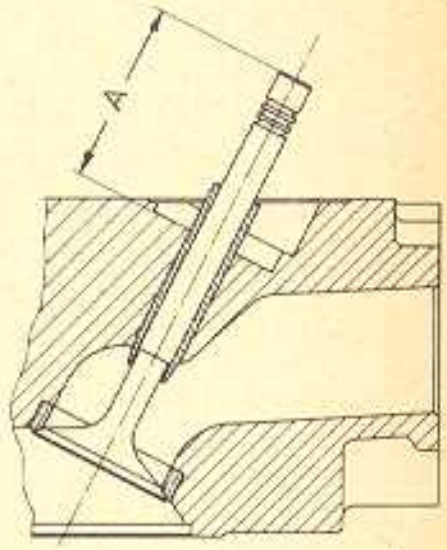
	911 SC Intake	Exhaust	911 Turbo Intake	Exhaust
a	49 ± 0.1	41.5 ± 0.1	49 ± 0.1	41.5 ± 0.1
b	8.97 – 0.012	8.95 – 0.012	8.97 – 0.012	8.95 – 0.012
c	110.1 ± 0.25	108.4 ± 0.25	110.1 ± 0.25	108.4 ± 0.25



Checking valve seats

To check valve seat depth, insert respective valve into guide and measure distance between valve stem and bottom of bearing surface for valve spring shims, however, without shims (see distance A in sketch).

If dimension is greater than specified, measure again with a new valve. If dimension is still beyond specifications, valve seat inserts have been cut too deep and should be replaced, or exchange the cylinder head.

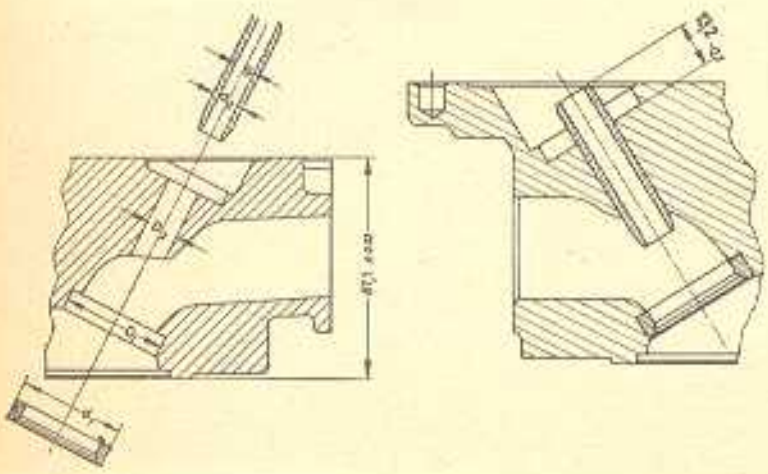


Distance A

911 SC, 911 Turbo 46.0 + 0.3 mm

Valve guides (wear limits, installation sizes)

Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits mm
Valve guide, outside dia. d 2 Cylinder head, bore dia. D 2	13.049 – 13.060 13.000 – 13.018			
Intake valve guide, inside dia. g Intake valve stem, dia. b	9.000 – 9.015 8.958 – 8.970	+ 0.030	+ 0.057	0.15
Exhaust valve guide, inside dia. g Exhaust valve stem, dia. b	9.000 – 9.015 8.938 – 8.950	+ 0.050	+ 0.077	0.20



Machine oversize to correspond with bore in cylinder head.
Press-fit: 0.06 – 0.09 mm

Size table for pulling in valve guides

Valve guide	Outside dia. d 2 Valve guide *	Bore dia. D 2 Cylinder head
Standard size	13.060	13.000 – 13.018
1st oversize	13.260	13.000 – 13.200

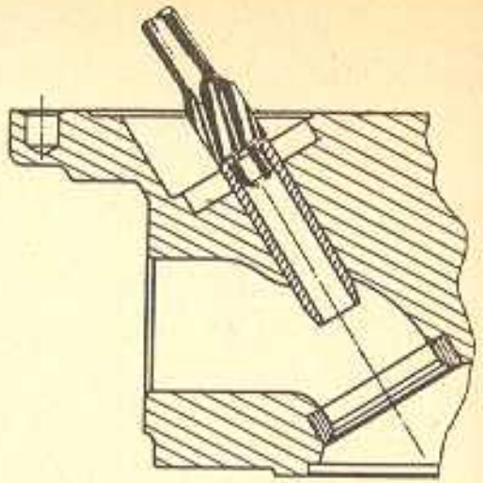
* Grind valve guides on diameter d 2 according to pertinent bore diameter D 2 – remembering press-fit of 0.06 – 0.09 mm

Replacing valve guides

Removal

Grind off protruding valve guides from the camshaft end with a counterbore, until guides are flush with the cylinder head.

Loosen guides with a brief hammer knock and press out in direction of combustion chamber with a press.



Installation

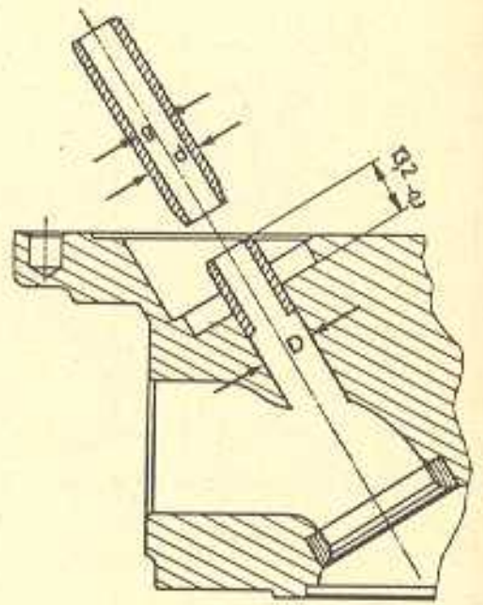
Removal operation will have widened bores in the cylinder head for valve guides slightly.

New, oversized valve guides will have to be installed and matched accordingly (refer to size table).

1. Measure size of bores for valve guides.
2. Machine outside diameter of oversize valve guides in a lathe to match size of bores in cylinder head. Intake and exhaust valves must have a press-fit of 0.06 to 0.09 mm.
3. Coat machined valve guides with talcum powder and press into cylinder head from camshaft end with a locally made mandrel.
4. Open up valve guides to dimension "**g**" = 9.00 to 9.015 mm with a broach or in a finish drilling machine. If necessary, valve guides could also be machined with a suitable reamer.

Important: cylinder head must be mounted or clamped at right angle for pressing-in and machining valve guides.

Check contact pattern on valve seats and, if necessary, machine valve seats after replacement of valve guides.



Size table for pulling in valve guides:

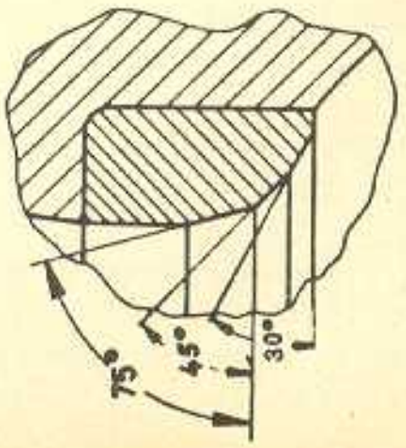
Valve guide	Outside dia. d Valve guide*	Bore dia. D Cylinder head
Standard size	13.060	13.000 – 13.018
1st oversize	13.260	13.000 – 13.200

* Grind valve guides on diameter **d** according to pertinent bore diameter **D** – remembering press-fit.

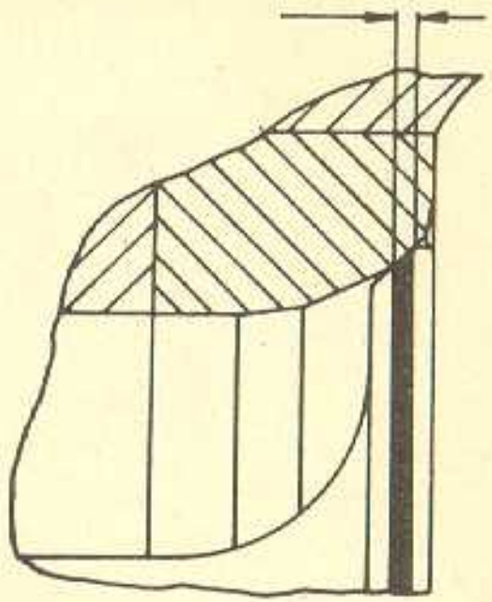
Specifications for installation of valve seat inserts

		Outside dia. d 1 valve seat insert	Bore D 1 in cylinder head
911 SC and 911 Turbo			
Standard size	Intake	51.680 – 51.661	51.500 – 51.530
Standard size	Exhaust	44.200 – 44.184	44.000 – 44.025
1st oversize	Intake	52.000 – 51.981	51.820 – 51.850
1st oversize	Exhaust	44.760 – 44.744	44.560 – 44.585

Angles and sizes of valve seat inserts

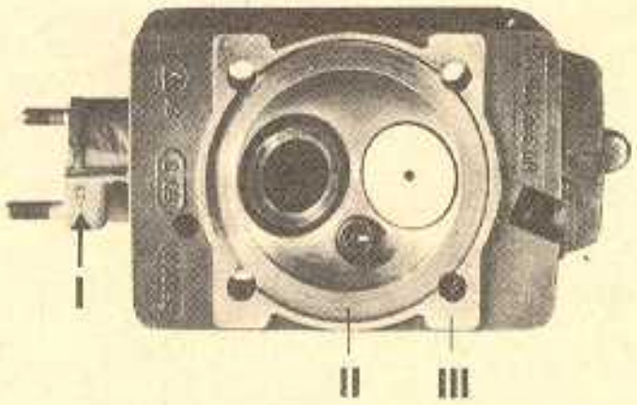


Intake = 1.3 ± 0.1
Exhaust = 1.5 ± 0.1



Machining cylinder head

Machining size (machining depth 0.25 ± 0.02 mm) is specified. These cylinder heads are marked with "–25" on flange of intake port (I).



Never install machined cylinder heads separately, but always all 3 machined cylinder heads on one side.

Thicker cylinder head gaskets (0.50 mm instead of 0.25 mm thick) will have to be installed with machined cylinder heads.

The use of two 0.25 mm gaskets instead of one 0.50 mm thick gasket is not approved because of the tolerances and unfavorable settling.

Repair information:

The sealing surfaces cannot be machined with conventional workshop equipment. The following procedures apply to workshops with pertinent equipment (vertical or universal milling machines required).

1. Clean cylinder head, sand blasting if necessary.
2. Clamp cylinder head on milling machine level. Grind 0.25 ± 0.02 mm off of inner (II) and outer (III) surfaces.
   Important: cylinder heads may only be machined **once.**
3. Bevel edges of machined surfaces slightly and mark cylinder head with "–25", see illustration.

Installation lengths of valve springs

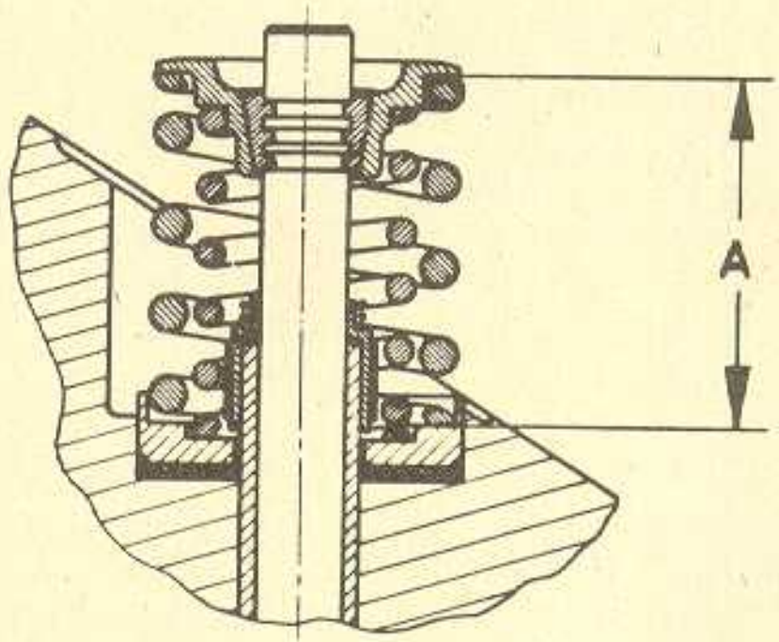
Checking

Install Special Tool P 10c together with shims, spring retainers, springs and both collets belonging to a pertinent valve.

Read distance "A" on Special Tool P 10c and correct by installing or removing shims when necessary.

Note

Check for correct seating of spring retainer in special tool, machining special tool if necessary.



	Intake	Exhaust
911 SC	34.5 – 0.3 mm	34.5 – 0.3 mm
911 Turbo	33.5 ± 0.3 mm	33.5 ± 0.3 mm

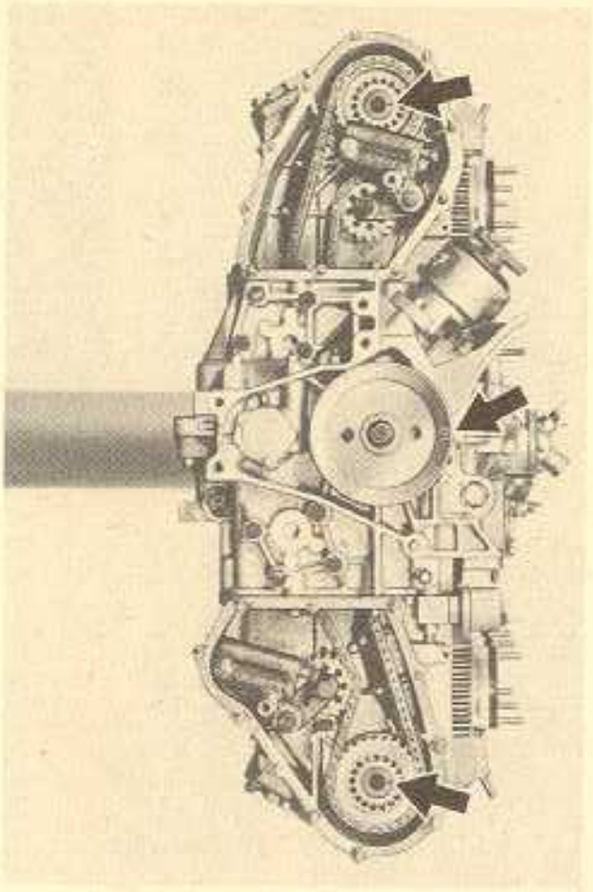
Camshafts, timing

	Type	Camshaft left Part No.	Camshaft right Part No.	Identification on face of camshaft Left	Right	Intake valve stroke in overlapping TDC with 0.1 mm valve clearance	Timing with 0.1 mm valve clearance
911 SC	930/10	930 105 147 08 or 930 105 147 10	930 105 148 08 or 930 105 148 10	930 147 08 or 930 147 10	930 148 08 or 930 148 10	0.9 – 1.1	Intake opens 1° BTDC Intake closes 53° ABDC Exhaust opens 43° BBDC Exhaust closes 3° ATDC
	930/16 930/17	930 105 147 08 or 930 105 147 10	930 105 148 08 or 930 105 148 10	930 147 08 or 930 147 10	930 148 08 or 930 148 10	1.4 – 1.7	Intake opens 7° BTDC Intake closes 47° ABDC Exhaust opens 49° BBDC Exhaust closes 3° BTDC
911 Turbo	930/60 930/66	930 105 143 00 or 930 105 143 01	930 105 142 00 or 930 105 142 01	930 147 08 or 930 143 01	930 143 00 or 930 142 01	0.65 – 0.80	Intake opens 3° ATDC Intake closes 37° ABDC Exhaust opens 27° BBDC Exhaust closes 5° BTDC

Adjusting timing

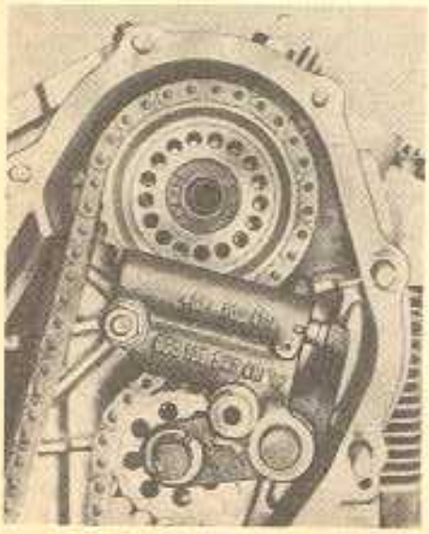
Initial adjustment

1. Turn crankshaft until Z 1 mark on pulley is precisely aligned with joint of crankcase or line on blower housing.

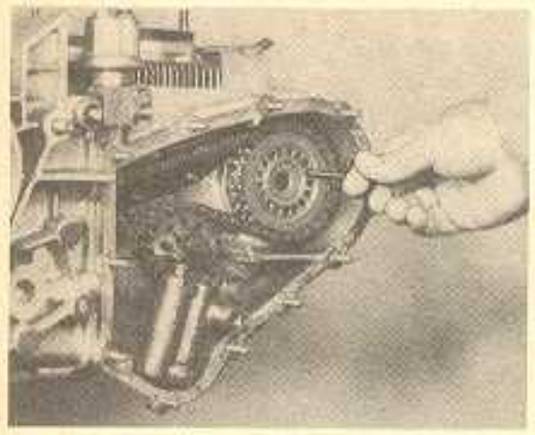


2. Position both camshafts with punch marks or code 930 facing up.

Aligning the Z 1 mark on the pulley with the joint and positioning the camshafts that punched marks face up gives the engine its basic setting of ignition TDC in cylinder no. 1 and overlapping valves in cylinder no. 4.



3. A bore in the sprocket will be aligned precisely with a bore in the sprocket range in the position described above. Insert pin in these precisely aligned bores.



4. Screw in bolts for sprockets finger tight. Counterhold with Special Tool P 9191.

Information

Give threads of bolts a light coat of Optimoly HT.

Information

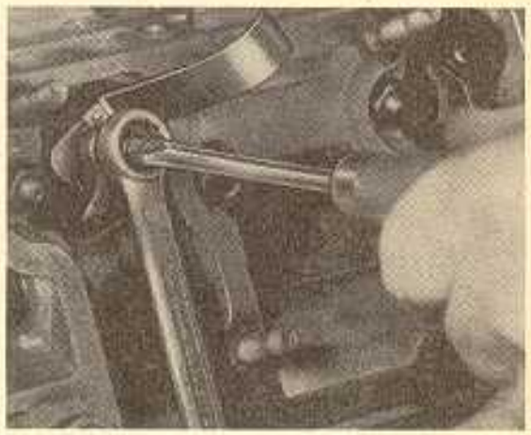
Proceed as described below, if one of the camshafts is displaced from its basic position.

Remove pin of camshaft in its basic position, so that it will also turn during the following adjustment. Turn the displaced camshaft to basic position with Special Tool P 9191 (punch mark or code 930 facing up).

Afterwards remove the sprocket mounting bolt and pin, and turn crankshaft to the Z 1 mark again.

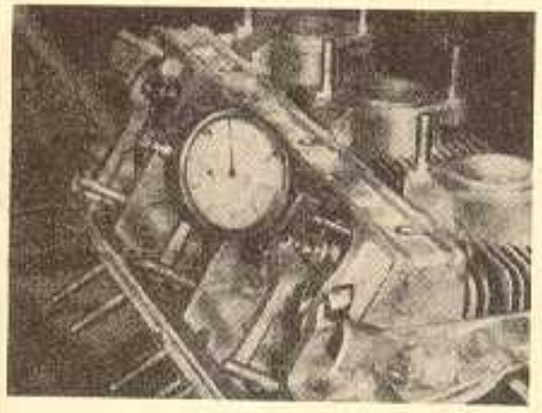
Final adjustment

1. Check or adjust valve clearance to precisely 0.10 mm with Special Tool P 213. It is sufficient for timing adjustments to have precise valve clearance for the intake valves of cylinders 1 and 4.



Left camshaft adjustment (cyl. no. 1)

2. Mount dial gage in Special Tool P 207 on stud of camshaft housing. Apply dial gage on spring retainer of cylinder 1 intake valve and set to 0 with about 10 mm preload and the valve closed.



3. Now turn crankshaft clockwise slowly about 1 turn from Z 1 (TDC), while observing the dial gage at the same time.

   Turn until the mean value of adjustment tolerances is reached.

4. Unscrew mounting bolt of left sprocket, remove and pull out dowel pin with Special Tool P 212.

5. Turn crankshaft accordingly until Z 1 mark on pulley is precisely aligned with joint of crankcase or line on blower housing.

6. Install dowel pin and srew in bolt finger tight, while counterholding.

7. Turn crankshaft two turns (720°) clockwise and recheck the adjustment. Read value should now be within adjustment tolerances.

8. Tighten bolt of left camshaft to final torque of 120 Nm (12 kpm), while a second person counterholds with Special Tool P 9191.

Right camshaft adjustment (cyl. no. 4)

1. Adjust cylinder no. 4 to ignition TDC (overlapping in cylinder no. 1).

2. Repeat adjusting procedures described in points 2 through 8 of the final adjustment for cylinder no. 1 on cylinder no.4.

Clutch drive plate

Measuring point, type	Installation size with tolerances mm	Wear limits mm
911 SC		
Clutch drive plate		
Relaxed thickness (new)	8.1 ± 0.3	6.3 for symmetrical wear
Max. lateral runout	0.6	0.6
911 Turbo		
Relaxed thickness (new)	10.1 ± 0.3	8.5 for symmetrical wear
Max. lateral runout	0.6	0.6

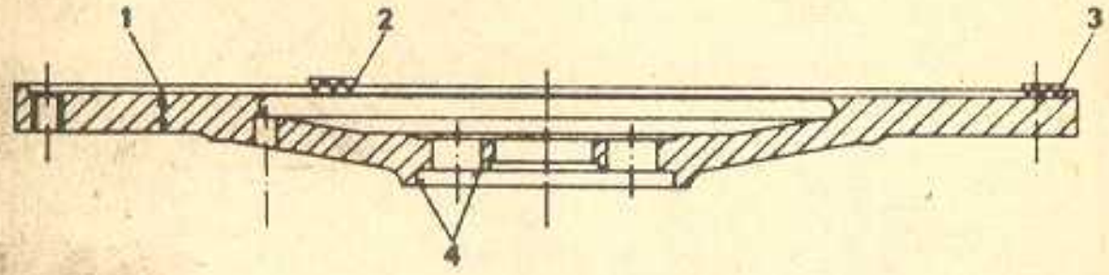
Machining flywheel

The flywheel bearing surface on the drive plate can be machined on a lathe, if there is serious scoring or considerable burnt spots.

Keep lathe cut as small as possible.

Wear limit of flywheel thickness:

911 SC 8.5 mm
911 Turbo 9.9 mm



1 Wear limit
2 Smallest possible out
3 Max. runout 0.1 mm
4 Lathe mounting points

Tightening torque for engine

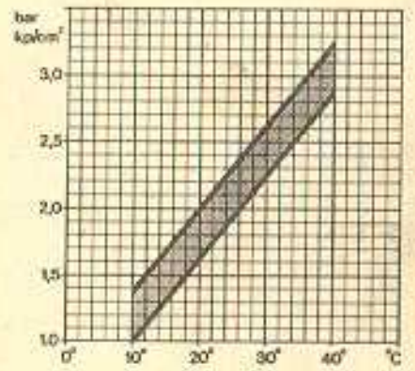
Location	Threads	Torque in Nm
Conrod nuts – 911 SC	M 10 × 1.25	50 – 55
Conrod nuts – 911 Turbo	M 10 × 1.25	
1st step (initial torque)		20
2nd step (final torque)		90 ± 2° torque angle
Crankcase bolts	M 10	35
All bolts on crankcase and camshaft housing	M 8	25
Flywheel to crankshaft	M 10 × 1.25	90
Bush with needle bearing to crankshaft	M 6	10
Pulley to crankshaft, bolt with washer	M 12 × 1.5	80
Durlok bolt for single and double pulley	M 12 × 1.5 × 22	170
Safety valve plug in crankcase	M 18 × 1.5	60
Pressure relief valve plug in crankcase	M 12 × 1.5	60
Adapter (on neck for oil pressure transmitter) to crankcase	M 12 × 1.5	35
Adapter to crankcase	M 22 × 1	120
Cylinder head nuts (1)	M 10 socket	
1st step (initial torque)		10
2nd step (final torque)		32
Rocker arm shafts	M 6 socket	18
Nut on camshaft	M 27 × 2	150
Bolt on camshaft (2) (introduced 10. 82)	M 12 × 1.5	120

(1) Lubricate threads of cylinder head mounting studs and cylinder head nut bearing surfaces lightly with Optimoly HT.

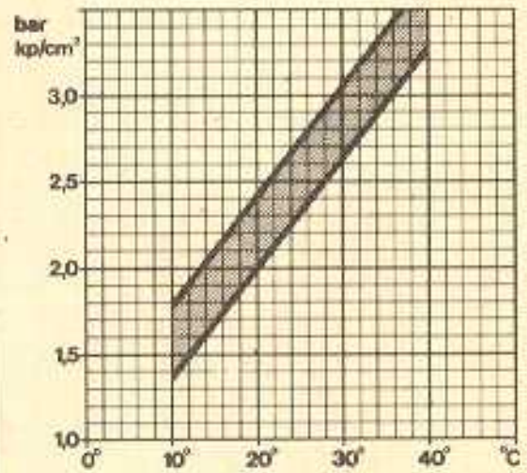
(2) Lubricate threads lightly with Optimoly HT (oil may not be used).

Location	Threads	Torque in Nm
Cover to camshaft housing	M 8	8
Console for engine carrier	M 10	40
Wide clamp to blower housing	M 8	12
Spark plugs	M 14 × 1.25	25 – 30
Pulley to alternator		40
Oil pressure control switch to crankcase	M 10 × 1	max. 20
Temperature transmitter to crankcase	M 14 × 1.5	max. 25
Oil pressure transmitter to connector	M 18 × 1.5	max. 35
Oxygen sensor to catalytic converter	M 18 × 1.5	50 – 60
Plug for catalytic converter exhaust test connection	M 8 × 1	15
Oil drain plug for oil filter screen cover	M 22 × 1.5	42
Oil drain plug for crankcase (introduced 3. 83)	M 20 × 1.5	70
Oil drain plug for oil tank	M 22 × 1.5	42

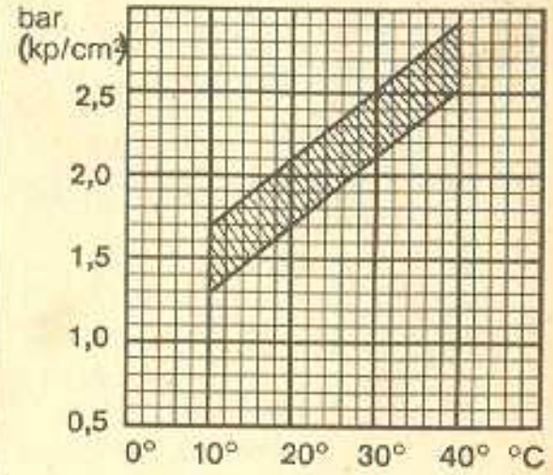
Testing and adjusting values – 911 SC (1982 and 1983 model)

Test step	Specification
Electric fuel pump Delivery rate	 at least 1000 cc/30 sec.
Control pressure "cold"	Diagram for warm-up regulator Part No. 911.606.105.09 Bosch No. 0438.140.089 Testing vacuum: 450...550 mbar (340...420 mmHg
	
Control pressure "warm" Test with atmospheric pressure (without vacuum) Vacuum pump connected for test on intake connection of warm-up regulator	 2.7...3.1 bar 3.4...3.8 bar
System pressure Testing value Adjusting value	 4.5...5.2 bar 4.7...4.9 bar
Leak test (engine warm) Pressure after 10 min. after 20 min.	 at least 1.3 bar at least 1.1 bar
Fuel injectors Opening pressure	 2.5...3.6 bar

Testing and adjusting values – 911 SC (USA) (with oxygen control)

Test step	Specification
Electric fuel pump Delivery rate	at least 1000 cc/30 sec.
Control pressure "cold"	Diagram for warm-up regulator Part No. 911.606.105.08 Bosch No. 0438.140.090
	
Control pressure "warm"	3.4...3.8 bar
System pressure Testing value Adjusting value	 4.5...5.2 bar 4.7...4.9 bar
Leak test (engine warm) Pressure after 10 min. after 20 min.	 at least 1.3 bar at least 1.1 bar
Fuel injectors Opening pressure	 2.5...3.6 bar

Testing and adjusting values – 911 SC (Japan)

Test step	Specification
Electric fuel pump Delivery rate	at least 1000 cc/30 sec.
Control pressure "cold"	Diagram for warm-up regulator Part No. 911.606.105.07 – 1980 mod. Part No. 911.606.105.10 – 1981 mod. Bosch No. 0438.140.072
	
Control pressure "warm"	3.4...3.8 bar
System pressure Testing value Adjusting value	 4.5...5.2 bar 4.7...4.9 bar
Leak test (engine warm) Pressure after 10 min. after 20 min.	 at least 1.3 bar at least 1.1 bar
Fuel injectors Opening pressure	 2.5...3.6 bar

Test step	Testing and adjusting values 911 SC			Remarks
Idle adjustment	Europe	USA and Canada	California and High Altitude States Japan	Australia and Sweden
Idle speed (rpm)	*** 800...950	900 ± 50	900 ± 50	800...950
CO level (%)	*** 1.0 to 2.0*	0.4 to 0.8**	0.4 to 0.8**	1.0 to 2.0*

* Air pump disconnected.
** Measured in front of catalytic converter with oxygen sensor plug pulled of.
*** From 1981 models (R.o.W.) the lower value is ideal for adjustments of idle speed and CO level (possible idling deviations).

Adjusting engine idle speed

911 SC (USA)

Adjusting

Information

Always check for correct seating of oil tank cap and gasket prior to adjusting the engine idle speed. Leaks on oil cap would lead to incorrect measurements.

Adjusting requirements:

Engine in perfect running condition and correctly adjusted ignition timing.

1. Connect exhaust test pipe on test connection of catalytic converter.

2. Run engine to operating temperature (oil temperature approx. 90° C, oil temperature gage needle on upper end of field surrounded in white).
3. Connect CO tester to instructions supplied with tester.
4. Disconnect oxygen sensor plug in engine compartment on left-hand side.

