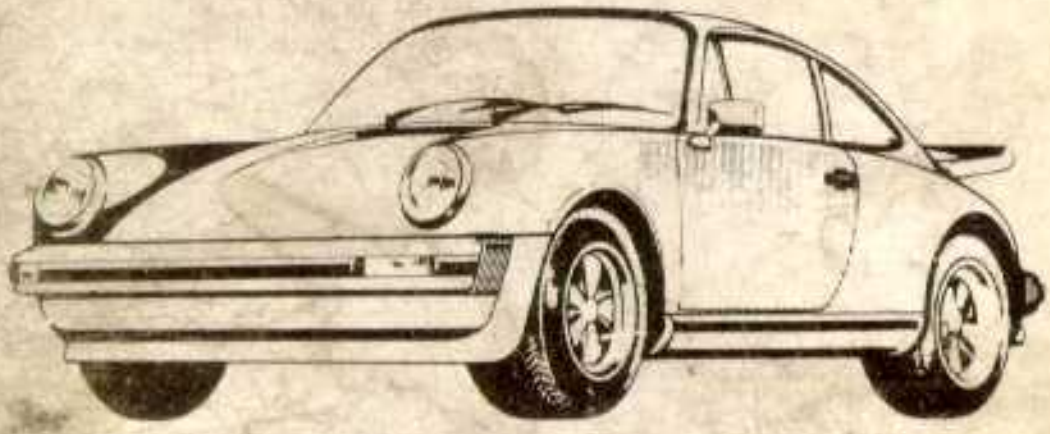
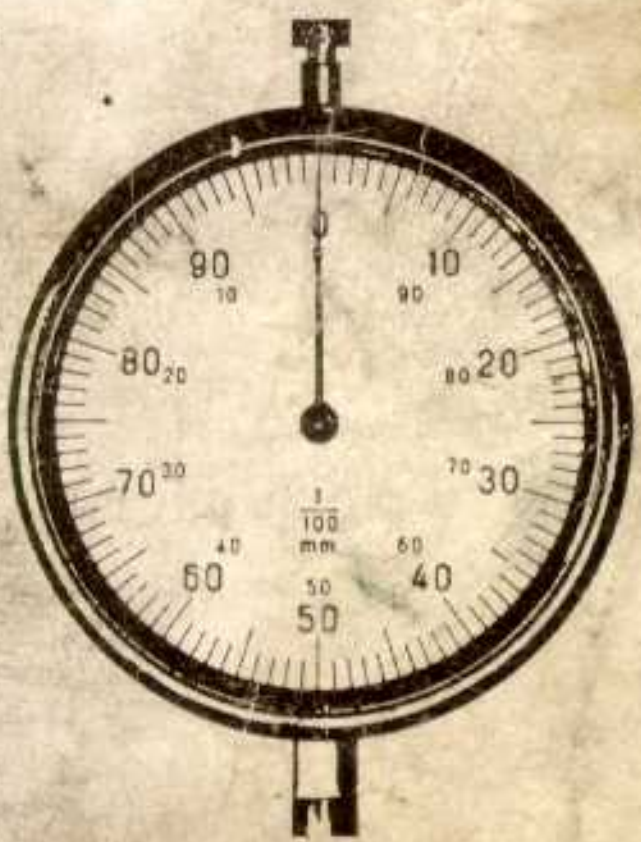
PORSCHE



84, 85
86, 87
Models

911 Carrera, 911 Turbo



Technical Specifications

Contents

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)

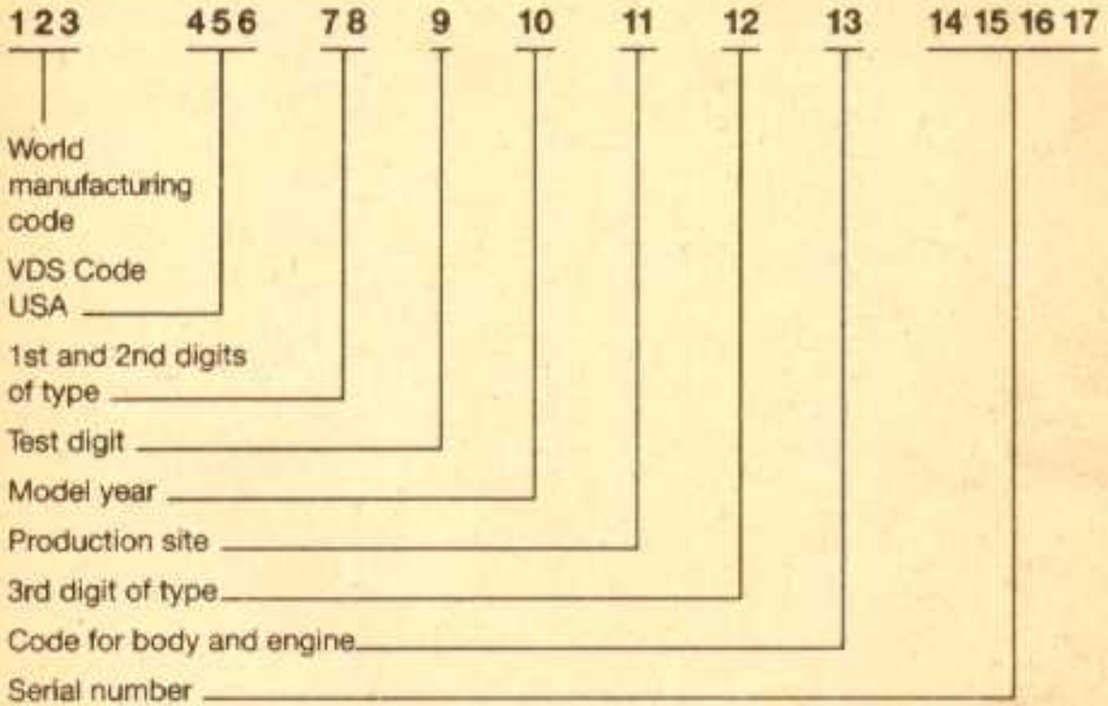
Conversion factors

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 — 1984 model

Explanation of digits:

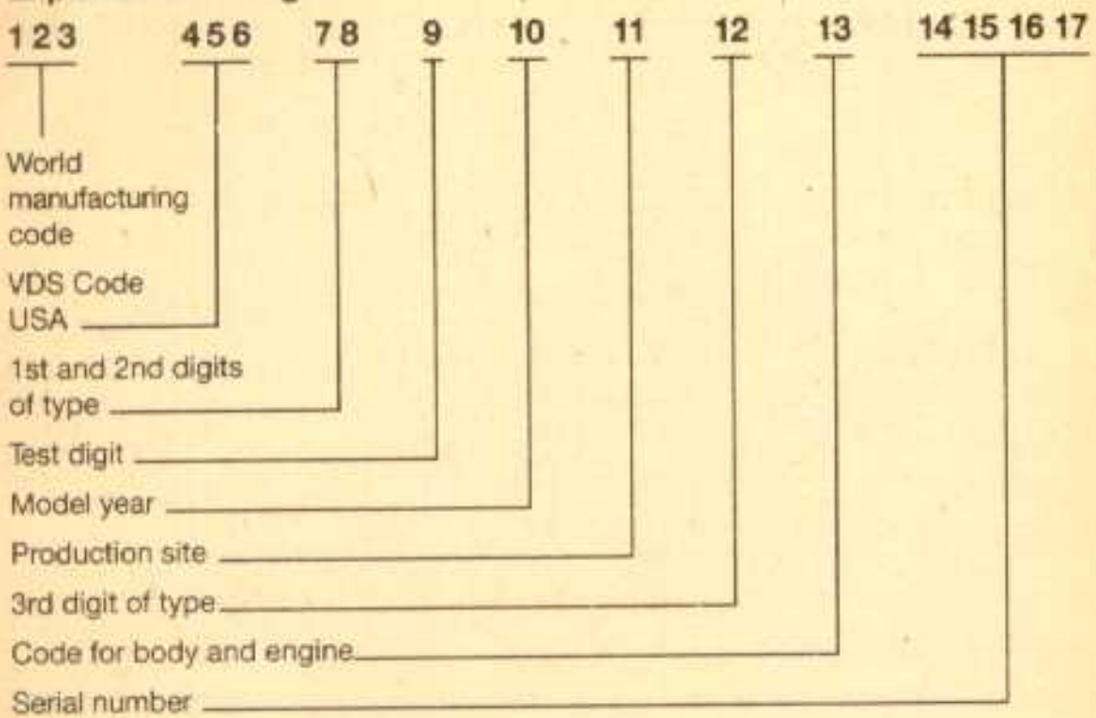


Chassis number ranges

Vehicle type		Engine type	Number range
911 Carrera Coupe	R.o.W.	930/20	WPO ZZZ 91 Z ES 100001 – 5000
911 Carrera Coupe	Japan	930/21	WPO ZZZ 91 Z ES 109501 – 9999
911 Carrera Targa	R.o.W.	930/20	WPO ZZZ 91 Z ES 140001 – 5000
911 Carrera Targa	Japan	930/21	WPO ZZZ 91 Z ES 149501 – 9999
911 Carrera Convertible	R.o.W.	930/20	WPO ZZZ 91 Z ES 150001 – 5000
911 Carrera Convertible	Japan	930/21	WPO ZZZ 91 Z ES 159501 – 9999
911 Carrera Coupe	USA	930/21	WPO ABO 91 – ES 120001 – 5000
911 Carrera Targa	USA	930/21	WPO EBO 91 – ES 160001 – 5000
911 Carrera Convertible	USA	930/21	WPO EBO 91 – ES 170001 – 5000
911 Turbo	R.o.W.	930/66	WPO ZZZ 93 Z ES 000001 – 2000
911 Turbo	Canada	930/66	WPO JAO 93 – ES 050001 – 2000

Chassis numbers — 1985 model

Explanation of digits:

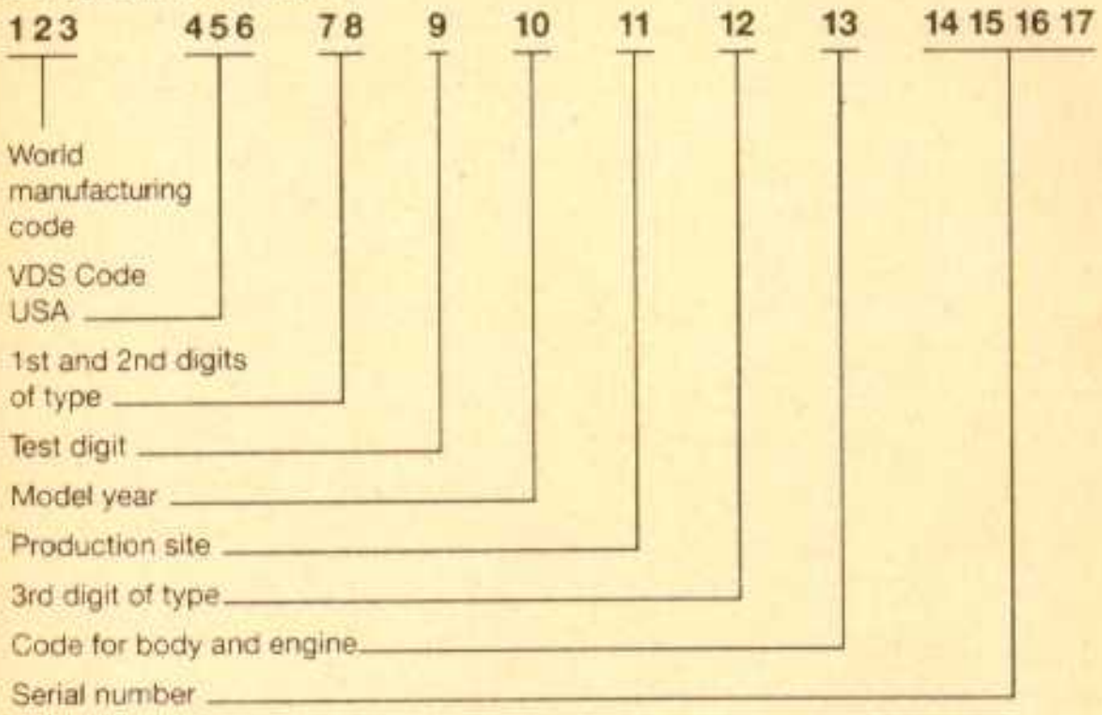


Chassis number ranges

Vehicle type		Engine type	Number range
911 Carrera Coupe	R.o.W.	930/20/26	WPO ZZZ 91 Z FS 100001 – 5000
911 Carrera Coupe	Japan	930/21	WPO ZZZ 91 Z FS 109501 – 9999
911 Carrera Targa	R.o.W.	930/20/26	WPO ZZZ 91 Z FS 140001 – 5000
911 Carrera Targa	Japan	930/21	WPO ZZZ 91 Z FS 149501 – 9999
911 Carrera Convertible	R.o.W.	930/20/26	WPO ZZZ 91 Z FS 150001 – 5000
911 Carrera Convertible	Japan	930/21	WPO ZZZ 91 Z FS 159501 – 9999
911 Carrera Coupe	USA	930/21	WPO ABO 91 – FS 120001 – 5000
911 Carrera Targa	USA	930/21	WPO EBO 91 – FS 160001 – 5000
911 Carrera Convertible	USA	930/21	WPO EBO 91 – FS 170001 – 5000
911 Turbo	R.o.W.	930/66	WPO ZZZ 93 Z FS 000001 – 2000
911 Turbo	Canada	930/66	WPO JAO 93 – FS 050001 – 2000

Chassis numbers — 1984 model

Explanation of digits:



Chassis number ranges

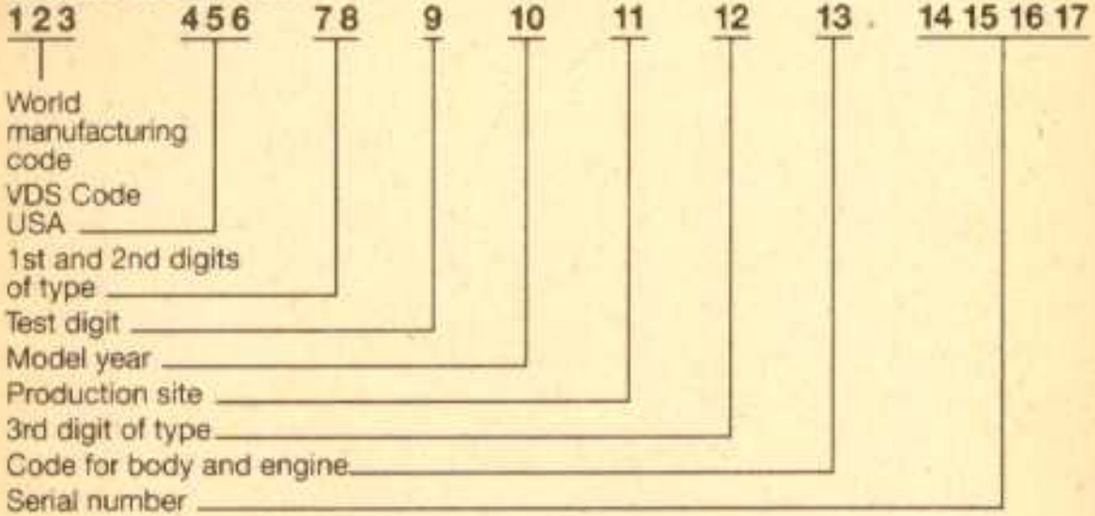
Vehicle type		Engine type	Number range
911 Coupe	R.o.W.	930/20, 26, 21	WPO ZZZ 91 Z GS 100001 – 5000
911 Coupe	Japan	930/21	WPO ZZZ 91 Z GS 109501 – 9999
911 Targa	R.o.W.	930/20, 26, 21	WPO ZZZ 91 Z GS 140001 – 5000
911 Targa	Japan	930/21	WPO ZZZ 91 Z GS 149501 – 9999
911 Convertible	R.o.W.	930/20, 26, 21	WPO ZZZ 91 Z GS 150001 – 5000
911 Convertible	Japan	930/21	WPO ZZZ 91 Z GS 159501 – 9999
911 Coupe	USA	930/21	WPO ABO 91 – GS 120001 – 5000
911 Targa	USA	930/21	WPO EBO 91 – GS 160001 – 5000
911 Convertible	USA	930/21	WPO EBO 91 – GS 170001 – 5000
911 Turbo	R.o.W.	930/66	WPO ZZZ 93 Z GS 000001 – 2000
911 Turbo	Canada	930/66	WPO JAO 93 – GS 055001 – 7000
911 Turbo US	USA	930/68	WPO JBO 93 – GS 050001 – 2000

Vehicle Identification Numbers — 1987 model

Information:

German legislation has changed the designation "chassis number" to **vehicle identification number** (abbreviated: Vehicle Ident. No.) for conformance with international agreements.