5. Turn control screw or bypass screw on throttle valve housing until specified engine speed is reached.

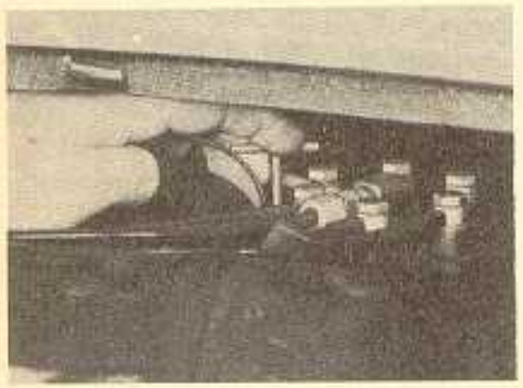
Information

Use separate tachometer from tester or similar.

6. Check CO level. If CO level is not in specified range, remove the mixture control unit of US cars and remove the threaded part of the shear-off screw in the bore providing access to the mixture control screw.

   Remove plug in mixture control unit between the fuel distributor and venturi of cars for Japan.

7. Insert Special Tool P 377.



8. Turn clockwise = richer mixture. Turn counterclockwise = leaner mixture.

Information

Always conform with the following points.

a) Basically always adjust CO level from lean to rich.

   Example: If mixture is excessively rich, first turn idle control screw counterclockwise further than necessary and then clockwise to nominal value.

b) Never exert pressure on special tool wrench while adjusting (engine would die).

c) Only turn control step minimum distances, since even a slight turn will change the CO content in exhaust considerably.

9. Remove special tool wrench.

10. Accelerate engine briefly.

11. Wait until CO tester displays CO level at idle speed.

    Repeat adjusting procedures, if necessary.

12. Recheck engine idle speed, correcting if necessary.

13. After finishing adjustments, screw a new shear-off screw in the access bore and tighten until head of screw shears off.

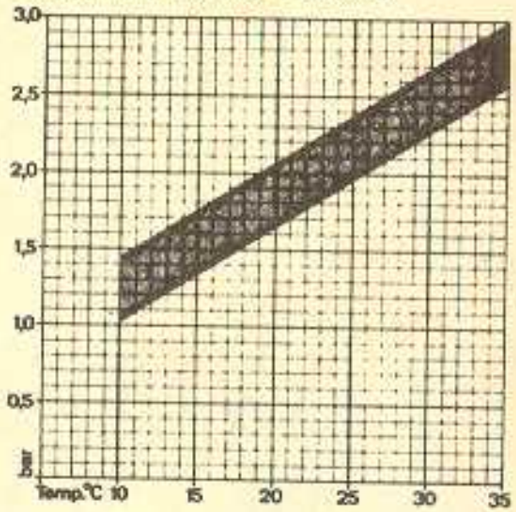
    Connect oxygen sensor plug.

14. Coat threads of nut plugging the test connection on catalytic converter with Bosch VS 140 16 Ft paste or Optimoly HT.

Testing and adjusting values for K-Jetronic (CIS) — 911 Turbo

Engine Type 930/60

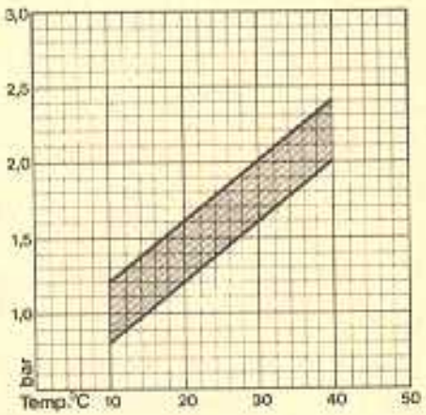
Test step	Specifications
Electric fuel pumps Delivery rate	at least 1500 cc/30 sec. (applicable for both pumps together)
Control pressure "cold" (= outside temperature)	Diagram for warm-up regulator Part No. 930.606.105.03 Bosch No. 0 438 140 054
Control pressure "warm"	3.65 ± 0.20 bar (kp/cm²)
"full throttle enrichment"	2.9 ± 0.20 bar (kp/cm²)
System pressure Testing value	6.0 to 6.7 bar (kp/cm²)
Adjusting value	6.2 to 6.4 bar (kp/cm²)
Leak test Pressure after 10 minutes	at least 1.6 bar (kp/cm²)
after 20 minutes	at least 1.4 bar (kp/cm²)
Fuel injectors Opening pressure	2.1 + 1.1 bar (kp/cm²)
delivery rate - control pressure circuit	160 to 240 cc minute



Testing and adjusting values for K-Jetronic (CIS) — 911 Turbo

Engine Type 930/66

Test step	Specifications
Electric fuel pumps Delivery rate	at least 1500 cc/30 sec. (applicable for both pumps together)
Control pressure "cold" (= outside temperature)	Diagram for warm-up regulator Part No. 930.606.105.05 Bosch No. 0 438 140 112
Control pressure "warm"	3.65 ± 0.20 bar (kp/cm²)
"full throttle enrichment"	2.9 ± 0.20 bar (kp/cm²)
System pressure Testing value Adjusting value	 6.0 to 6.7 bar (kp/cm²) 6.2 to 6.4 bar (kp/cm²)
Leak test Pressure after 10 minutes after 20 minutes	 at least 1.6 bar (kp/cm²) at least 1.4 bar (kp/cm²)
Fuel injectors Opening pressure	2.7 + 1.1 bar (kp/cm²)
delivery rate - control pressure circuit	160 to 240 cc minute



Idle adjustment

Engine Type 930/60/66

Note

Adjustments must be carried out with air cleaner mounted.

1. Disconnect air hose on air pump and insert a suitable plug in hose opening.
2. Turn control screw on throttle valve housing until specified idle speed is reached.
3. Adjust fuel/air mixture. Insert Special Tool 9156 into spring-loaded key wrench in the mixture control unit. Press special tool down about 18 mm to engage the spring-loaded key wrench in the mixture control screw.

   Turned clockwise = richer mixture

   Turned counterclockwise = leaner mixture



Test step	Specifications		
Idle adjustments (with approx. 90° C oil temp.)	Eng. Type	Europe	Canada
Idle speed (rpm)	930/60 930/66	950 ± 50	950 ± 50
CO (%)	930/60 930/66	1.5 to 2.5*	1.5 to 2.5*
HC		≤ 300 ppm	

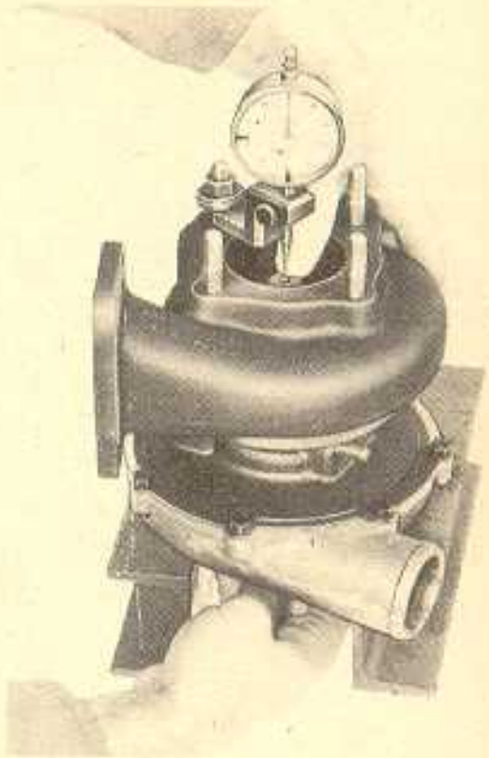
* Air pump disconnected

Checking turbocharger

Measuring axial play

Apply tip of dial gage on turbine shaft end. Pres rotor shaft against dial gage. Read and note value. Push rotor shaft in opposite direction. Read and note value. The differenve between both measured values is the axial play.

Max. play: 0.35 mm



Measuring radial play

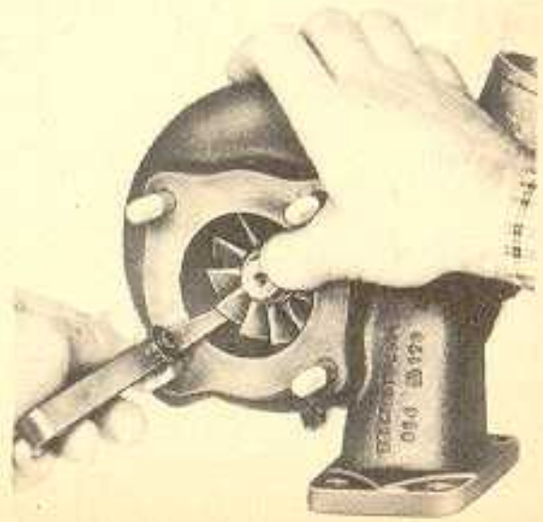
Radial play is only checked on turbine end.

Push down on turbine. Measure gap with a feeler gage and note value.

Push turbine in opposite direction. Measure gap with a feeler gage and note value.

The difference between both measured values is the radial play. Measure at at least two different points.

Max. play: 0.65 mm



Charge pressure

Engine Type 930/60/66:
0.70 to 0.85 bar at 5500 rpm
(measured on charge pressure safety switch)

Turbocharger identification

3 LDZ / 319 C 11.1

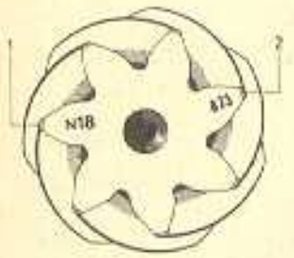
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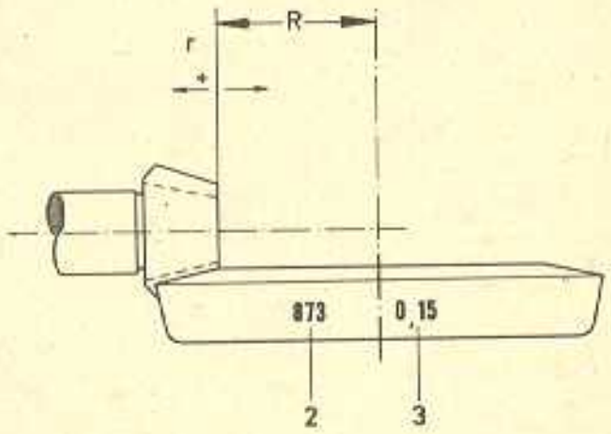
Adjusting drive pinion

General

Correct adjustment of drive pinion and ring gear is important for service life and smooth running of final drive. Consequently drive pinions and ring gears are already matched in production in special testing machines to guarantee good tooth contact pattern and quiet running in both directions. The point of smoothest running is found by moving the drive pinion in axial direction, whereby the ring gear is held within tolerances of the specified backlash. Deviation "r" (distance deviating from design distance "R") is measured and inscribed on face of pinion. Ring gear and pinion are always designed that deviation "r" is added to design distance "R", i. e. is preceded by a + sign.

To show difference to pinion/ring gear assemblies, whose deviation "r" had been + or –, the capitol letter "N" precedes the value "r" on the head of the drive pinion for these new pinion/ring gear sets. Each pinion/gear set has a pair number and both parts must always be replaced together.





R = Design distance
911 = 66.30 mm
911 Turbo = 82.29 mm

r = Deviation from R in + 1/100 mm (N 2 = + 0.02 mm)
1 = Deviation r
2 = Pair number
3 = Backlash

Important manual transmission adjusting data 915 and 930

2 examples for adjustment of pinion and ring gear

	Transm. Type 915	Transm. Type 930
Design dimension "R"	66.30 mm	82.29 mm
Deviation "r"	+ 0.10 mm	+ 0.02 mm
Adjustment dimension "E"	66.40 mm	82.31 mm
Dial gauge setting	66.30 mm	82.29 mm
Measured dimension (without shims)	– 0.29 mm	– 0.14 mm
Distance to face end of pinion shaft	66.01 mm	82.15 mm
Adjustment dimension "E"	66.40 mm	82.31 mm
Distance to face end of pinion shaft	– 66.01 mm	– 82.15 mm
Thickness of shims	0.39 mm*	0.16 mm*

* Round off the nearest 0.05 mm.

Shims are available 0.10, 0.15, and 0.20 mm thick.

Recheck adjustment dimension "E" after installation of shims; a deviation of ± 0.03 mm is permissible.

Adjusting ring gear

1 = shim S_1 2 = shim S_2 E = Adjusting distance

The backlash between pinion and ring gear can be adjusted only by changing thickness of shims S_1 and S_2 and, measured on ring gear at four different points, should be

0.12 to 0.18 mm for transmission type 915
0.16 to 0.20 mm for transmission type 930.

Perfect results require thoroughness and cleanliness for all assembling and measuring operations.

Pre-load and friction torque of taper roller bearings:

Transm. Type	Axial Preload (mm)	Friction Torque
915	0.30 to 0.40	350 to 650 Ncm (35 to 65 kpcm) FAG bearings 300 to 420 Ncm (30 to 42 kpcm) SKF bearings
930	0.2 to 0.33	440 to 680 Ncm (44 to 68 kpcm) FAG bearings 300 to 570 Ncm (30 to 57 kpcm) SKF bearings

Transmission tolerance survey

Measuring point	Type 915 Installation tolerance mm	Type 915 Wear limit mm	Type 930 Installation tolerance mm	Type 930 Wear limit mm
1. Backlash between gear I and II		0.22	0.055–0.13	0.22
1st gear	0.17			
2nd gear	0.17			
3rd gear	0.05–0.13			
4th gear	0.05–0.13			
5th gear	0.05–0.13			
2. Loose gears on pinion and drive shaft				
Axial clearance				
1st gear	0.3–0.4	0.5	same as 915	
2nd gear	0.2–0.3	0.4		
3rd gear	0.2–0.3	0.4		
4th gear	0.2–0.3	0.4		
5th gear	0.2–0.3	0.4		
3. Selector rods				
a) in guides radial clearance	0.195–0.236	0.4	same as 915	
b) Runout	—	0.1		

Measuring point	Type 915		Type 930	
	Installation tolerance mm	Wear limit mm	Installation tolerance mm	Wear limit mm
4. Selector forks				
in operating sleeve				
Axial clearance				
5th and reverse gear	0.1 – 0.3	0.5	same as 915.	
1st and 2nd gear	0.1 – 0.3	0.5		
3rd and 4th gear	0.1 – 0.3	0.5		
5. Synchronizing rings				
Outside dia. installed				
1st gear	86.20 – 86.54	after local wear through of molybdenum layer	86.15 – 86.65	after local wear through of molybdenum layer
2nd gear	86.20 – 86.54		86.15 – 86.65	
3rd gear	76.12 – 76.48		76.20 – 76.55	
4th gear	76.12 – 76.48		76.20 – 76.55	
5th gear	76.12 – 76.48		—	
6. Drive shaft				
Max. runout at guidepin	max. 0.1	max. 0.1 (align)	same as 915	

Tightening torque for manual transmission — Type 915

Location	Designation	Threads	Material/ Strength	Torque Nm
Transmission case (oil drain)	Plug with magnet	M 24 × 1.5 tapered	MUK 7	24
Gear box (oil filter)	Plug	M 24 × 1.5 tapered	MUK 7	24
Gear box and transmission case, side and front transmission covers, shift cover, tensioning plate, transmission mounts	Nut	M 8 × 1.25	22 H	24
Front cover	Backup light switch	M 18 × 1.5	Ms	35
Drive shaft	Collared nut	M 30 × 1.5	C 35	230
Drive shaft	Castle nut	M 18 × 1.5	22 H	160
Drive pinion	Collared nut	M 24 × 1.5	8.8	250
Fork, gearshift	Nut	M 6 × 1.0	22 H	10
Shift lock, transmission case	Bolt	M 10 × 1.5	8.8	17
Transmission case	Vent	M 14 × 1.5	9 S 20 K	25
Selector forks, shift rod fork	Bolt	M 8 × 1.25	8.8	25
Ring gear with differential or limited slip differential	Bolt	M 12 × 1.25	12.9	160
Joint flange	Bolt	M 10 × 1.25	8.8	44
Starter	Cylinder head nuts	M 10 × 1.5	CK 35	48

Location	Designation	Threads	Material/ Strength	Torque Nm
Crankcase/ transmission	Nut	M 10 × 1.5	H 22	48
Release lever/ adjusting screw	Nut	M 8 × 1.25	04	11
Spring clamp/ speed sender	Bolt	M 6 × 1.0	8.8	9
Reversing lever pin/ gear box	Pin	M 8 × 1.25	9 S 20 K	25
Cooling pipe coil/ oil pump	Bolt	M 8	8.8	22
Cooling pipe coil/ gear box	Bolt	M 6	8.8	9
Guide tube for release bearing	Screw	M 6 × 1.0	8.8	9
Oil pump cover/ side transmission cover	Bolt	M 6	8.8	9
Shield/ side transmission cover	Screw	M 6	8.8	9
Drive gear/ differential	Screw	M 5	8.8	5.6

Tightening torque for manual transmission — Typ 930

Location	Designation	Threads	Material/ Strength	Torque Nm
Drive shaft	Collared nut	M 30 × 1.5	8.8	210–230
Drive shaft	Collared nut	M 20 × 1.5	C 35 V	160–180
Drive pinion	Collared nut	M 24 × 1.5	8	240–260
Transmission case	Vent	M 14 × 1.5	9 S 20 K	20– 30
Joint rod, gearshift	Bolt	M 8 × 1.25	8.8	23– 26
Shift cover	mid-grip nut	M 8 × 1.25	× 12 CrNi 18.8	22– 25
Gear box	Backup light switch	M 18 × 1.5	Ms	25– 35
Gearshift, fork	Nut	M 6 × 1.0	8.8	9– 11
Tensioning plate, gear box and transmission case, front and side transmission covers	Bolt	M 8 × 1.25	8	22– 25
Shift lock, transmission case	Bolt	M 10 × 1.5	8.8	15– 18
Selector forks	Bolt	M 8 × 1.25	8.8	24– 26
Ring gear (differential)		M 12 × 1.25	11.9	135–140
Limited slip differential	Bolt	M 12 × 1.25	12.9	150–160
Joint flange	Expansion bolt	M 10 × 1.5	8.8	26– 30
Joint flange	Bolt	M 10 × 1.5	–	39– 46

Location	Designation	Threads	Material/ Strength	Torque Nm
Transmission case (oil drain)	Plug with magnet	M 24 × 1.5 (taper 1:16)	St 37	20–25
Gear box (oil filler)	Plug	M 30 × 1.5	5.8	20–25
Reverse gear additional lock	Plug	M 16 × 1.5	5.8	20–25
Guide tube (transmission case)	Screw	M 6 × 1.0	8.8	8–10
Clutch and gear ring mountings	Bolt	M 8 × 1.0	8.8	20–25
Starter mountings	Nut	M 10 × 1.5	8	46–50
Console to shift base	Screw	M 6	8.8	6.0
Shift base on tunnel	Bolt	M 8	8.8	21
Screw in shift rod head	Screw	M 8	8.8	15
Screw in shift clutch	Screw	M 8	8.8	15
Clamp	Bolt	M 8	8.8	25
Case cover/ limited slip differential	Screw	M 6	8.8	14

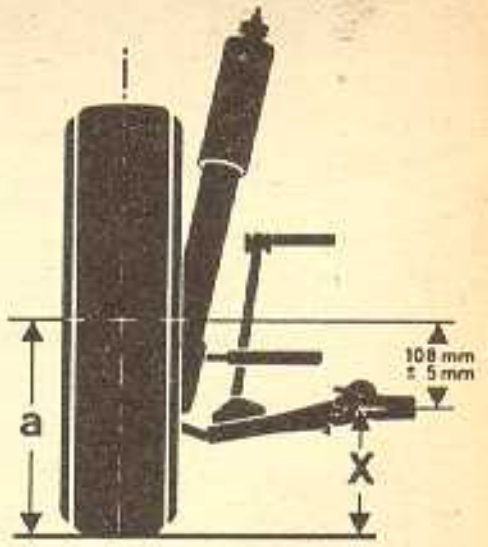
Front axle and steering specifications

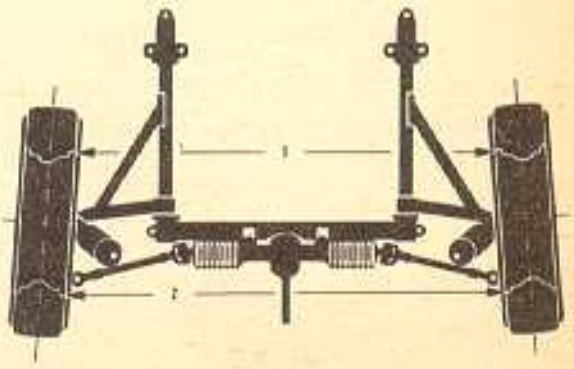
	911 SC	911 SC–USA, Canada, Japan	Turbo
Wheel suspension	Independent employing control arms and shock absorber struts		
Springs	One round torsion bar in driving direction for each wheel 18.8 mm diameter		
Track width	1369 mm with rim 6 J × 15	1361 mm with rim 6 J × 15	1432 mm with rim 7 J × 16
Shock absorbers	Double action, hydraulic shock absorber struts		
Stabilizers			
front/rear dia. in mm	20/18	20/18	20/18
Adjustment of ZF rack and pinion steering			
Frictional moment of steering: (measured on flange of steering gear with tie rods detached)	0.8 to 1.4 Nm = 8 to 14 kpcm)		
ZF steering specifications			
Steering ratio (in center): 17.78 : 1			
Number of steering wheel turns from lock to lock: approx. 3.0			

Specifications and tolerances

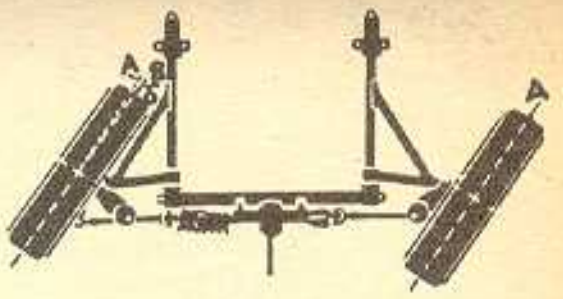
At curb weight according to DIN 70020
Car with full fuel tank, spare wheel and tools

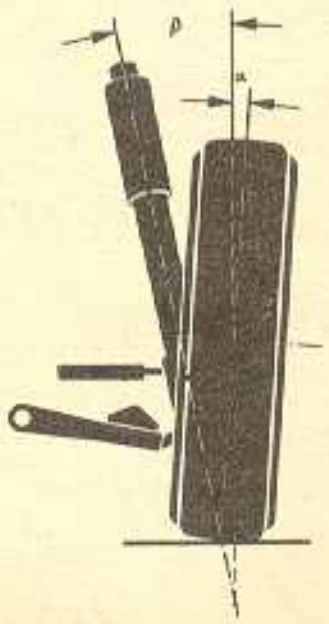
Designation	Adjustment data and tolerances	Max. difference between left and right
Front axle		
Height adjustment: Wheel center above middle of torsion bar		
911 SC	108 mm ± 5 mm	5 mm
911 SC – USA, Canada, Japan	99 mm ± 5 mm	5 mm
83 model onwards	108 mm ± 5 mm	5 mm
911 Turbo	94 mm ± 5 mm	5 mm
911 Turbo – USA, Canada, Japan	85 mm ± 5 mm	5 mm
83 model onwards	94 mm ± 5 mm	5 mm
Total toe (pressed with 150 N)	0°	—





Designation	Adjustment data and tolerance	Max. difference between left and right
Difference angle at 20° lock	0° to + 30'	Can only be influenced by exchanging steering arm
A' = Parallel to A B = Centerline of wheel γ = Difference angle		
Camber of front wheels (wheels pointing straight ahead)		
α = Camber angle 911 SC, Turbo	0° ± 10'	10'
911 SC, Turbo USA, Canada, Japan	+ 30' ± 10'	10'
83 model onwards	0° ± 10'	
β = Inclination of kingpin	11°	





Designation	Adjustment data and tolerances	Max. difference between left and right
γ = Caster	6° 5' ± 15'	30'
Caster results from total camber difference at 20° left lock and 20° right lock × 1.5		

These wheel alignment specifications can also be applied to earlier models.

Tightening torque for front axle

Location	Designation	Threads	Material/ Strength	Torque Nm
Support to spring strut	Nut	M 14 × 1.5	8	80
Support to body	Bolt	M 10	8.8	47
Plug for spring strut cartridge	Plug			120 + 20
Steering gear	Bolt	M 10	8.8	47
Joint pivot of steering tie rod to joint bush (steering gear)	Bolt	M 10	8.8	47
Ball joint of steering tie rod to steering arm	Castle nut	M 10 × 1	8	45
Ball joint and joint pivot to steering tie rod (locknut)	Nut	M 14 × 1.5		45
Auxiliary carrier to body	Bolt	M 12 × 1.5	8.8	90
Stabilizer to auxiliary carrier strut	Bolt	M 8	8.8	25
Auxiliary carrier strut, splash guard and stabilizer to body	Bolt	M 10	8.8	47
Auxiliary carrier strut and splash guard to auxiliary carrier	Nut	M 10	8	28

Location	Designation	Threads	Material/ Strength	Torque Nm
Control arm to body	Bolt	M 10	8.8	47
Ball joint to control arm	Slotted nut	M 45 × 1.5	8.8	250
Ball joint to spring strut	Universal stopnut	M 8	8	22
Brake disc to wheel hub	Nut	M 8	8.8	23
Shield for brake disc	Bolt	M 8	8.8	10
Caliper to steering knuckle	Bolt	M 12 × 1.5	8.8	70
Nut on steering knuckle	Screw	M 7	10.9	15
Brake pipe connection	Coupling nut	M 10 × 1		12
Wheel to wheel hub	Wheel nut	M 14 × 1.5		130

Tightening torque for steering

Location	Designation	Threads	Material/ Strength	Torque Nm
Steering gear	Bolt	M 10	8.8	47
Pivot bush to rack	Bellows holder (slotted nut)	M 16 × 1.5		70
Joint pivot (steering tie rod) to pivot bush	Bolt	M 10	8.8	47
Ball joint to steering arm	Castle nut	M 10 × 1	8	45
Ball joint and pivot to steering tie rod (locknut)	Nut	M 14 × 1.5		45
Steering coupling to steering shaft	Bolt	M 8	8.8	25
Steering shaft to steering gear	Bolt	M 8	8.8	25
Steering shaft bearing	Bolt	M 8	8.8	25
Universal joint to steering shaft (lubricated with Optimoly HT)	Bolt	M 8	8.8	20
Coupling flange to drive pinion	Self-locking nut	M 10	8	45
Case cover to steering gear	Bolt	M 8	8.8	15
Steering wheel	Nut	M 18 × 1.5	8	50
Centering bolt for steering lock	Stud	M 8	10.9	2–3
Locknut for centering bolt	Nut	M 8	8	18

Rear axle specifications

	911 SC	911 SC USA, Canada, Japan	Turbo
Wheel suspension	Independent, employing trailing arms, wheels driven by propeller shafts		
Springs	One round torsion bar in lateral direction for each wheel		
Torsion bar dia.	24.1 mm	24.1 mm	26 mm
Track width	1379 mm with rim 7 J × 15	1367 mm with rim 7 J × 15	1501 mm with rim 8 J × 16
Shock absorbers	Double action, hydraulic shock absorbers		
Stabilizers front/rear dia. in mm	20/18	20/18	20/18

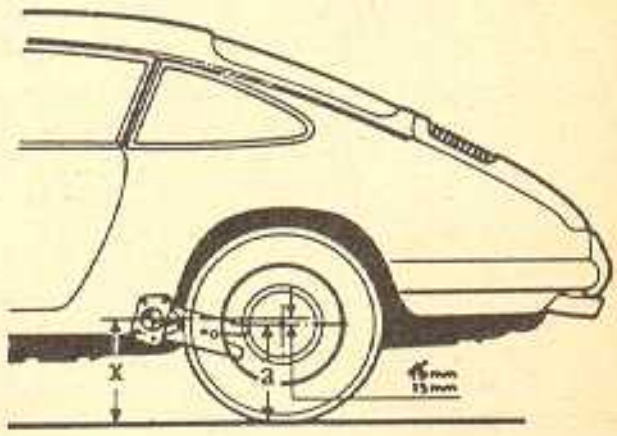
Specifications and tolerances

(at curb weight according to DIN 70020; car with full fuel tank, spare wheel and tools)

Designation	Adjustment data and tolerances	
Torsion bar specification Inclination of spring strut		
Coupe 911 SC	35°	with Bielstein-shock absorbers 34°
Coupe 911 SC USA, Canada, Japan	40°	with Bielstein-shock absorbers 39°

23°
W 30mm BAR

Designation	Adjustment data and tolerances	Max. difference between left and right
Targa	+ 0.5°	
Air conditioner	+ 0.5°	
Turbo	33°	
Turbo – USA, Canada, Japan	37°	
Camber of rear wheels		
911 SC	– 1° ± 10'	20'
Turbo	– 30' ± 10'	20'
911 SC/Turbo		
USA, Canada, Japan	0° ± 10'	20'
83 model onwards	– 1° ± 10'	20'
Track for all types	+ 10' ± 10' each wheel	20'
Height adjustment		
Wheel center below center of cross tube		
911 SC	16 mm ± 5 mm	8 mm
Turbo	12 mm ± 5 mm	8mm
911 SC/Turbo		
USA, Canada, Japan	37 mm ± 5 mm	8 mm
83 model onwards		
911 SC	16 mm ± 5 mm	
911 Turbo	12 mm ± 5 mm	



Tightening torque for bolts and nuts for rear axle

Location	Designation	Threads	Material	Tightening torque Nm
Bearing cover to body	Hexagon head bolt	M 10	8.8	47
Control arm to cross tube	Hexagon head bolt	M 14 × 1.5	10.9	60
Spring strut to control arm	Eccentric	M 12 × 1.5	8.8	60
Spring strut to control arm	Hexagon head bolt	M 12 × 1.5	10.9	95
Brake caliper to control arm	Hexagon socket screw	M 12 × 1.5	8.8	60
Shock absorber to control arm	Hexagon head bolt	M 14 × 1.5	8.8	125
Shock absorber to body	Hexagon nut	M 10 × 1	8	25
Brake line	Coupling nut	M 10 × 1		14
Stabilizer to body	Hexagon head bolt	M 8	8.8	25
Axle shafts to transmission and drive shaft	Fillister head bolt	M 10 M 8	12.9 12.9	83 42
Stabilizer to stabilizer suspender	Hexagon nut	M 12 × 1.5	8/8.8	85
Stabilizer suspender to rear axle trailing arm	Hexagon head bolt	M 12 × 1.5	8.8	85
Wheel to wheel hub	Wheel nut	M 14 × 1.5		130
Wheel hub to drive shaft	Castle nut	M 20 × 1.5	10.9	300 – 320
Brake disc to wheel hub	Countersunk bolt	M 6	8.8	5
Adjusting lever to spring strut	Hexagon head bolt	M 16 × 1.5	10.9	245
Adjusting lever to spring strut	Eccentric bolt	M 16 × 1.5	10.9	245

Brakes – Specifications

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Brake booster				
Tandem master cyl. dia.	20.64 mm	23.81 mm		
Brake booster dia.	7"	8"		
Play on brake pedal with brakes bled and engine stopped	10 mm	10 mm		
Brake circuit division	front axle/ rear axle	front axle/ rear axle		
Front wheel brakes				
Brake disc outside dia.	282.5 mm inboard venting	304 mm inboard venting perforated evolent-shaped inboard venting ports		
Effective brake disc dia.	228 mm	247 mm		
Brake disc thickness (new)	20.5 mm	32 mm		

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Min. brake disc thickness* after machining	19.1 mm	30.6 mm	18.5 mm	30 mm
Max. brake disc surface-to-valley surface finish after machining	0.006 mm	0.006 mm		
Max. brake disc thickness tolerance	0.02 mm	0.02 mm		
Max. brake disc lateral runout	0.05 mm	0.05 mm		
Max. lateral runout installed	0.1 mm	0.1 mm		
Pistons in brake caliper	48 mm dia. 2 pistons per caliper	38 mm dia. 4 pistons per caliper		
Brake pad area per wheel	76 cm^2	94 cm^2		
Brake pad thickness	10 mm	13 mm	2 mm	2 mm
Brake pad recess play	brake liner has easy movement in recess	0.4 – 0.6 mm		
Rear wheel brakes				
Brake disc outside dia.	290 mm inboard venting	309 mm inboard venting perforated evolent-shaped inboard venting ports		
Effective brake disc dia.	244 mm	251 mm		

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Brake disc thickness (new)	20 mm	28 mm		
Min. brake disc thickness* after machining	18.6 mm	26.6 mm	18 mm	26 mm
Max. brake disc peak-to-valley surface finish after machining	0.006 mm	0.006 mm		
Max. brake disc thickness tolerance	0.02 mm	0.02 mm		
Max. brake disc lateral runout	0.05 mm	0.05 mm		
Max. lateral runout installed	0.1 mm	0.1 mm		
Pistons in caliper	38 mmdia. 2 pistons per caliper	30 mm dia. 4 pistons per caliper		
Brake pad area per wheel	52.5 cm^2	94 cm^2		
Brake pad thickness	10 mm	13 mm	2 mm	2 mm
Brake pad recess play	Brake pads move easily in recess	0.4 – 0.6 mm		
Parking brake				
Brake drum dia.	180 mm	180 mm	181 mm	181 mm
Brake shoe width	25 mm	25 mm		
Liner area per wheel	85 cm^2	85 cm^2		
Brake liner thickness	4.5 mm	4.5 mm	2 mm	2 mm

Caliper version

911 SC: gray cast iron front and rear Turbo: light alloy front and rear

* Brake disc should only be machined symmetrically, i.e. uniform on both sides.

Machining specifications and wear limits for brake discs and parking brake

Vehicle type	Type of brake disc	Location of brake disc	Distance "a" (in ref. to new brake disc thickness)	New brake disc thickness	Min. thickness of brake disc after machining	Wear limit of brake disc (for symmetric wear)
911 SC	Vented brake disc	Front wheel	35.25 ± 0.1 mm	20.5 – 0.2 mm	19.1 mm	18.5 mm
Turbo	Vented, perforated brake disc	Front wheel	35.7 + 0.25 mm* – 0.35 mm	32 – 0.2 mm	30.6 mm	30 mm
			from mod. 1981 56.7 ± 0.1 mm	32 – 0.2 mm	30.6 mm	30 mm
911 SC	Vented brake disc	Rear wheel	76 + 0.2 mm	20.0 – 0.2 mm	18.6 mm	18.0 mm
Turbo	Vented, perforated brake disc	Rear wheel	76 + 0.2 mm	28 – 0.2 mm	26.6 mm	26 mm

All	Thickness tolerance of brake discs	max. 0.02 mm
All	Lateral runout of brake discs	max. 0.05 mm
All	Surface finish of brake discs after machining	max. 0.006 mm

* From brake flange bearing surface on wheel hub (brake disc, ring, brake flange assembly) to inside brake disc friction surface.

Caution!

Refinishing and wear specifications listed above are based on the assumption that remaining thickness of the brake pad is not less than 2.0 mm.

This pad thickness is required to assure perfect operation of brakes. (Installation of cross spring assures this.)

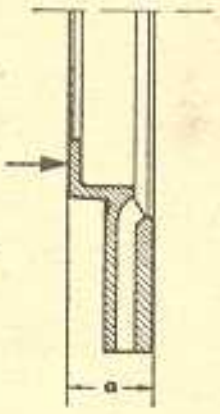
Only balanced brake discs are supplied. Brake discs are balanced by special clips in the cooling vents.

Caution! Never remove balance clips.

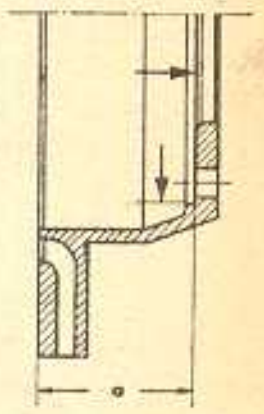
Caution!

Machine brake disc symmetrically, i.e. uniformly on both sides. Arrows indicate brake disc reference or mounting points.

Front wheel brake disc



Rear wheel brake disc



Parking brake

Brake drum dia. (new)	180 + 0.2 mm
Brake drum wear limit	max. 181.0 mm dia.
Brake liner width	25 mm

Caution!

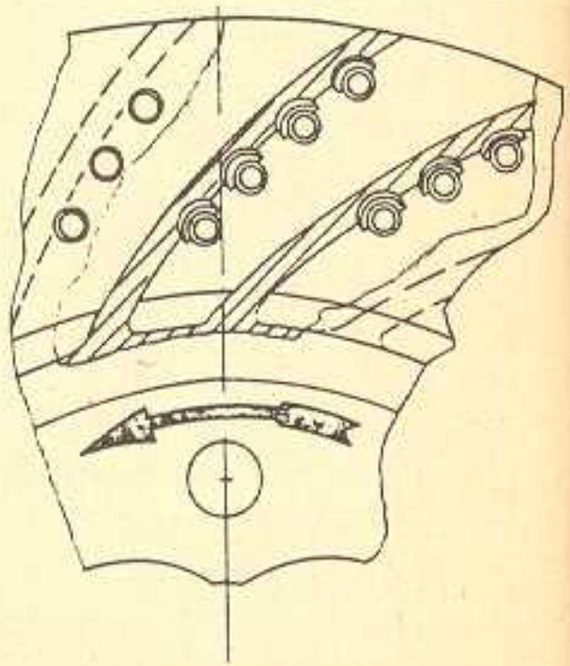
Parking brake liners must be at least 2.0 mm thick.

Arrangement of brake disc venting ports (assembly information)

The inboard venting ports of brake discs **on Turbo** are arranged in evolvent-shape. Don't mix up left and right sides when assembling.

Identification: Evolvent shape and part number.

Part number is located on brake disc.



← Forward direction

Left side part number:

3rd group number
uneven

Right side part number:

3rd group number
even

Examples:

930 351 **04700** = left side

930 351 **04800** = right side

Brake circuit failure indicator

Each of both brake circuits has a stop light switch on the brake master cylinder, which also acts as a brake function warning switch.

An indicator lamp installed in the instrument panel comes on when a brake circuit fails.

After repairing the brake system the brake indicator lamp must be switched off by disconnecting the battery.

Tightening torque for hydraulic and mechanical brake parts

Location	Designation	Threads	Material	Tightening torque Nm
Nut on steering knuckle	Fillister head screw	M 7	10.9	15
Brake caliper to steering knuckle	Fillister head screw/ hexagon head bolt	M 12 × 1.5	8.8	70
Brake flange to wheel hub	Hexagon head bolt	M 8	8.8	23
Brake disc to brake flange	Hexagon head bolt	M 6	8.8	10
Brake disc to wheel hub	Hexagon head bolt	M 8	8.8	23
Guard to steering knuckle	Hexagon head bolt	M 8	8.8	10
Guard and brake backplate to trailing arm	Fillister head screw	M 8	8.8	25
Guard to brake backplate	Hexagon head bolt	M 8	8.8	25
Brake disc to wheel hub	Countersunk screw	M 6	8.8	5
Brake caliper to trailing arm	Fillister head screw/ hexagon head screw	M 12 × 1.5	8.8	60
Wheel to wheel hub	Wheel nut	M 14 × 1.5	F 53/10 K	130

Location	Designation	Threads	Material	Tightening torque Nm
Brake master cylinder to vacuum booster	Hexagon nut	M 8	8	25
Stop light switch to master cylinder	Stop light switch	M 10 × 1		15 + 4
Brake booster to console	Hexagon nut	M 8	8	25
Brake fluid tank	Hexagon head bolt	M 6	8.8	2
Pivot and joint shell to push rod	Hexagon nut	M 10	8	35
Brake booster to trunk floor	Hexagon nut	M 8	8	25
Strut to console	Hexagon head bolt	M 10	8.8	46
Brake lines to master cylinder, branch brake hoses and brake calipers	Coupling	M 10 × 1		14
Branch to cover and rear axle cross tube	Hexagon head bolt	M 6	8.8	6
Bleeder screws on brake calipers (Turbo)	Bleeder screw	M 10 × 1		8 – 11
Brake caliper sections to bridge (Turbo)	Fillister head bolt	M 12 × 1.5	8.8	60
Spring plate to bridge (Turbo)	Countersunk screw	M 5		4
Ring adapter to brake caliper (Turbo)	Hollow union bolt	M 10 × 1		16
Bleeder valve in brake caliper	Bleeder screw			3

Rims and tires

Type	Standard rims		tires	Optional extra* rims		tires
911 SC	front rear	LM g 6 J × 15 LM g 7 J × 15	185/70 VR 15 215/60 VR 15	front rear	LM gs 6 J × 16 LM gs 7 J × 16	205/55 VR 16 225/50 VR 16
				Winter tires**		
				5½ J × 15***		165 R 15 M+S***
				5½ J × 14		185 R 14 M+S
				5½ J × 15*** 6 J × 15 7 J × 15 6 J × 15 front/ 7 J × 15 rear		185/70 R 15 M+S
				6 J × 16 6 J × 16 front/ 7 J × 16 rear		205/55 R 16 M+S
Turbo	front rear	LM gs 7 J × 16 LM gs 8 J × 16	205/55 VR 16 225/50 VR 16			
				Winter tires**		
				6 J × 15 7 J × 15 6 J × 15 front/ 7 J × 15 rear		185/70 R 15 M+S
				6 J × 16 7 J × 16 6 J × 16 front/ 7 J × 16 rear		205/55 R 16 M+S

Tire inflation pressure (reference values)

(measured on cold tires)

	911 SC	Turbo	Turbo – USA, Canada, Japan
Front	2.0 bar	2.0 bar	2.0 bar
Rear	2.4 bar	3.0 bar	2.4 bar
Spare wheel	2.2 bar	2.2 bar	2.2 bar

These values also apply to winter tires.

LM g = Cast light alloy
LM gs = Forged light alloy

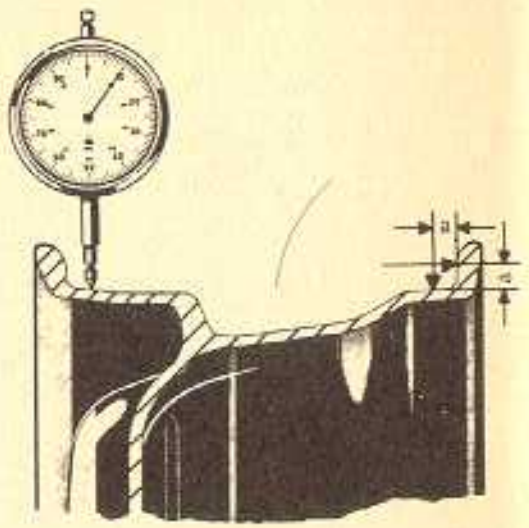
* Other wheel rim/tire combinations are possible in addition to optional extra tires (Technical Information).

** SR or HR version.

*** Not recommended.

Checking wheel rims

Refer to drawing for lateral and radial runout measuring points on inside of rim.



Max. permissible lateral and radial runout of light alloy rim = 1.0 mm

Max. permissible lateral and radial runout of rim + tire = 1.5 mm

Note:

Straigthening of deformed rims is not permitted.

Distance "a" = 8 mm

Check rim flanges of light alloy wheel rims for wear. Inner rim flange is more subject to wear.

Use a conventional 8 mm radius gage to check, but first remove any sharp edges and burrs.

Wear limit 1 mm. If necessary, replace wheel rim.

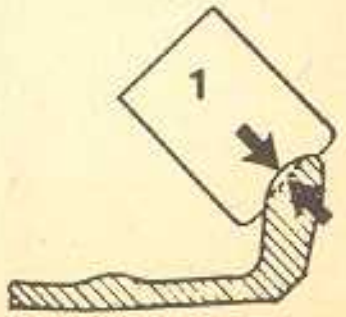
Checking rim flange shape:

——— New condition

- - - - Worn

◗ ◖ Max. wear 1 mm

1 8 mm radius gage



Ignition timing values 911 SC and 911 Turbo

Engine type	911 SC (USA/Japan)	911 SC	911 Turbo (Europe, R.o.W.)
Ignition timing	5° BTDC	25° BTDC	29° BTDC
at engine speed (rpm)	900 ± 50	4000	4000
Vacuum control detached	yes	yes	yes
Ignition timing control	19°...25° BTDC	not above 25° BTDC	0° ± 2° BTDC
at engine speed (rpm)	6000	6000	1000 ± 50
Vacuum control detached	yes	yes	no

911 SC and 911 Turbo

Spark plug survey

		911 SC USA/Japan	911 Turbo All
Spark plugs	Bosch	WR 5 DC	W3 DP or DPO
	Bosch	WR 5 DP	(W280 P21)
	Beru	14-5 DU	
Electrode gap		0.7 + 0.1 mm	0.6 + 0.1 mm

	911 SC R.d.W.
Spark plugs Bosch	WR 3 CC
Bosch	WR 3 CP
Electrode gap	0.7 + 0.1 mm

Battery charge condition

	Normal Climates Density	Temperature Protection	Tropics Density
Discharged (dead)	1.12	−11° C	1.08
Half charged	1.20	−27° C	1.16
Charged	1.28	−68° C	1.23

Fuse and relay chart for 911 SC

Fused equipment	Amps
1 Fog lights	25
2 License plate lights, fog light indicator lamp and relay	5
3 Front and rear right marker lights	5
4 Front and rear left marker lights, engine compartment light	5
5 Right low beam headlight	8
6 Left low beam headlight	8
7 Right high beam headlight	8
8 Left high beam headlight, high beam indicator lamp	8
9 Right front turn signal	5
10 Left front turn signal	5
11 Flasher, backup lights	16
12 Rear window defogger relay, heater blower, rear window defogger indicator lamp, automatic heater control	25
13 Windshield wipers, washer pump, cigar lighter	25
14 Electric sliding roof, rear window wiper, outside mirror	16
15 Stop light, tempostat	8
16 Fuel pump	25
17 Hazard lights, windshield defogger	16
18 Courtesy light, clock, glove box light, trunk light	5
19 Headlight cleaners	25
20 Air conditioner blower	25
21 Electric window controls	25
Fuses in engine compartment	
1 Rear window defogger, rear wiper return	25
2 Heater blower	25
3 Heater blower relay	5

Relays in fuse box

I Air conditioner
II Fog lights
III Horn
IV Tempostat
V Window controls
VI Not occupied
VII Fuel pump

Relays in engine compartment

I Single-step rear window defogger
II Heater blower
III Double-step rear window defogger

Fuse and relay chart for 911 Turbo

Fused equipment	Amps
1 Fog lights	16
2 License plate lights, fog light indicator lamp and relay	5
3 Front and rear right marker lights	5
4 Front and rear left marker lights, engine compartment light	5
5 Right low beam headlight	8
6 Left low beam headlight	8
7 Right high beam headlight	8
8 Left high beam headlight, high beam indicator lamp	8
9 Right front turn signal	5
10 Left front turn signal	5
11 Flasher relay, backup lights, outside mirror	16
12 Electric sliding roof, rear window wiper	25
13 Windshield wipers, washer pump, cigar lighter	25
14 Blower, relay and indicator lamp for windshield and rear window defoggers, automatic rear window control	16
15 Stop light	8
16 Fuel pumps	25
17 Hazard lights, windshield defogger	16
18 Courtesy light, clock, glove box light, trunk light	5
19 Headlight cleaners	25
20 Air conditioner blower	25
21 Electric window controls	25
In engine compartment	
Rear window defogger, rear wiper return	25

Relays in fuse box

I Air conditioner
II Fog lights
III Horn
IV Not occupied
V Window controls
VI Fuel pump 1
VII Fuel pump 2

Relays in engine compartment

II Air sensor and charge pressure safety switch
III Rear window defogger
IV Delay relay

Bulb Chart — 911 SC and 911 Turbo

Location	Wattage	Base DIN (SAE)	Remarks
Main headlights H 4	60/55 W	P 43 t-38	
Additional headlights H 3 Front fog lights H 3	55 W	PK 22 S	
Main headlights "AS"	45/40 W	P 45 t	Japan
Stop/tail lights	21/5 W	BAY 15 d	
Turn signals Backup lights Rear fog lights	21 W	BA 15 s	
Side marker lights License plate light	4 W	BA 9 s	
Trunk light	10 W	BA 15 s	
Passenger compartment light Engine compartment light	10 W	SV 8.5-8	
Lamps for instruments and ashtray	2 W	BA 7 s	
Glass base indicator lamp	1.2 W	W 2 × 4.6 d	
License plate light	5 W	BA 15 s	
Side turn signals	5 W	3.5 × 9.5	
Sealed beam headlights (RHD)	60/50 W	(6014)	USA
Sealed beam halogen headlights	60/50 W	(6014)	USA
Stop/tail lights Turn signal/marker lights	32/3 cp	(1034)	USA
Turn signals Backup lights	32 cp	(1073)	USA
Sign light	1.2 W	2.9 × 4.6	USA
Side marker/ license plate light	2 cp	(1895)	USA

Dimensions at curb weight according to DIN

		911 SC	Turbo
Wheelbase	mm	2272	2272
Front track width	mm	1369 (1361)	1432
Rear track width	mm	1379 (1367)	1501
Lenght	mm	4291	4291
Width	mm	1652	1775
Height	mm	1320 (1340)	1310 (1328)

USA values in brackets

Weights

		911 SC R. o. W.	911 SC USA	Turbo R. o. W.	Turbo Canada
Curb weight acc. to DIN	kg	1160	1250	1300	1300
Gross vehicle weight	kg	1500	1550	1680	1600
Max. axle load, front/rear	kg	650/930	650/950	700/1050	675/1000
Max. trailer load					
without brakes**	kg	480	480	—	—
with brakes**	kg	800	800	—	—
Max. roof load (only coupe)*	kg	35	35	35	35

* But without exceeding the gross vehicle weight.
** For gradients up to 16 %.

Filling capacities

	911 SC	Turbo
Engine	Brand name heavy duty oil of API Classification SE or SF. SAE 10 W/50, 15 W/40 or 20 W/50 multigrade oil for year around operation. Latter oil not for constant temperatures below – 15° C. Only use brand name oils which had been tested and approved by Porsche. Only when multigrade oil is not available and operating conditions are normal, may brand name single-grade oils be used, but then oil must be changed at specified intervals to avoid damage as specified by the season of the year. Use SAE 30 in summer and SAE 20 W in winter (adequate only for temperatures below +5° C).	
Total oil volume of system	ltr. approx. 13	13
Oil change volume	ltr. approx. 10	10
Manual transmission*	ltr. approx. 3	3.7
Fuel tank	ltr. approx. 80	80
Brake fluid tank	ltr. approx. 0.2	0.2
Washing fluid tank	ltr. approx. 8.5	8.5

* SAE 90 of Specification API-GL 5 (or Mil-L 2105 B)

Performances, consumption of fuel and oil

		911 SC	911 Turbo
Top speed with manual transmission	km/h	235 (225 USA)	260
Acceleration 0 – 100 km/h	s	6.8 (7.0 USA)	5.4
Kilometer from standing start	s	26.8 (27.5 USA)	24
Fuel consumption (acc. DIN 70030, part 1)			
at 90 km/h	l/100 km	8.0	8.1
at 120 km/h	l/100 km	9.7	15.3
City test	l/100 km	13.4	20.0
Oil consumption	l/1000 km	approx. 1.5	1.0 – 2.0

Specifications for Air Conditioner

Refrigerant	1350 grams of R 12
Refrigerating oil in compressor	120 ± 20 cc Suniso No. 5 GS
Burst-type seal on tank	Seal bursts at pressure of approx. 40 bar
Power consumption of compressor clutch	Approx. 50 watts

Tightening Torque

Location	Threads	Torque Nm
Compressor – suction conn. – pressure conn.	7/8" × 14 UNF 3/4" × 16 UNF	29 – 37 20 – 28
Condenser – rear	3/4" × 16 UNF	20 – 28
Condenser – front	5/8" × 18 UNF	14 – 20
Fluid tank	5/8" × 18 UNF	14 – 20
Expansion valve Pressure connection	5/8" × 18 UNF	14 – 20
Expansion valve Evaporator connection	3/4" × 16 UNF	20 – 28
Evaporator suction pipe	7/8" × 14 UNF	29 – 37

Safety Regulations for Handling Refrigerant R 12

The employed R 12 refrigerant is known as a safety refrigerant. This means, this refrigerant is not flammable, not explosive, not poisonous, not attacktive, odorless and tasteless. You should still conform with the following points in spite of this.

1. Avoid any contact with refrigerant in liquid or gas state. Concerned skin must be treated as for frostbite. Wear goggles for protection of eyes. Visit a physician immediately, if refrigerant gets in the eyes in-spite of the goggles.
2. System must be discharged when working on an air conditioner. Refrigerant gas must not be discharged in closed rooms. There is danger of asphyxiation in workpits due to fact that it is heavier than air.
3. Never weld on parts of a closed air conditioner or in the immediate vicinity. Regardless of whether the system is filled with refrigerant or not, heat will cause very high pressure which could lead to damage in the system or even an explosion. R 12 is absolutely not poisonous at normal temperatures, however will decompose when in contact with an open flame or at high temperatures and be converted into hydrochloric gas and hydrogen floride. These decomposition products will contain, among others, chloric gas and carbonyl chloride. Precautions must be taken, since these products could be dangerous to health.
4. Refrigerant bottles must not be thrown or, in filled state, be subjected to rays of sunshine or other sources of heat for longer periods of time. The maximum permissible temperature of 45° C for a filled refrigerant bottle must not be exceeded.

Control Dimensions for Floor Assembly 911 SC

Dimension	Description	mm
A	Control arm take-up front inside	565.5 ± 1
B	Auxiliary platform take-up	726 ± 1
C	Front floor plate measuring points	1200 ± 2
D	Rear floor plate measuring points	850 ± 2
E	Engine mounts	752 ± 1
F	Front floor plate – inside control arm take-up measuring point	1327 ± 3
G	Rear floor plate – auxiliary platform take-up measuring point	1868 ± 3
H	Axle tube/transmission take-up – front floor plate measuring point	1550 ± 3
I	Axle tube/transmission take-up – inside engine mount bolting points	1323 ± 5
K	Rear floor plate – inside engine mount bolting measuring point	1557 ± 5
L	Front floor plate – inside control arm take-up measuring point	1041 ± 3
M	Front floor plate – rear floor plate measuring point	1215 ± 2
N	Rear floor plate – engine mount bolting measuring point	1355 ± 3
O	Axle tube/transmission take-up – inside engine mount bolting points	1220 ± 3

All dimensions are measured horizontally from centerline of hole.

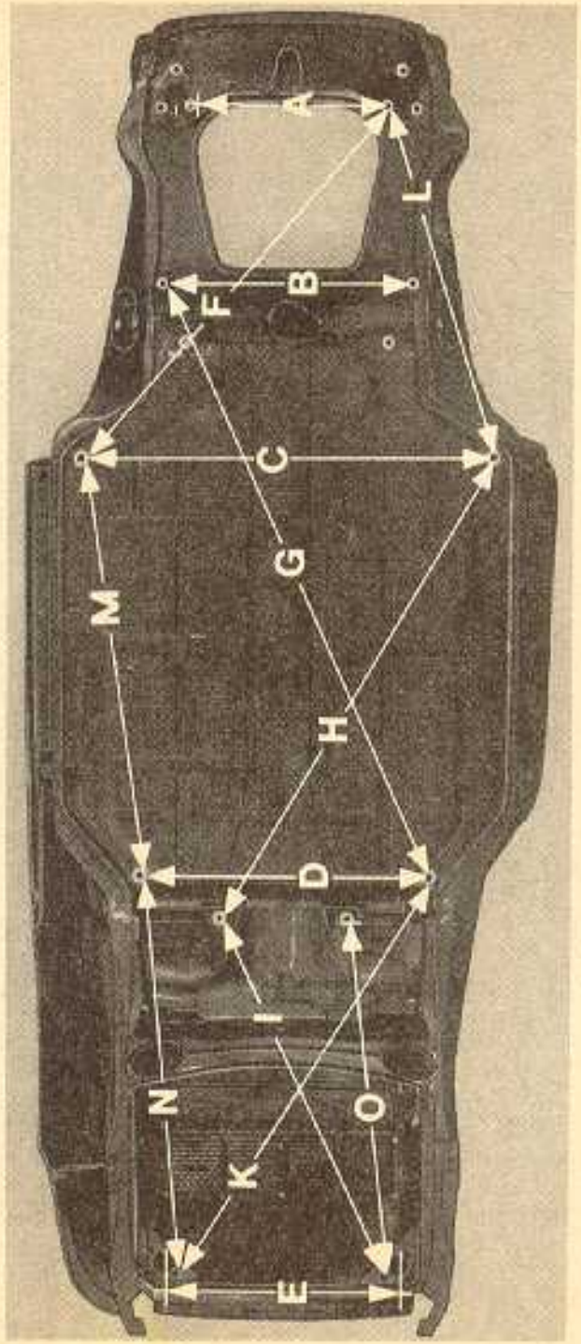
Note:
Dimensions to bolting points of engine mounts are to be measured direct (inclined dimensions).

Important:
The difference between left and right for length dimensions must not exceed specified tolerances.

Control Dimensions for Floor Assembly — 911 Turbo

Dimension	Description	mm
A	Control arm take-up front inside	565.5 ± 2
B	Auxiliary platform take-up	726 ± 1
C	Front floor plate measuring points	1200 ± 2
D	Rear floor plate measuring points	850 ± 2
E	Engine mounts	752 ± 3
F	Front floor plate – inside control arm take-up measuring point	1327 ± 3
G	Rear floor plate – auxiliary platform take-up measuring point	1868 ± 3
H	Axle tube/transmission take-up – front floor plate measuring point	1528.5 ± 3
I	Axle tube/transmission take-up – inside engine mount bolting points	1374 ± 3
K	Rear floor plate – inside engine mount bolt measuring point	1582 ± 3
L	Front floor plate – inside control arm take-up measuring point	1041 ± 3
M	Front floor plate measuring point – rear floor plate measuring point	1215 ± 2
N	Rear floor plate – inside engine mount bolt measuring point	1384 ± 3
O	Axle tube/transmission take-up – inside engine mount bolting points	1273 ± 3

Control Points



Maintenance Schedule

The recommended service intervals apply under normal driving conditions and do not take into consideration all of the optional equipment available. Dusty areas require more frequent checking and possibly replacement of the air filter cartridge. Tire, clutch, and brake wear as well as the condition of the oil in the engine in particular depend greatly on the driving habits and are adversely influenced by extreme operating conditions; this might necessitate shorter intervals for checking and replacement and applies logically also for the item "check battery acid level".

Also, the new moving components of the chassis require an certain running-in period. We recommend, therefore, having an alignment check performed after the first 2000 to 3000 miles / 3000 to 5000 km.

Maintenance service should be carried out at least once a year and precautionary measures against corrosion should be taken before winter. The brake fluid should be renewed every two years.

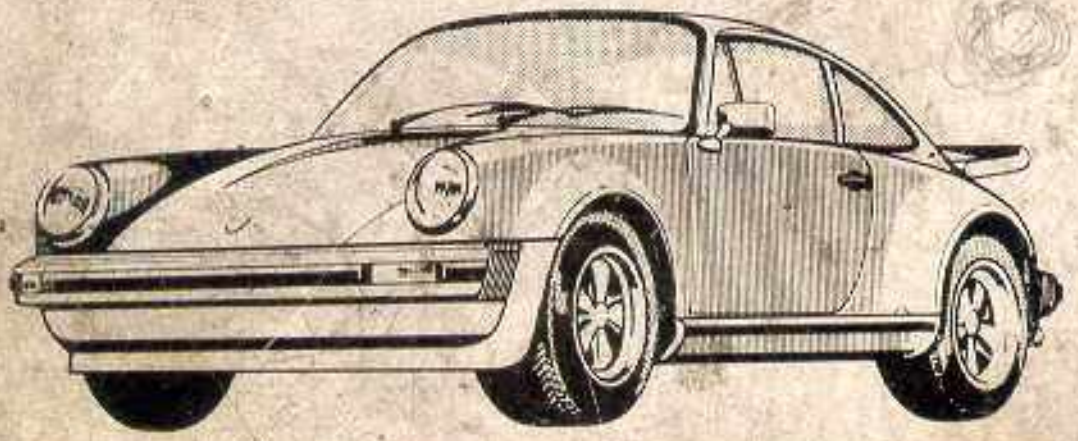
Service items apply to both 911 SC and 911 Turbo unless model is specified.