Vehicle Ident. No.:



Vehicle Ident. No. Ranges

Vehicle type		Engine type	Number range
911 Coupe	R.o.W.	930/20, 25, 26	WPO ZZZ 91 Z HS 10 0001 – 5000
911 Coupe	R.o.W.(M 637)	930/20, 25, 26	WPO ZZZ 91 Z HS 10 5001 – 5300
911 Coupe	Japan	930/25	WPO ZZZ 91 Z HS 10 9501 – 9999
911 Targa	R.o.W.	930/20, 25, 26	WPO ZZZ 91 Z HS 14 0001 – 5000
911 Targa	Japan	930/25	WPO ZZZ 91 Z HS 14 9501 – 9999
911 Convertible	R.o.W.	930/20, 25, 26	WPO ZZZ 91 Z HS 15 0001 – 5000
911 Convertible	Japan	930/25	WPO ZZZ 91 Z HS 15 9501 – 9999
911 Coupe	USA	930/25	WPO ABO 91 – HS 12 0001 – 5000
911 Coupe	USA (M 637)	930/25	WPO ABO 91 – HS 12 5001 – 5300
911 Targa	USA	930/25	WPO EBO 91 – HS 16 0001 – 5000
911 Convertible	USA	930/25	WPO EBO 91 – HS 17 0001 – 5000
911 Turbo	R.o.W.	930/66	WPO ZZZ 93 Z HS 00 0001 – 2000
911 Turbo	Canada	930/66	WPO JAO 93 – HS 05 0001 – 7000
911 Turbo	USA	930/68	WPO JBO 93 – HS 05 0001 – 5000
911 Turbo Conv.	R.o.W.	930/66	WPO ZZZ 93 Z HS 02 0001 – 2000
911 Turbo Conv.	USA	930/68	WPO EBO 93 – HS 07 0001 – 2000
911 Turbo Conv.	Canada	930/66	WPO EAO 93 – HS 07 5001 – 7000
911 Turbo Targa	R.o.W.	930/66	WPO ZZZ 93 Z HS 01 0001 – 2000
911 Turbo Targa	USA	930/68	WPO EBO 93 Z HS 06 0001 – 2000
911 Turbo Targa	Canada	930/66	WPO EAO 93 Z HS 06 5001 – 7000
911 Turbo "B"	R.o.W./959	959/50	WPO ZZZ 95 Z HS 90 0001 – 1000

1984 model

3 — Model year E = 1984

4 5 6 7 8 — Serial number

Engine numbers (8 digits)

Explanation of digits Example: 63 E 27011

2 — Engine types: 3 = 911 Carrera R.o.W.; 4 = 911 Carrera USA; 7 = 911 Turbo R.o.W./Canada

1 — Unit type: 6 = 6 cyl. engine

Engine number ranges

Engine type	Technical data	Installed in model	Number range
930/20	3.2 l 170 kW	911 Carrera R.o.W.	63 E 00001 – 10000
930/21	3.2 l 150 kW	911 Carrera USA/Japan	64 E 00001 – 10000
930/66	3.3 l 221 kW	911 Turbo R.o.W. and Canada	67 E 00001 – 10000

1985 model

3 — Model year F = 1985

4 5 6 7 8 — Serial number

Engine numbers (8 digits)

Explanation of digits Example: 63 F 27011

2 — Engine types: 3 = 911 Carrera R.o.W.; 4 = 911 Carrera USA/FRG – M 298; 7 = 911 Turbo R.o.W./Canada

1 — Unit type: 6 = 6 cyl. engine

Engine number ranges

Engine type	Technical data	Installed in model	Number range
930/20	3.2 l 170 kW	911 Carrera R.o.W.	63 F 00001 – 10000
930/21	3.2 l 150 kW	911 Carrera USA/Japan/FRG – M 298	64 F 00001 – 10000
930/26	3.2 l 170 kW	911 Carrera Sweden/Switzerland/Australia	63 F 10001 – 11000
930/66	3.3 l 221 kW	911 Turbo R.o.W. and Canada	67 F 00001 – 01000

Engine numbers (8 digits) — 1986 model

Explanation of digits Example: 63 G 26012

1	2		3	4 5 6 7 8
Unit type	Engine types		Model year	Serial number
6 = 6 cyl. engine	3 = 911 Carrera	R. o. W.	G = 1986	
	4 = 911 Carrera	USA/R. o. W. M 298		
	7 = 911 Turbo	R. o. W./Canada		
	8 = 911 Turbo	USA		

Engine number ranges

Engine type	Technical data	Installed in model		Number range
930/20	3.2 l 170 kW	911	R. o. W.	63 G 00001 – 10000
930/21	3.2 l 152 kW	911	USA/Japan M 298	64 G 00001 – 10000
930/26	3.2 l 170 kW	911	Sweden, Switzerland, Australia	63 G 10001 – 11000
930/66	3.3 l 221 kW	911 Turbo	R. o. W./Canada	67 G 00001 – 01000
930/68	3.3 l 208 kW	911 Turbo	USA	68 G 00001 – 02000

Engine numbers (8 digits) — 1987 model

Explanation of digits Example: 63 H 26012

1	2		3	4 5 6 7 8
Unit type	Engine types		Model year	Serial number
6 = 6 cyl. engine	3 = 911 Carrera	R. o. W.	H = 1987	e. g. 26012
	4 = 911 Carrera with M 298	R. o. W. USA		
	5 = 959 Group „B"			
	7 = 911 Turbo	R. o. W./Canada		
	8 = 911 Turbo	USA		

Engine number ranges

Engine type	Technical data	Installed in model		Number range
930/20	3.2 l 170 kW	911	R. o. W.	63 H 00001 – 10000
930/25	3.2 l 160 kW	911	USA/Japan M 298	64 H 00001 – 10000
930/26	3.2 l 170 kW	911	Sweden	63 H 10001 – 11000
930/66	3,3 l 221 kW	911 Turbo	R. o. W./Canada	67 H 00001 – 05000
930/68	3,3 l 210 kW	911 Turbo	USA	68 H 00001 – 05000

Transmission numbers (8 digits) — 1984 model

Explanation of digits Example: 73 D 34951

1	2		3	4 5 6 7 8
Unit type	Transmission types		Model year	Serial number
7 = Transmission for 6 cyl.	3 = 5-speed 911 4 = 5-speed 911 7 = 911 Turbo	R. o. W. USA, Japan	E = 1984	

Transmission number ranges

Transmission type	Technical data	Installed in model		Number range
915/67	5-speed	911 Carrera	R. o. W.	73 E 00001 – 10000
915/68	5-speed	911 Carrera	USA/Japan	74 E 00001 – 10000
930/34	4-speed	911 Turbo		77 E 00001 – 02000
915/69	5-speed	911 Carrera (Turbo Look)	R. o. W.	73 E 10001 – 11000
915/70	5-speed	911 Carrera (Turbo Look)	USA/Japan	74 E 10001 – 11000

Transmission numbers (8 digits) — 1985 model

Explanation of digits Example: 73 F 34951

1	2		3	4 5 6 7 8
Unit type	Transmission types		Model year	Serial number
7 = Transmission for 6 cyl.	3 = 5-speed 911 4 = 5-speed 911 7 = 911 Turbo	R. o. W. USA/Japan/FRG – M 298	F = 1985	

Transmission number ranges

Transmission type	Technical data	Installed in model		Number range
930/36/37	4-speed	911 Turbo	R. o. W./Canada/Switzerl.	77 F 00001 – 02000
915/72	5-speed	911 Carrera	R. o. W.	77 F 00001 – 10000
915/73	5-speed	911 Carrera	USA/Japan/FRG – M 298	74 F 00001 – 02000

Transmission numbers (8 digits) — 1986 model

Explanation of digits Example: 73 G 34953

1	2		3	4 5 6 7 8
Unit type	Transmission types		Model year	Serial number
7 = Transmission for 6 cyl.	3 = 5-speed 911 4 = 5-speed 911 7 = 911 Turbo	R. o. W. USA/Japan	G = 1986	

Transmission number ranges

Transmission type	Technical data	Installed in model		Number range
915/72	5-speed	911	R. o. W.	73 G 00001 – 10000
915/73	5-speed	911	USA/Japan M 298	74 G 00001 – 10000
930/36/37	4-speed	911 Turbo	Canada/USA/R. o. W. Switzerland	77 G 00001 – 02000

Transmission numbers (8 digits) — 1987 model

Explanation of digits Example: 73 H 34953

1	2		3	4 5 6 7 8
Unit type	Transmission types		Model year	Serial number
7 = Transmission for 6 cyl.	3 = 5-speed 911 4 = 5-speed 911 5 = 6-speed 959 7 = 4-speed 911	R. o. W. USA/Japan M 298 Group "B" Turbo	H = 1987	e. g. 34953

Transmission number ranges

Transmission type	Technical data	Installed in model		Number range
950/00	5-speed	911	R. o. W.	73 H 00001 – 20000
950/01	5-speed	911	USA/Japan M 298	74 H 00001 – 20000
950/02	5-speed	911	Switzerland	73 H 20001 – 25000
930/36	4-speed	911 Turbo		77 H 00001 – 10000

Information:
A twelve (12) between type and transmission numbers indicates that transmission is fitted with a limited slip differential (40 %).

Engine type designations

Year Mfd.	Model Year	Engine Type Designation Official
1983/84	**1984**	911 Carrera 911 Carrera 911 Turbo
1984/85	**1985**	911 Carrera 911 Carrera 911 Carrera
		911 Turbo
1985/86	**1986**	911 Carrera 911 Carrera 911 Carrera
		911 Turbo
		911 Turbo
1986/87	**1987**	911 Carrera 911 Carrera
		911 Carrera
		911 Carrera 911 Turbo 911 Turbo

Transmission survey – 911 Carrera
Five speed manual transmission

1984 model

Transmission Type	Technical Data	Installed in Vehicle Type	Transmission Number Range
915/67	5-speed with oil cooling	911 Europe/R. o. W.	73 E 00001 – 10000
915/68	5-speed without oil cooling	911 USA/Japan	74 E 00001 – 10000
915/69	5-speed with oil cooling	911 Europe/R. o. W. (Turbo Look)	73 E 10001 – 11000
915/70	5-speed without oil cooling	911 USA/Japan (Turbo Look)	74 E 10001 – 11000

1985 model

Transmission Type	Technical Data	Installed in Vehicle Type	Transmission Number Range
915/72	5-speed with oil cooling	911 Europe/R. o. W.	73 F 00001 – 10000
915/73	5-speed without oil cooling	911 USA/Japan	74 F 00001 – 10000
		911 Europe/R. o. W. (M 298 unleaded)	

1986 model

Transmission Type	Technical Data	Installed in Vehicle Type	Transmission Number Range
915/72	5-speed with oil cooling	911 Europe/R. o. W.	73 G 00001 – 10000
915/73	5-speed without oil cooling	911 USA/Japan	74 G 00001 – 10000
		911 Europe/R. o. W. (M 298 unleaded)	

General Data	Manual Transmission 915	
Ratios	915/67, 915/69, 915/72	915/68, 915/70, 915/73
1st gear	11 : 35 i = 3.1818	11 : 35 i = 3.1818
2nd gear	18 : 33 i = 1.8333	18 : 32 i = 1.7777
3rd gear	23 : 29 i = 1.2608	23 : 29 i = 1.2608
4th gear	29 : 28 i = 0.9655	26 : 26 i = 1.0000
5th gear	38 : 29 i = 0.7631	38 : 30 i = 0.7895
Reverse gear	12:21 - 20:38 i = 3.3250	12:21 - 20:38 i = 3.3250
Final drive ratio	8 : 31 i = 3.8750	
Filling capacity	Approx. 3.1 ltr. (or approx. 3.0 ltr. without cooling pipe coil) of SAE 90 gear lube to API Classification GL 5 (or MIL-L 2105 B)	

Transmission Survey – 911 Turbo
Four Speed Manual Transmission Type 930

1984 Model

Transmission Type	Technical Data	Installed in Vehicle Type	Transmission Number Range
930/34 930/35		R. o. W./Canada Switzerland	77 E 00001 – 02000 77 E 00001 – 02000

1985 Model

Transmission Type	Technical Data	Installed in Vehicle Type	Transmission Number Range
930/36 930/37		R. o. W./Canada Switzerland	77 F 00001 – 02000 77 F 00001 – 02000

1986 Model

Transmission Type	Technical Data	Installed in Vehicle Type	Transmission Number Range
930/36 930/37		R. o. W./USA/Can. Switzerland	77 G 00001 – 02000 77 G 00001 – 02000

1987 Model

Transmission Type	Technical Data	Installed in Vehicle Type	Transmission Number Range
930/36		Worldwide	77 H 00001 – 10000

Five Speed Manual Transmission Type G 50 (950) since 911 Carrera 1987 Model

Transmission Type	Technical Data	Installed in Vehicle Type	Transmission Number Range
950/00	5-speed	911 Europe/R. o. W.	73 H 00001 – 20000
950/01	5-speed	911 USA/Japan M 298	74 H 00001 – 20000
950/02	5-speed	911 Switzerland	73 H 20001 – 25000

General Data	Manual Transmission G 50		
Ratios	950/00	950/01	950/02
1st gear	12 : 42 i = 3.500	12 : 42 i = 3.500	13 : 41 i = 3.154
2nd gear	17 : 35 i = 2.059	17 : 35 i = 2.059	19 : 36 i = 1.895
3rd gear	22 : 31 i = 1.409	22 : 31 i = 1.409	24 : 32 i = 1.333
4th gear	27 : 29 i = 1.074	32 : 36 i = 1.125	28 : 29 i = 1.036
5th gear	36 : 31 i = 0.861	36 : 32 i = 0.889	36 : 31 i = 0.861
Reverse gear	40 : 21 : 14 i = 2.857	40 : 21 : 14 i = 2.857	40 : 21 : 14 i = 2.857
Final drive ratio	9 : 31 i = 3.444	9 : 31 i = 3.444	9 : 31 i = 3.444
Filling capacity	Approx. 3 liters of SAE 75 W 90 gear lube to API Classification GL 5 (or MIL-L 2105 B)		

Specifications – 911 Carrera — 1984/85/86 Models

Engine		911 Carrera	
Internal engine code		930/20/26	930/21 USA, Japan
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	74.4/2.93	74.4/2.93
Total displacement	cm^3/$inch^3$	3164/193.1	3164/193.1
Compression ratio		10.3 : 1	9.5 : 1
Max. engine power to DIN 70020	kW/HP	170/231	152/207
Net power to SAE J 1349	kW/HP	166/223	149/200
at engine speed	rpm	5900	5900
Max. torque to DIN 70020	Nm/kpm	284/28,6	260/26,5
Net torque to SAE J 1349	Nm/ft lbs	278/276	251/185
at engine speed	rpm	4800	4800
Max. liter output to DIN 70020	kW/1, HP/1	53.7/73.0	48/65.4
to SAE J 1349	kW/1, HP/1	53/75	46/62
Max. permissible speed	rpm	6520	6520

Specifications – 911 Carrera — 1987 Model

Engine		911 Carrera		
Internal engine code		930/20/26 FRG without Cat. Sweden with secondary air pump	930/25 Australia with modified control unit	930/25 A, CH, I, USA M-equipment 298, FRG
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	74.4/2.93	74.4/2.93	74.4/2.93
Total displacement	cm^3/$inch^3$	3164/193.1	3164/193.1	3164/193.1
Compression ratio		10.3 : 1	9.5 : 1	9.5 : 1
Max. engine power to 80/1269 EC	kW/HP	170/231	152/207	160/217
Net power to SAE J 1349	kW/HP	166/223	149/200	
at engine speed	rpm	5900	5900	5900
Max. torque to 80/1269 EC	Nm/kpm	284/28.6	260/26.5	265/27.0
Net torque to SAE J 1349	Nm/ft lbs	278/276	251/185	265/195
at engine speed	rpm	4800	4800	4800
Max. liter output to 80/1269 EC	kW/1, HP/1	53.7/73.0	48/65.4	50.6/68.6
to SAE J 1349	kW/1, HP/1	53/75	46/62	50.6/67.6

Engine Internal engine code		911 Carrera 930/20/26	930/21/25
Cut-off speed			
Speed governed by at	rpm	6520 ± 50	6520 ±
Engine weight (dry)	approx. kg/lbs	219/483	220/485
Cooling system		Air-cooling from axial blower on alternator	
Blower drive		By v-belt off of crankshaft	
Crankshaft/blower ratio		1 : 1.67	1 : 1.67
Air delivery rate		1500 l/s at 6000 rpm crankshaft speed	1500 l/s at 6000 rpm crankshaft speed
Drive belt size		9.5 × 710	9.5 × 710

Engine Internal engine code		911 Carrera 930 (all engine types)
Lubricating system Oil cooling		Dry sump lubricating Oil cooler on crankcase in blower air stream, plus pipe oil cooler at front right (plate oil cooler since 1985 models)
Oil pressure at 90° C oil temperature and speed of 5000 rpm	bar	approx. 4.0
Oil consumption	l/1000 km	approx. 1.5
Crankcase		Two-piece aluminum alloy
Crankshaft		Forged (tenifer treated)
Crankshaft bearings		Eight plain bearings
Connecting rods		Forged (Steel)
Connecting rod bearings		Plain bearing half shells
Piston pin bearing in conrod		Press-fit bronze bush
Intermediate shaft bearings		Two plain bearings
Pistons		Light alloy pistons, forged pistons from Mahle, cast pistons from KS
Piston pin		Floating installation, held by circlips
Piston rings		2 compression rings, 1 oil scraper ring

Engine Internal engine code	911 Carrera 930 (all engine types)
Cylinders	Nikasil (Mahle) or 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 Exhaust	0.1 mm measured between valve and rocker arm
Fuel supply	DME (Digital Motor Electronics) 1 electric roller cell pump