300 to 1200 miles/ 500 to 2000 km		then at and every 12000 miles / 20000 km
■	Check valve clearance. At first service, check rocker arm shafts for tightness (when engine cold).	■
	Replace air filter cartridge and check hose connections for tightness. Replace filter cartridge in air pump. **911 SC:** Clean flame protection cartridge in crankcase. **911 Turbo:** Lubricate throttle valve shaft and check for smooth action.	■
	Replace spark plugs.	■

	Lubricate control mechanism joints (also necessary after every engine wash). Check control mechanism for smooth action.	■
	Check brake fluid level in reservoir. Check brake pad wear, push rod play between brake pedal and brake booster, free travel of hand and foot brake. Check all pipes, hoses and hose connections for damage and corrosion. Check entire brake system for possible leaks. Check foot and hand brake (road test or testbed run).	■
■	Check clutch play and pedal travel.	■
	Lubricate clutch release lever and secondary spring.	■
■	**911 Turbo:** Check exhaust flange for tightness and entire exhaust system for possible leaks.	■
■	Check condition and tension of V-belts and/or toothed belts.	■
■	Change engine oil, replace engine oil filter. Clean magnetic bolts. Check transmission oil.	■
	Change transmission oil. Clean magnetic bolts.	every 80000 km
■	Check engine, oil reservoir, filter bracket, front oil cooler and transmission for leaks.	■

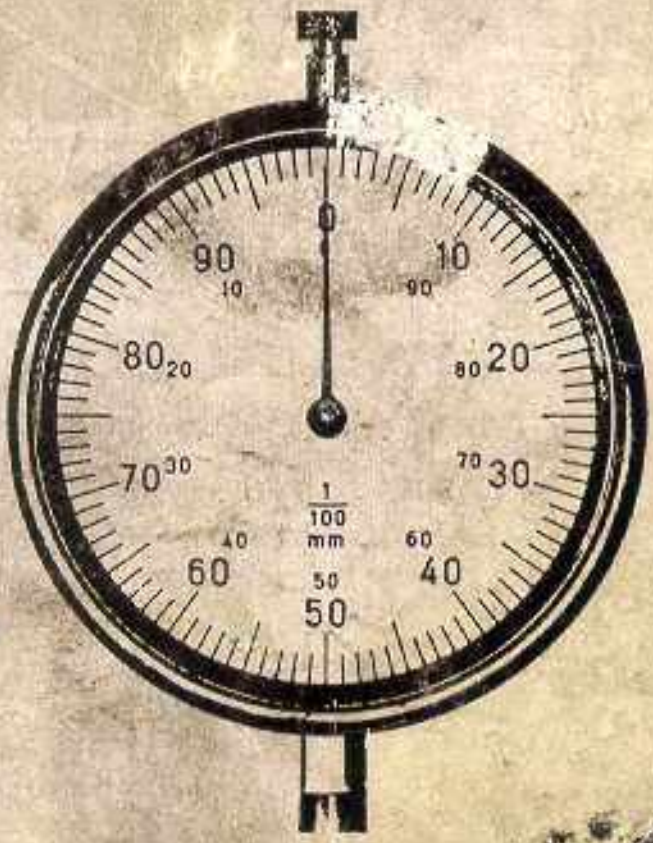
300 to 1200 miles/ 500 to 2000 km		then at and every 12000 miles / 20000 km
	911 Turbo: Check action of supercharger pressure safety switch.	■
	Steering: Check all connections to steering gear, track rods, pull rods and joints for tightness and good function. Also check bellows for leaks (remove cover plate).	■
■	Check front wheel bearing play.	
■	**911 Turbo:** Check rear wheel bearing play.	■
	Fuel system: Replace fuel filter, check fuel line connections for tightness and leaks. Also check function of fuel pump safety switches.	■
■	Check tire pressure.	■
	Check ignition timing. Check idling setting with exhaust gas analyzer (engine oil temperature of approx. 90° C).	■
	Check battery acid level; check headlight adjustment and operation of turn indicators, stop and rear lights, windshield wipers and horns. Check adjustment of spray nozzles, top up washer reservoir (anti-freeze!).	■
	Treat seals on doors, covers and Targa top and remove abraded rubber. Check door catches, lubricate door hinges.	■
	Check function of heating, ventilation or air-conditioning (driver's and passenger's side).	■

PORSCHE



82, 83 911 SC, 911 Turbo

Models



Technical Specifications

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Important conversion factors and new units of measurement

	Old units		New units
Pressure	tech. atmosphere	at (kp/cm²)	Bar (bar)
Output	Horsepower	HP	Kilowatt (kW)
Force	Kilopond	kp	Newton (N)
Power	Kilopondmeter	kpm	Newtonmeter (Nm)

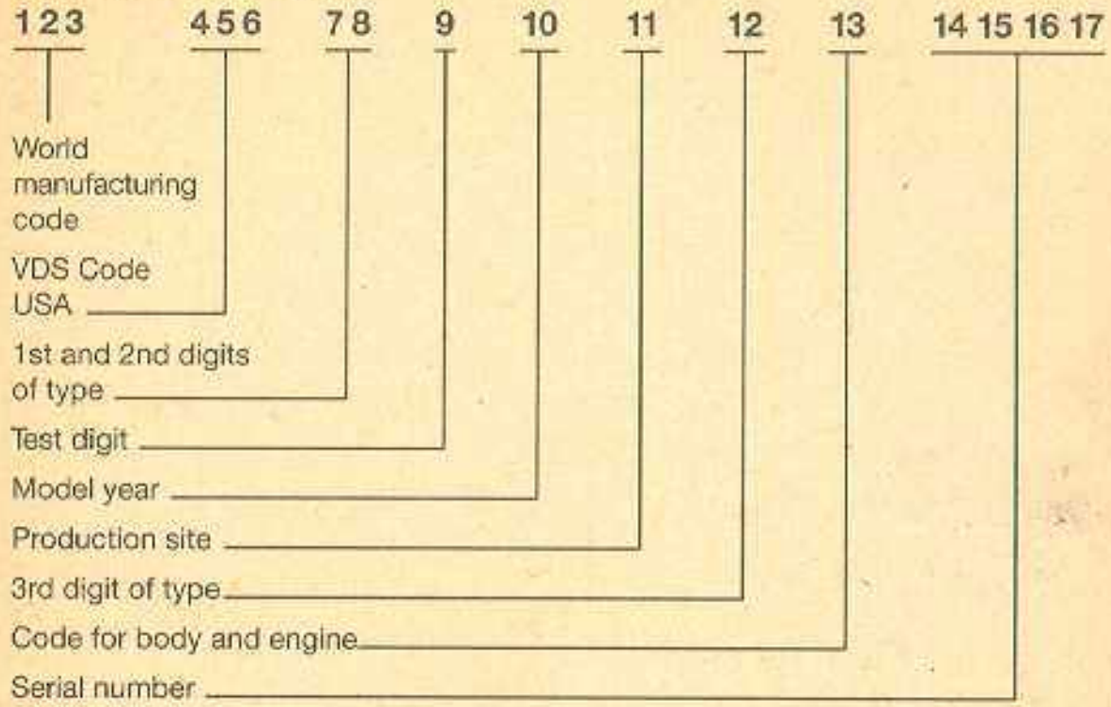
Conversion factors

at (kp/cm²)	in bar	× 0.981
kp	in N	× 9.81
HP	in kW	× 0.736
kpm	in Nm	× 9.81
m/s	in km/h	× 3.6
at	in mm Hg	× 735.56
km/h	in mph (miles)	× 0.621
° F (Fahrenheit)	in ° C	(° F – 32) × 0.555
l	in U.S. gal	× 0.264
l	in Imp. gal	× 0.22

The conversion factor 10 is applied for the conversion of tightening torque from kpm to Nm. This is more than sufficient for shop practice.

Chassis numbers — 1982 model

Explanation of digits:



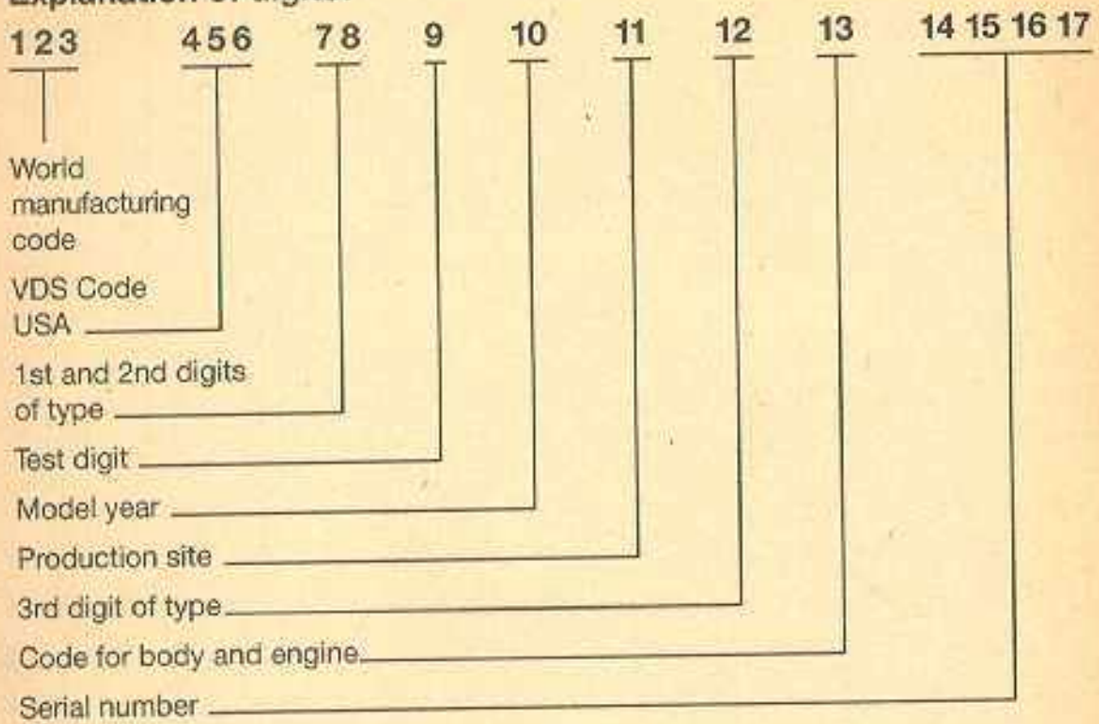
Chassis number ranges

Vehicle type		Engine type	Number range
911 SC-Coupé	R.o.W.	930/10	WPO ZZZ 91 Z CS 10 0001 – 5000
911 SC-Coupé	Japan	930/17	WPO ZZZ 91 Z CS 10 9501 – 9999
911 SC-Targa	R.o.W.	930/10	WPO ZZZ 91 Z CS 14 0001 – 5000
911 SC-Targa	Japan	930/17	WPO ZZZ 91 Z CS 14 9501 – 9999
911 SC-Coupé	USA	930/16	WPO AAO 91 – CS 12 0001 – 5000
911 SC-Targa	USA	930/16	WPO EAO 91 – CS 16 0001 – 5000
930 Turbo	R.o.W.	930/60	WPO ZZZ 93 Z CS 00 0001 – 2000
930 Turbo	Canada	930/60	WPO JAO 93 – CS 05 0001 – 2000

Chassis numbers

1983 model

Explanation of digits:



Chassis number ranges

Vehicle type		Engine type	Number range
911 SC-Coupé	R.o.W.	930/10	WPO ZZZ 91 Z DS 10 0001 – 5000
911 SC-Coupé	Japan	930/17	WPO ZZZ 91 Z DS 10 9501 – 9999
911 SC-Targa	R.o.W.	930/10	WPO ZZZ 91 Z DS 14 0001 – 5000
911 SC-Targa	Japan	930/17	WPO ZZZ 91 Z DS 14 9501 – 9999
911 SC-Coupé	USA	930/16	WPO AAO 91 – DS 12 0001 – 5000
911 SC-Targa	USA	930/16	WPO EAO 91 – DS 16 0001 – 5000
911 Turbo	R.o.W.	930/66	WPO ZZZ 93 Z DS 00 0001 – 2000
911 Turbo	Canada	930/66	WPO JAO 93 – DS 05 0001 – 2000

Engine type designations

Year mfd.	Model year	Engine type designation Official		Internal	Displace-ment	kW/HP
1981/82	**1982**	911 SC	R. o. W.	930/10	3.0 l	150/204
		911 SC	Japan	930/16	3.0 l	132/180
		911 SC	USA	930/17	3.0 l	132/180
		911 Turbo	R. o. W.	930/60	3.3 l	221/300
		911 Turbo	Canada	930/60	3.3 l	221/300
1982/83	**1983**	911 SC	R. o. W.	930/10	3.0 l	150/204
		911 SC	Japan	930/16	3.0 l	132/180
		911 SC	USA	930/17	3.0 l	132/180
		911 Turbo	R. o. W.	930/66	3.3 l	221/300
		911 Turbo	Canada	930/66	3.3 l	221/300

Engine numbers

1982 model

Explanation of digits Example: 63 C 2701

1	2		3	4 5 6 7
Unit type	Engine types		Model year	Serial number
6 = 6 cyl. engine	3 = 911 SC	R. o. W.	**C = 1982**	
	4 = 911 SC	USA		
	7 = 911 Turbo	R. o. W.		

Engine number ranges

Engine type	Technical data	Installed in model		Number range
930/10	3.0 l 150 kW	911 SC	R. o. W.	63 C 0001 – 8000
930/17	3.0 l 132 kW	911 SC	Japan	63 C 8001 – 9000
930/16	3.0 l 132 kW	911 SC	USA	64 C 0001 – 9999
930/60	3.3 l 221 kW	911 Turbo	R. o. W. and Canada	67 C 0001 – 1000

Engine numbers

1983 model

Explanation of digits Example: 63 D 2701

1	2		3	4 5 6 7
Unit type	Engine types		Model year	Serial number
6 = 6 cyl. engine	3 = 911 SC	R. o. W.	**D = 1983**	
	4 = 911 SC	USA		
	7 = 911 Turbo	R. o. W./Canada		

Engine number ranges

Engine type	Technical data	Installed in model		Number range
930/10	3.0 l 150 kW	911 SC	R. o. W.	63 D 0001 – 8000
930/17	3.0 l 132 kW	911 SC	Japan	63 D 8001 – 9000
930/16	3.0 l 132 kW	911 SC	USA	64 D 0001 – 9999
930/66	3.3 l 221 kW	911 Turbo	R. o. W. and Canada	67 D 0001 – 1000

Transmission numbers — 1982 model

Explanation of digits Example: 73 C 3495

1	2		3	4 5 6 7
Unit type	Transmission types		Model year	Serial number
7 = Transmission for 6 cyl. engine	3 = 5-gear 911	R. o. W.	**C = 1982**	
	4 = 5-gear 911	USA, Japan		
	7 = 911 Turbo			

Transmission number ranges

Transmission type	Technical data	Installed in model		Number range
915/62	5-gear	911 SC	R. o. W.	73 C 0001 – 9999
915/63	5-gear	911 SC	USA, Japan	74 C 0001 – 9999
930/34	4-gear	911 Turbo		77 C 0001 – 2000

Transmission numbers — 1983 model

Explanation of digits Example: 73 D 3495

1	2		3	4 5 6 7
Unit type	Transmission types		Model year	Serial number
7 = Transmission for 6 cyl. engine	3 = 5-gear 911	R. o. W.	**D = 1983**	
	4 = 5-gear 911	USA, Japan		
	7 = 911 Turbo			

Transmission number ranges

Transmission type	Technical data	Installed in model		Number range
915/62	5-gear	911 SC	R. o. W.	73 D 0001 – 9999
915/63	5-gear	911 SC	USA, Japan	74 D 0001 – 9999
930/34	4-gear	911 Turbo		77 D 0001 – 2000

Transmission type codes

Trans-mission Type	No. of Gears	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	Pinion/ Ring Gear	As from Transmission Number	Remarks
915.62	5	11/35	18/33	23/29	26/26	28/22	8/31	731 0001	Manual transm. 911 R.o.W.
915.63	5	11/35	18/32	23/29	26/26	28/23	8/31	741 0001	Manual transm. 911 USA/Japan
930.34	4	16/36	23/30	26/25	32/20	—	9/38	771 0001	Manual transm. 911 Turbo Worldwide

Since 1983 models the 911 Turbo transmission 930/34 for cars in Switzerland has a longer second gear:

24 : 30, i = 1.250
was (23 : 30, i = 1.304)

The shift cover on the transmission has a dot of paint for identification.

Engine specifications 911 SC — 1982 and 1983 models

Engine		911 SC	
Internal engine code		930/16/17	930/10
Design		Four stroke internal combustion engine (two banks of cylinders opposite each other)	
No. of cylinders		6	6
Bore	mm/inch	95.0/3.74	95.0/3.74
Stroke	mm/inch	70.4/2.77	70.4/2.77
Total displacement	cm^3/$inch^3$	2994/182.7	2994/182.7
Compression ratio		9.3 : 1	9.8 : 1
Max. engine power acc. DIN 70020	kW/HP	132/180	150/204
Net power, SAE J 245	kW/HP	128/172	145/195
at engine speed	rpm	5500	5900
Max. torque acc. DIN 70020	Nm/kpm	265/27	267/27
Net torque, SAE J 245	Nm/ft lbs	257/189	258/190
at engine speed	rpm	4200	4300
Max. liter output acc. DIN 70020	kW/l, HP/l	44/60	50.1/68.1
acc. SAE J 245	kW/l, HP/l	42/57	48.4/65.1
Max. permissible speed	rpm	6700	7000

Engine		911 SC	
Internal engine code		930/16/17	930/10
Cut-off speed			
Speed governed by switching-off ignition	rpm		6800 ± 200
Speed governed by switching-off fuel pump	rpm	6500 + 200	
Engine weight (dry)	kg/lbs. approx.	200/441	190/419
Fuel octane	RON	91 91 lead-free (USA)	98
Cooling system		air-cooling from axial blower on alternator	
Blower drive		by v-belt off of crankshaft	
Crankshaft/blower ratio		1 : 1.68	1 : 1.68
Air delivery rate		1500 l/s at 6000 rpm of crankshaft	1500 l/s at 6000 rpm of crankshaft
Drive belt		9.5 × 710	9.5 × 710

Engine		911 SC
Internal engine code		930 (all engine types)
Lubricating system		dry sump lubrication
Oil cooling		oil cooler on crankcase in blower air stream, plus cooling pipe coil or pipe oil cooler
Oil pressure at 90° C oil temperature and speed of 5000 rpm	bar	approx. 4.0
Oil consumption	ltr./1000 km	approx. 1.5
Crankcase		two-piece aluminum alloy
Crankshaft		forged (tenifer treated)
Crankshaft bearings		8 plain bearings
Connecting rods		forged (steel)
Connecting rod bearings		plain bearing half shells
Piston pin bearing in conrod		press-fit bronze bush
Pistons		cast or forged aluminum
Piston pin		floating installation, held by circlips
Piston rings		2 compression rings, 1 oil scraper ring

Engine	911 SC
Internal engine code	930 (all engine types)
Cylinders	Nikasil (Mahle) and Alusil (KS)
Cylinder head	single alloy cylinder head
Valve seat insert	shrink-fit made of annealed sintered steel
Valve guide	thermohedul FS 15
Valve arrangement for each cylinder	1 intake and 1 exhaust valve in vee suspension
Exhaust valve	without sodium filling, with reinforced seat surface
Valve springs	2 coil springs per valve
Valve timing	left and right one each overhead camshaft
Camshaft	cast, 4 bearings direct in camshaft housing (no bearing shells)
Camshaft drive	by chain
Valve clearance on cold engine	
Intake	0.1 mm measured between valve stem end surface and
Exhaust	cap of valve adjusting screw

Engine		911 SC
Internal engine code		930 (all engine types)
Clutch		single plate dry type
Diameter	mm	225
Contact pressure	N (kp)	7800...8500 (775...866)
Fuel supply		K-Jetronic 1 electric roller cell pump, EKP 4, with exchangable pressure holding valve, steel fuel and injection pipes

Engine specifications 911 Turbo — 1982 and 1983 models

Engine		911 Turbo
Internal engine code		930/60/66
Design		Four stroke internal combustion engine (two banks of cylinders opposite each other)
No. of cylinders		6
Bore	mm/inch	97.0/3.82
Stroke	mm/inch	74.4/2.93
Total displacement	cm^3/$inch^3$	3299/201.3
Compression ratio		7.0 : 1
Max. engine power	kW/HP kW/HP	221/300 221/296
at engine speed	rpm	5500
Max. torque	Nm/kpm Nm/lbft	412/42 412/304
at engine speed	rpm	4000
Max. liter output	kW/l, HP/l	67/91
Max. permissible speed	rpm	6700

Engine Internal engine code		911 Turbo 930/60/66	
Max. permissible constant speed	rpm	6000	
Cut-off speed of speed governor in distributor	rpm	7000 ± 200	
Engine weight (dry)		930/60	930/66
	kg/lbs	230/507	269/593
Fuel octane	RON/MON (leaded premium grade gasoline to DIN 51 600)	98/88	

Engine Internal engine code		911 Turbo 930 (all engine types)
Cooling system		air-cooling from axial blower on alternator
Blower drive		by v-belt off of crankshaft
Crankshaft/blower ratio		1 : 1.68
Air delivery rate		1500 l/s at 6000 rpm of crankshaft
Blower drive belt		9.5 × 710
Lubricating system		dry sump lubrication
Oil cooling		oil cooler on crankcase in blower air stream, plus cooling pipe coil or oil cooler
Oil pressure at 90° C oil temperature and speed of 5000 rpm	bar	approx. 5.0
Oil consumption	l/1000 km	approx. 1.0 to 2.0
Crankcase		two-piece aluminum alloy
Crankshaft		forged (tenifer treated)
Crankshaft bearings		8 plain bearings
Connecting rods		forged steel

Engine Internal engine code	911 Turbo 930 (all engine types)
Connecting rod bearings	plain bearings half shells
Piston pin bearing in conrod	press-fit bronze bush
Intermediate shaft bearing	two plain bearings
Pistons	forged alloy (Mahle)
Piston pins	floating installation, held by circlips
Piston rings	2 compression rings, 1 oil scraper ring
Cylinders	Nikasil (Mahle)
Cylinder head	light alloy single cylinder head
Valve seat insert	shrink-fit, made of annealed sintered steel
Valve guide	thermohedul FS 15
Arrangement of valves per cylinder	1 intake and 1 exhaust valve in vee suspension
Exhaust valve	sodium filled with reinforced seat surface
Valve springs	2 coil springs per valve
Valve timing	left and right one each overhead camshaft
Camshaft	cast, 4 bearings direct in camshaft housing (no bearing shells)
Camshaft drive	by chain

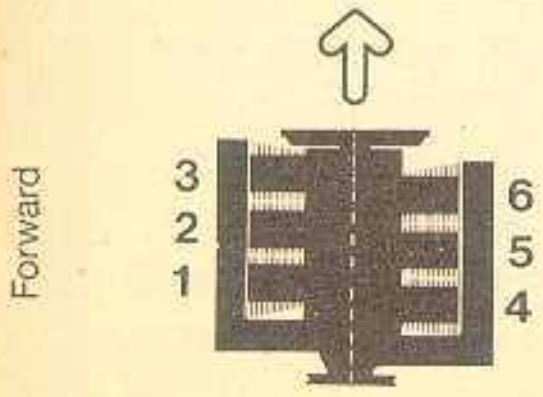
Engine Internal engine code		911 Turbo 930 (all engine types)
Valve clearance on cold engine		
Intake Exhaust		0.1 mm measured between valve stem end surface and cap of valve adjustment screw
Clutch		single plate dry type
Diameter (manual transmission)	mm	240
Contact pressure	N (kp)	11200 – 12100 (1142 – 1233)
Fuel supply		K-Jetronic (CIS) since 1983 models fuel distributor with capsule valve, Bosch 0438 100 037 data plate color: blue/green
Supercharging		KKK exhaust gas turbocharger, charge pressure regulated via bypass valve, charged air cooling

Electrical system

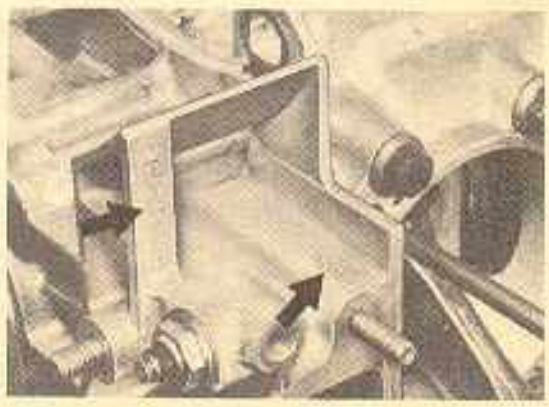
Battery voltage	V	12
Battery capacity	Ah	66 (88 optional extra)
Alternator/output	A/W	70/980
Regulator switch		matched to alternator (black plastic housing screwed on alternator)
Ignition		CDI without contacts
Ignition transformer		Bosch
Firing order		1 - 6 - 2 - 4 - 3 - 5

Designation of cylinders on 6 cylinder engine

Firing order
1 - 6 - 2 - 4 - 3 - 5



Engine number and
engine type designation



Engine tolerance and wear limit survey – 911 SC

Note: B = bore W = shaft

Measuring point		Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits in mm
Crankshaft	– main bearing	B 60.020 – 60.059	+0.010	+0.072	visual inspection
Bearings 1 – 7	(d 1)	W59.971 – 59.990			59.960
Crankshaft	– main bearing	B 31.041 – 31.084	+0.048	+0.104	visual inspection
Bearing 8	(d 3)	W30.980 – 30.993			30.970
Crankpin	– conrod bearing	B 53.020 – 53.059	+0.030	+0.088	visual inspection
	(d 2)	W52.971 – 52.990			52.960
Crankshaft runout (measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)					max. 0.04
Crankshaft unbalance					max. 10 cmg.
Crankshaft	– main bearing				
Axial play			+0.110	+0.195	0.30
Crankshaft	– timing gear	B 41.975 – 42.000	–0.002	–0.038	
		W42.002 – 42.013			
Crankshaft	– distributor drive	B 41.975 – 42.000	–0.002	–0.038	
		W42.002 – 42.013			
Crankshaft	– flywheel	B 50.002 – 50.021	+0.021	+0.028	
		W50.000 – 50.030			
Crankshaft	– pulley	B 30.000 – 30.033	+0.007	+0.073	
		W29.960 – 29.993			
Pulley: radial runout					max. 0.15
lateral runout					max. 0.20

Engine tolerance and wear limit survey – 911 Turbo

Note: B = bore W = shaft

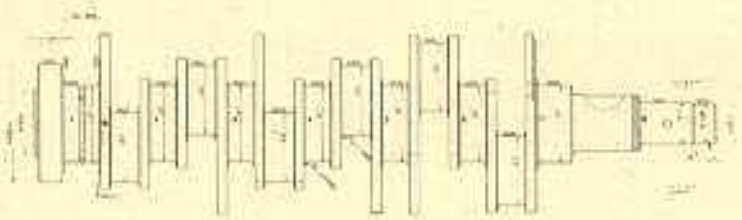
Measuring point		Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits in mm
Crankshaft Bearings 1–7	– main bearing (d 1)	B 60.020–60.059 W59.971–59.990	+0.010	+0.072	visual inspection 59.960
Crankshaft Bearing 8	– main bearing (d 3)	B 31.041–31.084 W30.980–30.993	+0.048	+0.104	visual inspection 30.970
Crankpin	– conrod bearing (d 2)	B 55.020–55.059 W54.971–52.990	+0.030	+0.088	visual inspection 54.960
Crankshaft runout (measured on bearings 4 and 8 with bearings 1 and 7 in vee blocks)					max. 0.04
Crankshaft unbalance					max. 10 cmg.
Crankshaft Axial play	– main bearing		+0.110	+0.195	0.30
Crankshaft	– timing gear	B 41.975–42.000 W42.002–42.013	–0.002	–0.038	
Crankshaft	– distributor drive	B 41.975–42.000 W42.002–42.013	–0.002	–0.038	
Crankshaft	– flywheel	B 90.000–90.030 W89.780–90.000	0.0	+0.049	
Crankshaft	– pulley	B 30.000–30.033 W29.960–29.993	+0.007	+0.073	
Pulley: radial runout lateral runout					max. 0.15 max. 0.20

Crankshaft – standard and repair sizes – 911 SC

Size	Crankcase diameter bearings 1–8	All main bearings d 1	Connecting rod bearings d 2	Main bearing diameter d 3 of crankshaft bearing 8	Collar diameter d 4	Seat for timing gear diameter d 5	Crankshaft pulley diameter d 6	Thrust bearing width A
Stand.		59.971...59.990	52.971...52.990	30.980...30.993	89.780...90.000	42.002...42.013	29.960...29.993	28.000...28.060
–0.25		59.721...59.740	52.721...52.740	30.730...30.743				
–0.50		59.471...59.490	52.471...52.490	30.480...30.493	89.280...89.500		29.370...29.500	
–0.75		59.221...59.240	52.221...52.240	30.230...30.243				
–1.00		58.971...58.990	51.971...51.990	29.980...29.993				

Normal
65.000...65.019

Oversize
65.250...65.269



Only grind bearing surface for radial oil seals to 29.5 and 89.5 as specified here when scoring is too deep. Otherwise repolish as necessary: 3 microns.
After grinding give oil bores a 0.5 radius. Break sharp edges with 0.2 to 0.5 radius. Max. radial runout in reference to take-up in —.—: max. 0.04.
Specification for tenifer treatment according to Tenifer 120 W PN 1053 ferroflux.
Never straighten main bearings 3 and 5 after tenifer treatment. Straightening of the other main bearing journals through stemming in the radii is permitted.

Color codes for repair sizes

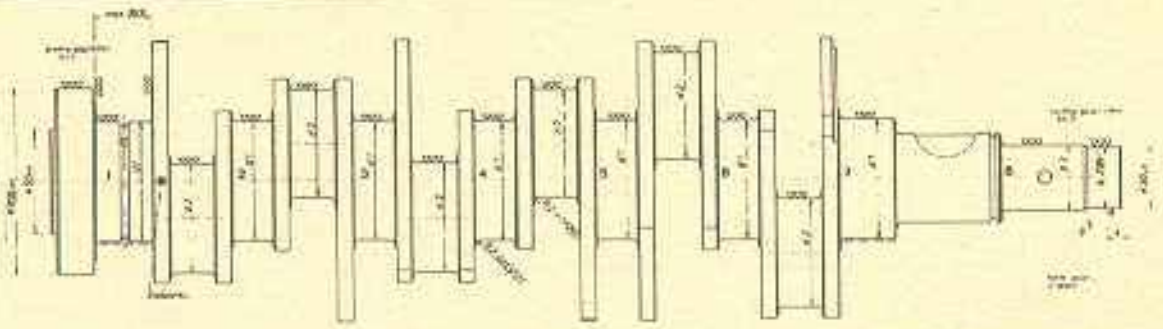
1st repair size	blue	paint dot
2nd repair size	green	paint dot
3rd repair size	yellow	paint dot
4th repair size	white	paint dot

Crankshaft – standard and repair sizes – 911 Turbo

Size	Crankcase diameter bearings 1–8	All main bearings d 1	Connecting rod bearings d 2	Main bearing diameter d 3 of crankshaft bearing 8	Collar diameter d 4	Seat for timing gear diameter d 5	Crankshaft pulley diameter d 6	Thrust bearing width A
Stand.		59.971...59.990	54.971...54.990	30.980...30.993	89.780...90.000	42.002...42.013	29.960...29.993	28.000...28.060
–0.25		59.721...59.740	54.721...54.740	30.730...30.743				
–0.50		59.471...59.490	54.471...54.490	30.480...30.493	89.280...89.500		29.370...29.500	
–0.75		59.221...59.240	54.221...54.240	30.230...30.243				
–1.00		58.971...58.990	53.971...53.990	29.980...29.993				

Normal
65.000...65.019

Oversize
65.250...65.269



Only grind bearing surface for radial oil seals to 29.5 and 89.5 as specified here when scoring is too deep. Otherwise repolish as necessary: 3 microns.
After grinding give oil bores a 0.5 radius. Break sharp edges with 0.2 to 0.5 radius. Max. radial runout in reference to take-up in —.—: max. 0.04.
Specification for tenifer treatment according to Tenifer 120 W PN 1053 ferroflux.
Never straighten main bearings 3 and 5 after tenifer treatment. Straightening of the other main bearing journals through stemming in the radii is permitted.

Color codes for repair sizes

1st repair size	blue	paint dot
2nd repair size	green	paint dot
3rd repair size	yellow	paint dot
4th repair size	white	paint dot

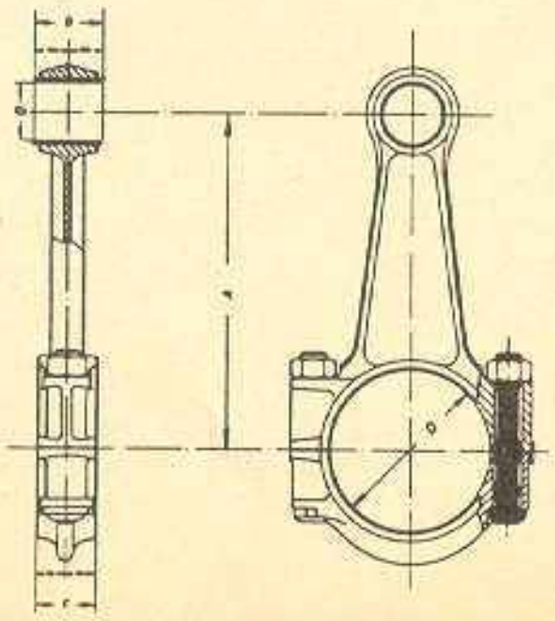
Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limit mm
Crankcase				
Case bore for main bearings:				
Bearings 1 – 8	65.000 – 65.019			
Oversize	65.250 – 65.269			
Case bore for intermediate shaft:				
Bearing 1 (thrust bearing)	27.500 – 27.521			
Bearing 2	26.500 – 26.521			
Spring for safety valve:				
Relaxed length	approx. 69			
Spring force at 52 mm	104 N/10.6 kp			
Spring force at 46 mm	138 N/14.1 kp			
Spring wire dia.	1.8			
Spring for pressure relief valve:				
Relaxed length	approx. 87			
Spring force at 50.5 mm	82.4 N/8.4 kp			
Spring wire dia.	1.5			

Installation note:

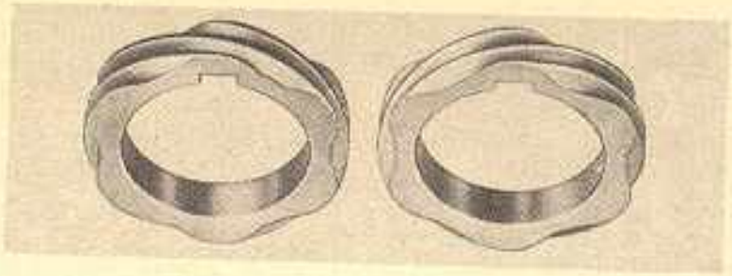
The pressure relief valve spring (approx. 87 mm long) may only be used in conjunction with a spring guide (safeguard against bending).

Never press springs flat.

Measuring point	Installation size with tolerances mm 911 SC	911 Turbo	Clearance (+) or press-fit (–) from	to	Wear limit mm
Connecting rods					
A Distance between centers	127.75–127.80	126.95–127.00			
b Width of conrod bush	24.8–25.0	24.5–25.0			
c Width at big end	21.7–21.8	21.7–21.8			
Width at crankpin	22.00–22.05	22.00–22.05	+0.200	+0.350	
D Conrod dia. (without bearing shell)	56.000–56.019	58.000–58.019			
G Conrod bush dia. installed in conrod (finished)	22.020–22.033	23.020–23.033			
Piston pin bushing/piston pin clearance			+0.020	+0.037	0.055



Installing drive gear for left-hand turning distributor on crankshaft



For left-hand turning distributor (with Porsche manufacturing code stamped)
Part No. 930 102 115 01

For right-hand turning distributor

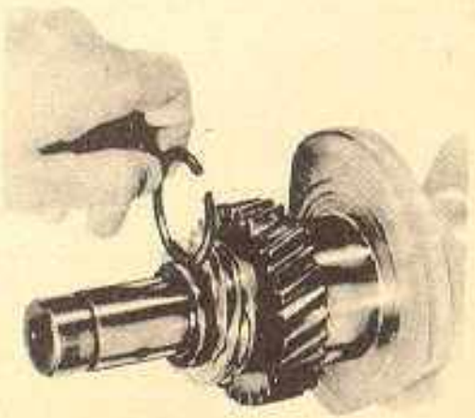
Installing circlips on crankshaft

To take up axial play on distributor drive gear, there are circlips in different thicknesses.

The following circlips are available:

Part No.	Thick-ness	Code
901.102.148.00	2.4 mm	0
901.102.148.01	2.3 mm	1
901.102.148.02	2.2 mm	2
901.102.148.03	2.1mm	3

Install timing gear, intermediate ring and drive gear for left-hand turning distributor on crankshaft against stop. Find correct circlip thickness by inserting different circlips. Circlip must be installed without play.



Connecting rod weight groups – 911 SC

Connecting rods are grouped according to weights.

Final digits of the part number indicate the specified weight group.

These final digits are stamped on the connecting rod shank if it is supplied as a replacement part.

Weight Over g	Weight Under g	Weight group for service	Service Conrod part number	Conrod code
633	642	1	930.103.015.51	51
642	651	2	930.103.015.52	52
651	660	3	930.103.015.53	53
660	669	4	930.103.015.54	54
669	678	5	930.103.015.55	55
678	687	6	930.103.015.56	56
687	696	7	930.103.015.57	57
696	705	8	930.103.015.58	58
705	714	9	930.103.015.59	59

Connecting rod weight groups – 911 Turbo

Weight Over g	Weight Under g	Weight group for service	Service Conrod part number	Conrod code
615	624	3	930.103.020.73	73
624	633	4	930.103.020.74	74
633	642	5	930.103.020.75	75
642	651	6	930.103.020.76	76
651	660	7	930.103.020.77	77
660	669	8	930.103.020.78	78
669	678	9	930.103.020.79	79
678	687	10	930.103.020.80	80
687	696	11	930.103.020.81	81

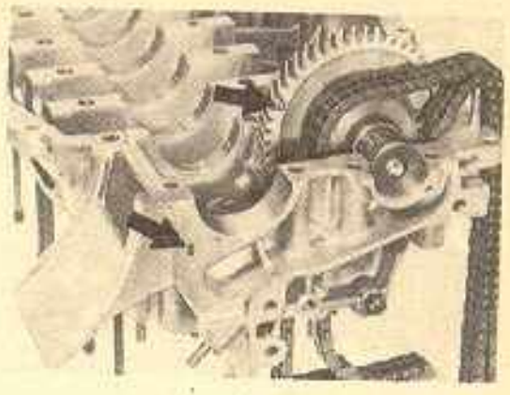
Note:

Connecting rods installed in a given engine must not differ in weight by more than 9 grams. To determine weight group, weigh the complete connecting rod without bearing shells.

Matching intermediate shaft and crankcase

Gears and crankcase may only be matched with each other as shown in the table below.

Code (0 or 1) is die-stamped on left-hand side of crankcase below the alternator holder.

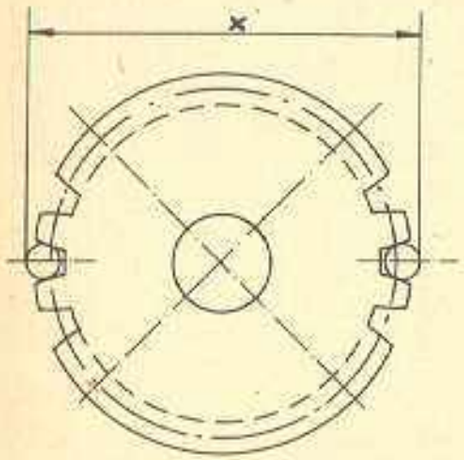


Distance Betw. Centers mm	Crankcase Code	Drive Gear on Crankshaft Code	Intermediate Shaft Gear Code	Backlash mm
103.975 – 103.990	0	0	0	0.029 – 0.049
		Installation still possible		
		1	0	0.016 – 0.042
		0	1	0.017 – 0.043
103.990 – 104.000	1	1	1	0.012 – 0.041
		Installation still possible		
		0	1	0.025 – 0.049
		1	0	0.025 – 0.048

Checking and installing intermediate shaft

Checking

1. Inspect intermediate shaft gear for wear. Measure intermediate shaft gear with help of 4.5 mm diameter steel rollers.

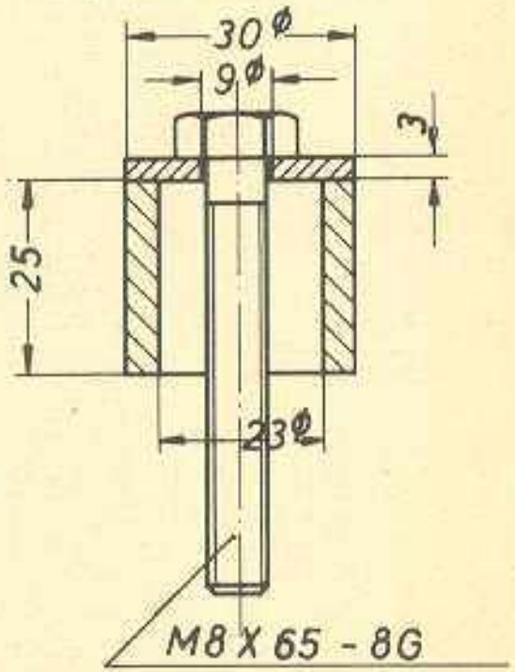


If distance x is less than 136.5 mm, intermediate shaft gear and drive gear on crankshaft must be replaced.

If it concerns an intermediate shaft gear with code 1, distance x must not be less than 135.55 mm. Visual inspection for signs of wear is very important in addition to this measuring test. The intermediate shaft and drive gear on the crankshaft must always be replaced.

2. Remove aluminum plug on face of intermediate shaft and clean oil bore to remove residue, if engine has been operated a long time or when reconditioning an engine (also for bearing damage).

3. Drill a 6.4 mm diameter hole in center of aluminum plug and tap M 8 threads. Pull out aluminum plug with a suitable tool and clean oil bore in intermediate shaft. Press in a new aluminum plug afterwards.



Note:

An intermediate shaft with bolted gear is one replacement part and can only be replaced complete.
Sprockets can be replaced separately.

Measuring point	Installation size with tolerances mm	Tolerance (+) or press-fit (–) from	to	Wear limits mm
Intermediate shaft				
Bearing 1 Crankcase bore – shaft	B 27.500 – 27.521 W 25.000 – 24.980			
Bearing 2 Crankcase bore – shaft	B 26.500 – 26.521 W 23.980 – 23.967	+ 0.030	+ 0.084	
Intermediate shaft clearance		+ 0.040	+ 0.133	0.16
Intermediate shaft axial play				
Chain guide – bolt	B 8.000 – 8.015 W 7.822 – 7.837	+ 0.001	+ 0.030	
Pinion – distributor shaft	B 12.456 – 12.474 W 12.444 – 12.455	+ 0.020	+ 0.074	
Distributor – crankcase	B 27.000 – 27.021 W 26.947 – 26.980			
Flywheel				
Lateral runout				max. 0.10
Radial runout				max. 0.20

Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits mm
Timing chain case				
Sprocket carrier shaft – chain tensioner housing	B 15.000 – 15.018 W 14.973 – 14.984	+0.016	+0.045	Visual inspection
Sprocket carrier shaft – sprocket carrier	B 15.000 – 15.018 W 14.973 – 14.984	+0.016	+0.045	
Sprocket carrier – sprocket pin	B 15.000 – 15.018 W 14.989 – 15.000	0.000	+0.029	
Sprocket – sprocket pin	B 15.032 – 15.050 W 14.989 – 15.000	+0.032	+0.610	Visual inspection
Pin – chain guide	B 8.000 – 8.015 W 7.886 – 7.895	+0.105	+0.129	
Pin – timing chain case	B 7.857 – 7.872 W 7.886 – 7.895	–0.014	–0.038	

Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits mm
Camshaft housing – camshaft				
Camshaft bearings Camshaft	B 48.967 – 48.992 W 48.926 – 48.942	+0.025	+0.066	0.10
Camshaft – axial play		+0.150	+0.200	0.40
Camshaft – sprocket flange	B 30.000 – 30.013 W 29.979 – 30.000	0.000	+0.034	
Camshaft – runout measured on center bearing (between points)				max. 0.02
Rocker arm shaft – camshaft housing	B 18.000 – 18.018 W 17.992 – 18.000	Rocker arm shaft held firm by wedge effect		
Rocker arm – rocker arm shaft	B 18.016 – 18.027 W 17.992 – 18.000	+0.016	+0.035	0.080
Axial play		+0.100	+0.350	0.50

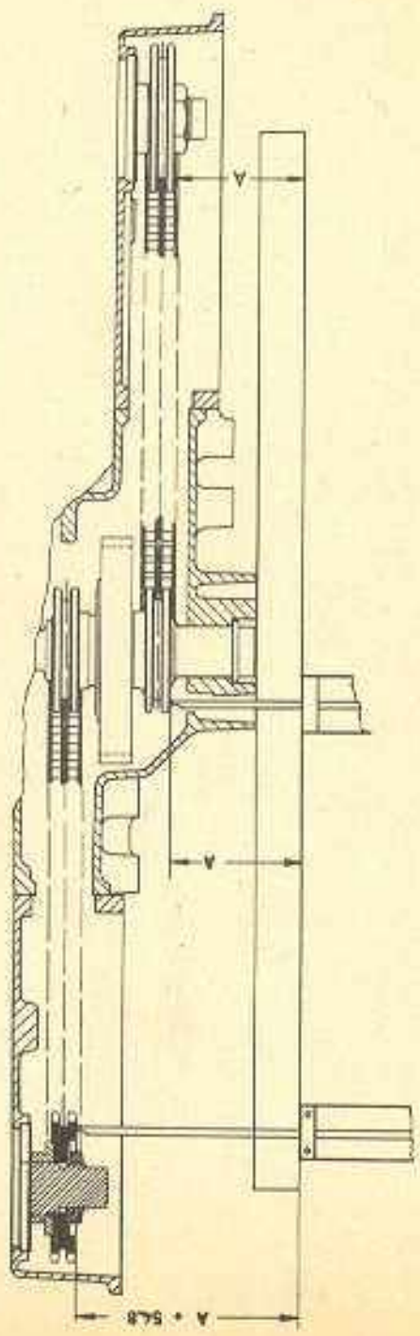
Checking parallel alignment of timing chain sprockets (old crankcase until March, 1983)

Before measuring, push intermediate shaft and camshaft axially toward flywheel to set bearing thrust flanges in position.

Measurement is made through hole below intermediate shaft against side of forward chain sprocket on intermediate shaft (dimension A).

This dimension must also be achieved at sprocket for cylinders 4 – 6. Use shims if necessary (maximum permissible difference is 0.25 mm).

Sprocket for cylinders 1 – 3, mounted on intermediate shaft, is positioned 54.8 mm further to front. This 54.8 mm (design dimension) must be considered when determining dimension A (maximum permissible difference is 0.25 mm).



Example: measured dimension A = 78.7 mm
This means sprocket of cylinders 1 – 3 is A + 54.8 = 133.5 mm

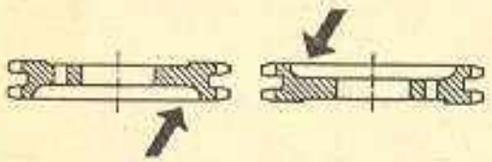
Checking parallel alignment of sprockets (modified crankcase since March, 1983)

Identification: oil filter screen ommitted, oil drain plug on left side of crankcase.

Preparations

1. Install thrust washer and quantity of removed shims on the camshaft (sprocket flange is same for both ends).

2. Sprocket on camshaft is same for both ends, however the chain running center from the take-up flange of the sprocket is offset. Sprocket for cylinder bank side 1 - 3 is mounted in such a manner, that the deep cut faces back. When mounting the sprocket for cylinder bank side 4 - 6 the deep cut must face forward.



Cylinder bank side 1 – 3 | Cylinder bank side 4 – 6

3. Hold sprockets with Special .Tool 9191 and torque the hexagon head bolts to 120 Nm.

Note:

First give threads of hexagon head bolts a thin coat of Optimoly HT.

Deviation in parallel alignment between the driving sprocket on the intermediate shaft and driven sprocket on the camshaft may be max. ± 0.25 mm. Before measuring, push intermediate shaft and camshaft axially toward flywheel to set bearing thrust collar in position.

Sprockets are adjusted by installing or removing shims, Part No. 901.105.561.00, 0.5 mm shim thickness. Normally 3 shims will be required underneath the left sprocket (cylinder bank 1 - 3) and 4 shims underneath the right sprocket (cylinder bank 4 - 6).

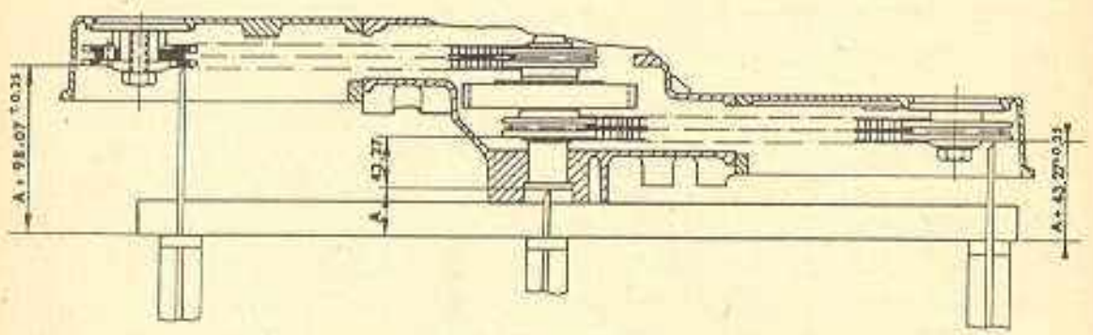
Adjustment

1. Measure distance "A" from front edge of crankcase or a steel ruler to face of intermediate shaft.



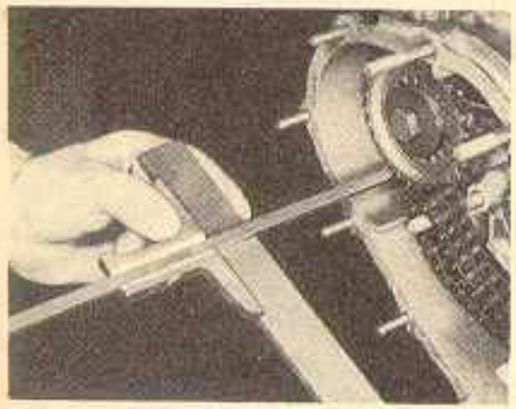
Design size of drive gears on intermediate shaft:
from face of intermediate shaft –
to face of rear intermediate shaft sprocket (cylinders 1 - 3) = 98.07 mm or
to face of front intermediate shaft sprocket (cylinders 4 – 6) = 43.27 mm

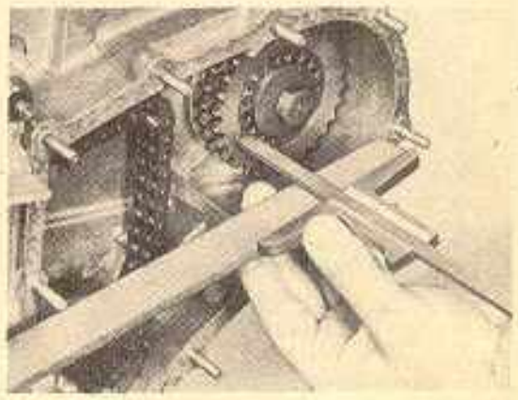
Design size + measured distance "A" produce position of sprockets on camshafts (max. permissible deviation ± 0.25 mm).



Example:
Measured distance "A" = 35.5 mm
For sprocket of cylinders 1 - 3 we then have

A + 98.07 =
35.5 + 98.07 = 133.57 ± 0.25 mm





For sprocket of cylinders 4 - 6 we then have

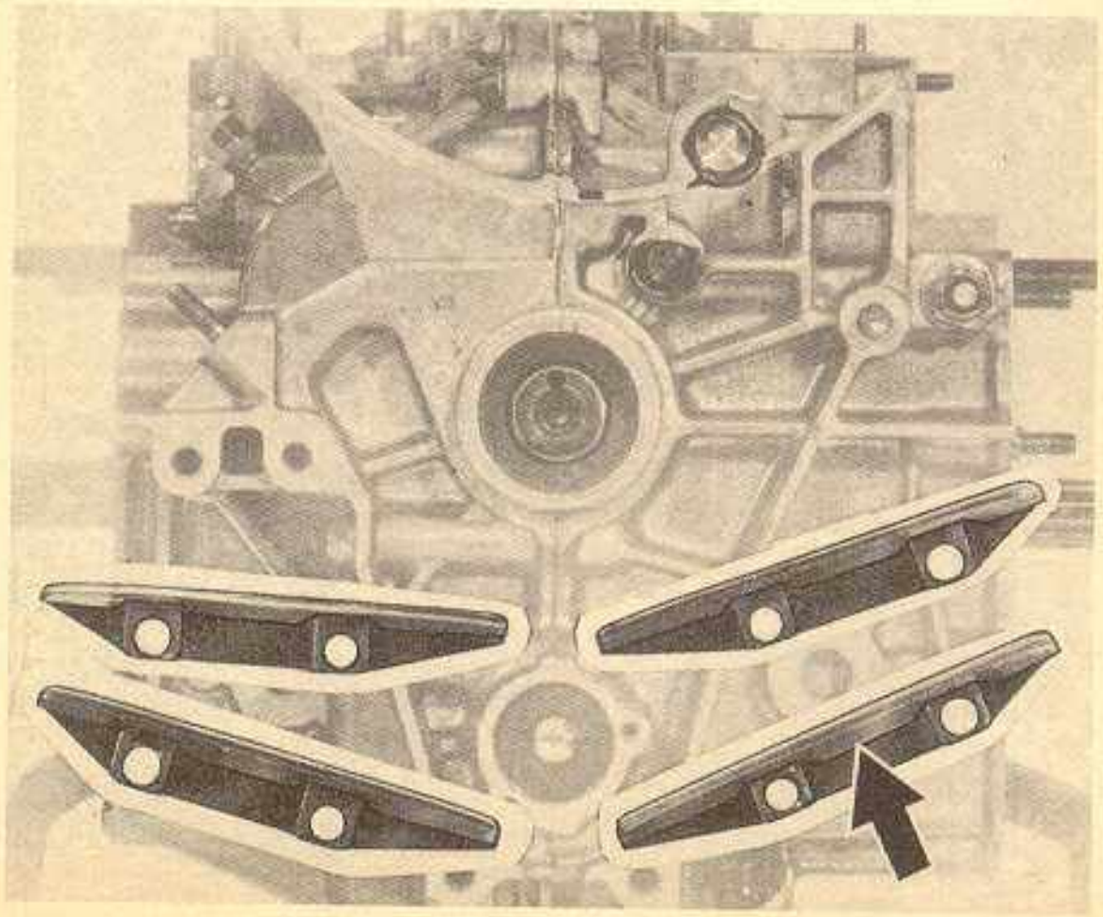
A + 43.27 =
35.5 + 43.27 = 78.77 ± 0.25 mm

Survey of guide rails on crankcase

Three black guide rails,
Part No. 911 105 222 06, and
one brown guide rail,
Part No. 911 105 222 05

Brown guide rail must be mounted from underneath (arrow) on right half of the crankcase.

Longer end of guide rails faces chain drive gears of the intermediate shaft.



Pistons and cylinders (sizes, weights and marks) — 911 SC / 911 Turbo

Size	Code	Nominal dia.	911 SC Piston dia. D Mahle	911 Turbo Piston dia. D Mahle
Standard	0	95/97	94.963 – 94.977	96.960 – 96.970
	1		94.970 – 94.984	96.967 – 96.977
	2		94.977 – 94.991	96.974 – 96.984
	3		94.984 – 94.998	96.981 – 96.991
			Cylinder dia. Alusil	Cylinder dia. Nikasil
Standard	0	95/97	95.000 – 95.007	97.000 – 97.007
	1		95.007 – 95.014	97.007 – 97.014
	2		95.014 – 95.021	97.014 – 97.021
	3		95.021 – 95.028	97.021 – 97.028
Play between piston and cylinder			0.023 – 0.044	0.030 – 0.047

Weight classes of pistons – 911 SC

Weight classes for **Mahle pistons**
Pistons weighed with components (piston pin, piston rings, circlips).

	Total piston weight in grams Weight class within one set		Code
Engine type	930/10 (R. o. W.)	930/16/17 (USA/Japan)	
Standard production	668 – 672 672 – 676	636 – 640 640 – 644	– – –
Max. weight difference 4 grams	676 – 680 680 – 684	644 – 648 648 – 652	+ + +
For service sector Max. weight difference 8 grams	668 – 676 676 – 684	636 – 644 644 – 652	– – or – + or + +

Weight classes for **KS pistons**
Pistons weighed with components (piston pin, piston rings, circlips).

	Total piston weight in grams Weight class within one set	Code
Engine type	930/16/17	
Standard production	673 – 677 677 – 681	– – –
Max. weight difference 4 grams	681 – 685 685 – 689	+ + +
For service sector Max. weight difference 8 grams	673 – 681 681 – 689	– – or – + or + +

Weight classes of pistons – 911 Turbo

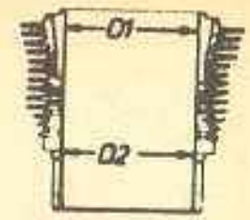
Installation specifications

1. Always only install pistons of same make and same weight class in one engine.
2. Piston pins must always remain with matching pistons and must not be mixed up even within an engine. Pay attention to this, marking pistons/pins if necessary, when disassembling and assembling engine.

Weight classes for **Mahle Pistons**
Pistons weighed with components (piston pin, piston rings, circlips).

	Total piston weight in grams Weight class within one set	Code
Engine type	930/60/66	
Standard production	616 – 620	– –
	620 – 624	–
Max. weight difference 4 grams	624 – 628	+
	628 – 632	+ +
For service sector Max weight difference 8 grams	616 – 624 624 – 632	– – or – + or + +

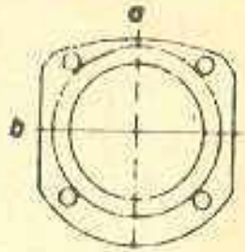
Checking pistons and cylinders



Cylinders
D 1 = measuring point for wear and ovality

30 mm below cylinder upper edge

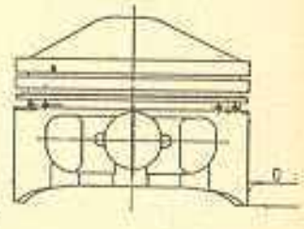
The cylinder is worn, if the distance at this measuring point is 0.08 mm more than the installation size. The ovality of a cylinder is determined by measuring in directions a and b. The difference between a and b must not exceed 0.04 mm.



D 2 = measuring point for piston ring end clearance

Rings slid in at height of cylinder base gasket.

Pistons
D = measuring point for wear



Mahle pistons = 18 mm
KS pistons = 10 mm

Replace pistons and cylinders when running clearance exceeds 0.12 mm. This results from the difference between the maximum cylinder diameter and minimum piston diameter.

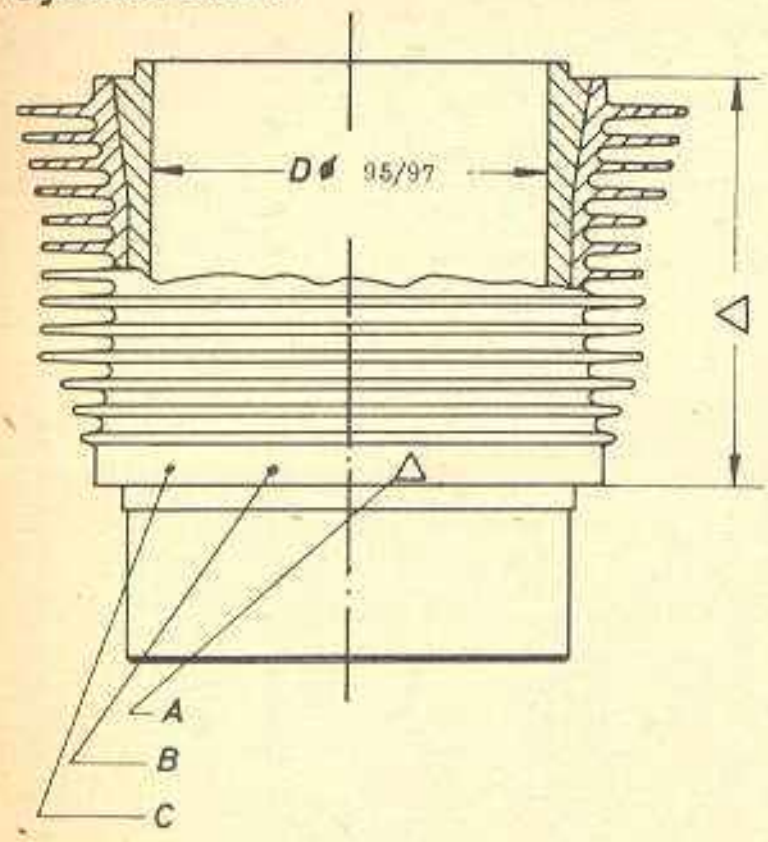
Piston ring end clearance

Piston ring	Clearance in mm (installation size)	Clearance in mm (wear limit)
Compression ring I	0.2 – 0.4	0.8
Compression ring II	0.2 – 0.4	1.0
Oil control ring III	0.3 – 0.6	2.0

Piston ring side clearance

Piston ring	Clearance in mm (installation size)	Clearance in mm (wear limit)
Compression ring I	0.070 – 0.102	0.2
Compression ring II	0.040 – 0.072	0.2
Oil control ring III	0.020 – 0.052	0.1

Cylinder sizes



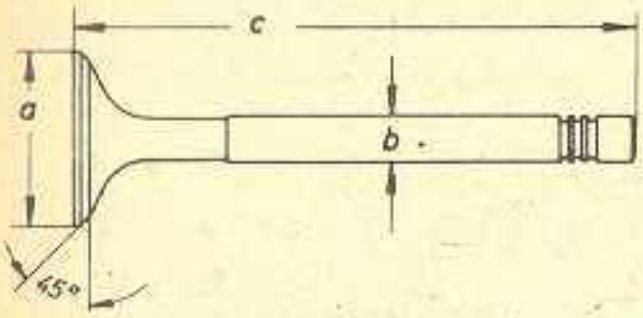
Cylinder height tolerances

Code A	Cylinder height	
5	85.400 – 85.425	911 SC
	85.600 – 85.625	911 Turbo
6	85.425 – 85.450	911 SC
	85.625 – 85.650	911 Turbo

A Tolerance group for cylinder height
B Tolerance group for cylinder diameter (refer to table)
C Manufacturer's identification

Valve sizes

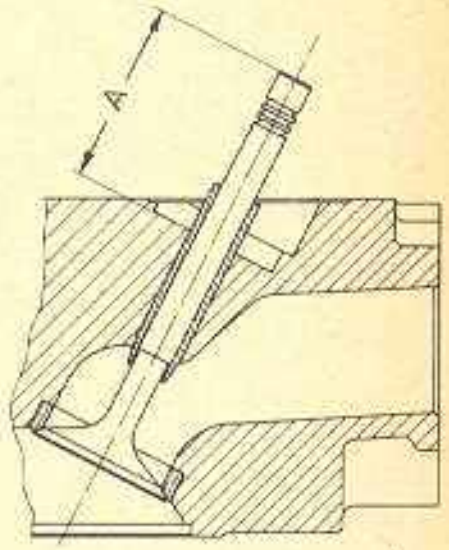
	911 SC Intake	Exhaust	911 Turbo Intake	Exhaust
a	49 ± 0.1	41.5 ± 0.1	49 ± 0.1	41.5 ± 0.1
b	8.97 – 0.012	8.95 – 0.012	8.97 – 0.012	8.95 – 0.012
c	110.1 ± 0.25	108.4 ± 0.25	110.1 ± 0.25	108.4 ± 0.25



Checking valve seats

To check valve seat depth, insert respective valve into guide and measure distance between valve stem and bottom of bearing surface for valve spring shims, however, without shims (see distance A in sketch).