Specifications – Engine

911 Turbo

Engine Internal engine code		911 Turbo R. o. W. 930/66	911 Turbo USA 930/68
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 to 80/1269 EC	kW/HP	221/300	
Net power to SAE J 1349	kW/HP		210/282
at engine speed	rpm	5500	5500
Max. torque to 80/1269 EC	Nm/kpm	430/43.8	
Net torque to SAE J 1349	Nm/ft lbs		390/288
at engine speed		4000	4000
Max. liter output	kW/1, HP/1	67.0/90.9	
to SAE J 1349	kW/1, HP/1		63.7/85.5

Engine Internal engine code		911 Turbo 930/66	930/68
Max. permissible constant speed	rpm	6000	6000
Speed governed by		Ignition shutoff	Fuel pump shutoff
at engine speed	rpm	7000 + 200 – 100	7000 + 200 – 100
Engine weight (dry)	kg/lbs	269/593	279/615
Fuel octane	RON/MON	98/88 (leaded premium grade gasoline to DIN 51 600)	96 RON (unleaded)

Engine		911 Turbo
Internal engine code		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 : 1.67
Air delivery rate		1500 l/s at 6000 rpm crankshaft speed
Blower drive belt size		9.5 × 710
Lubricating system		Dry sump lubrication
Oil cooling		Oil cooler on crankcase in blower air stream, plus pipe oil cooler (plate oil cooler since 1985 models)
Oilpressure at 90° C oil temperature and 5000 rpm engine speed	bar	approx. 4.5
Oil consumption	l/1000 km	approx. 1.0 – 2.0
Crankcase		Two-piece aluminum alloy
Crankshaft		Forged (tenifer treated)
Crankshaft bearings		Eight plain bearings
Connecting rods		Forged (steel)

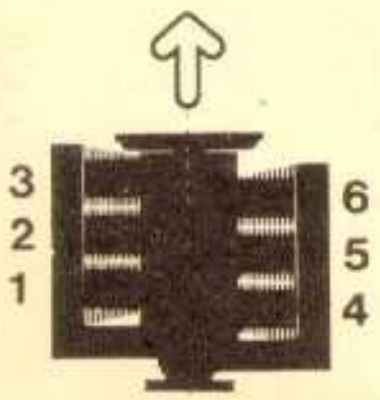
Engine	911 Carrera
Internal engine code	930 (all engine types)
Connecting rod bearings	Plain bearings half shells
Piston pin bearing in conrod	Press-fit bronze bush
Intermediate shaft bearing	Two plain bearings
Pistons	Forged alloy (Mahle)
Piston pins	Floating installation, held by circlips
Piston rings	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		911 Turbo
Internal engine code		930 (all engine types)
Valve clearance on cold engine		
Intake		0.1 mm measured between valve and rocker arm
Exhaust		
Clutch		Single plate dry type, pulled version
Diameter (manual transmission)	mm	240
Contact pressure	N (kp)	11200 – 12100 (1142 – 1233)
Fuel supply		K-Jetronic (CIS) 2 electric roller cell pumps in series
Supercharging		KKK exhaust gas turbocharger, charging pressure regulation by bypass valve, charging air cooling

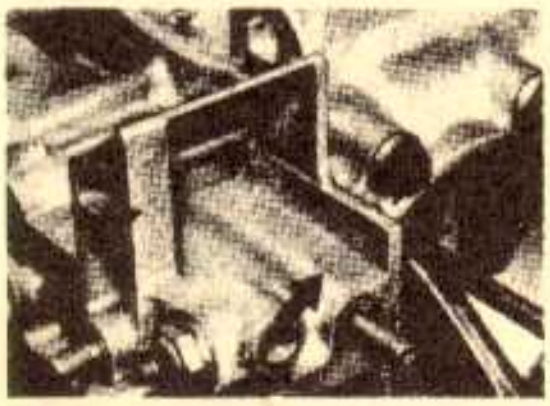
Electrical system		
Battery voltage	V	12
Battery capacity	Ah	66 (88 optional extra)
Alternator/output	A/W	90/1260
Regulator switch		Matched to alternator
Ignition 911 Turbo		CDI without contacts
911 Carrera		DME (Digital Motor Electronics)
Ignition transformer		Bosch
Firing order		1 - 6 - 2 - 4 - 3 - 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 Carrera and 911 Turbo

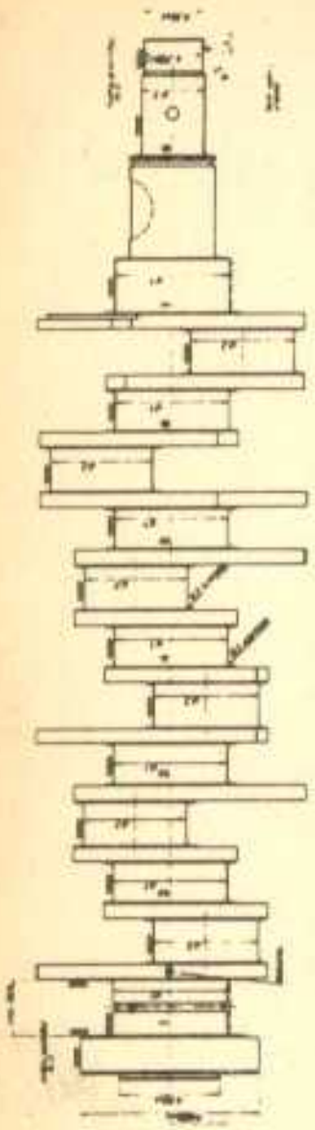
Note: B = bore W = width

Measuring Point	Installation Size with Tolerances mm	Clearance (+) or Press-fit (–) from	to	Wear Limits 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 W54.971–54.990	+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 lateral runout				Max. 0.15 Max. 0.20

Crankshaft – Standard and Repair Sizes – 911 Carrera and 911 Turbo

Size	Crankcase Diameter Bearings 1...8	All Main Bearings d 1	Conrod Bearings d 2	Main Bearing Dia. d 3 of Crankshaft Bearing 8
Standard	Standard 65.000...65.019 Oversize 65.250...65.269	59.971...59.990	54.971...54.990	30.980...30.993
–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
–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

Size	Collar Dia. d 4	Timing Gear Seat Dia. d 5	Crankshaft Pulley Dia. d 6	Thrust Bearing Width A
Standard	89.780...90.000	42.002...42.013	29.960...29.993	28.000...28.060
–0.25 –0.50 –0.75 –1.00	89.780...89.800		29.670...29.800	



Only grind bearing surfaces for radial oil seals to 29.8 and 89.8 mm as specified here when scoring is too deep.

Otherwise repolish as necessary: 3 microns.

After grinding give oil bores a 0.5 mm 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 90 W PN 1053.

Never straighten main bearings 3 and 5 after tenifer treatment.

Straightening of the other main bearings 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

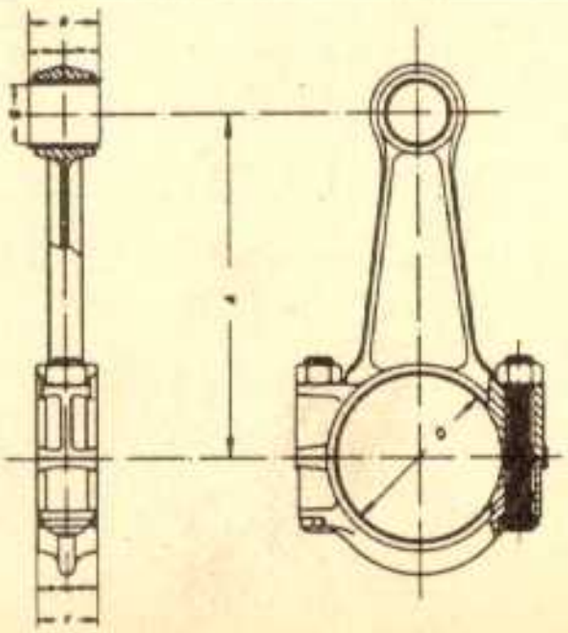
Measuring Point	Installation Size with Tolerances mm	Clearance (+) or Press-fit (–) from to	Wear Limit mm
Crankcase			
Case bore for main bearings:			
Bearings 1 – 8	65.000 – 65.019		
Oversize	65.250 – 65.269		
Case bore for intermediate shaft:			
Bearing 1 (thrust bearing)	27.500 – 27.521		
Bearing 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.

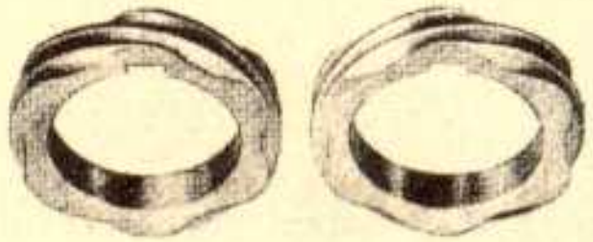
Measuring Point	Installation Size with Tolerances mm 911 Carrera + 911 Turbo	Clearance (+) or Press-fit (–) from mm	to mm	Wear Limit mm
Connecting Rods				
A Distance between centers	126.95 – 127.00			
b Width of conrod bush	24.5 – 25.0			
c Width at big end	21.7 – 21.8			
since '86 model	21.85 – 21.9			
Bearing width at crankpin	22.00 – 22.05	+0.200 +0.100	+0.350 +0.200	
D Conrod dia. (without bearing shell)	58.000 – 58.019			
G Conrod bush dia. installed in conrod (finished)	23.020 – 23.033			
Conrod bush/piston pin clearance		+0.020	+0.037	0.055



Installing drive gear for right-hand and left-hand turning distributor on crankshaft

Remarks:
From 1984 models on Carrera engines use a right-hand turning distributor and therefore a new drive gear with modified teeth on the crankshaft.
911 Turbo cars still use a left-hand turning distributor.

Turbo



Carrera

Part No. 930 102 115 01
For left-hand turning distributor (with Porsche manufacturing code stamped)

Part No. 930 102 112 00
For right-hand turning distributor (with Porsche manufacturing code and part number die-stamped)

Installed position: Porsche emblem faces pulley.

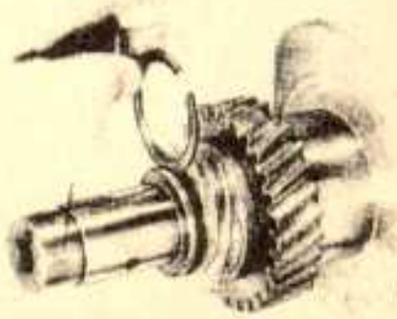
Installing circlips on crankshaft

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

The following circlips are available:

Part Number	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	2.1 mm	3

Install timing gear, intermediate ring and drive gear on crankshaft against stop. Find correct circlip thickness by inserting different circlips. Circlips must be installed without play.



Connecting rod weight groups – 911 Carrera and 911 Turbo

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	Weight Under grams	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.

Conrod codes for service parts are inscribed electrically.

Matching intermediate shaft and crankcase

Gears and crankcase may only be matched with each other as shown in the table below.

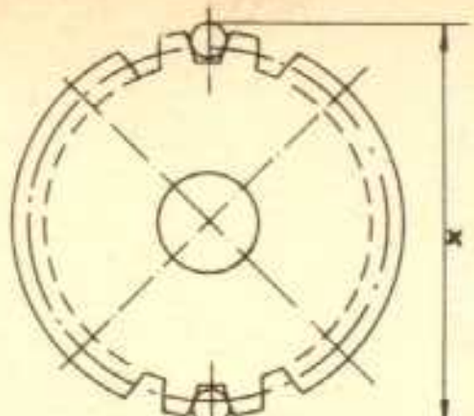
Code (0 or 1) is die-stamped on left-hand side of crankcase below the alternator holder.

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

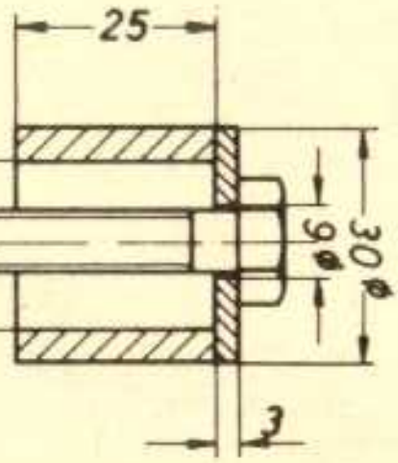
Checking

1. Inspect intermediate shaft gear for wear. Measure intermediate shaft gear with help of 4.5 mm diameter steel rollers.



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.



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.

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			
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				
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	

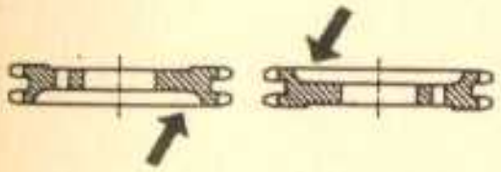
Measuring point	Installation size with tolerances mm	Clearance (+) or press-fit (–) from	to	Wear limits mm
Camshaft housing – camshaft				
Camshaft bearings	B 48.967 – 48.992	+0.025	+0.066	0.10
Camshaft	W 48.926 – 48.942			
Camshaft – axial play		+0.150	+0.200	0.40
Camshaft – sprocket flange	B 30.000 – 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 sprockets

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.

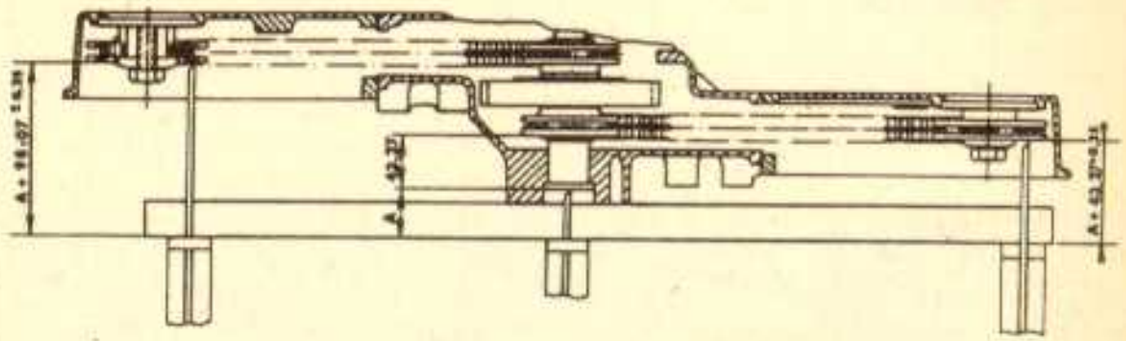
Sprockets are adjusted by installing or removing shims, Part No. 901.105.561.00, 0.5 mm shim thickness. Normally 3 shims will be required underneath the left sprocket (cylinder bank 1 - 3) and 4 shims underneath the right sprocket (cylinder bank 4 - 6).

Adjustment

1. Measure distance "A" from front edge of crankcase or a steel ruler to face of intermediate shaft.

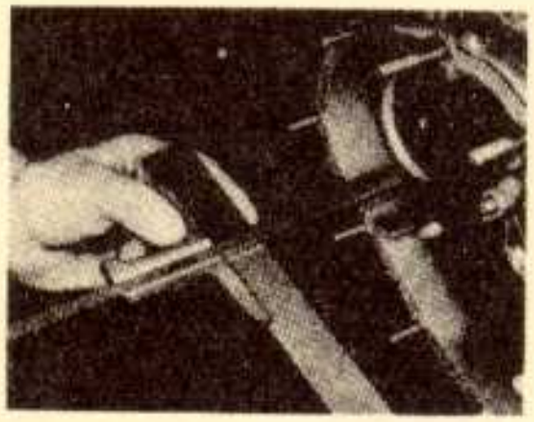
Design size of drive gears on intermediate shaft:
from face of intermediate shaft –
to face of rear intermediate shaft sprocket (cylinders 1 - 3) = 98.07 mm or
to face of front intermediate shaft sprocket (cylinders 4 – 6) = 43.27 mm

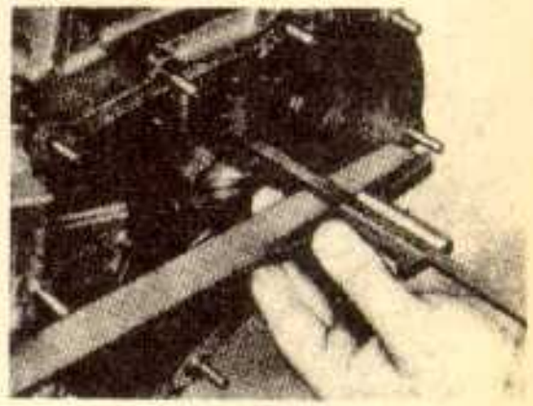
Design size + measured distance "A" produce position of sprockets on camshafts (max. permissible deviation ± 0.25 mm).