If dimension is greater than specified, measure again with a new valve. If dimension is still beyond specifications, valve seat inserts have been cut too deep and should be replaced, or exchange the cylinder head.

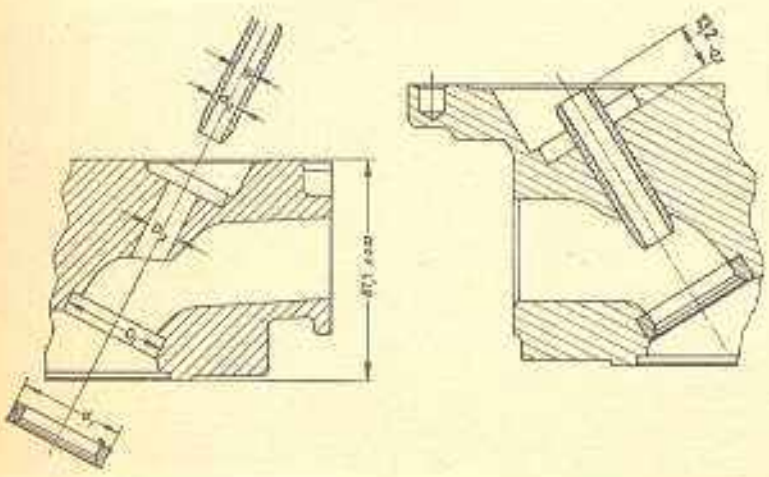


Distance A

911 SC, 911 Turbo 46.0 + 0.3 mm

Valve guides (wear limits, installation sizes)

Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits mm
Valve guide, outside dia. d 2 Cylinder head, bore dia. D 2	13.049 – 13.060 13.000 – 13.018			
Intake valve guide, inside dia. g Intake valve stem, dia. b	9.000 – 9.015 8.958 – 8.970	+ 0.030	+ 0.057	0.15
Exhaust valve guide, inside dia. g Exhaust valve stem, dia. b	9.000 – 9.015 8.938 – 8.950	+ 0.050	+ 0.077	0.20



Machine oversize to correspond with bore in cylinder head.
Press-fit: 0.06 – 0.09 mm

Size table for pulling in valve guides

Valve guide	Outside dia. d 2 Valve guide *	Bore dia. D 2 Cylinder head
Standard size	13.060	13.000 – 13.018
1st oversize	13.260	13.000 – 13.200

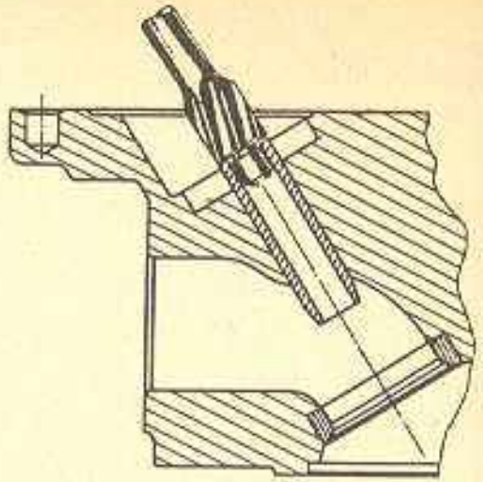
* Grind valve guides on diameter d 2 according to pertinent bore diameter D 2 – remembering press-fit of 0.06 – 0.09 mm

Replacing valve guides

Removal

Grind off protruding valve guides from the camshaft end with a counterbore, until guides are flush with the cylinder head.

Loosen guides with a brief hammer knock and press out in direction of combustion chamber with a press.



Installation

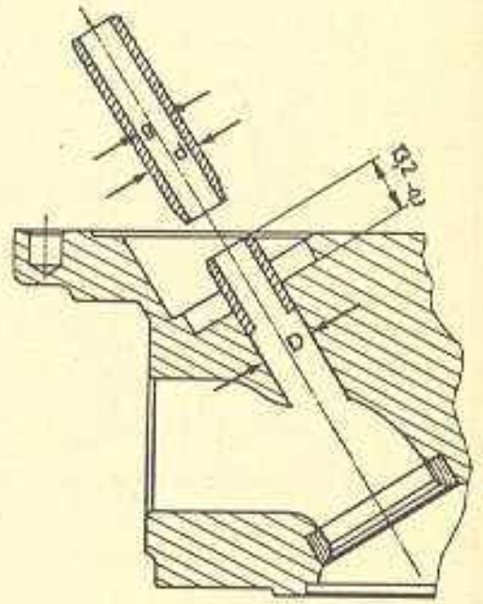
Removal operation will have widened bores in the cylinder head for valve guides slightly.

New, oversized valve guides will have to be installed and matched accordingly (refer to size table).

1. Measure size of bores for valve guides.
2. Machine outside diameter of oversize valve guides in a lathe to match size of bores in cylinder head. Intake and exhaust valves must have a press-fit of 0.06 to 0.09 mm.
3. Coat machined valve guides with talcum powder and press into cylinder head from camshaft end with a locally made mandrel.
4. Open up valve guides to dimension "**g**" = 9.00 to 9.015 mm with a broach or in a finish drilling machine. If necessary, valve guides could also be machined with a suitable reamer.

   Important: cylinder head must be mounted or clamped at right angle for pressing-in and machining valve guides.

   Check contact pattern on valve seats and, if necessary, machine valve seats after replacement of valve guides.



Size table for pulling in valve guides:

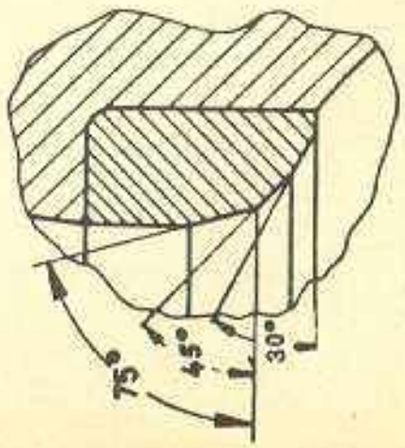
Valve guide	Outside dia. **d** Valve guide*	Bore dia. **D** Cylinder head
Standard size	13.060	13.000 – 13.018
1st oversize	13.260	13.000 – 13.200

* Grind valve guides on diameter **d** according to pertinent bore diameter **D** – remembering press-fit.

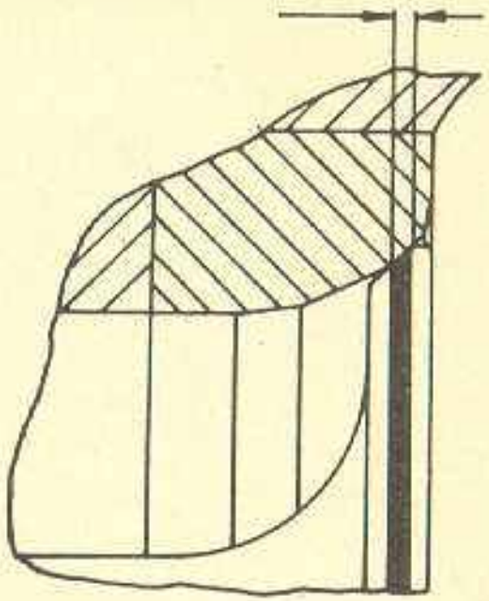
Specifications for installation of valve seat inserts

		Outside dia. d 1 valve seat insert	Bore D 1 in cylinder head
911 SC and 911 Turbo			
Standard size	Intake	51.680 – 51.661	51.500 – 51.530
Standard size	Exhaust	44.200 – 44.184	44.000 – 44.025
1st oversize	Intake	52.000 – 51.981	51.820 – 51.850
1st oversize	Exhaust	44.760 – 44.744	44.560 – 44.585

Angles and sizes of valve seat inserts

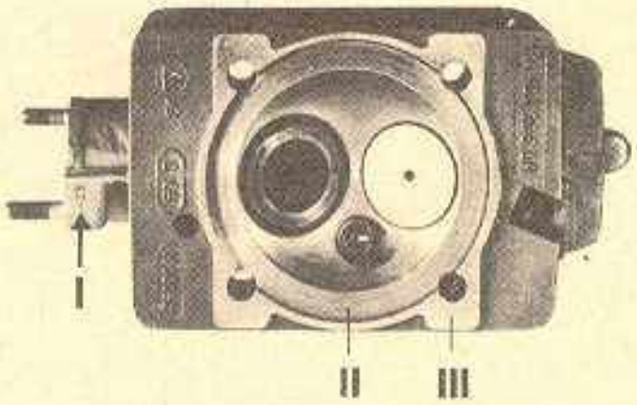


Intake = 1.3 ± 0.1
Exhaust = 1.5 ± 0.1



Machining cylinder head

Machining size (machining depth 0.25 ± 0.02 mm) is specified. These cylinder heads are marked with "–25" on flange of intake port (I).



Never install machined cylinder heads separately, but always all 3 machined cylinder heads on one side.

Thicker cylinder head gaskets (0.50 mm instead of 0.25 mm thick) will have to be installed with machined cylinder heads.

The use of two 0.25 mm gaskets instead of one 0.50 mm thick gasket is not approved because of the tolerances and unfavorable settling.

Repair information:

The sealing surfaces cannot be machined with conventional workshop equipment. The following procedures apply to workshops with pertinent equipment (vertical or universal milling machines required).

1. Clean cylinder head, sand blasting if necessary.
2. Clamp cylinder head on milling machine level. Grind 0.25 ± 0.02 mm off of inner (II) and outer (III) surfaces.
   Important: cylinder heads may only be machined **once.**
3. Bevel edges of machined surfaces slightly and mark cylinder head with "–25", see illustration.

Installation lengths of valve springs

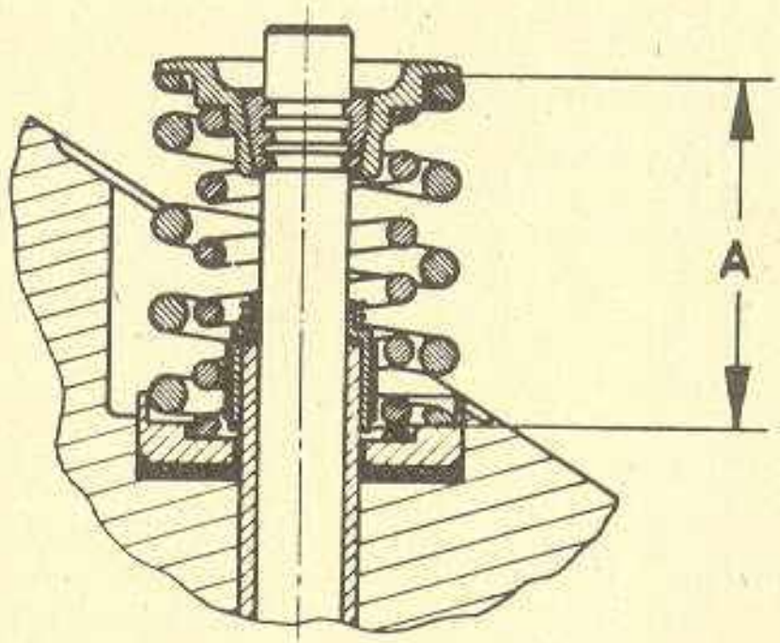
Checking

Install Special Tool P 10c together with shims, spring retainers, springs and both collets belonging to a pertinent valve.

Read distance "A" on Special Tool P 10c and correct by installing or removing shims when necessary.

Note

Check for correct seating of spring retainer in special tool, machining special tool if necessary.



	Intake	Exhaust
911 SC	34.5 – 0.3 mm	34.5 – 0.3 mm
911 Turbo	33.5 ± 0.3 mm	33.5 ± 0.3 mm

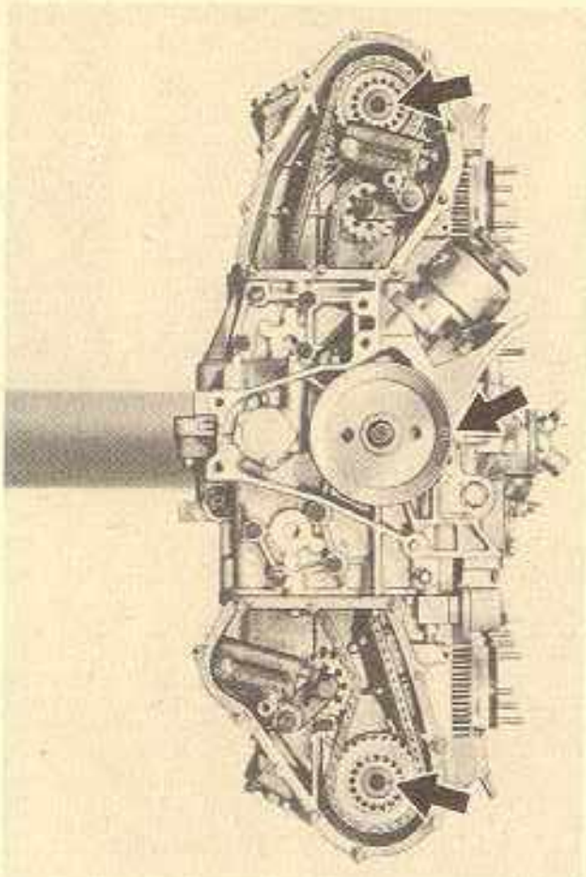
Camshafts, timing

	Type	Camshaft left Part No.	Camshaft right Part No.	Identification on face of camshaft Left	Right	Intake valve stroke in overlapping TDC with 0.1 mm valve clearance	Timing with 0.1 mm valve clearance
911 SC	930/10	930 105 147 08 or 930 105 147 10	930 105 148 08 or 930 105 148 10	930 147 08 or 930 147 10	930 148 08 or 930 148 10	0.9 – 1.1	Intake opens 1° BTDC Intake closes 53° ABDC Exhaust opens 43° BBDC Exhaust closes 3° ATDC
	930/16 930/17	930 105 147 08 or 930 105 147 10	930 105 148 08 or 930 105 148 10	930 147 08 or 930 147 10	930 148 08 or 930 148 10	1.4 – 1.7	Intake opens 7° BTDC Intake closes 47° ABDC Exhaust opens 49° BBDC Exhaust closes 3° BTDC
911 Turbo	930/60 930/66	930 105 143 00 or 930 105 143 01	930 105 142 00 or 930 105 142 01	930 147 08 or 930 143 01	930 143 00 or 930 142 01	0.65 – 0.80	Intake opens 3° ATDC Intake closes 37° ABDC Exhaust opens 27° BBDC Exhaust closes 5° BTDC

Adjusting timing

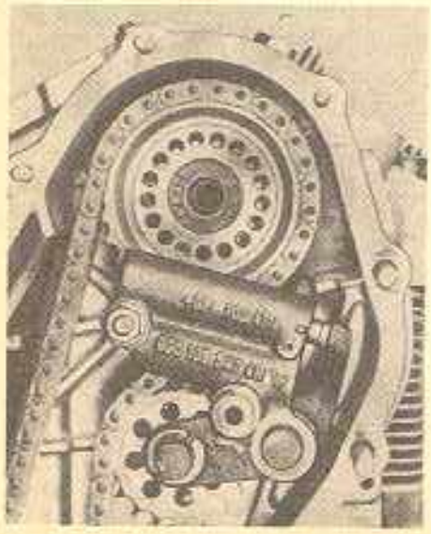
Initial adjustment

1. Turn crankshaft until Z 1 mark on pulley is precisely aligned with joint of crankcase or line on blower housing.

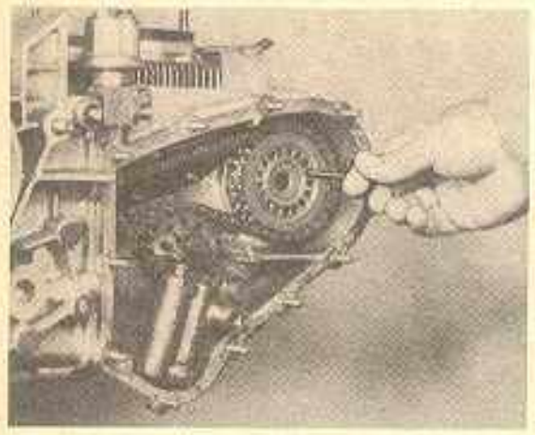


2. Position both camshafts with punch marks or code 930 facing up.

Aligning the Z 1 mark on the pulley with the joint and positioning the camshafts that punched marks face up gives the engine its basic setting of ignition TDC in cylinder no. 1 and overlapping valves in cylinder no. 4.



3. A bore in the sprocket will be aligned precisely with a bore in the sprocket range in the position described above. Insert pin in these precisely aligned bores.



4. Screw in bolts for sprockets finger tight. Counterhold with Special Tool P 9191.

Information

Give threads of bolts a light coat of Optimoly HT.

Information

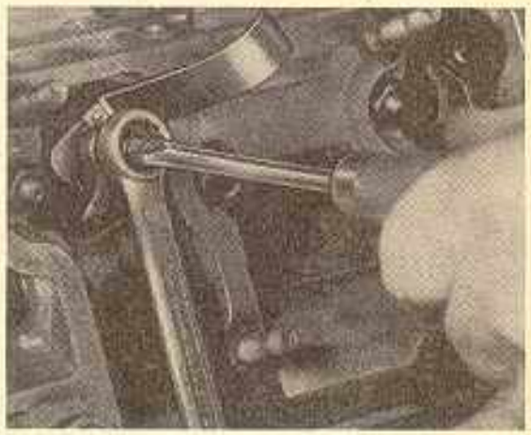
Proceed as described below, if one of the camshafts is displaced from its basic position.

Remove pin of camshaft in its basic position, so that it will also turn during the following adjustment. Turn the displaced camshaft to basic position with Special Tool P 9191 (punch mark or code 930 facing up).

Afterwards remove the sprocket mounting bolt and pin, and turn crankshaft to the Z 1 mark again.

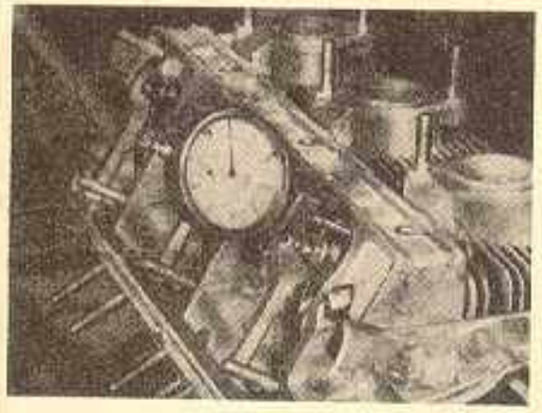
Final adjustment

1. Check or adjust valve clearance to precisely 0.10 mm with Special Tool P 213. It is sufficient for timing adjustments to have precise valve clearance for the intake valves of cylinders 1 and 4.



Left camshaft adjustment (cyl. no. 1)

2. Mount dial gage in Special Tool P 207 on stud of camshaft housing. Apply dial gage on spring retainer of cylinder 1 intake valve and set to 0 with about 10 mm preload and the valve closed.



3. Now turn crankshaft clockwise slowly about 1 turn from Z 1 (TDC), while observing the dial gage at the same time.

   Turn until the mean value of adjustment tolerances is reached.

4. Unscrew mounting bolt of left sprocket, remove and pull out dowel pin with Special Tool P 212.

5. Turn crankshaft accordingly until Z 1 mark on pulley is precisely aligned with joint of crankcase or line on blower housing.

6. Install dowel pin and srew in bolt finger tight, while counterholding.

7. Turn crankshaft two turns (720°) clockwise and recheck the adjustment. Read value should now be within adjustment tolerances.

8. Tighten bolt of left camshaft to final torque of 120 Nm (12 kpm), while a second person counterholds with Special Tool P 9191.

Right camshaft adjustment (cyl. no. 4)

1. Adjust cylinder no. 4 to ignition TDC (overlapping in cylinder no. 1).

2. Repeat adjusting procedures described in points 2 through 8 of the final adjustment for cylinder no. 1 on cylinder no.4.

Clutch drive plate

Measuring point, type	Installation size with tolerances mm	Wear limits mm
911 SC		
Clutch drive plate		
Relaxed thickness (new)	8.1 ± 0.3	6.3 for symmetrical wear
Max. lateral runout	0.6	0.6
911 Turbo		
Relaxed thickness (new)	10.1 ± 0.3	8.5 for symmetrical wear
Max. lateral runout	0.6	0.6

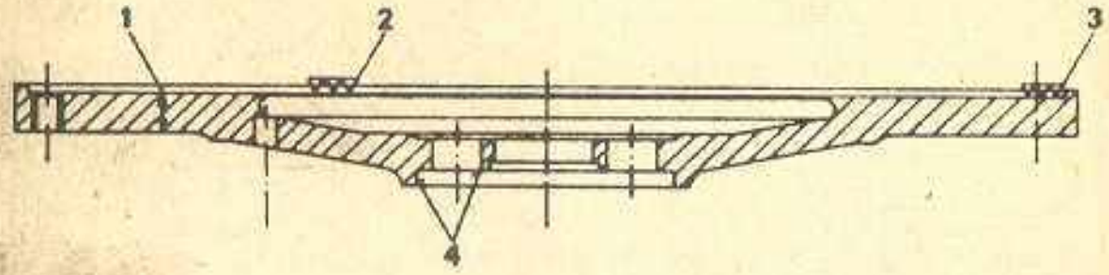
Machining flywheel

The flywheel bearing surface on the drive plate can be machined on a lathe, if there is serious scoring or considerable burnt spots.

Keep lathe cut as small as possible.

Wear limit of flywheel thickness:

911 SC 8.5 mm
911 Turbo 9.9 mm



1 Wear limit
2 Smallest possible out
3 Max. runout 0.1 mm
4 Lathe mounting points

Tightening torque for engine

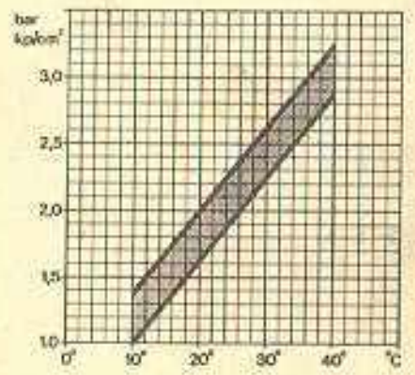
Location	Threads	Torque in Nm
Conrod nuts – 911 SC	M 10 × 1.25	50 – 55
Conrod nuts – 911 Turbo	M 10 × 1.25	
1st step (initial torque)		20
2nd step (final torque)		90 ± 2° torque angle
Crankcase bolts	M 10	35
All bolts on crankcase and camshaft housing	M 8	25
Flywheel to crankshaft	M 10 × 1.25	90
Bush with needle bearing to crankshaft	M 6	10
Pulley to crankshaft, bolt with washer	M 12 × 1.5	80
Durlok bolt for single and double pulley	M 12 × 1.5 × 22	170
Safety valve plug in crankcase	M 18 × 1.5	60
Pressure relief valve plug in crankcase	M 12 × 1.5	60
Adapter (on neck for oil pressure transmitter) to crankcase	M 12 × 1.5	35
Adapter to crankcase	M 22 × 1	120
Cylinder head nuts (1)	M 10 socket	
1st step (initial torque)		10
2nd step (final torque)		32
Rocker arm shafts	M 6 socket	18
Nut on camshaft	M 27 × 2	150
Bolt on camshaft (2) (introduced 10. 82)	M 12 × 1.5	120

(1) Lubricate threads of cylinder head mounting studs and cylinder head nut bearing surfaces lightly with Optimoly HT.

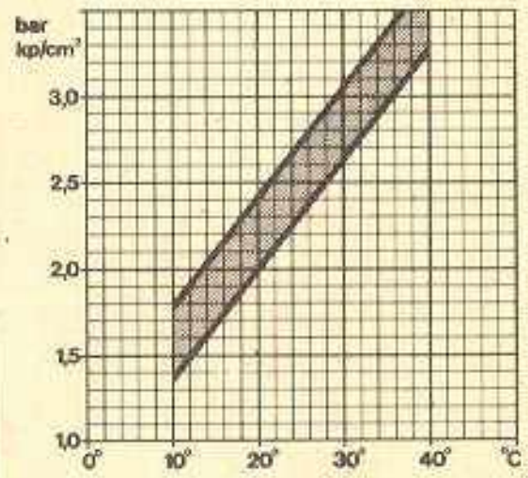
(2) Lubricate threads lightly with Optimoly HT (oil may not be used).

Location	Threads	Torque in Nm
Cover to camshaft housing	M 8	8
Console for engine carrier	M 10	40
Wide clamp to blower housing	M 8	12
Spark plugs	M 14 × 1.25	25 – 30
Pulley to alternator		40
Oil pressure control switch to crankcase	M 10 × 1	max. 20
Temperature transmitter to crankcase	M 14 × 1.5	max. 25
Oil pressure transmitter to connector	M 18 × 1.5	max. 35
Oxygen sensor to catalytic converter	M 18 × 1.5	50 – 60
Plug for catalytic converter exhaust test connection	M 8 × 1	15
Oil drain plug for oil filter screen cover	M 22 × 1.5	42
Oil drain plug for crankcase (introduced 3. 83)	M 20 × 1.5	70
Oil drain plug for oil tank	M 22 × 1.5	42

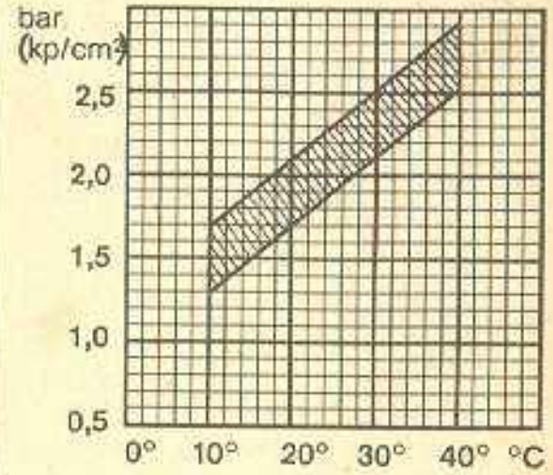
Testing and adjusting values – 911 SC (1982 and 1983 model)

Test step	Specification
Electric fuel pump Delivery rate	 at least 1000 cc/30 sec.
Control pressure "cold"	Diagram for warm-up regulator Part No. 911.606.105.09 Bosch No. 0438.140.089 Testing vacuum: 450...550 mbar (340...420 mmHg
	
Control pressure "warm" Test with atmospheric pressure (without vacuum) Vacuum pump connected for test on intake connection of warm-up regulator	 2.7...3.1 bar 3.4...3.8 bar
System pressure Testing value Adjusting value	 4.5...5.2 bar 4.7...4.9 bar
Leak test (engine warm) Pressure after 10 min. after 20 min.	 at least 1.3 bar at least 1.1 bar
Fuel injectors Opening pressure	 2.5...3.6 bar

Testing and adjusting values – 911 SC (USA) (with oxygen control)

Test step	Specification
Electric fuel pump Delivery rate	at least 1000 cc/30 sec.
Control pressure "cold"	Diagram for warm-up regulator Part No. 911.606.105.08 Bosch No. 0438.140.090
	
Control pressure "warm"	3.4...3.8 bar
System pressure Testing value Adjusting value	 4.5...5.2 bar 4.7...4.9 bar
Leak test (engine warm) Pressure after 10 min. after 20 min.	 at least 1.3 bar at least 1.1 bar
Fuel injectors Opening pressure	 2.5...3.6 bar

Testing and adjusting values – 911 SC (Japan)

Test step	Specification
Electric fuel pump Delivery rate	 at least 1000 cc/30 sec.
Control pressure "cold"	Diagram for warm-up regulator Part No. 911.606.105.07 – 1980 mod. Part No. 911.606.105.10 – 1981 mod. Bosch No. 0438.140.072
	
Control pressure "warm"	3.4...3.8 bar
System pressure Testing value Adjusting value	 4.5...5.2 bar 4.7...4.9 bar
Leak test (engine warm) Pressure after 10 min. after 20 min.	 at least 1.3 bar at least 1.1 bar
Fuel injectors Opening pressure	 2.5...3.6 bar

Testing and adjusting values 911 SC

Test step		Remarks		
Idle adjustment	Europe	USA and Canada	California and High Altitude States	Japan	Australia and Sweden
Idle speed (rpm)	*** 800...950	900 ± 50	900 ± 50	900 ± 50	800...950
CO level (%)	*** 1.0 to 2.0*	0.4 to 0.8**	0.4 to 0.8**	0.4 to 0.8**	1.0 to 2.0*

* Air pump disconnected.
** Measured in front of catalytic converter with oxygen sensor plug pulled of.
*** From 1981 models (R.o.W.) the lower value is ideal for adjustments of idle speed and CO level (possible idling deviations).

Adjusting engine idle speed

911 SC (USA)

Adjusting

Information

Always check for correct seating of oil tank cap and gasket prior to adjusting the engine idle speed. Leaks on oil cap would lead to incorrect measurements.

Adjusting requirements:

Engine in perfect running condition and correctly adjusted ignition timing.

1. Connect exhaust test pipe on test connection of catalytic converter.

2. Run engine to operating temperature (oil temperature approx. 90° C, oil temperature gage needle on upper end of field surrounded in white).
3. Connect CO tester to instructions supplied with tester.
4. Disconnect oxygen sensor plug in engine compartment on left-hand side.