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 1 - 4 we then have

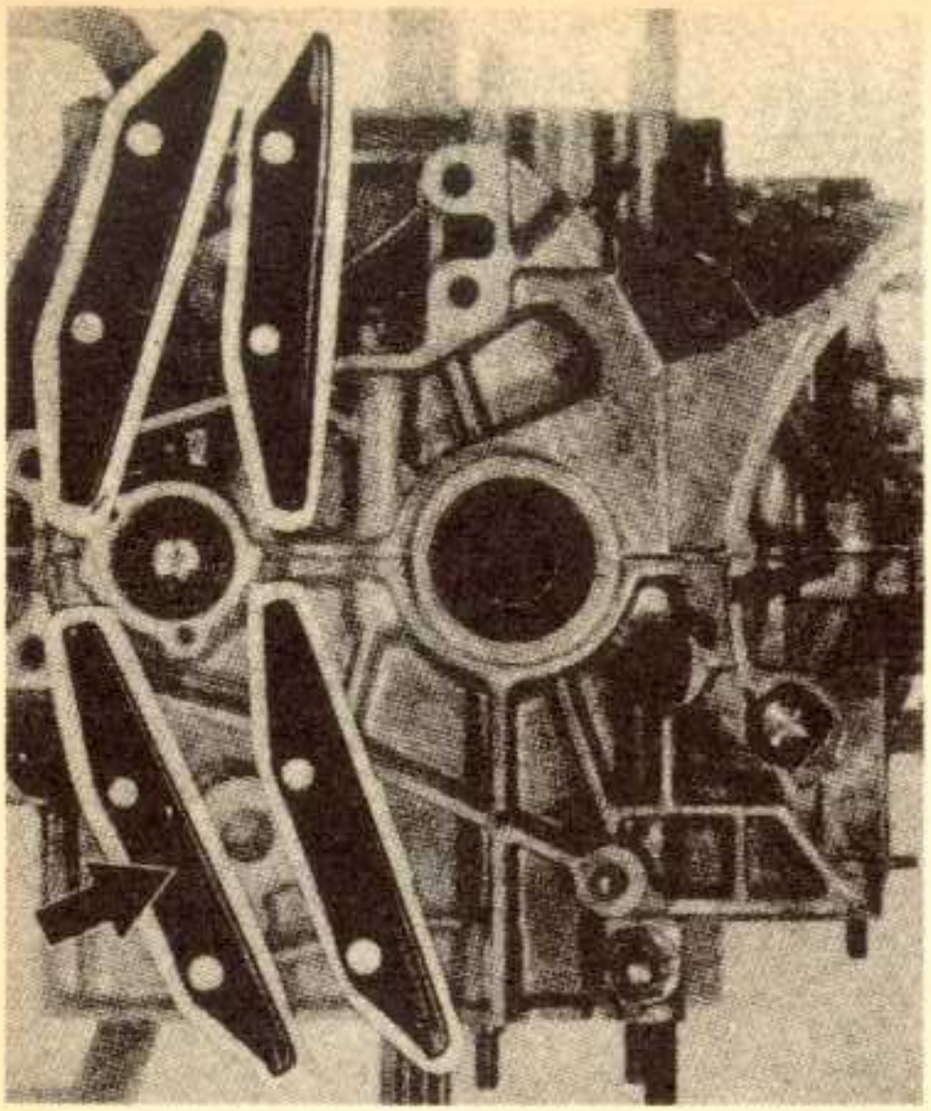
A + 43.27 =
35.5 + 43.27 = 78.77 ± 0.25 mm

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 codes)

Size	Code	Nominal Diameter	911 Carrera Piston Dia. D Mahle	911 Carrera Piston Dia. D KS	911 Turbo Piston Dia. D Mahle
Standard	0	95/97	94.965–94.975	94.975–94.980	96.960–96.970
	1		94.972–94.982	94.980–94.985	96.967–96.977
	2		94.979–94.989	94.985–94.990	96.974–96.984
	3		94.986–94.996	94.990–94.995	96.981–96.991
			Cylinder Dia. Nikasil	Cylinder Dia. Alusil	Cylinder Dia. Nikasil
Standard	0	95/97	95.000–95.007	95.000–95.005	97.000–97.007
	1		95.007–95.014	95.005–95.010	97.007–97.014
	2		95.014–95.021	95.010–95.015	97.014–97.021
	3		95.021–95.028	95.015–95.020	97.021–97.028
Play between piston and cylinder			0.025–0.042	0.020–0.030	0.030–0.047

911 Carrera

Piston and cylinder differences – Mahle and KS

Nikasil
Cylinders – Mahle
coated aluminum cylinders, yellowish

Pistons, forged,
leaded, dark-gray

Piston ring, groove 3
Bevelled edge oil control ring with hose covered spring, not chrome plated

Alusil
Cylinders – KS
uncoated aluminum cylinders, light-gray

Pistons (ferrocoat pistons), cast,
iron-coated, light-gray

Piston ring, groove 3
Double-bevelled oil control ring with hose covered spring, chrome plated

Weight classes of pistons – 911 Carrera

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	930/20/25/26 R. o. W.	930/21 USA	
Standard production	618 – 622	613 – 617	– –
	622 – 626	617 – 621	–
Max. weight difference 4 grams	626 – 630	621 – 625	+
	630 – 634	625 – 629	+ +
For service sector Max. weight difference 8 grams	618 – 626	613 – 621	– – or –
	626 – 634	621 – 629	+ 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	930/21 USA	
Standard production	654 – 650	– –
	654 – 658	–
Max. weight difference 4 grams	658 – 662	+
	662 – 666	+ +
For service sector Max. weight difference 8 grams	654 – 662	– – or –
	662 – 670	+ or + +

Weight classes of pistons – 911 Turbo

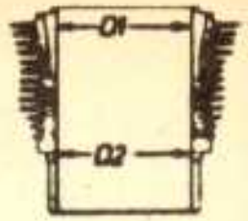
Installation specifications

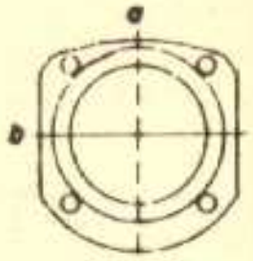
1. Always only install pistons of same make and same weight class in one engine.
2. Piston pins must always remain with matching pistons and must not be mixed up even within an engine. Pay attention to this, marking pistons/pins if necessary, when disassembling and assembling engine.

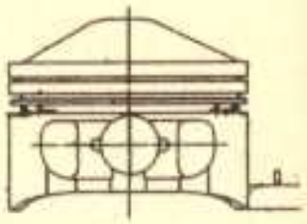
Weight classes for **Mahle Pistons**
Pistons weighed with components (piston pin, piston rings, circlips).

	Total piston weight in grams Weight class within one set	Code
Engine type	930/66/68	
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	– – or –
	624 – 632	+ 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

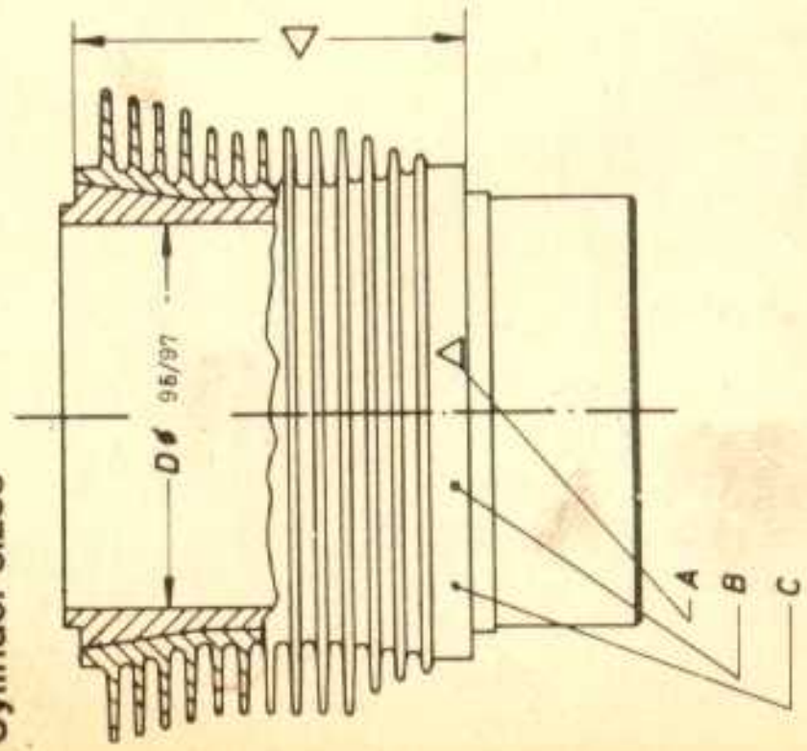
Piston ring side clearance

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

Tolerances for cylinder height

Code A	Cylinder height	
5	85.400–85.425	911 Carrera
	85.600–85.625	911 Turbo
6	85.425–85.450	911 Carrera
	85.625–85.650	911 Turbo

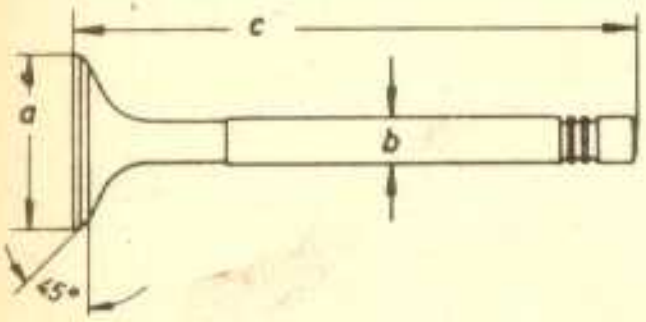
Cylinder sizes



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

Valve sizes

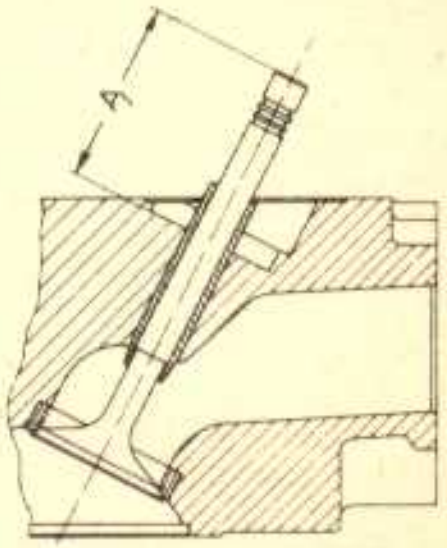
	911 Carrera Intake	Exhaust	911 Turbo Intake	Exhaust
a	49 ± 0.1	41.5 ± 0.1	49 ± 0.1	41.5 ± 0.1
b	8.97 – 0.012	8.95 – 0.012	8.97 – 0.012	8.95 – 0.012
c	110.1 ± 0.25	108.4 ± 0.25	110.1 ± 0.25	108.4 ± 0.25



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.

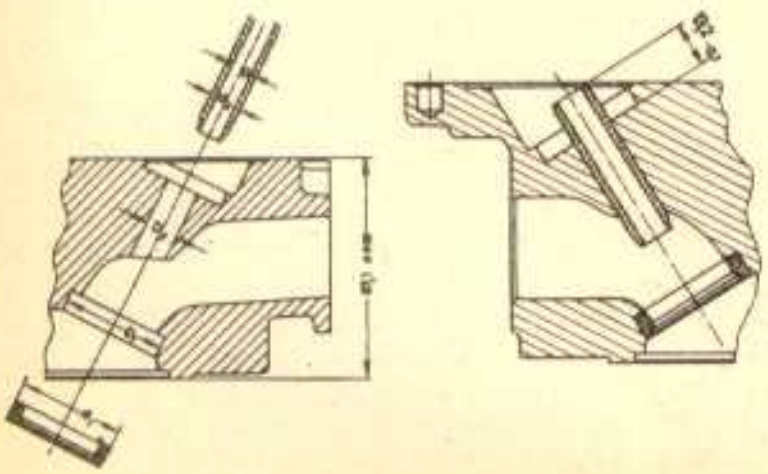


Distance A

911 Carrera, 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

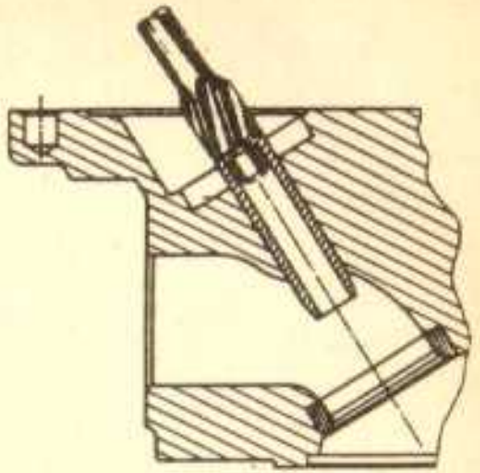
* Grind valve guides on diameter d 2 according to pertinent bore diameter D 2 – remembering press-fit of 0.06 – 0.09 mm

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

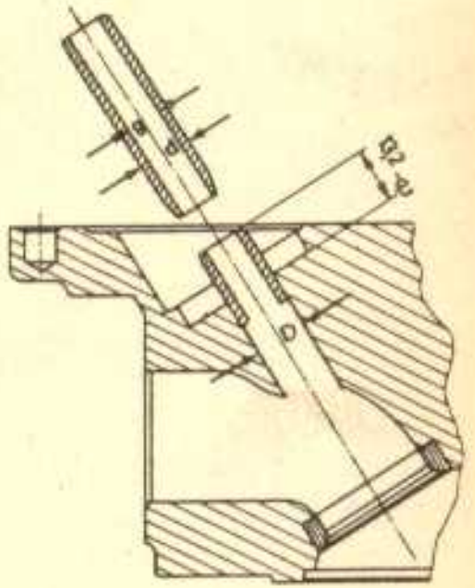
Removal operation will have widened bores in the cylinder head for valve guides slightly.

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 camschaft 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:

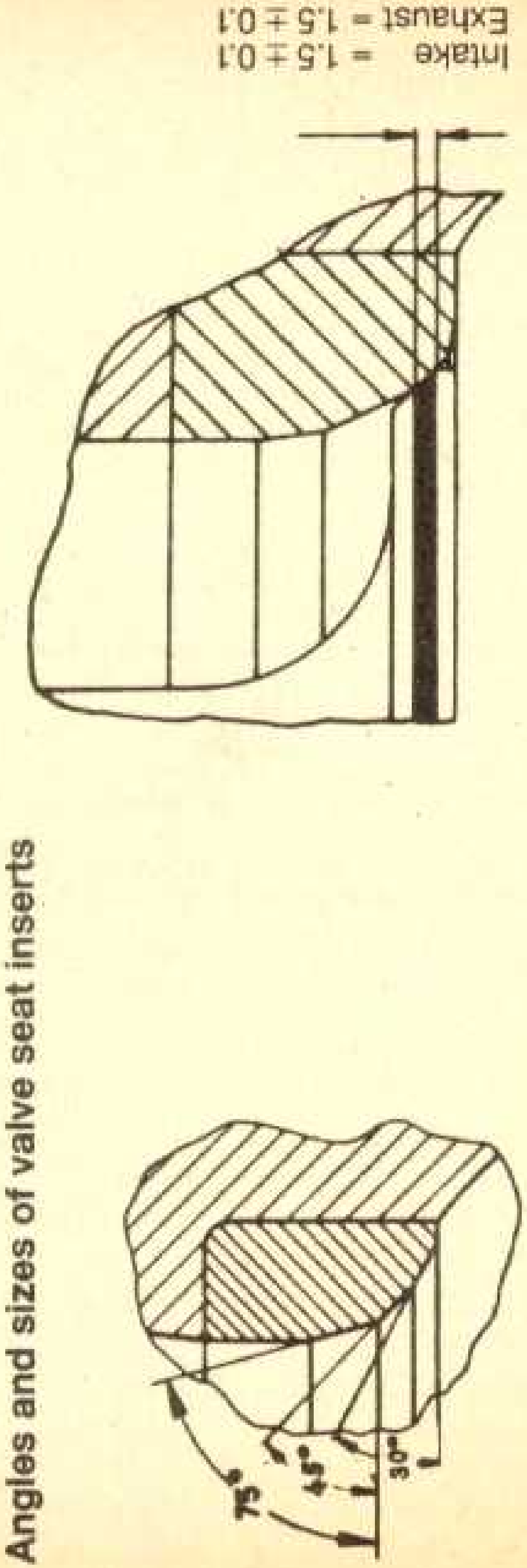
Valve guide	Outside dia. **d** Valve guide*	Bore dia. **D** Cylinder head
Standard size	13.060	13.000 – 13.018
1st oversize	13.260	13.000 – 13.200

* Grind valve guides on diameter **d** according to pertinent bore diameter **D** – remembering press-fit.

Size table for pulling in valve seat inserts

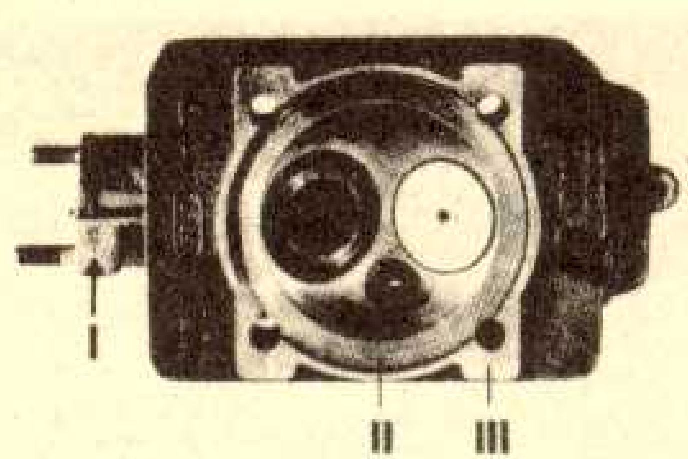
911 Carrera – 911 Turbo		Outside dia. d1 valve seat insert	Bore D1 in Cylinder head
Standard size	Intake	51.680 – 51.661	51.500 – 51.530
Standard size	Exhaust	44.200 – 44.184	44.000 – 44.025
1st oversize	Intake	52.000 – 51.981	51.820 – 51.850
1st oversize	Exhaust	44.760 – 44.744	44.560 – 44.585

Angles and sizes of valve seat inserts



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

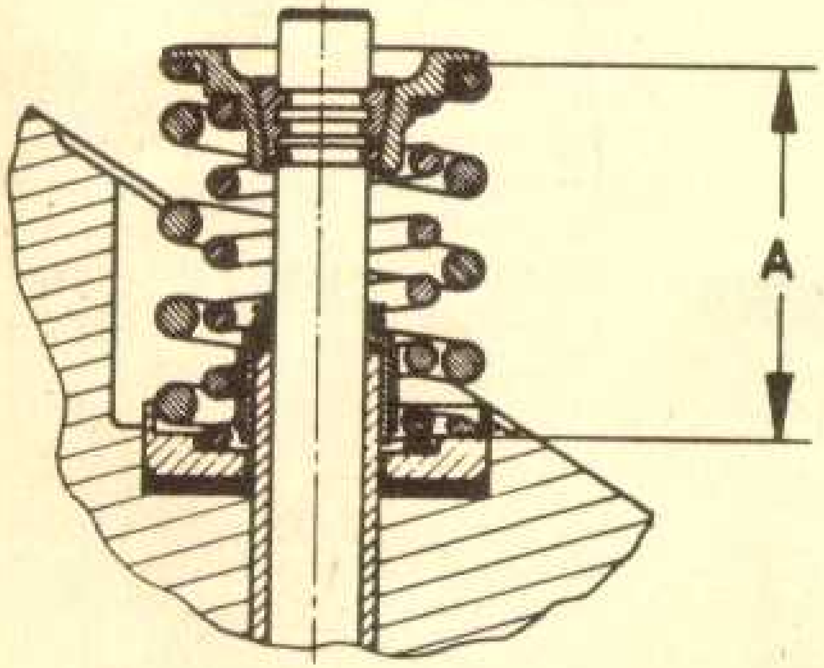
Checking

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 Carrera	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	Camshaft right	Identification on face of camshaft left	Identification on face of camshaft right	Intake valve stroke in overlapping TDC with 0.1 mm valve clearance	Timing with 0.1 mm valve clearance
911 Carrera	930/20 930/21 930/25 930/26	930 105 147 10	930 105 148 10	930 147 10	930 148 10	* 1,1 – 1,4	Intake opens 4° BTDC Intake closes 50° ABDC Exhaust opens 46° BBDC Exhaust closes at TDC
	* Ideal adjusting value 1,25						
911 Turbo	930/66 930/68	930 105 143 01	930 105 142 01	930 143 01	930 142 01	* 0,65 – 0,80	Intake opens 3° ATDC Intake closes 37° ABDC Exhaust opens 27° BBDC Exhaust closes 5° BTDC
	From July 1984	930 105 143 03	930 105 142 03	930 143 03	930 142 03		
	* Ideal adjusting value 0,70 mm						

Clutch / 1984 – 1986 Models

911 Carrera

General Data	Clutch
Design	Single-plate dry type, pulled version
Pressure plate	MFZ 225 K/7800 – 8500 N contact pressure
Clutch disc	TD 225 (spring/torsion damper)

Clutch / 1987 Model

911 Carrera

General Data	Clutch
Design	Single-plate dry type, pulled version
Pressure plate	GMFZ 240 / 7400 – 8200 N contact pressure
Clutch disc	240 GUD (rubber damper)

Clutch

911 Turbo

General Data	Clutch
Design	Single-plate dry type, pulled version
Pressure plate	MFZ 240 / 9500 – 10300 N contact pressure
Clutch disc	240 GUD (rubber/torsion spring)

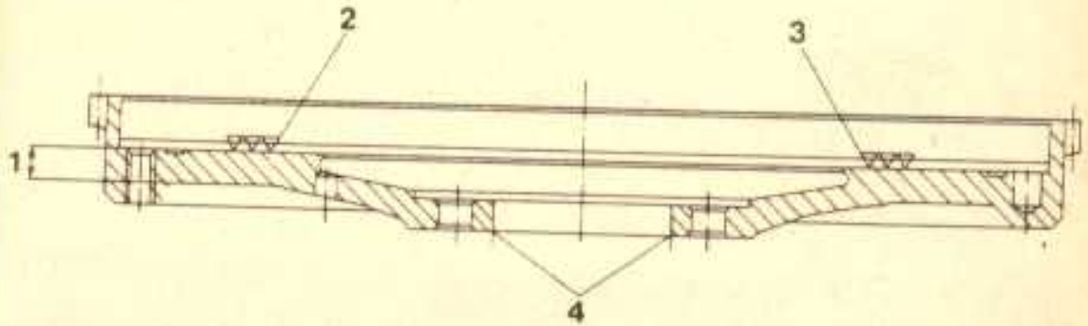
Machining flywheel, 1984/85/86 models

911 Carrera

The flywheel bearing surface for 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: 8.5 mm.



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

Machining flywheel, 1987 model

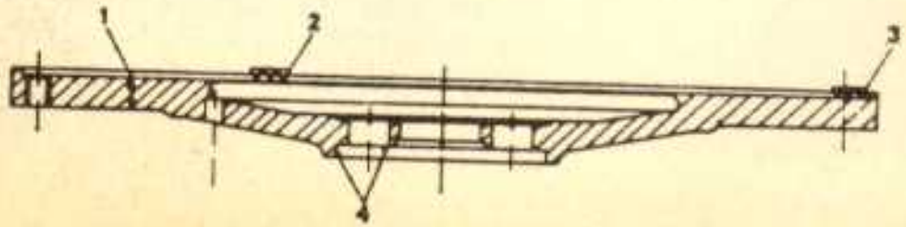
911 Carrera

The bearing surface for a rubber-damped drive plate may **not be machined** since 1987 models. The release bearing could bear on the drive plate damper depending on tolerances.

Machining flywheel

911 Turbo

Wear limit of flywheel thickness: 9.9 mm.



Checking and adjusting speed and reference mark senders

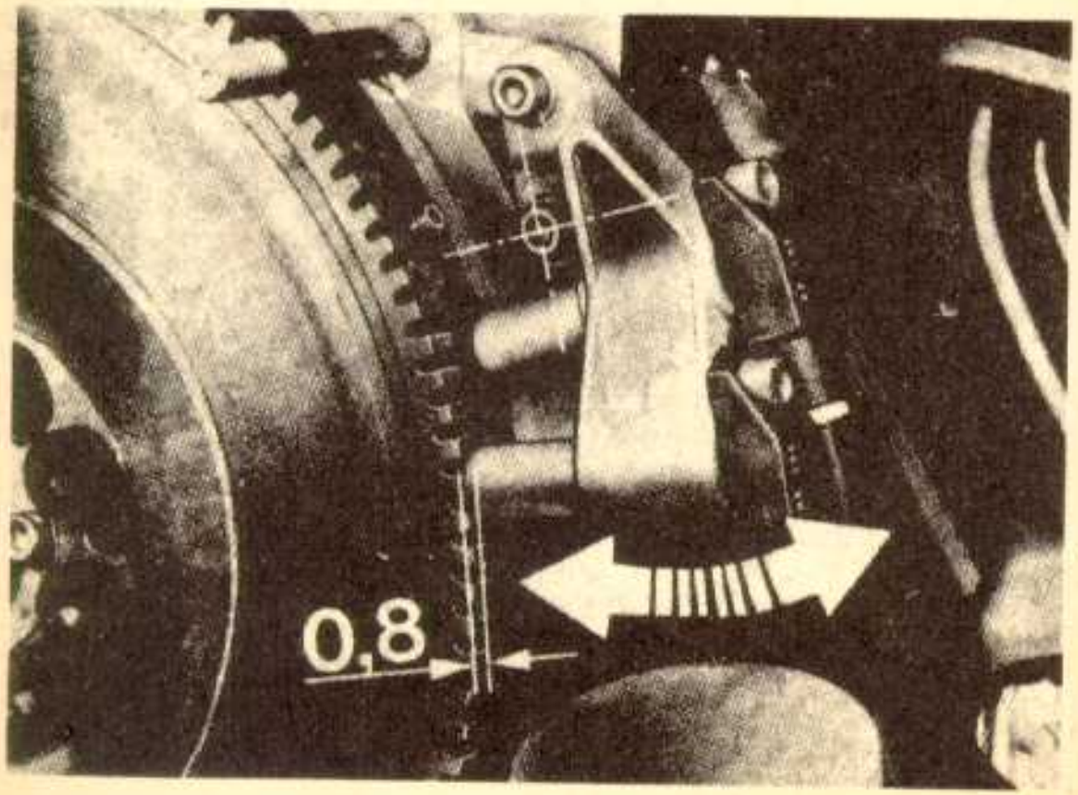
Speed sensor / reference mark sensor

Checking distance
0.8 ± 0.2 mm

Adjusting distance
0.8 ± 0.05 mm

An adjustment is only necessary, if the checked distance is above or below tolerances.

Correct adjustment of the speed sender will automatically position the reference mark sender correctly.



Tightening torque for engine

Location	Threads	Torque Nm
Conrod nuts 1st step (initial torque) 2nd step (final torque)	M 10 × 1.25	 20 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 on crankshaft	M 6	10
Pulley to crankshaft, bolt with spring washer	M 12 × 1.5	80
Durlok bolt for single and double bolt	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	35
Adapter to crankcase	M 22 × 1	120
Cylinder head nuts 911 Turbo	M 10 socket	
1st step (initial torque) 2nd step (final torque)		10 32
Cylinder head nuts (1) 911 Carrera	**M 10 socket**	
1st step (initial torque) 2nd step (final torque)		15 1 × 90 ± 2° torque angle

Location	Threads	Torque Nm
Rocker arm shafts	M 6 socket	18
Bolt on camshaft (2)	M 12 × 1.5	120
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 on 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 (crankcase)	M 20 × 1.5	70
Oil drain plug (oil tank)	M 22 × 1.5	42
Cap nut on fuel distributing pipe	M 12 × 1.5	12

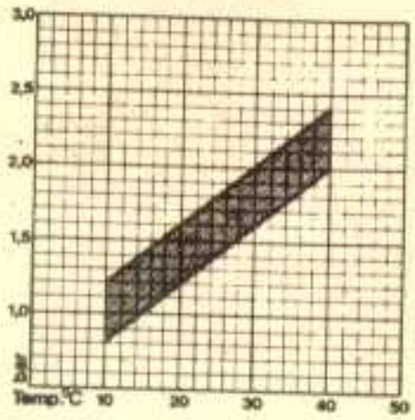
(1) Use cylinder head nuts, Part No. 901 104 382 02.
Identification: yellow passivation.
Lubricate threads of cylinder head mounting studs and cylinder head nut bearing surfaces lightly with Optimoly HT.

(2) Lubricate threads lightly witht Optimoly HT.

Testing and Adjusting Values for K-Jetronic (CIS) — 911 Turbo

Engine Type 930/66

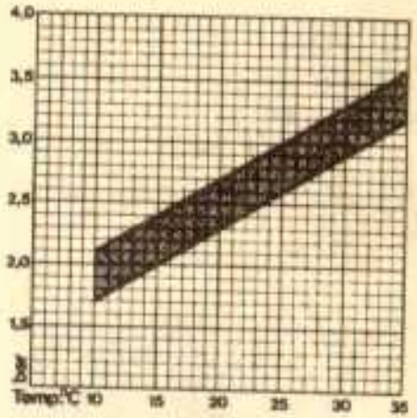
Test step	Specifications
Electric fuel pumps Delivery rate	at least 1500 cc/30 sec. (applicable for both pumps together)
Control pressure "cold" (= outside temperature)	Diagram for warm-up regulator Part No. 930.606.105.05 Bosch No. 0 438 140 112
Control pressure "warm"	3.65 ± 0.20 bar (kp/cm²)
"full 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



Testing and Adjusting Values for K-Jetronic (CIS) from 1986 Models on — 911 Turbo USA

Engine Type 930/68

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. 930.606.105.06 Bosch No. 0 438 140 153
Control pressure "warm"	3.95 ± 0.20 bar (kp/cm²)
"full throttle enrichment"	2.9 ± 0.20 bar (kp/cm²)
System pressure Testing value Adjusting value	6.7 to 7.4 bar (kp/cm²) 6.9 to 7.1 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	3.3 – 3.7 bar (kp/cm²)
Delivery rate - control pressure circuit	160 to 240 cc/minute



Testing and adjusting values — 911 Carrera

Test Step	Specifications			Special Remarks
Electric fuel pump Delivery rate	at least 850 cc/30 sec.			
Fuel pressure (engine stopped, fuel pump bridged)	2.5 ± 0.2 bar			
Testing value at idle speed	approx. 2 bar			
Leak test Pressure after 20 minutes	at least 1 bar			
Idle adjustment	Europe	USA Canada Japan	Austraiia Switzerland Sweden	Idle adjustment at about +15 bis 35° C intake air temperature
Idle speed (rpm)	800 ± 40 880 ± 40**	800 ± 40 880 ± 40**	800 ± 40 880 ± 40**	
CO %	1.0 – 1.5	0.6 – 1.0*	0.5 – 1.0*	* Measured ahead of cat. conv. and with oxygen sensor plug disconnected
HC	without catalytic converter: ≤ 300 ppm with catalytic converter: ≤ 300 ppm*			** From 1987 models on in conjunction with control unit 911 618 111 18 911 618 111 19 911 618 111 20

Note
Air pump of cars with Engine Type 930/26 must be disconnected for idle speed measurements.
Only measure speed digitally.

Idle adjustment — 911 Carrera

Adjusting requirements:

Engine in perfect running condition.

Note

Procedures must always be performed in the specified order.

1. Connect CO tester to instructions supplied with tester.

   Connect CO testing hose on test connection of catalytic converter in cars with catalytic converter.

2. Run engine to operating temperature (oil temperature approx. 90° C).

   Disconnect oxygen sensor plug in engine compartment on left-hand side of cars with catalytic converter.

3. Check CO. If CO level is not within specifications, it will be necessary to make corrections on the air flow sensor.

   Insert Special Tool 9156 or a commercially available flexible screwdriver.

   Turned clockwise – richer mixture

   Turned counterclockwise – leaner mixture

Note

Electric consuming equipment must be switched off during adjustments.

Perform adjustments as quickly as possible, to avoid excessive heat in intake ports and therefore wrong CO values.

Intake air temperature: about +15 to +35° C

4. Check and adjust idle speed. This requires stopping the function of idle speed volumetric efficiency regulation.

a) A test box is located on an engine electric plate in the engine compartment on left-hand side.

Bridge test sockets B and C with a locally made test lead.

(This stops the function of idle speed volumetric efficiency regulation.)

b) Check and adjust idle speed with, for example, VAG Tester 1367.

Turn control screw (bypass) on throttle valve housing until specified idle speed is reached.

5. Release idle speed volumetric efficiency regulation after finishing adjustments (remove locally made test lead bridge on test sockets).

6. Recheck adjustments, correcting if necessary.

Idle adjustment

Engine Type 930/66

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

Idle adjustment

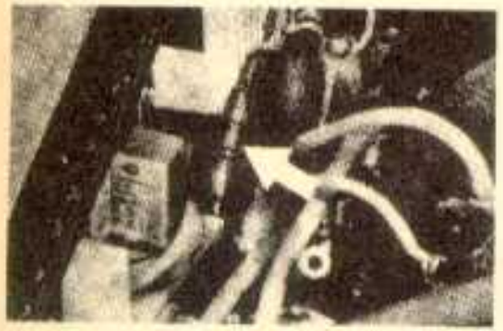
Engine Type 930/68

Adjusting Requirements:

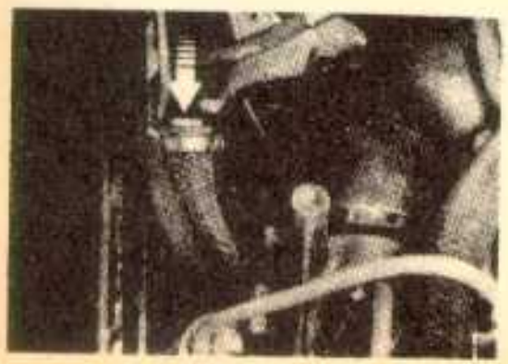
Engine must be in perfect running condition. Power consuming equipment must be switched off during adjustments. Adjustments must be completed as quickly as possible, to avoid excessive heat in intake ports and therefore wrong CO values.

Adjustments must be carried out with a mounted air cleaner.

1. Mount adapter US 8040 and CO tester US 4492 on test connection.
2. Disconnect oxygen sensor plug and connect CO tester to instructions supplied with equipment.