5. Turn control screw or bypass screw on throttle valve housing until specified engine speed is reached.

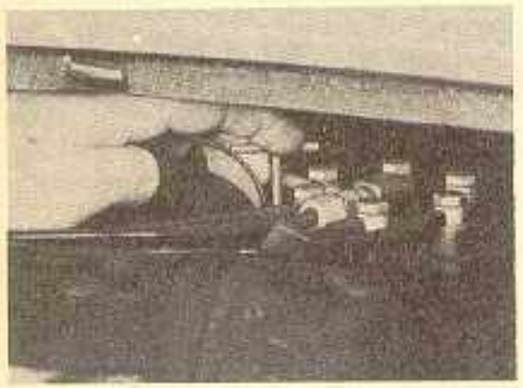
Information

Use separate tachometer from tester or similar.

6. Check CO level. If CO level is not in specified range, remove the mixture control unit of US cars and remove the threaded part of the shear-off screw in the bore providing access to the mixture control screw.

   Remove plug in mixture control unit between the fuel distributor and venturi of cars for Japan.

7. Insert Special Tool P 377.



8. Turn clockwise = richer mixture. Turn counterclockwise = leaner mixture.

Information

Always conform with the following points.

a) Basically always adjust CO level from lean to rich.

   Example: If mixture is excessively rich, first turn idle control screw counterclockwise further than necessary and then clockwise to nominal value.

b) Never exert pressure on special tool wrench while adjusting (engine would die).

c) Only turn control step minimum distances, since even a slight turn will change the CO content in exhaust considerably.

9. Remove special tool wrench.
10. Accelerate engine briefly.
11. Wait until CO tester displays CO level at idle speed.

    Repeat adjusting procedures, if necessary.

12. Recheck engine idle speed, correcting if necessary.
13. After finishing adjustments, screw a new shear-off screw in the access bore and tighten until head of screw shears off.

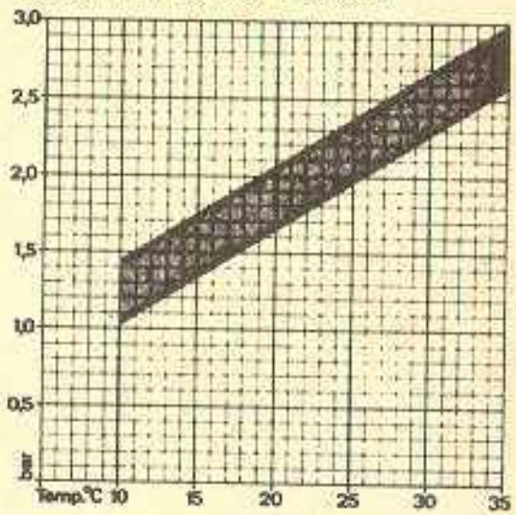
    Connect oxygen sensor plug.

14. Coat threads of nut plugging the test connection on catalytic converter with Bosch VS 140 16 Ft paste or Optimoly HT.

Testing and adjusting values for K-Jetronic (CIS) — 911 Turbo

Engine Type 930/60

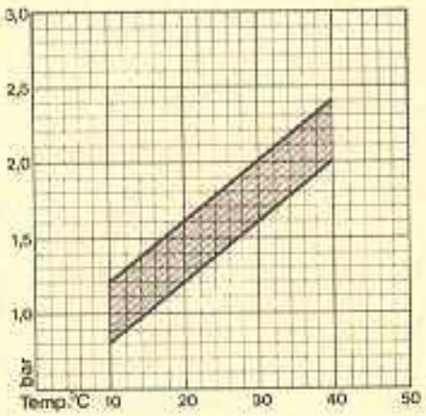
Test step	Specifications
Electric fuel pumps Delivery rate	at least 1500 cc/30 sec. (applicable for both pumps together)
Control pressure "cold" (= outside temperature)	Diagram for warm-up regulator Part No. 930.606.105.03 Bosch No. 0 438 140 054
Control pressure "warm"	3.65 ± 0.20 bar (kp/cm²)
"full throttle enrichment"	2.9 ± 0.20 bar (kp/cm²)
System pressure Testing value	6.0 to 6.7 bar (kp/cm²)
Adjusting value	6.2 to 6.4 bar (kp/cm²)
Leak test Pressure after 10 minutes	at least 1.6 bar (kp/cm²)
after 20 minutes	at least 1.4 bar (kp/cm²)
Fuel injectors Opening pressure	2.1 + 1.1 bar (kp/cm²)
delivery rate - control pressure circuit	160 to 240 cc minute



Testing and adjusting values for K-Jetronic (CIS) — 911 Turbo

Engine Type 930/66

Test step	Specifications
Electric fuel pumps Delivery rate	at least 1500 cc/30 sec. (applicable for both pumps together)
Control pressure "cold" (= outside temperature)	Diagram for warm-up regulator Part No. 930.606.105.05 Bosch No. 0 438 140 112
Control pressure "warm"	3.65 ± 0.20 bar (kp/cm²)
"full throttle enrichment"	2.9 ± 0.20 bar (kp/cm²)
System pressure Testing value Adjusting value	 6.0 to 6.7 bar (kp/cm²) 6.2 to 6.4 bar (kp/cm²)
Leak test Pressure after 10 minutes after 20 minutes	 at least 1.6 bar (kp/cm²) at least 1.4 bar (kp/cm²)
Fuel injectors Opening pressure	2.7 + 1.1 bar (kp/cm²)
delivery rate - control pressure circuit	160 to 240 cc minute



Idle adjustment

Engine Type 930/60/66

Note

Adjustments must be carried out with air cleaner mounted.

1. Disconnect air hose on air pump and insert a suitable plug in hose opening.
2. Turn control screw on throttle valve housing until specified idle speed is reached.
3. Adjust fuel/air mixture. Insert Special Tool 9156 into spring-loaded key wrench in the mixture control unit. Press special tool down about 18 mm to engage the spring-loaded key wrench in the mixture control screw.

   Turned clockwise = richer mixture

   Turned counterclockwise = leaner mixture



Test step	Specifications		
Idle adjustments (with approx. 90° C oil temp.)	Eng. Type	Europe	Canada
Idle speed (rpm)	930/60 930/66	950 ± 50	950 ± 50
CO (%)	930/60 930/66	1.5 to 2.5*	1.5 to 2.5*
HC		≤ 300 ppm	

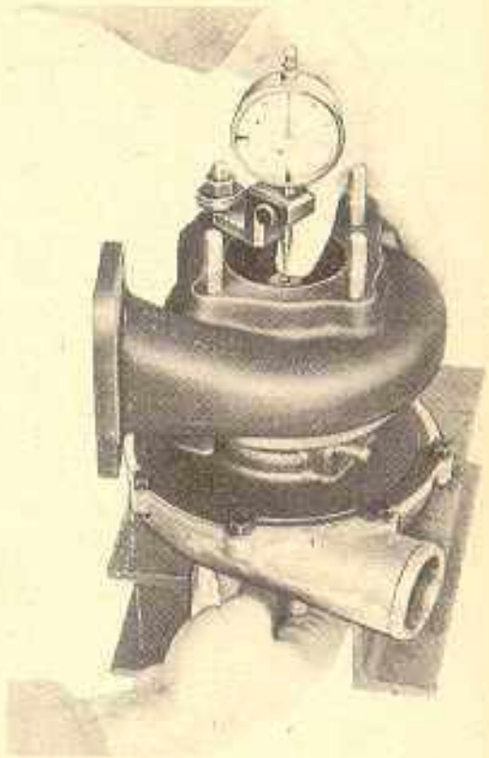
* Air pump disconnected

Checking turbocharger

Measuring axial play

Apply tip of dial gage on turbine shaft end. Pres rotor shaft against dial gage. Read and note value. Push rotor shaft in opposite direction. Read and note value. The differenve between both measured values is the axial play.

Max. play: 0.35 mm



Measuring radial play

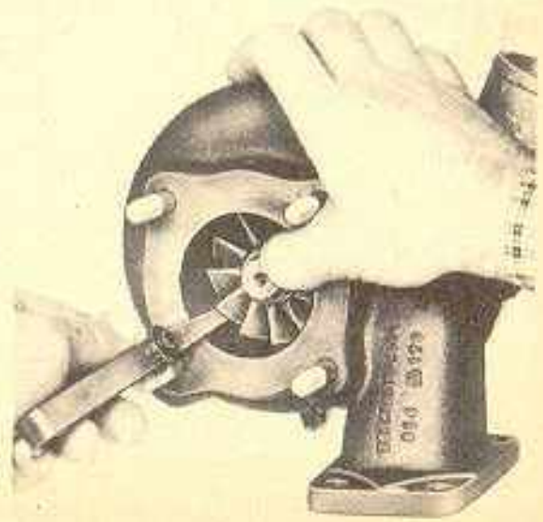
Radial play is only checked on turbine end.

Push down on turbine. Measure gap with a feeler gage and note value.

Push turbine in opposite direction. Measure gap with a feeler gage and note value.

The difference between both measured values is the radial play. Measure at at least two different points.

Max. play: 0.65 mm



Charge pressure

Engine Type 930/60/66:
0.70 to 0.85 bar at 5500 rpm
(measured on charge pressure safety switch)

Turbocharger identification

3 LDZ / 319 C 11.1

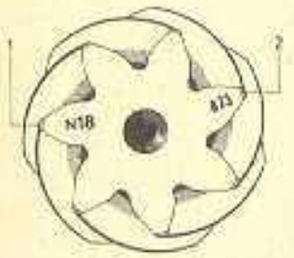
Version number
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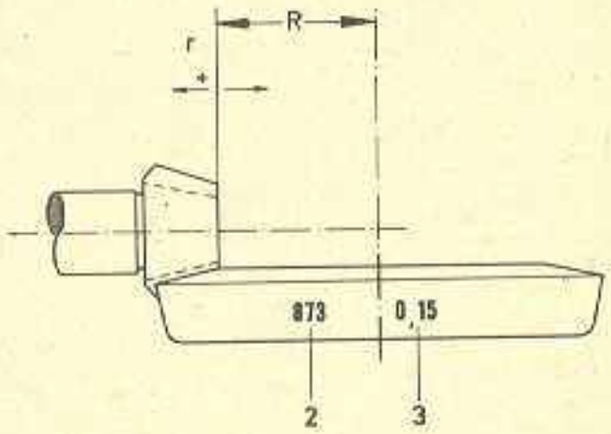
Adjusting drive pinion

General

Correct adjustment of drive pinion and ring gear is important for service life and smooth running of final drive. Consequently drive pinions and ring gears are already matched in production in special testing machines to guarantee good tooth contact pattern and quiet running in both directions. The point of smoothest running is found by moving the drive pinion in axial direction, whereby the ring gear is held within tolerances of the specified backlash. Deviation "r" (distance deviating from design distance "R") is measured and inscribed on face of pinion. Ring gear and pinion are always designed that deviation "r" is added to design distance "R", i. e. is preceded by a + sign.

To show difference to pinion/ring gear assemblies, whose deviation "r" had been + or –, the capitol letter "N" precedes the value "r" on the head of the drive pinion for these new pinion/ring gear sets. Each pinion/gear set has a pair number and both parts must always be replaced together.





R = Design distance
911 = 66.30 mm
911 Turbo = 82.29 mm

r = Deviation from R in + 1/100 mm (N 2 = + 0.02 mm)
1 = Deviation r
2 = Pair number
3 = Backlash

Important manual transmission adjusting data 915 and 930

2 examples for adjustment of pinion and ring gear

	Transm. Type 915	Transm. Type 930
Design dimension "R"	66.30 mm	82.29 mm
Deviation "r"	+ 0.10 mm	+ 0.02 mm
Adjustment dimension "E"	66.40 mm	82.31 mm
Dial gauge setting	66.30 mm	82.29 mm
Measured dimension (without shims)	– 0.29 mm	– 0.14 mm
Distance to face end of pinion shaft	66.01 mm	82.15 mm
Adjustment dimension "E"	66.40 mm	82.31 mm
Distance to face end of pinion shaft	– 66.01 mm	– 82.15 mm
Thickness of shims	0.39 mm*	0.16 mm*

* Round off the nearest 0.05 mm.

Shims are available 0.10, 0.15, and 0.20 mm thick.

Recheck adjustment dimension "E" after installation of shims; a deviation of ± 0.03 mm is permissible.

Adjusting ring gear

1 = shim S_1 2 = shim S_2 E = Adjusting distance

The backlash between pinion and ring gear can be adjusted only by changing thickness of shims S_1 and S_2 and, measured on ring gear at four different points, should be

0.12 to 0.18 mm for transmission type 915
0.16 to 0.20 mm for transmission type 930.

Perfect results require thoroughness and cleanliness for all assembling and measuring operations.

Pre-load and friction torque of taper roller bearings:

Transm. Type	Axial Preload (mm)	Friction Torque
915	0.30 to 0.40	350 to 650 Ncm (35 to 65 kpcm) FAG bearings 300 to 420 Ncm (30 to 42 kpcm) SKF bearings
930	0.2 to 0.33	440 to 680 Ncm (44 to 68 kpcm) FAG bearings 300 to 570 Ncm (30 to 57 kpcm) SKF bearings

Transmission tolerance survey

Measuring point	Type 915		Type 930	
	Installation tolerance mm	Wear limit mm	Installation tolerance mm	Wear limit mm
1. Backlash between gear I and II		0.22	0.055–0.13	0.22
1st gear	0.17			
2nd gear	0.17			
3rd gear	0.05–0.13			
4th gear	0.05–0.13			
5th gear	0.05–0.13			
2. Loose gears on pinion and drive shaft				
Axial clearance				
1st gear	0.3–0.4	0.5	same as 915	
2nd gear	0.2–0.3	0.4		
3rd gear	0.2–0.3	0.4		
4th gear	0.2–0.3	0.4		
5th gear	0.2–0.3	0.4		
3. Selector rods				
a) in guides radial clearance	0.195–0.236	0.4	same as 915	
b) Runout	—	0.1		

Measuring point	Type 915 Installation tolerance mm	Type 915 Wear limit mm	Type 930 Installation tolerance mm	Type 930 Wear limit mm
4. Selector forks				
in operating sleeve				
Axial clearance				
5th and reverse gear	0.1 – 0.3	0.5	same as 915.	
1st and 2nd gear	0.1 – 0.3	0.5		
3rd and 4th gear	0.1 – 0.3	0.5		
5. Synchronizing rings				
Outside dia. installed				
1st gear	86.20 – 86.54	after local wear through of molybdenum layer	86.15 – 86.65	after local wear through of molybdenum layer
2nd gear	86.20 – 86.54		86.15 – 86.65	
3rd gear	76.12 – 76.48		76.20 – 76.55	
4th gear	76.12 – 76.48		76.20 – 76.55	
5th gear	76.12 – 76.48		—	
6. Drive shaft				
Max. runout at guidepin	max. 0.1	max. 0.1 (align)	same as 915	

Tightening torque for manual transmission Type 915

Location	Designation	Threads	Material/ Strength	Torque Nm
Transmission case (oil drain)	Plug with magnet	M 24 × 1.5 tapered	MUK 7	24
Gear box (oil filter)	Plug	M 24 × 1.5 tapered	MUK 7	24
Gear box and transmission case, side and front transmission covers, shift cover, tensioning plate, transmission mounts	Nut	M 8 × 1.25	22 H	24
Front cover	Backup light switch	M 18 × 1.5	Ms	35
Drive shaft	Collared nut	M 30 × 1.5	C 35	230
Drive shaft	Castle nut	M 18 × 1.5	22 H	160
Drive pinion	Collared nut	M 24 × 1.5	8.8	250
Fork, gearshift	Nut	M 6 × 1.0	22 H	10
Shift lock, transmission case	Bolt	M 10 × 1.5	8.8	17
Transmission case	Vent	M 14 × 1.5	9 S 20 K	25
Selector forks, shift rod fork	Bolt	M 8 × 1.25	8.8	25
Ring gear with differential or limited slip differential	Bolt	M 12 × 1.25	12.9	160
Joint flange	Bolt	M 10 × 1.25	8.8	44
Starter	Cylinder head nuts	M 10 × 1.5	CK 35	48

Location	Designation	Threads	Material/ Strength	Torque Nm
Crankcase/ transmission	Nut	M 10 × 1.5	H 22	48
Release lever/ adjusting screw	Nut	M 8 × 1.25	04	11
Spring clamp/ speed sender	Bolt	M 6 × 1.0	8.8	9
Reversing lever pin/ gear box	Pin	M 8 × 1.25	9 S 20 K	25
Cooling pipe coil/ oil pump	Bolt	M 8	8.8	22
Cooling pipe coil/ gear box	Bolt	M 6	8.8	9
Guide tube for release bearing	Screw	M 6 × 1.0	8.8	9
Oil pump cover/ side transmission cover	Bolt	M 6	8.8	9
Shield/ side transmission cover	Screw	M 6	8.8	9
Drive gear/ differential	Screw	M 5	8.8	5.6

Tightening torque for manual transmission — Typ 930

Location	Designation	Threads	Material/ Strength	Torque Nm
Drive shaft	Collared nut	M 30 × 1.5	8.8	210–230
Drive shaft	Collared nut	M 20 × 1.5	C 35 V	160–180
Drive pinion	Collared nut	M 24 × 1.5	8	240–260
Transmission case	Vent	M 14 × 1.5	9 S 20 K	20– 30
Joint rod, gearshift	Bolt	M 8 × 1.25	8.8	23– 26
Shift cover	mid-grip nut	M 8 × 1.25	× 12 CrNi 18.8	22– 25
Gear box	Backup light switch	M 18 × 1.5	Ms	25– 35
Gearshift, fork	Nut	M 6 × 1.0	8.8	9– 11
Tensioning plate, gear box and transmission case, front and side transmission covers	Bolt	M 8 × 1.25	8	22– 25
Shift lock, transmission case	Bolt	M 10 × 1.5	8.8	15– 18
Selector forks	Bolt	M 8 × 1.25	8.8	24– 26
Ring gear (differential)		M 12 × 1.25	11.9	135–140
Limited slip differential	Bolt	M 12 × 1.25	12.9	150–160
Joint flange	Expansion bolt	M 10 × 1.5	8.8	26– 30
Joint flange	Bolt	M 10 × 1.5	–	39– 46

Location	Designation	Threads	Material/ Strength	Torque Nm
Transmission case (oil drain)	Plug with magnet	M 24 × 1.5 (taper 1:16)	St 37	20–25
Gear box (oil filler)	Plug	M 30 × 1.5	5.8	20–25
Reverse gear additional lock	Plug	M 16 × 1.5	5.8	20–25
Guide tube (transmission case)	Screw	M 6 × 1.0	8.8	8–10
Clutch and gear ring mountings	Bolt	M 8 × 1.0	8.8	20–25
Starter mountings	Nut	M 10 × 1.5	8	46–50
Console to shift base	Screw	M 6	8.8	6.0
Shift base on tunnel	Bolt	M 8	8.8	21
Screw in shift rod head	Screw	M 8	8.8	15
Screw in shift clutch	Screw	M 8	8.8	15
Clamp	Bolt	M 8	8.8	25
Case cover/ limited slip differential	Screw	M 6	8.8	14

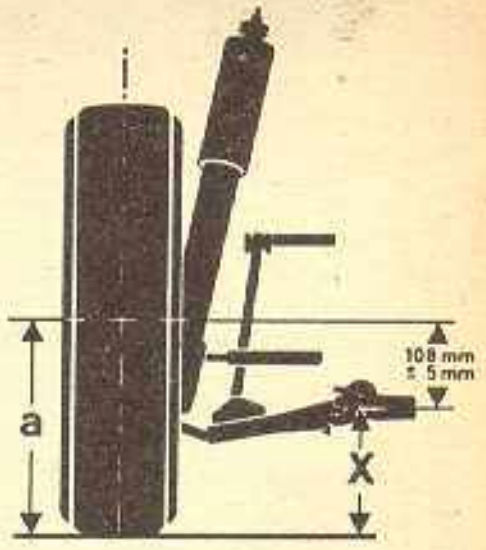
Front axle and steering specifications

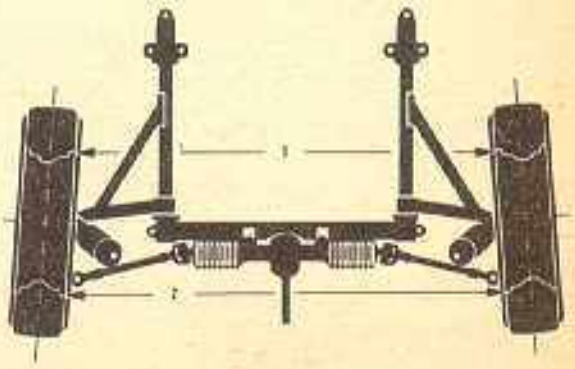
	911 SC	911 SC–USA, Canada, Japan	Turbo
Wheel suspension	Independent employing control arms and shock absorber struts		
Springs	One round torsion bar in driving direction for each wheel 18.8 mm diameter		
Track width	1369 mm with rim 6 J × 15	1361 mm with rim 6 J × 15	1432 mm with rim 7 J × 16
Shock absorbers	Double action, hydraulic shock absorber struts		
Stabilizers			
front/rear dia. in mm	20/18	20/18	20/18
Adjustment of ZF rack and pinion steering			
Frictional moment of steering: (measured on flange of steering gear with tie rods detached)	0.8 to 1.4 Nm = 8 to 14 kpcm)		
ZF steering specifications			
Steering ratio (in center): 17.78 : 1			
Number of steering wheel turns from lock to lock: approx. 3.0			

Specifications and tolerances

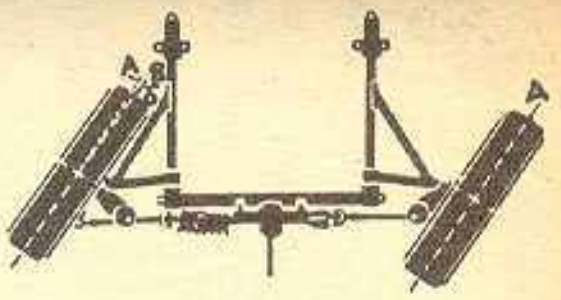
At curb weight according to DIN 70020
Car with full fuel tank, spare wheel and tools

Designation	Adjustment data and tolerances	Max. difference between left and right
Front axle		
Height adjustment: Wheel center above middle of torsion bar		
911 SC	108 mm ± 5 mm	5 mm
911 SC – USA, Canada, Japan	99 mm ± 5 mm	5 mm
83 model onwards	108 mm ± 5 mm	5 mm
911 Turbo	94 mm ± 5 mm	5 mm
911 Turbo – USA, Canada, Japan	85 mm ± 5 mm	5 mm
83 model onwards	94 mm ± 5 mm	5 mm
Total toe (pressed with 150 N)	0°	—

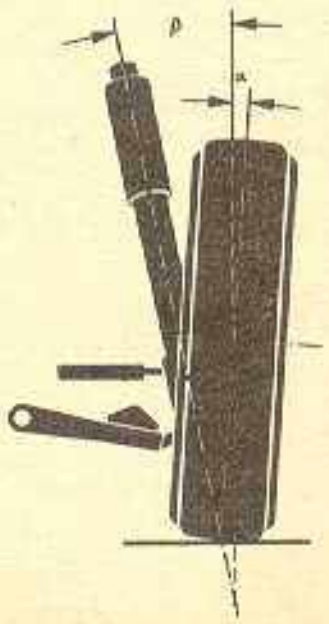




Designation	Adjustment data and tolerance	Max. difference between left and right
Difference angle at 20° lock	0° to + 30'	Can only be influenced by exchanging steering arm
A' = Parallel to A B = Centerline of wheel γ = Difference angle		



Camber of front wheels (wheels pointing straight ahead)		
α = Camber angle 911 SC, Turbo	0° ± 10'	10'
911 SC, Turbo USA, Canada, Japan	+ 30' ± 10'	10'
83 model onwards	0° ± 10'	
β = Inclination of kingpin	11°	



Designation	Adjustment data and tolerances	Max. difference between left and right
γ = Caster	6° 5' ± 15'	30'
Caster results from total camber difference at 20° left lock and 20° right lock × 1.5		

These wheel alignment specifications can also be applied to earlier models.

Tightening torque for front axle

Location	Designation	Threads	Material/ Strength	Torque Nm
Support to spring strut	Nut	M 14 × 1.5	8	80
Support to body	Bolt	M 10	8.8	47
Plug for spring strut cartridge	Plug			120 + 20
Steering gear	Bolt	M 10	8.8	47
Joint pivot of steering tie rod to joint bush (steering gear)	Bolt	M 10	8.8	47
Ball joint of steering tie rod to steering arm	Castle nut	M 10 × 1	8	45
Ball joint and joint pivot to steering tie rod (locknut)	Nut	M 14 × 1.5		45
Auxiliary carrier to body	Bolt	M 12 × 1.5	8.8	90
Stabilizer to auxiliary carrier strut	Bolt	M 8	8.8	25
Auxiliary carrier strut, splash guard and stabilizer to body	Bolt	M 10	8.8	47
Auxiliary carrier strut and splash guard to auxiliary carrier	Nut	M 10	8	28

Location	Designation	Threads	Material/ Strength	Torque Nm
Control arm to body	Bolt	M 10	8.8	47
Ball joint to control arm	Slotted nut	M 45 × 1.5	8.8	250
Ball joint to spring strut	Universal stopnut	M 8	8	22
Brake disc to wheel hub	Nut	M 8	8.8	23
Shield for brake disc	Bolt	M 8	8.8	10
Caliper to steering knuckle	Bolt	M 12 × 1.5	8.8	70
Nut on steering knuckle	Screw	M 7	10.9	15
Brake pipe connection	Coupling nut	M 10 × 1		12
Wheel to wheel hub	Wheel nut	M 14 × 1.5		130

Tightening torque for steering

Location	Designation	Threads	Material/ Strength	Torque Nm
Steering gear	Bolt	M 10	8.8	47
Pivot bush to rack	Bellows holder (slotted nut)	M 16 × 1.5		70
Joint pivot (steering tie rod) to pivot bush	Bolt	M 10	8.8	47
Ball joint to steering arm	Castle nut	M 10 × 1	8	45
Ball joint and pivot to steering tie rod (locknut)	Nut	M 14 × 1.5		45
Steering coupling to steering shaft	Bolt	M 8	8.8	25
Steering shaft to steering gear	Bolt	M 8	8.8	25
Steering shaft bearing	Bolt	M 8	8.8	25
Universal joint to steering shaft (lubricated with Optimoly HT)	Bolt	M 8	8.8	20
Coupling flange to drive pinion	Self-locking nut	M 10	8	45
Case cover to steering gear	Bolt	M 8	8.8	15
Steering wheel	Nut	M 18 × 1.5	8	50
Centering bolt for steering lock	Stud	M 8	10.9	2–3
Locknut for centering bolt	Nut	M 8	8	18

Rear axle specifications

	911 SC	911 SC USA, Canada, Japan	Turbo
Wheel suspension	Independent, employing trailing arms, wheels driven by propeller shafts		
Springs	One round torsion bar in lateral direction for each wheel		
Torsion bar dia.	24.1 mm	24.1 mm	26 mm
Track width	1379 mm with rim 7 J × 15	1367 mm with rim 7 J × 15	1501 mm with rim 8 J × 16
Shock absorbers	Double action, hydraulic shock absorbers		
Stabilizers front/rear dia. in mm	20/18	20/18	20/18

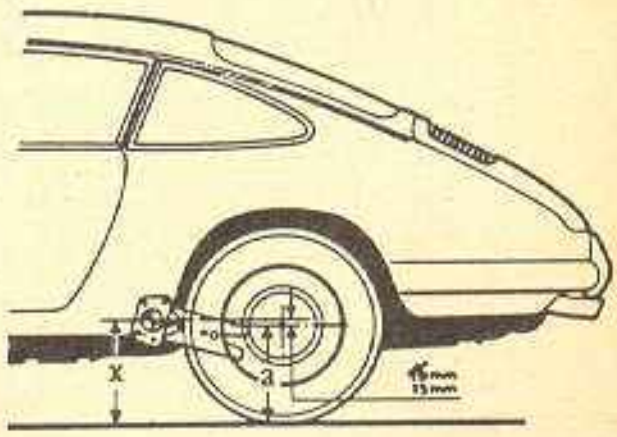
Specifications and tolerances

(at curb weight according to DIN 70020; car with full fuel tank, spare wheel and tools)

Designation	Adjustment data and tolerances	
Torsion bar specification Inclination of spring strut		
Coupe 911 SC	35°	with Bielstein-shock absorbers 34°
Coupe 911 SC USA, Canada, Japan	40°	with Bielstein-shock absorbers 39°

23°
W 30mm BAR

Designation	Adjustment data and tolerances	Max. difference between left and right
Targa	+ 0.5°	
Air conditioner	+ 0.5°	
Turbo	33°	
Turbo – USA, Canada, Japan	37°	
Camber of rear wheels		
911 SC	− 1° ± 10'	20'
Turbo	− 30' ± 10'	20'
911 SC/Turbo USA, Canada, Japan	0° ± 10'	20'
83 model onwards	− 1° ± 10'	20'
Track for all types	+ 10' ± 10' each wheel	20'
Height adjustment		
Wheel center below center of cross tube		
911 SC	16 mm ± 5 mm	8 mm
Turbo	12 mm ± 5 mm	8mm
911 SC/Turbo USA, Canada, Japan	37 mm ± 5 mm	8 mm
83 model onwards		
911 SC	16 mm ± 5 mm	
911 Turbo	12 mm ± 5 mm	



Tightening torque for bolts and nuts for rear axle

Location	Designation	Threads	Material	Tightening torque Nm
Bearing cover to body	Hexagon head bolt	M 10	8.8	47
Control arm to cross tube	Hexagon head bolt	M 14 × 1.5	10.9	60
Spring strut to control arm	Eccentric	M 12 × 1.5	8.8	60
Spring strut to control arm	Hexagon head bolt	M 12 × 1.5	10.9	95
Brake caliper to control arm	Hexagon socket screw	M 12 × 1.5	8.8	60
Shock absorber to control arm	Hexagon head bolt	M 14 × 1.5	8.8	125
Shock absorber to body	Hexagon nut	M 10 × 1	8	25
Brake line	Coupling nut	M 10 × 1		14
Stabilizer to body	Hexagon head bolt	M 8	8.8	25
Axle shafts to transmission and drive shaft	Fillister head bolt	M 10 M 8	12.9 12.9	83 42
Stabilizer to stabilizer suspender	Hexagon nut	M 12 × 1.5	8/8.8	85
Stabilizer suspender to rear axle trailing arm	Hexagon head bolt	M 12 × 1.5	8.8	85
Wheel to wheel hub	Wheel nut	M 14 × 1.5		130
Wheel hub to drive shaft	Castle nut	M 20 × 1.5	10.9	300 – 320
Brake disc to wheel hub	Countersunk bolt	M 6	8.8	5
Adjusting lever to spring strut	Hexagon head bolt	M 16 × 1.5	10.9	245
Adjusting lever to spring strut	Eccentric bolt	M 16 × 1.5	10.9	245

Brakes – Specifications

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Brake booster				
Tandem master cyl. dia.	20.64 mm	23.81 mm		
Brake booster dia.	7"	8"		
Play on brake pedal with brakes bled and engine stopped	10 mm	10 mm		
Brake circuit division	front axle/ rear axle	front axle/ rear axle		
Front wheel brakes				
Brake disc outside dia.	282.5 mm inboard venting	304 mm inboard venting perforated evolent-shaped inboard venting ports		
Effective brake disc dia.	228 mm	247 mm		
Brake disc thickness (new)	20.5 mm	32 mm		

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Min. brake disc thickness* after machining	19.1 mm	30.6 mm	18.5 mm	30 mm
Max. brake disc surface-to-valley surface finish after machining	0.006 mm	0.006 mm		
Max. brake disc thickness tolerance	0.02 mm	0.02 mm		
Max. brake disc lateral runout	0.05 mm	0.05 mm		
Max. lateral runout installed	0.1 mm	0.1 mm		
Pistons in brake caliper	48 mm dia. 2 pistons per caliper	38 mm dia. 4 pistons per caliper		
Brake pad area per wheel	76 cm^2	94 cm^2		
Brake pad thickness	10 mm	13 mm	2 mm	2 mm
Brake pad recess play	brake liner has easy movement in recess	0.4 – 0.6 mm		
Rear wheel brakes				
Brake disc outside dia.	290 mm inboard venting	309 mm inboard venting perforated evolent-shaped inboard venting ports		
Effective brake disc dia.	244 mm	251 mm		

Description	Remarks, specifications 911 SC	Turbo	Wear limit 911 SC	Turbo
Brake disc thickness (new)	20 mm	28 mm		
Min. brake disc thickness* after machining	18.6 mm	26.6 mm	18 mm	26 mm
Max. brake disc peak-to-valley surface finish after machining	0.006 mm	0.006 mm		
Max. brake disc thickness tolerance	0.02 mm	0.02 mm		
Max. brake disc lateral runout	0.05 mm	0.05 mm		
Max. lateral runout installed	0.1 mm	0.1 mm		
Pistons in caliper	38 mmdia. 2 pistons per caliper	30 mm dia. 4 pistons per caliper		
Brake pad area per wheel	52.5 cm^2	94 cm^2		
Brake pad thickness	10 mm	13 mm	2 mm	2 mm
Brake pad recess play	Brake pads move easily in recess	0.4 – 0.6 mm		
Parking brake				
Brake drum dia.	180 mm	180 mm	181 mm	181 mm
Brake shoe width	25 mm	25 mm		
Liner area per wheel	85 cm^2	85 cm^2		
Brake liner thickness	4.5 mm	4.5 mm	2 mm	2 mm

Caliper version

911 SC: gray cast iron front and rear Turbo: light alloy front and rear

* Brake disc should only be machined symmetrically, i.e. uniform on both sides.