3. Insert a suitable plug in air hose between air pump and blowoff switching valve.

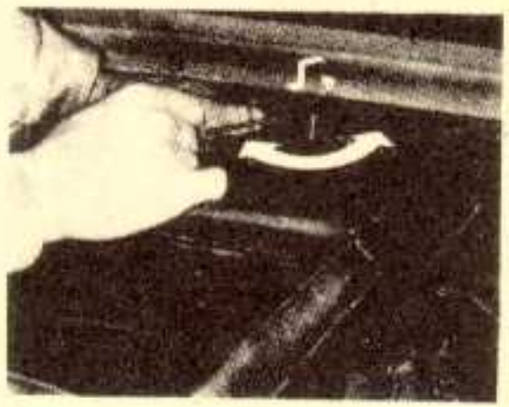


4. Run engine to operating temperature (80 to 90° C oil temperature).
5. Turn control screw on throttle valve housing until specified idle speed of 900 ± 50 rpm is reached.
6. Check CO level. If CO value is not within specifications, correct adjustment on the mixture control unit. Insert Special Tool 9156 into spring-loaded key wrench in the mixture control unit. Press special tool down about 18 mm until spring-loaded key wrench engages in mixture control screw.

   Turned clockwise – richer mixture

   Turned counterclockwise – leaner mixture

   CO adjusting value: 0.6 ± 0.2 %



Note

If CO adjusting value has to be corrected on the mixture control unit, charging air cooler and complete air cleaner as well as lead-sealed key wrench must be removed.

7. After finishing adjustments, connect oxygen sensor plug, mount air hose and screw plug in test connection.

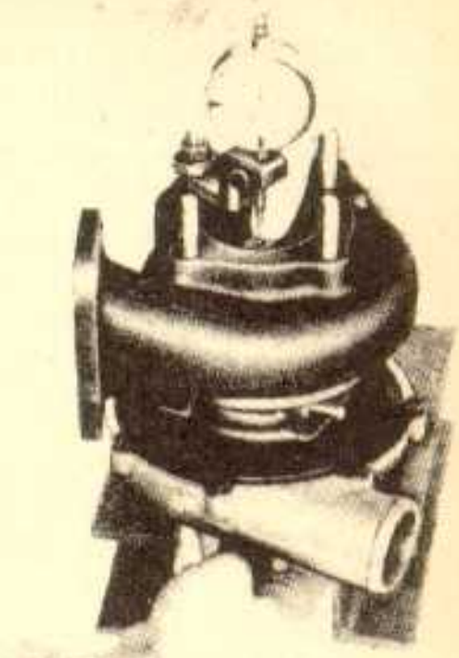
   Coat threads of plug lightly with Bosch VS 140 16 Ft or Optimoly HT paste. Tightening torque: 15 Nm.

Test step	Specifications			
Idle adjustments (with approx. 90° C oil temp.)	Eng. Type	Europe	USA	Canada
Idle speed (rpm)	930/66 930/68	950 ± 50	950 ± 50	950 ± 50
CO (%)	930/66	1.5 to 2.5*		1.5 to 2.5*
	Mod. 87	1.5 to 2.0*		
	930/68	0.6 ± 0.2*/**		
HC		without cat. conv. ≤ 300 ppm with cat. conv. ≤ 300 ppm**		

* Air pump disconnected.

** Measured in front of catalytic converter and oxygen sensor plug 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 930/66:
0.70 to 0.85 bar.

Engine Type 930/68:
0.60 to 0.70 bar at 5500 rpm.

Turbochrager identification

3 LDZ / 319 C 11.1

Version number
522 297 031 00

Adjusting drive pinion/ring gear

Five speed manual transmission – Type 915

Recommended sequence for new adjustment of drive pinion

Keep the following sequence in interest of economical procedures, if pinion and ring gear have to be adjusted.

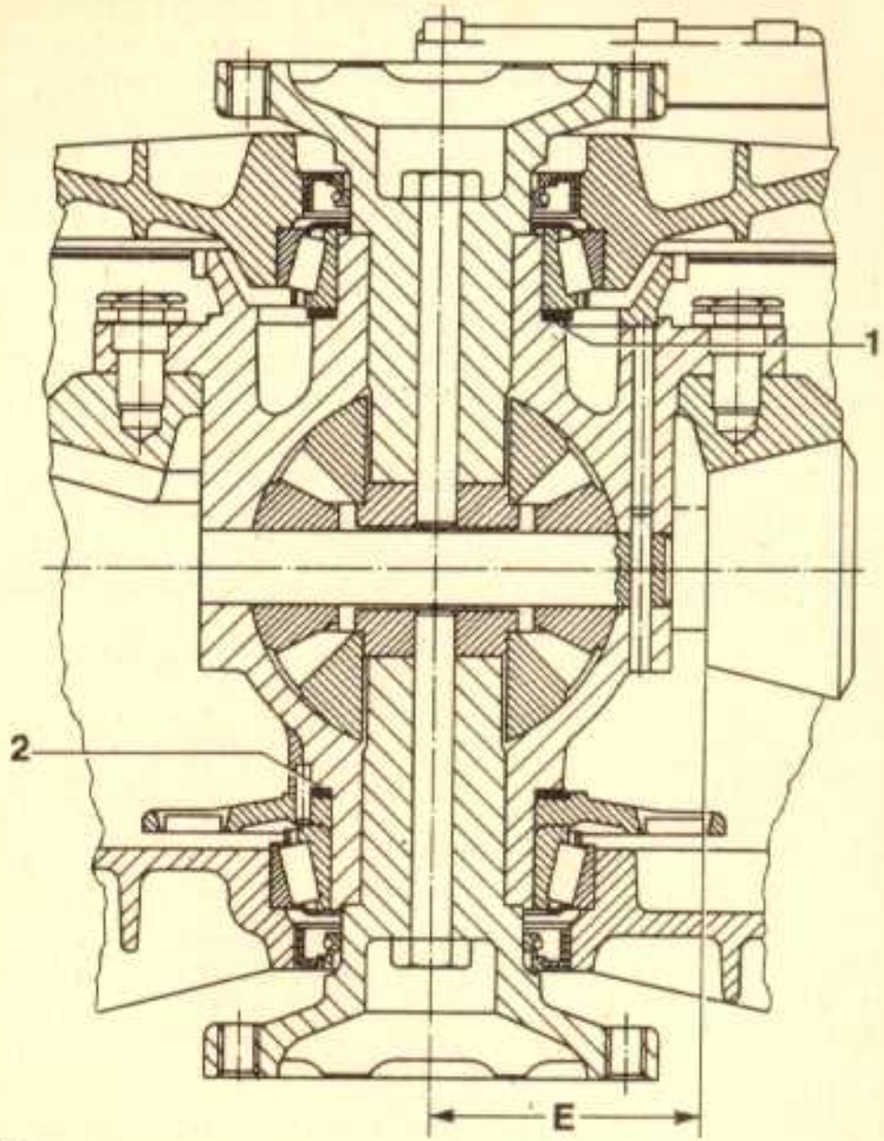
1. Measure total shim thickness "S_{tot}" (S_1 plus S_2) for specified preloading of tapered roller bearing/differential.
2. Measure shim thickness "S_3".
3. Split up total shim thickness "S_{tot}" into S_1 and S_2, so that there is specified backlash between ring gear and drive pinion.

The objevtive of adjustments is to again find the point of smoothest running, which had been determined on a testing machine in production.

Absolute cleanliness is required for all jobs and test to guarantee perfect results.

Re-adjustment of drive pinion and ring gear or drive pinion set is only necessary after repairing a final drive, if parts having direct influence on the adjustment had been replaced. Refer to following table to avoid unnecessary adjustments!

Adjust: / Replaced part:	Ring gear ($S_1 + S_2$)	Drive pinion via deviation "r" (S_3)
Transmission case	●	●
Side transmission cover	●	
Large cylindrical roller bearing and four-point bearing for drive pinion	●	●
Pinion/ring gear	●	●
Differential case	●	
Tapered roller bearing for differential	●	



1 Shim S_1
2 Shim S_2
E Adjusting distance

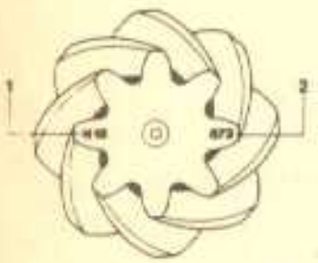
Perfect results require thotoughness and cleanliness for all assembling and measuring operations.

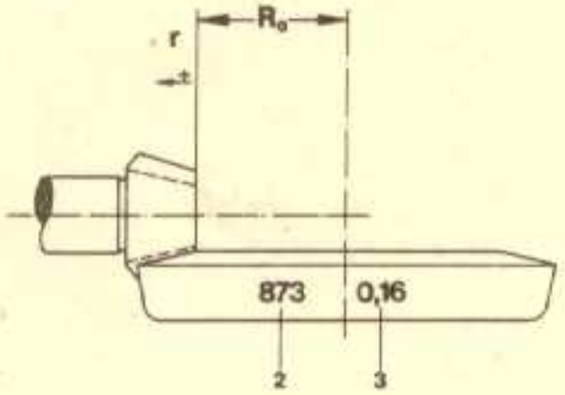
Adjusting drive pinion and ring gear

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 alredy 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_o") is measured and inscribed on face of pinion. Ring gear and pinion are always designed that deviation "r" is added to design distance "R_o", 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.



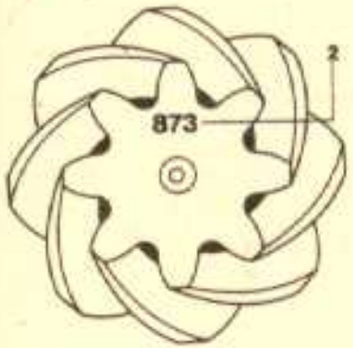


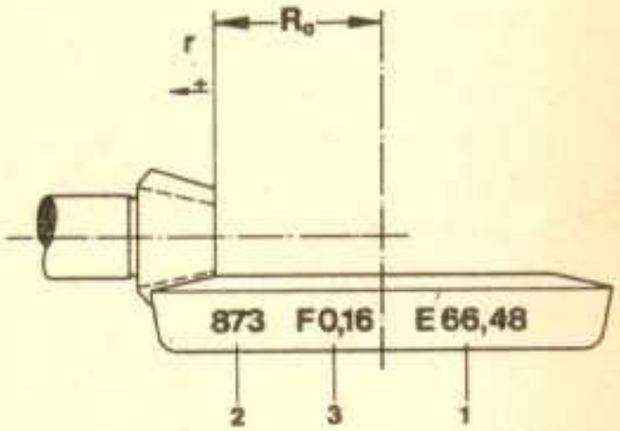
R_o = Design distance (66.30 mm), (911 Turbo 82.29 mm)
r = Deviation from R_o in 1/100 mm
1 = Deviation r
2 = Pair number
3 = Backlash

Changes on drive pinion/ring gear

Pinions/ring gears are installed from 1985 models on, of which information E (e. g. E 66.48) is inscribed instead of deviation "r" (N).

Since this value E is equal to distance E (R_o + r), it is no longer necessary to calculate the adjusting distance for these pinions/ring gears.





R_o = Design distance (66.30 mm)
r = Deviation r
1 = Adjusting distance (R_o + r), e. g. 66.48 mm
2 = Pair number
3 = Backlash, e. g. 0.16 mm

Tightening torque for manual transmission — Typ 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

Adjusting drive pinion/ring gear

Five speed manual transmission – Type G 50 (950)

Recommended sequence for new adjustment of drive pinion

Keep the following sequence in interest of economical procedures, if pinion and ring gear have to be adjusted.

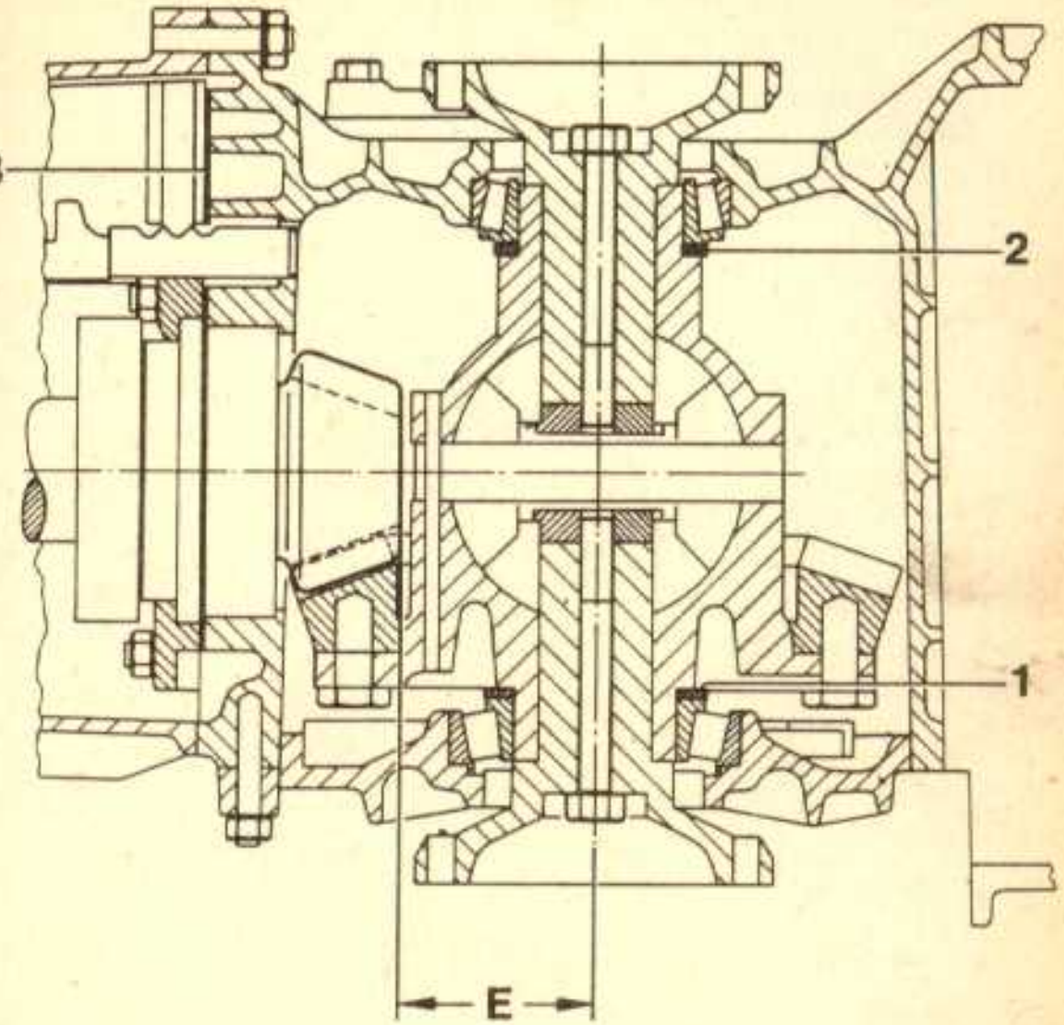
1. Measure total shim thickness "S_{tot}" (S_1 plus S_2) for specified preloading of tapered roller bearing/differential.
2. Measure shim thickness "S_3".
3. Split up total shim thickness "S_{tot}" into S_1 and S_2, so that there is specified backlash between ring gear and drive pinion.

The objective of adjustments is to again find the point of smoothest running, which had been determined on a testing machine in production.

Absolute cleanliness is required for all jobs and tests to guarantee perfect results.

Re-adjustment of drive pinion and ring gear or drive pinion set is only necessary after repairing a final drive, if parts having direct influence on the adjustment had been replaced. Refer to following table to avoid unnecessary adjustments!

Adjust: / Replaced part:	Ring gear ($S_1 + S_2$)	Drive pinion (S_3)
Transmission case	●	●
Side transmission cover	●	
Large cylindrical roller bearing and four-point bearing for drive pinion	●	●
Pinion/ring gear	●	●
Differential case	●	
Tapered roller bearing for differential	●	



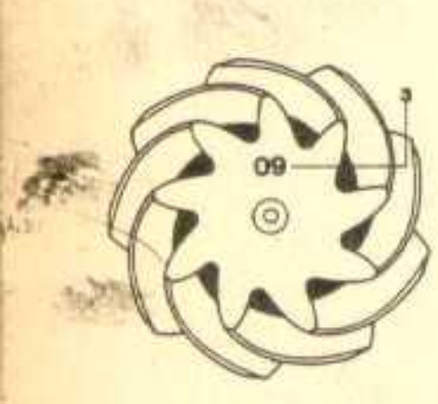
1 Shim S_1
2 Shim S_2
3 Shim S_3
E Adjusting distance

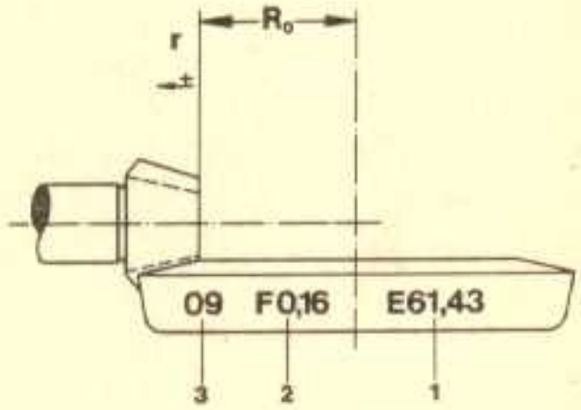
Perfect results require thoroughness and cleanliness for all assembling and measuring operations.

Adjusting drive pinion and ring gear — Typ G 50 (950)

General

Correct adjustment of drive pinion and ring gear is important for servive life and smooth running of final drive. Consequently drive pinions and ring gears are already matched in produvtion 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" from design distance "R" is determined, added to design distance "R_0" and inscribed as adjusting distance "E" on the ring gear.





R_0 = Design distance (61.00 mm)
r = Deviation r
1 = Adjusting distance (R_0 + r), e. g. E 61.43
2 = Backlash, e. g. F 0.16
3 = Pair number

Tightening torque for manual transmission Typ G 50 (950)

Location	Designation	Threads	Material/ Strength	Torque Nm
Transmission case (oil drain)	Plug with magnet	M 22 × 1.5	6.8	30
Transmission case (oil filler)	Plug	M 22 × 1.5	6.8	30
Gear box, side and front trnsmission covers, tensioning plate	Nut	M 8	8	23
Gear box	Backup light switch	M 18 × 1.5	–	35
Drive shaft	Collared nut	M 30 × 1.5	–	250
Drive shift	Collared nut	M 14 × 1.5	–	140
Drive pinion	Collared nut	M 30 × 1.5	–	250
Transmission case	Vent	M 14 × 1.5	–	35
Selector forks	Bolt	M 8 × 30	8.8	23
Ring gear	Bolt	M 12 × 1.25	12.9	165
Joint flange	Bolt	M 10 × 85	–	44
Reverse gear II	Collared nut	M 8	8.8	23

Location	Designation	Threads	Material/ Strength	Torque Nm
Shift gate (tensioning plate)	Screw	M 6×12	8.8	10
Spring clamp (speed sender)	Screw	M 6×12	8.8	10
Reversing lever pin	Pin	M 8×1.25	–	23
Guide tube for release bearing	Screw	M 6	–	10
End cover for transmission case	Bolt	M 8×30	8.8	23
Plug for transmission case	Bolt	M 12×1.5	–	23
Transmission member	Locknut	M 8	8	23

Front axle and Steering – Specifications

	911 Carrera	Turbo + Turbo-Look
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	1372 mm with 6 J × 15 rim	1432 mm with 7 J × 16 rim
Shock absorbers	Double action, hydraulic shock absorber struts	
Stabilizers		
Front dia.	20 mm 22 mm (since '86 mod.)	20 mm 22 mm (since '85 mod)*

Adjustment of ZF rack and pinion steering

Frictional moment of steering: (measured on flange of steering gear with tie rods detached) 80 – 140 Ncm (8 – 14 kpcm)

ZF steering specifications

Steering ratio (in center): 17.78 : 1

Number of steering wheel turns from lock to lock: approx. 3.0

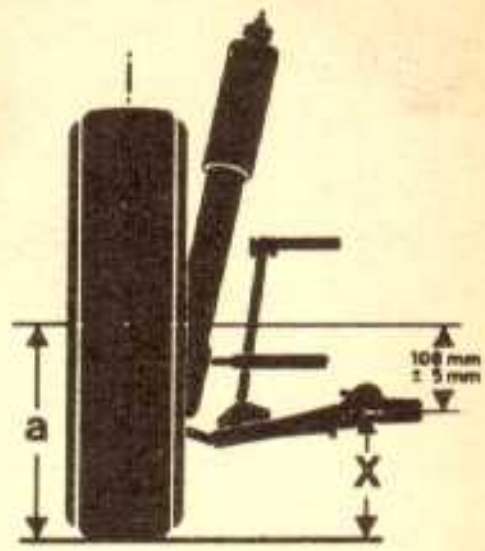
* Turbo-Look from 1986 models on

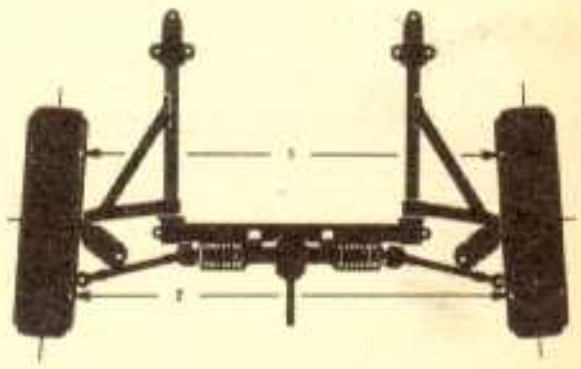
Adjusting values and tolerances

At curb weight according to DIN 70020

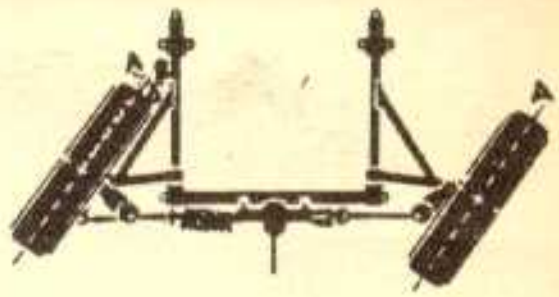
car with full tank, spare wheel and tools

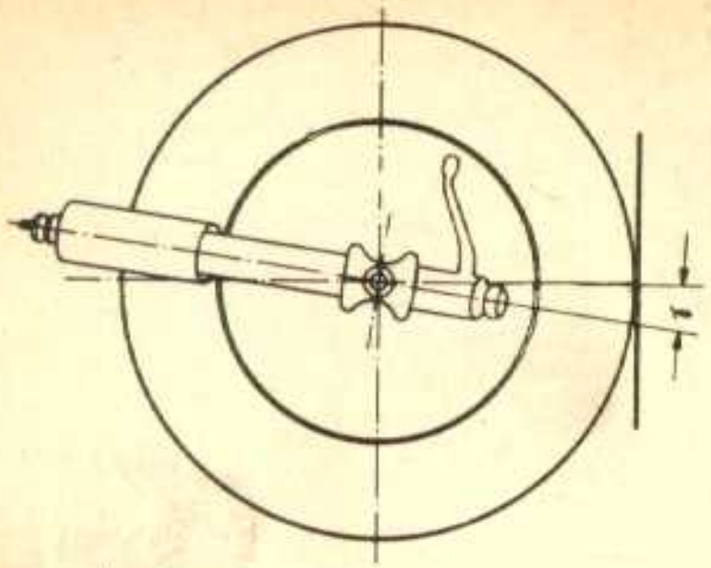
Designation	Adjusting Value and tolerances	Max. difference between left and right
Front axle		
Height adjustment: Wheel center above middle of torsion bar		
911 Carrera + Turbo-Look	108 mm ± 5 mm	5 mm
Turbo	94 mm ± 5 mm	5 mm
Toe – **not pressed** (911 Carrera, Turbo and Turbo-Look)	+ 15' ± 5'	–





Designation	Adjusting and tolerances	Max. difference between left and right
Toe difference angle at 20° lock	0° to + 30'	Can only be influneced by exchanging steering arm
A' = Parallel to A B = Centerline of wheel γ = Difference angle		
Camber of front wheels (wheels pointing straight ahed)		
α = Camber angle 911 Carrera, Turbo and Turbo Look	0° ± 10'	10'
β = Inclination of kingpin	11°	





Designation	Adjusting value and tolerances	Max. difference between left and right
γ = Caster	6° 5' ± 15'	30'

These wheel alignment specifications can also be applied to earlier vehicle types.

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
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

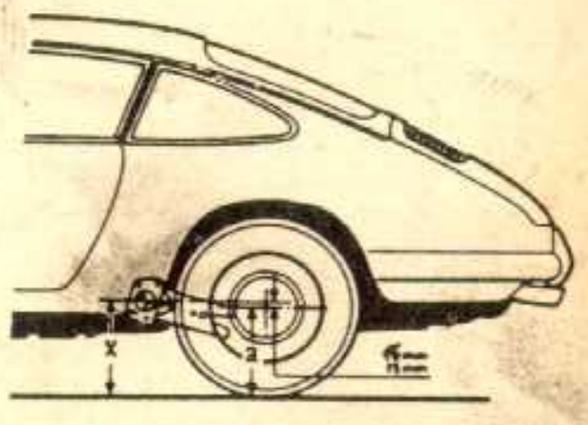
	911 Carrera	Turbo + Turbo-Look
Wheel suspension	Independent, employing trailing arms, wheels driven by propeller shafts	
Springs	One round torsion bar in lateral direction for each wheel	
Torsion bar dia.	24.1 mm 25.0 mm (since '86 mod.)	26 mm (Turbo-Look same as 911 Carrera)
Track width	1380 mm with 7 J × 15 rim	1501 mm with 8 J × 16 rim
Shock absorbers	Double action, hydraulik shock absorbers	
Stabilizers rear dia.	18 mm 21 mm (since '86 mod.)	18 mm 20 mm (since '85 mod. Turbo Look same as 911 Carrera)

Adjusting values and tolerances

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

Designation	Adjusting value and tolerances	Max. diff. between left and right
Torsion bar adjustment Inclination of spring strut		
Torsion bar 24.1 mm dia.	35°, with gas pressure shock absorbers 34°	0.5°
(until end of '85 models)	• 36° Turbo-Look	0.5°
Torsion bar 25 mm dia.	32°	0.5°
(since '86 models)	• 34° Turbo-Look	0.5°

Designation	Adjusting value and tolerances	Max. diff. between left and right
Targa and convertible	+ 0.5°	
Air conditioner	+ 0.5°	
Turbo	33°	
Camber of rear wheels		
911 Carrera	− 1° ± 10'	20'
Turbo + Turbo Look	− 30' ± 10'	20'
Toe of rear wheels		
911 Carrera + Turbo Look	+ 10' ± 10' each wheel	20'
Turbo	+ 10' + 10' each wheel	10'
Height adjustment		
Cross tube center above center of rear wheel		
911 Carrera + Turbo Look	16 mm ± 5 mm	8 mm
Turbo	12 mm ± 5 mm	8mm



1° change in spring strut inclination = approx. 7 to 9 mm change in car height

Tightening torque for bolts and nuts on rear axle

Location	Designation	Threads	Material/ Strength	Torque Nm
Bearing cover to body	Bolt	M 10	8.8	47
Trailing arm to cross tube	Self-locking nut	M 14 × 1.5		100
Spring strut to trailing arm	Eccentric	M 12 × 1.5	8.8/10.9	85
Spring strut to trailing arm	Bolt	M 12 × 1.5	10.9	120
Brake caliper to trailing arm	Bolt	M 12 × 1.5	8.8	60
Shock absorber to trailing arm	Bolt	M 14 × 1.5	8.8/10.9	125
Shock absorber to body	Nut	M 10 × 1	8	25
Brake pipe connection	Coupling	M 10 × 1		12
Stabilizer to body	Bolt	M 8	8.8	25
Propeller shaft	Bolt	M 10	12.9	83
Shield to brake backplate	Bolt	M 8	8.8	25
Shield and brake backplate to trailing arm	Bolt	M 8	8.8	25
Wheel to wheel hub	Wheel nut	M 14 × 1.5		130

Location	Designation	Threads	Material/ Strength	Torque Nm
Wheel hub to drive shaft	Castle nut	M 20 × 1.5	10.9	300 – 320
Brake disc to wheel hub	Screw	M 6	8.8	5
Stabilizer stabilizer suspender	Bolt	M 12 × 1.5	8/8.8	85
Stabilizer suspender to trailing arm	Bolt	M 16 × 1.5	10.9	85
Adjusting lever to spring strut	Bolt	M 16 × 1.5	10.9	245
Adjusting lever to spring strut	Eccentric bolt	M 16 × 1.5	10.9	245
Friction welded axle shaft to wheel hub	Self-locking nut	M 22 × 1.5		460

Brakes – Specifications

Description	Remarks, Specifications		Wear Limits	
	911 Carrera	911 Turbo and Turbo Look	911 Carrera	911 Turbo and Turbo Look
Service brakes (foot-operated)	Hydraulic, dual circuit brake system with front/rear brake ciruit division (black/white) Brake booster, inboard vented brake discs with brake calipers on front and rear wheels			
Brake booster dia.	8"	8"		
Boosting factor	2.25	2.25 3,0***		
Master cylinder dia.	20.64 mm	23.81 mm		
Stroke	20/12 mm	18/14 mm		
Brake force regulator switching-over pressure – reducing factor	33 bar – 0,46	33 bar – 0,46 55 bar – 0,46***		
Brake disc dia.				
front	282.5 mm	304 mm perf.		
rear	290 mm	309 mm perf.		
Effective brake disc dia.				
front	228 mm	247 mm		
rear	244 mm	251 mm		
Piston diameter in brake caliper				
front	48 mm*	38 mm**		
rear	42 mm*	30 mm**		
Brake pad surface each front wheel	76 cm^2	94 cm^2		
Brake pad surface each rear wheel	52.5 cm^2	94 cm^2		
Total brake pad surface	257 cm^2	376 cm^2		
Pad thickness				
front	10 mm	13 mm	2 mm	2 mm
rear	10 mm	13 mm	2 mm	2 mm

* 2 pistons each brake caliper
** 4 pistons each brake caliper
*** Since 1985 models

Description	Remarks, Specifications		Wear Limits	
	911 Carrera,	911 Carrera Turbo + Turbo Look	911 Carrera	911 Carrera Turbo + Turbo Look
Brake disc thickness new front	24 mm	32 mm		
rear	24 mm	28 mm		
Min. brake disc thickness* after machining front	22.6 mm	30.6 mm	22.0 mm	30 mm
rear	22.6 mm	26.6 mm	22.0 mm	26 mm
Max. brake disc thickness deviation	0.02 mm	0.02 mm		
Max. brake disc lateral runout	0.05 mm	0.05 mm		
Max. lateral runout in installed state	0.1 mm	0.1 mm		
Max. peak-to-valley surface finish after machining	0.006 mm	0.006 mm		
Play on brake pedal with bled brakes and stopping engine	app. 10 mm	app. 10 mm		
Parking brake (hand-operated)	Mechanically operated drum brakes on both rear wheels			
Brake drum dia.	180 mm	180 mm	181 mm	181 mm
Brake shoe width	25 mm	25 mm		
Brake liner surface per wheel	85 cm^2	85 cm^2		
Brake liner thickness	4.5 mm	4.5 mm	2 mm	2 mm

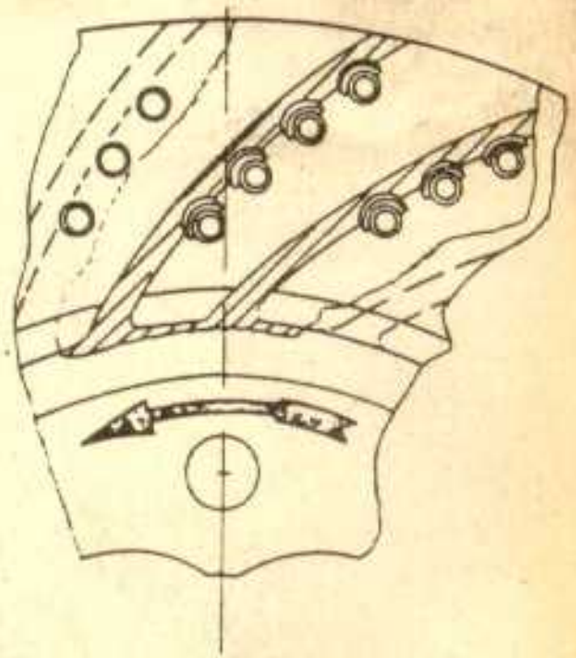
* Brake disc should only be machined symmetrically, i. e. uniform on both sides.