Machining specifications and wear limits for brake discs and parking brake

Vehicle type	Type of brake disc	Location of brake disc	Distance "a" (in ref. to new brake disc thickness)	New brake disc thickness	Min. thickness of brake disc after machining	Wear limit of brake disc (for symmetric wear)
911 SC	Vented brake disc	Front wheel	35.25 ± 0.1 mm	20.5 – 0.2 mm	19.1 mm	18.5 mm
Turbo	Vented, perforated brake disc	Front wheel	35.7 + 0.25 mm* – 0.35 mm	32 – 0.2 mm	30.6 mm	30 mm
			from mod. 1981 56.7 ± 0.1 mm	32 – 0.2 mm	30.6 mm	30 mm
911 SC	Vented brake disc	Rear wheel	76 + 0.2 mm	20.0 – 0.2 mm	18.6 mm	18.0 mm
Turbo	Vented, perforated brake disc	Rear wheel	76 + 0.2 mm	28 – 0.2 mm	26.6 mm	26 mm

All	Thickness tolerance of brake discs	max. 0.02 mm
All	Lateral runout of brake discs	max. 0.05 mm
All	Surface finish of brake discs after machining	max. 0.006 mm

* From brake flange bearing surface on wheel hub (brake disc, ring, brake flange assembly) to inside brake disc friction surface.

Caution!

Refinishing and wear specifications listed above are based on the assumption that remaining thickness of the brake pad is not less than 2.0 mm.

This pad thickness is required to assure perfect operation of brakes. (Installation of cross spring assures this.)

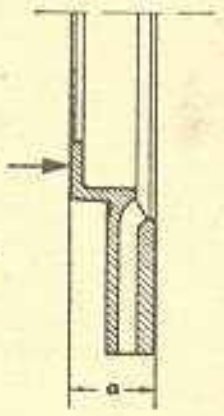
Only balanced brake discs are supplied. Brake discs are balanced by special clips in the cooling vents.

Caution! Never remove balance clips.

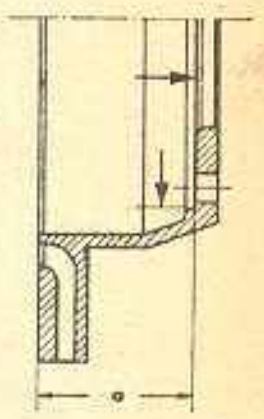
Caution!

Machine brake disc symmetrically, i.e. uniformly on both sides. Arrows indicate brake disc reference or mounting points.

Front wheel brake disc



Rear wheel brake disc



Parking brake

Brake drum dia. (new)	180 + 0.2 mm
Brake drum wear limit	max. 181.0 mm dia.
Brake liner width	25 mm

Caution!

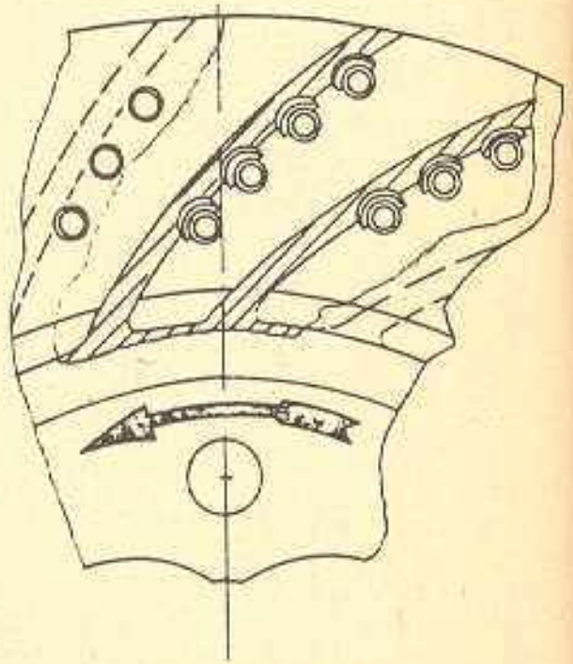
Parking brake liners must be at least 2.0 mm thick.

Arrangement of brake disc venting ports (assembly information)

The inboard venting ports of brake discs **on Turbo** are arranged in evolvent-shape. Don't mix up left and right sides when assembling.

Identification: Evolvent shape and part number.

Part number is located on brake disc.



← Forward direction

Left side part number:
3rd group number
uneven

Right side part number:
3rd group number
even

Examples:
930 351 **04700** = left side
930 351 **04800** = right side

Brake circuit failure indicator

Each of both brake circuits has a stop light switch on the brake master cylinder, which also acts as a brake function warning switch.

An indicator lamp installed in the instrument panel comes on when a brake circuit fails.

After repairing the brake system the brake indicator lamp must be switched off by disconnecting the battery.

Tightening torque for hydraulic and mechanical brake parts

Location	Designation	Threads	Material	Tightening torque Nm
Nut on steering knuckle	Fillister head screw	M 7	10.9	15
Brake caliper to steering knuckle	Fillister head screw/ hexagon head bolt	M 12 × 1.5	8.8	70
Brake flange to wheel hub	Hexagon head bolt	M 8	8.8	23
Brake disc to brake flange	Hexagon head bolt	M 6	8.8	10
Brake disc to wheel hub	Hexagon head bolt	M 8	8.8	23
Guard to steering knuckle	Hexagon head bolt	M 8	8.8	10
Guard and brake backplate to trailing arm	Fillister head screw	M 8	8.8	25
Guard to brake backplate	Hexagon head bolt	M 8	8.8	25
Brake disc to wheel hub	Countersunk screw	M 6	8.8	5
Brake caliper to trailing arm	Fillister head screw/ hexagon head screw	M 12 × 1.5	8.8	60
Wheel to wheel hub	Wheel nut	M 14 × 1.5	F 53/10 K	130

Location	Designation	Threads	Material	Tightening torque Nm
Brake master cylinder to vacuum booster	Hexagon nut	M 8	8	25
Stop light switch to master cylinder	Stop light switch	M 10 × 1		15 + 4
Brake booster to console	Hexagon nut	M 8	8	25
Brake fluid tank	Hexagon head bolt	M 6	8.8	2
Pivot and joint shell to push rod	Hexagon nut	M 10	8	35
Brake booster to trunk floor	Hexagon nut	M 8	8	25
Strut to console	Hexagon head bolt	M 10	8.8	46
Brake lines to master cylinder, branch brake hoses and brake calipers	Coupling	M 10 × 1		14
Branch to cover and rear axle cross tube	Hexagon head bolt	M 6	8.8	6
Bleeder screws on brake calipers (Turbo)	Bleeder screw	M 10 × 1		8 – 11
Brake caliper sections to bridge (Turbo)	Fillister head bolt	M 12 × 1.5	8.8	60
Spring plate to bridge (Turbo)	Countersunk screw	M 5		4
Ring adapter to brake caliper (Turbo)	Hollow union bolt	M 10 × 1		16
Bleeder valve in brake caliper	Bleeder screw			3

Rims and tires

Type	Standard rims		tires	Optional extra* rims		tires
911 SC	front rear	LM g 6 J × 15 LM g 7 J × 15	185/70 VR 15 215/60 VR 15	front rear	LM gs 6 J × 16 LM gs 7 J × 16	205/55 VR 16 225/50 VR 16
				Winter tires**		
				5½ J × 15***		165 R 15 M+S***
				5½ J × 14		185 R 14 M+S
				5½ J × 15*** 6 J × 15 7 J × 15 6 J × 15 front/ 7 J × 15 rear		185/70 R 15 M+S
				6 J × 16 6 J × 16 front/ 7 J × 16 rear		205/55 R 16 M+S
Turbo	front rear	LM gs 7 J × 16 LM gs 8 J × 16	205/55 VR 16 225/50 VR 16			
				Winter tires**		
				6 J × 15 7 J × 15 6 J × 15 front/ 7 J × 15 rear		185/70 R 15 M+S
				6 J × 16 7 J × 16 6 J × 16 front/ 7 J × 16 rear		205/55 R 16 M+S

Tire inflation pressure (reference values)

(measured on cold tires)

	911 SC	Turbo	Turbo – USA, Canada, Japan
Front	2.0 bar	2.0 bar	2.0 bar
Rear	2.4 bar	3.0 bar	2.4 bar
Spare wheel	2.2 bar	2.2 bar	2.2 bar

These values also apply to winter tires.

LM g = Cast light alloy
LM gs = Forged light alloy

* Other wheel rim/tire combinations are possible in addition to optional extra tires (Technical Information).

** SR or HR version.

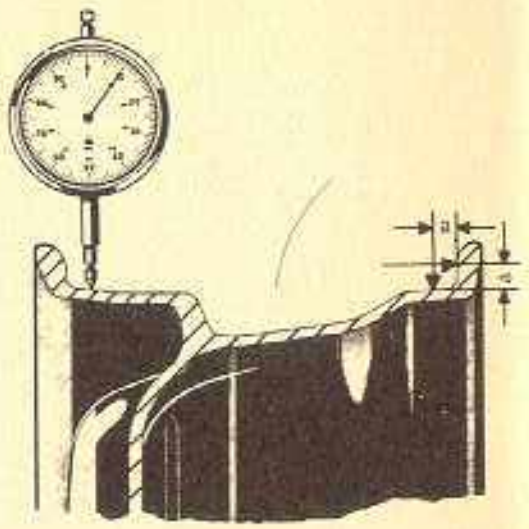
*** Not recommended.

Checking wheel rims

Refer to drawing for lateral and radial runout measuring points on inside of rim.

Max. permissible lateral and radial runout of light alloy rim = 1.0 mm

Max. permissible lateral and radial runout of rim + tire = 1.5 mm



Note:

Straigthening of deformed rims is not permitted.

Distance "a" = 8 mm

Check rim flanges of light alloy wheel rims for wear. Inner rim flange is more subject to wear.

Use a conventional 8 mm radius gage to check, but first remove any sharp edges and burrs.

Wear limit 1 mm. If necessary, replace wheel rim.

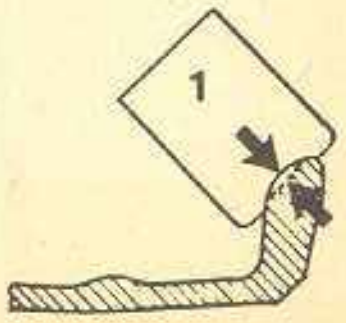
Checking rim flange shape:

——— New condition

- - - - Worn

◗ ◖ Max. wear 1 mm

1 8 mm radius gage



Ignition timing values 911 SC and 911 Turbo

Engine type	911 SC (USA/Japan)	911 SC	911 Turbo (Europe, R.o.W.)
Ignition timing	5° BTDC	25° BTDC	29° BTDC
at engine speed (rpm)	900 ± 50	4000	4000
Vacuum control detached	yes	yes	yes
Ignition timing control	19°...25° BTDC	not above 25° BTDC	0° ± 2° BTDC
at engine speed (rpm)	6000	6000	1000 ± 50
Vacuum control detached	yes	yes	no

911 SC and 911 Turbo

Spark plug survey

		911 SC USA/Japan	911 Turbo All
Spark plugs	Bosch	WR 5 DC	W 3 DP or DPO (W 280 P 21)
	Bosch	WR 5 DP	
	Beru	14-5 DU	
Electrode gap		0.7 + 0.1 mm	0.6 + 0.1 mm

Battery charge condition

	Normal Climates Density	Temperature Protection	Tropics Density
Discharged (dead)	1.12	– 11° C	1.08
Half charged	1.20	– 27° C	1.16
Charged	1.28	– 68° C	1.23

Fuse and relay chart for 911 SC

Fused equipment	Amps
1 Fog lights	25
2 License plate lights, fog light indicator lamp and relay	5
3 Front and rear right marker lights	5
4 Front and rear left marker lights, engine compartment light	5
5 Right low beam headlight	8
6 Left low beam headlight	8
7 Right high beam headlight	8
8 Left high beam headlight, high beam indicator lamp	8
9 Right front turn signal	5
10 Left front turn signal	5
11 Flasher, backup lights	16
12 Rear window defogger relay, heater blower, rear window defogger indicator lamp, automatic heater control	25
13 Windshield wipers, washer pump, cigar lighter	25
14 Electric sliding roof, rear window wiper, outside mirror	16
15 Stop light, tempostat	8
16 Fuel pump	25
17 Hazard lights, windshield defogger	16
18 Courtesy light, clock, glove box light, trunk light	5
19 Headlight cleaners	25
20 Air conditioner blower	25
21 Electric window controls	25
Fuses in engine compartment	
1 Rear window defogger, rear wiper return	25
2 Heater blower	25
3 Heater blower relay	5

Relays in fuse box

I Air conditioner
II Fog lights
III Horn
IV Tempostat
V Window controls
VI Not occupied
VII Fuel pump

Relays in engine compartment

I Single-step rear window defogger
II Heater blower
III Double-step rear window defogger

Fuse and relay chart for 911 Turbo

Fused equipment	Amps
1 Fog lights	16
2 License plate lights, fog light indicator lamp and relay	5
3 Front and rear right marker lights	5
4 Front and rear left marker lights, engine compartment light	5
5 Right low beam headlight	8
6 Left low beam headlight	8
7 Right high beam headlight	8
8 Left high beam headlight, high beam indicator lamp	8
9 Right front turn signal	5
10 Left front turn signal	5
11 Flasher relay, backup lights, outside mirror	16
12 Electric sliding roof, rear window wiper	25
13 Windshield wipers, washer pump, cigar lighter	25
14 Blower, relay and indicator lamp for windshield and rear window defoggers, automatic rear window control	16
15 Stop light	8
16 Fuel pumps	25
17 Hazard lights, windshield defogger	16
18 Courtesy light, clock, glove box light, trunk light	5
19 Headlight cleaners	25
20 Air conditioner blower	25
21 Electric window controls	25
In engine compartment	
Rear window defogger, rear wiper return	25

Relays in fuse box

I Air conditioner
II Fog lights
III Horn
IV Not occupied
V Window controls
VI Fuel pump 1
VII Fuel pump 2

Relays in engine compartment

II Air sensor and charge pressure safety switch
III Rear window defogger
IV Delay relay

Bulb Chart — 911 SC and 911 Turbo

Location	Wattage	Base DIN (SAE)	Remarks
Main headlights H 4	60/55 W	P 43 t-38	
Additional headlights H 3 Front fog lights H 3	55 W	PK 22 S	
Main headlights "AS"	45/40 W	P 45 t	Japan
Stop/tail lights	21/5 W	BAY 15 d	
Turn signals Backup lights Rear fog lights	21 W	BA 15 s	
Side marker lights License plate light	4 W	BA 9 s	
Trunk light	10 W	BA 15 s	
Passenger compartment light Engine compartment light	10 W	SV 8.5-8	
Lamps for instruments and ashtray	2 W	BA 7 s	
Glass base indicator lamp	1.2 W	W 2 × 4.6 d	
License plate light	5 W	BA 15 s	
Side turn signals	5 W	3.5 × 9.5	
Sealed beam headlights (RHD)	60/50 W	(6014)	USA
Sealed beam halogen headlights	60/50 W	(6014)	USA
Stop/tail lights Turn signal/marker lights	32/3 cp	(1034)	USA
Turn signals Backup lights	32 cp	(1073)	USA
Sign light	1.2 W	2.9 × 4.6	USA
Side marker/ license plate light	2 cp	(1895)	USA

Dimensions at curb weight according to DIN

		911 SC	Turbo
Wheelbase	mm	2272	2272
Front track width	mm	1369 (1361)	1432
Rear track width	mm	1379 (1367)	1501
Lenght	mm	4291	4291
Width	mm	1652	1775
Height	mm	1320 (1340)	1310 (1328)

USA values in brackets

Weights

		911 SC R. o. W.	911 SC USA	Turbo R. o. W.	Turbo Canada
Curb weight acc. to DIN	kg	1160	1250	1300	1300
Gross vehicle weight	kg	1500	1550	1680	1600
Max. axle load, front/rear	kg	650/930	650/950	700/1050	675/1000
Max. trailer load					
without brakes*	kg	480	480	—	—
with brakes**	kg	800	800	—	—
Max. roof load (only coupe)*	kg	35	35	35	35

* But without exceeding the gross vehicle weight.
** For gradients up to 16%.

Filling capacities

		911 SC	Turbo
Engine		Brand name heavy duty oil of API Classification SE or SF. SAE 10 W/50, 15 W/40 or 20 W/50 multigrade oil for year around operation. Latter oil not for constant temperatures below –15° C. Only use brand name oils which had been tested and approved by Porsche. Only when multigrade oil is not available and operating conditions are normal, may brand name single-grade oils be used, but then oil must be changed at specified intervals to avoid damage as specified by the season of the year. Use SAE 30 in summer and SAE 20 W in winter (adequate only for temperatures below +5° C).	
Total oil volume of system	ltr. approx.	13	13
Oil change volume	ltr. approx.	10	10
Manual transmission*	ltr. approx.	3	3.7
Fuel tank	ltr. approx.	80	80
Brake fluid tank	ltr. approx.	0.2	0.2
Washing fluid tank	ltr. approx.	8.5	8.5

* SAE 90 of Specification API-GL 5 (or Mil-L 2105 B)

Performances, consumption of fuel and oil

		911 SC	911 Turbo
Top speed with manual transmission	km/h	235 (225 USA)	260
Acceleration 0 – 100 km/h	s	6.8 (7.0 USA)	5.4
Kilometer from standing start	s	26.8 (27.5 USA)	24
Fuel consumption (acc. DIN 70030, part 1)			
at 90 km/h	l/100 km	8.0	8.1
at 120 km/h	l/100 km	9.7	15.3
City test	l/100 km	13.4	20.0
Oil consumption	l/1000 km	approx. 1.5	1.0 – 2.0

Specifications for Air Conditioner

Refrigerant	1350 grams of R 12
Refrigerating oil in compressor	120 ± 20 cc Suniso No. 5 GS
Burst-type seal on tank	Seal bursts at pressure of approx. 40 bar
Power consumption of compressor clutch	Approx. 50 watts

Tightening Torque

Location	Threads	Torque Nm
Compressor – suction conn. – pressure conn.	7/8" × 14 UNF 3/4" × 16 UNF	29 – 37 20 – 28
Condenser – rear	3/4" × 16 UNF	20 – 28
Condenser – front	5/8" × 18 UNF	14 – 20
Fluid tank	5/8" × 18 UNF	14 – 20
Expansion valve Pressure connection	5/8" × 18 UNF	14 – 20
Expansion valve Evaporator connection	3/4" × 16 UNF	20 – 28
Evaporator suction pipe	7/8" × 14 UNF	29 – 37

Safety Regulations for Handling Refrigerant R 12

The employed R 12 refrigerant is known as a safety refrigerant. This means, this refrigerant is not flammable, not explosive, not poisonous, not attacktive, odorless and tasteless. You should still conform with the following points in spite of this.

1. Avoid any contact with refrigerant in liquid or gas state. Concerned skin must be treated as for frostbite. Wear goggles for protection of eyes. Visit a physician immediately, if refrigerant gets in the eyes in-spite of the goggles.
2. System must be discharged when working on an air conditioner. Refrigerant gas must not be discharged in closed rooms. There is danger of asphyxiation in workpits due to fact that it is heavier than air.
3. Never weld on parts of a closed air conditioner or in the immediate vicinity. Regardless of whether the system is filled with refrigerant or not, heat will cause very high pressure which could lead to damage in the system or even an explosion. R 12 is absolutely not poisonous at normal temperatures, however will decompose when in contact with an open flame or at high temperatures and be converted into hydrochloric gas and hydrogen floride. These decomposition products will contain, among others, chloric gas and carbonyl chloride. Precautions must be taken, since these products could be dangerous to health.
4. Refrigerant bottles must not be thrown or, in filled state, be subjected to rays of sunshine or other sources of heat for longer periods of time. The maximum permissible temperature of 45° C for a filled refrigerant bottle must not be exceeded.

Control Dimensions for Floor Assembly 911 SC

Dimension	Description	mm
A	Control arm take-up front inside	565.5 ± 1
B	Auxiliary platform take-up	726 ± 1
C	Front floor plate measuring points	1200 ± 2
D	Rear floor plate measuring points	850 ± 2
E	Engine mounts	752 ± 1
F	Front floor plate – inside control arm take-up measuring point	1327 ± 3
G	Rear floor plate – auxiliary platform take-up measuring point	1868 ± 3
H	Axle tube/transmission take-up – front floor plate measuring point	1550 ± 3
I	Axle tube/transmission take-up – inside engine mount bolting points	1323 ± 5
K	Rear floor plate – inside engine mount bolting measuring point	1557 ± 5
L	Front floor plate – inside control arm take-up measuring point	1041 ± 3
M	Front floor plate – rear floor plate measuring point	1215 ± 2
N	Rear floor plate – engine mount bolting measuring point	1355 ± 3
O	Axle tube/transmission take-up – inside engine mount bolting points	1220 ± 3

All dimensions are measured horizontally from centerline of hole.

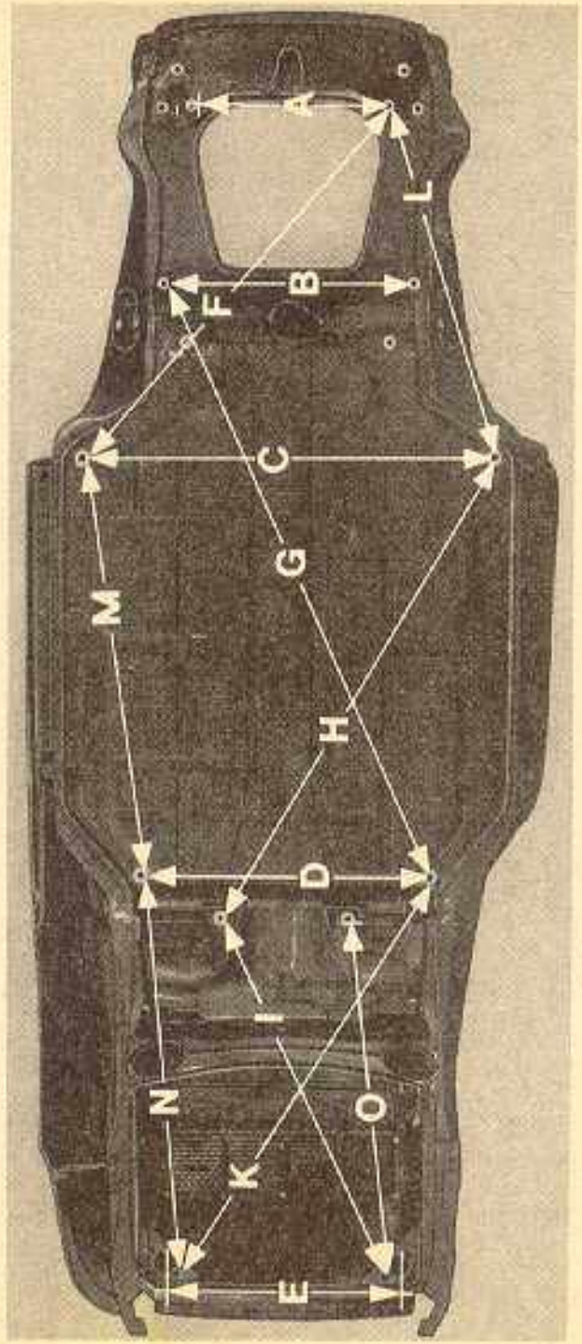
Note:
Dimensions to bolting points of engine mounts are to be measured direct (inclined dimensions).

Important:
The difference between left and right for length dimensions must not exceed specified tolerances.

Control Dimensions for Floor Assembly — 911 Turbo

Dimension	Description	mm
A	Control arm take-up front inside	565.5 ± 2
B	Auxiliary platform take-up	726 ± 1
C	Front floor plate measuring points	1200 ± 2
D	Rear floor plate measuring points	850 ± 2
E	Engine mounts	752 ± 3
F	Front floor plate – inside control arm take-up measuring point	1327 ± 3
G	Rear floor plate – auxiliary platform take-up measuring point	1868 ± 3
H	Axle tube/transmission take-up – front floor plate measuring point	1528.5 ± 3
I	Axle tube/transmission take-up – inside engine mount bolting points	1374 ± 3
K	Rear floor plate – inside engine mount bolt measuring point	1582 ± 3
L	Front floor plate – inside control arm take-up measuring point	1041 ± 3
M	Front floor plate measuring point – rear floor plate measuring point	1215 ± 2
N	Rear floor plate – inside engine mount bolt measuring point	1384 ± 3
O	Axle tube/transmission take-up – inside engine mount bolting points	1273 ± 3

Control Points



Maintenance Schedule

The recommended service intervals apply under normal driving conditions and do not take into consideration all of the optional equipment available. Dusty areas require more frequent checking and possibly replacement of the air filter cartridge. Tire, clutch, and brake wear as well as the condition of the oil in the engine in particular depend greatly on the driving habits and are adversely influenced by extreme operating conditions; this might necessitate shorter intervals for checking and replacement and applies logically also for the item "check battery acid level".

Also, the new moving components of the chassis require an certain running-in period. We recommend, therefore, having an alignment check performed after the first 2000 to 3000 miles / 3000 to 5000 km.

Maintenance service should be carried out at least once a year and precautionary measures against corrosion should be taken before winter. The brake fluid should be renewed every two years.

Service items apply to both 911 SC and 911 Turbo unless model is specified.

300 to 1200 miles/ 500 to 2000 km		then at and every 12000 miles / 20000 km
■	Check valve clearance. At first service, check rocker arm shafts for tightness (when engine cold).	■
	Replace air filter cartridge and check hose connections for tightness. Replace filter cartridge in air pump. **911 SC:** Clean flame protection cartridge in crankcase. **911 Turbo:** Lubricate throttle valve shaft and check for smooth action.	■
	Replace spark plugs.	■

300 to 1200 miles/ 500 to 2000 km		then at and every 12000 miles / 20000 km
	Lubricate control mechanism joints (also necessary after every engine wash). Check control mechanism for smooth action.	■
	Check brake fluid level in reservoir. Check brake pad wear, push rod play between brake pedal and brake booster, free travel of hand and foot brake. Check all pipes, hoses and hose connections for damage and corrosion. Check entire brake system for possible leaks. Check foot and hand brake (road test or testbed run).	■
■	Check clutch play and pedal travel.	■
	Lubricate clutch release lever and secondary spring.	■
■	**911 Turbo:** Check exhaust flange for tightness and entire exhaust system for possible leaks.	■
■	Check condition and tension of V-belts and/or toothed belts.	■
■	Change engine oil, replace engine oil filter. Clean magnetic bolts. Check transmission oil.	■
	Change transmission oil. Clean magnetic bolts.	every 80000 km
■	Check engine, oil reservoir, filter bracket, front oil cooler and transmission for leaks.	■

300 to 1200 miles/ 500 to 2000 km		then at and every 12000 miles / 20000 km
	911 Turbo: Check action of supercharger pressure safety switch.	■
	Steering: Check all connections to steering gear, track rods, pull rods and joints for tightness and good function. Also check bellows for leaks (remove cover plate).	■
■	Check front wheel bearing play.	
■	**911 Turbo:** Check rear wheel bearing play.	■
	Fuel system: Replace fuel filter, check fuel line connections for tightness and leaks. Also check function of fuel pump safety switches.	■
■	Check tire pressure.	■
	Check ignition timing. Check idling setting with exhaust gas analyzer (engine oil temperature of approx. 90° C).	■
	Check battery acid level; check headlight adjustment and operation of turn indicators, stop and rear lights, windshield wipers and horns. Check adjustment of spray nozzles, top up washer reservoir (anti-freeze!).	■
	Treat seals on doors, covers and Targa top and remove abraded rubber. Check door catches, lubricate door hinges.	■
	Check function of heating, ventilation or air-conditioning (driver's and passenger's side).	■

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