Arrangement of brake disc venting ports (assembly information)

The inboard venting ports of brake discs **on Turbo** cars 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 **04702** = left side
930 351 **04802** = right side

Tightening torque for hydraulic brake parts

Location	Designation	Threads	Material/ Strength	Torque Nm
Brake master cylinder to vacuum booster	Nut	M 8	8	25
Stop light switch to brake master cylinder	Stop light switch	M 10 × 1		15 + 4
Brake booster to console	Nut	M 8	8	25
Brake fluid tank	Screw	M 6	8.8	2
Pivot and joint shell to push rod	Nut	M 10	8	35
Brake booster to trunk floor plate	Nut	M 8	8	25
Strut to console	Bolt	M 10	8.8	46
Brake pipes to master cylinder, branches, brake hoses and brake calipers	Coupling	M 10 × 1		12
Branch to bracket and rear axle cross tube	Screw	M 6	8.8	6
Bleeder screws on brake calipers	Bleeder scrwe			3
Ring adapter to brake master cylinder	Hollow union bolt	M 10 × 1	5.6	16
Brake force regulator to connector or ring adapter		M 10 × 1		14
Bleeder screws on brake calipers (Turbo Look cars)	Bleeder screw	M 10		8 – 11

Location	Designation	Threads	Material/ Strength	Torque Nm
Brake caliper halves to bridge (Turbo Look cars)	Bolt	M 12 × 1.5	8.8	60
Spring plate to bridge (Turbo Look cars)	Screw	M 5		4
Ring adapter to brake caliper (Turbo Look cars)	Hollow union bolt	M 10 × 1		16

Tightening torque for mechanical brake parts

Location	Designation	Threads	Material/ Strength	Torque Nm
Nut on steering knuckle	Screw	M 7	10.9	15
Brake caliper to steering knuckle	Bolt	M 12 × 1.5	8.8	70
Brake disc to wheel hub	Bolt	M 8	8.8	23
Shield to steering knuckle	Bolt	M 8	8.8	10
Shield to brake backplate	Bolt	M 8	8.8	25
Shield and brake backplate to trailing arm	Bolt	M 8	8.8	25
Brake disc to wheel hub	Screw	M 6	8.8	5
Brake caliper to trailing arm	Bolt	M 12 × 1.5	8.8	60
Wheel to wheel hub	Wheel nut	M 14 × 1.5		130

Survey of rims and tires

911 Carrera

Type	Standard Rims		Standard Tires	Optional Extra Rims		Optional Extra Tires
911 Carrera	front	6 J × 15*	185/70 or 195/65 VR 15***	front	7 J × 15**	185/70 or 195/65 VR 15***
	rear	7 J × 15*	215/60 VR 15	rear	8 J × 15**	215/60 VR 15
				front	6 J × 16**	205/55 VR 16
				rear	7 J × 16**	225/50 VR 16
911 Carrera Turbo Look	front	7 J × 16**	205/55 VR 16			
	rear	8 J × 16**	225/50 VR 16			
since 1986 models	front	7 J × 16**	205/55 VR 16			
	rear	9 J × 16**	245/45 VR 16			

* Cast light alloy
** Forged light alloy
*** Since 1987 models

Winter tires*

Tires**	Rims – possible and recommended sizes Recommended sizes are underlined.		
185/70 R 15 M+S 88 T	6 J × 15 H2 front and 7 J × 15 H2 rear 6 J × 15 H2 front and rear 7 J × 15 H2 front and rear		
195/65 R 15 M+S 91 T	same rim combination as for 185/70 R 15 tires (column above)		
185/70 R 15 M+S 88 T 215/60 R 15 M+S 90 T (rear)	6 J × 15 H2 front 7 J × 15 H2 rear	or	7 J × 15 H2 front 8 J × 15 H2 rear
195/65 R 15 M+S 91 T 215/60 R 15 M+S 90 T	6 J × 15 H2 front 7 J × 15 H2 rear	or	7 J × 15 H2 rear 8 J × 15 H2 rear
205/55 R 16 M+S 88 T	6 J × 16 H2 front and 7 J × 16 H2 rear 6 J × 16 H2 front and rear 7 J × 16 H2 front and rear***		
205/55 R 16 M+S 88 T 225/50 R 16 M+S 92 T (rear)	6 J × 16 H2 front 7 J × 16 H2 rear	or	7 J × 16 H2 front*** 8 J × 16 H2 rear***

Cold tire inflation pressure — front 2.0 bar; rear 2.5 bar (3.0 bar Turbo Look)

Spare wheel front and rear**** — 2.5 bar or 2.2 bar

* Refer to Technical Information of Group 4 for information and recommendations about winter tires and tire chains.

** M+S winter tires of version Q (SR) may also be used. Tires with greater load capacity are also approved, of course.

Tire Designations:

Q (SR) = Version for top speed up to 160 km/h
T (HR) = Version for top speed up to 190 km/h
88 = Max. 560 kg load capacity
89 = Max. 580 kg load capacity
90 = Max. 600 kg load capacity
92 = Max. 630 kg load capacity

*** Only for Turbo Look

**** 2.2 bar pressure for 165 - 15 4 PR 83 P tires.
2.5 bar pressure for 165 - 15 8 PR 89 P tires.

Survey of rims and tires — 911 Turbo

Rims and tires

Rims	Forged light alloy
Tires: front wheels	205/55 VR 16 on 7 J × 16 rims
rear wheels	225/50 VR 16 on 8 J × 16 rims since 1986 models 245/45 VR 16 on 9 J × 16 rims
Spare wheel	165/15 collapsible tire on 5½ J × 15 rim compressor included

Cold tire inflation pressure

Turbo		Turbo – USA, Japan, Canada
Front	2.0 bar	2.0 bar
Rear	3.0 bar	2.5 bar 3.0 bar*
Spare wheel	2.5 bar or 2.2 bar**	2.5 bar or 2.2 bar**

* Information on a tire in regards to max. permissible tire inflation pressure is important for actual tire inflation pressure.

"Max. Press 36 psi" = 2.5 bar inflation pressure
"Max. Press 44 psi" = 3.0 bar inflation pressure

Only tires of version "Max. Press 44 psi" = 3.0 bar inflation pressure are installed since 1986 models.

** 2.2 bar inflation pressure for 165 - 15 4 PR 83 P tires.
2.5 bar inflation pressure for 165 - 15 8 PR 89 P tires.

Winter tires*

The following table is not applicable for 911 Turbo cars which are fitted with the 15" version series 50 summer tires.

Tires**	Rims – possible and recommebded sizes. Recommended sizes are underlined.		
185/70 R 15 M+S 88 T	6 J × 15 H2 front and 7 J × 15 H2 rear 6 J × 15 H2 front and rear 7 J × 15 H2 front and rear		
195/65 R 15 M+S 91 T	Same rim combination as for 185/70 R 15 tires (column above)		
185/70 R 15 M+S 88 T 215/60 R 15 M+S 90 T (rear)	6 J × 15 H2 front 7 J × 15 H2 rear	or	7 J × 15 H2 front 8 J × 15 H2 rear
195/65 R 15 M+S 91 T 215/60 R 15 M+S 90 T	6 J × 15 H2 front 7 J × 15 H2 front	or	7 J × 15 H2 front 8 J × 15 H2 rear
205/55 R 16 M+S 88 T	6 J × 16 H2 front and 7 J × 16 H2 rear 6 J × 16 H2 front and rear 7 J × 16 H2 front and rear		
205/55 R 16 M+S 88 T 225/50 R 16 M+S 92 T (rear)	6 J × 16 H2 front 7 J × 16 H2 rear	or	7 J × 16 H2 front 8 J × 16 H2 rear

Cold tire inflation pressure: same as for summer tires

* Refer to Technical Information of Group 4 for information and recommendations on winter tires and tire chains.
Only forged light alloy wheel rims may be used.

** M+S winter tires of version Q (SR) may also be used. Tires with greater load capacity, of course, are also approved.

Tire Designations:

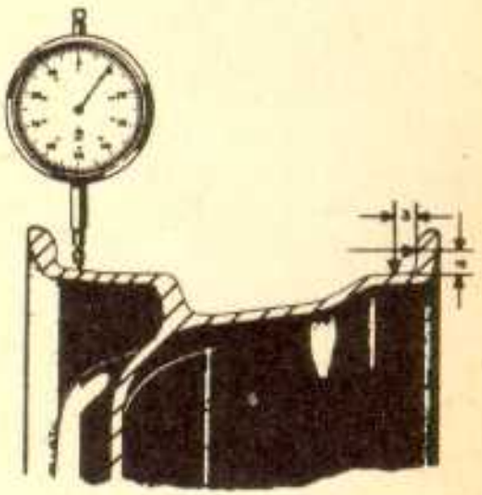
Q (SR) = Version for top speed up to 160 km/h
T (HR) = Version for top speed up to 190 km/h
88 = Max. 560 kg load capacity
89 = Max. 580 kg load capacity
90 = Max. 600 kg load capacity
92 = Max. 630 kg load capacity

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



Distance "a" = 8 mm

Note:

Straigthening of deformed rims is not permitted.

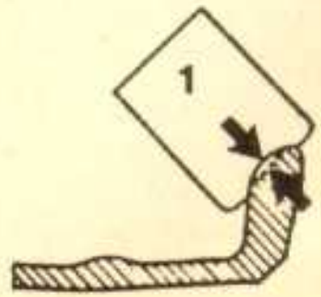
Check rim flanges of light alloy wheel rims for wear. Inner rim flange is more subject to wear.

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 control values — 911 Carrera

Engine Type	911 Carrera	911 Carrera since 11.86*
Control value at engine speed (rpm)	3° ± 3° **A**TDC 800 ± 40	3.5° ± 3° **B**TDC 880 ± 40
Control value at engine speed (rpm)	26° ± 2° BTDC 3800 ± 100	26° ± 2° BTDC 3800 ± 100

* In conjunction with control unit 911 618 111 18
911 618 111 19
911 618 111 20

Ignition timing adjusting values — 911 Turbo

Engine Type	911 Turbo 930/66	911 Turbo 930/68
Ignition timing at engine speed (rpm)	29 ± 1° BTDC 40000	26 ± 1° BTDC 4000
Vacuum control detached	yes	yes
Ignition timing control check* at engine speed (rpm)	2° ± 2° **B**TDC 900 ± 50	1° ± 2° **A**TDC 900 ± 50
Vacuum control detached	no	no

* Ignition timing must have been adjusted first.

Spark Plug Survey

	911 Carrera USA/Japan	911 Turbo All
Spark plugs – Bosch	WR 7 DC	W 3 DP or DPO (W 280 P 21)
Bosch	WR 7 DP	
Champion	RN - 7 YC	
Electrode gap	0.7 + 0.1 mm	0.6 + 0.1 mm

Battery Charge Condition

Normal Climates Density	Temperature Protection	Tropics Density
	– 11° C	1.08
	– 27° C	1.16
	– 68° C	1.23
Discharged (dead)	1.12	
Half charged	1.20	
Charged	1.28	

Fuse and Relay Chart
911 Carrera – 1984 and 1985 Models

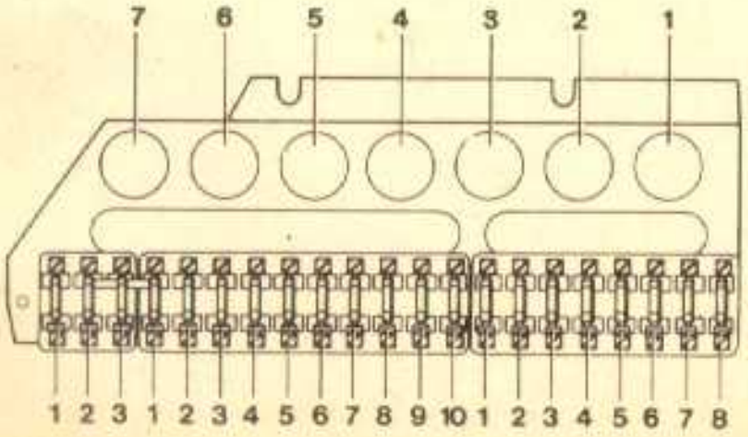
Fuses in Luggage Compartment

3 Pin Fuse Box

No.	Fused Equipment	Amps
1	Electric window controls, sun roof	25
2	Air conditioner	25
3	Headlight cleaners	25

10 Pin Fuse Box

No.	Fused Equipment	Amps
1	Inside lights	5
2	Hazard lights term. 30	16
3	Fuel pump	25
4	Stop lights, cruise control	8
5	Mirrors, heating regulation	16
6	Heater blower, cigar lighter	25
7	Windshield wipers and washer, rear window wiper	25
8	Hazard lights term. 15, backup lights	16
9	Turn signal front left	5
10	Turn signal front right	5



8 Pin Fuse Box

No.	Fused Equipment	Amps
1	High beam left	8
2	High beam right	8
3	Low beam left	8
4	Low beam right	8
5	Side marker light left	5
6	Side marker light right	5
7	License plate lights	5
8	Front fog lamps	16

3 Pin Fuse Box in Engine Compartment

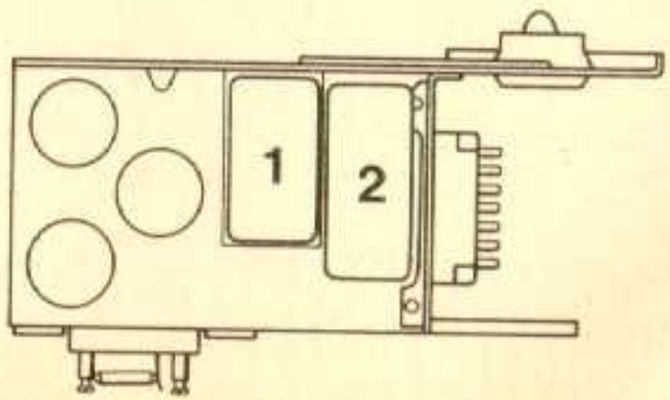
No.	Fused Equipment	Amps
1	Heater control unit relay	16
2	Engine compartment fan	25
3	Rear window defogger	25

Relays in Fuse Box

1	Air conditioner
2	Front fog lamps
3	Horn
4	Cruise control
5	Not occupied
6	Additional fan
7	Not occupied

Relays in Engine Compartment

1	Engine compartment fan
2	Rear window defogger



Fuse and Relay Chart
911 Carrera – 1986 Model

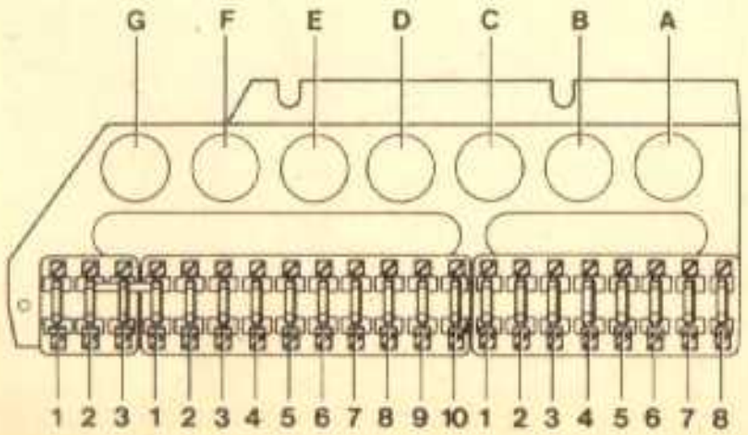
Fuses in Luggage Compartment

3 Pin Fuse Box

No.	Fused Equipment	Amps
1	Electric window controls, sun roof, seat heating	25
2	Air conditioner, additional fan, seat controls	25
3	Headlight cleaners, convertible top	25

10 Pin Fuse Box

No.	Fused Equipment	Amps
1	Inside lights, clock, radio	5
2	Hazard lights term. 30, central locks	16
3	Fuel pump	25
4	Stop lights, cruise control	8
5	Mirrors, heating regulation	16
6	Heater blower, cigar lighter	25
7	Windshield wipers and washer, rear window wiper, heated spray jet	25
8	Hazard lights term. 15, backup lights	16
9	Turn signal front left	5
10	Turn signal front right	5



8 Pin Fuse Box

No.	Fused Equipment	Amps
1	High beam left	8
2	High beam right	8
3	Low beam left	8
4	Low beam right	8
5	Side marker light left	5
6	Side marker light right	5
7	Fog light switch, tail fog light	5
8	Front fog lamps	16

Flying Fuses in Luggage Compartment

No.	Fused Equipment	Amps
1	License plate lights	T2.5
2	Convertible top control unit	T2.5

3 Pin Fuse Box in Engine Compartment

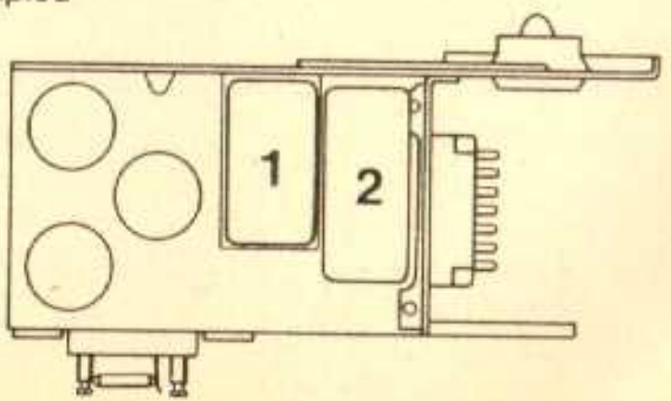
No.	Fused Equipment	Amps
1	Additional fan	16
2	Engine compartment fan	25
3	Rear window defogger/wiper	25

Relays in Fuse Box

A	Air conditioner
B	Front fog lamps
C	Horn
D	Cruise control
E	Not occupied
F	Additional fan
G	Not occupied

Relays in Engine Compartment

1	Engine compartment fan
2	Rear window defogger



Fuse and Relay Chart
911 Carrera – 1987 Model

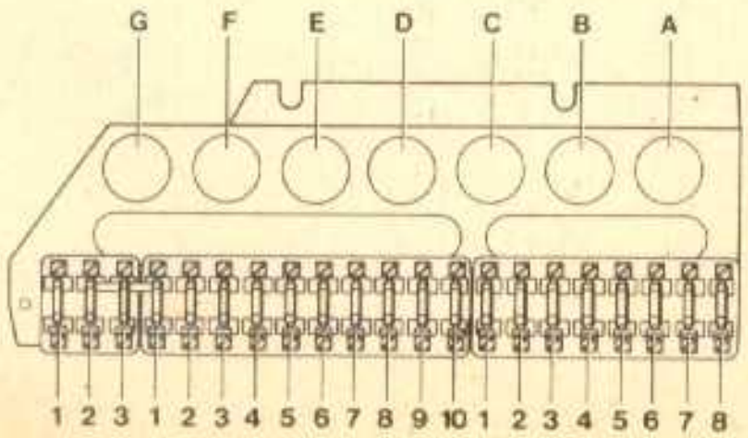
Fuses in Luggage Compartment

3 Pin Fuse Box

No.	Fused Equipment	Amps
1	Electric window controls, sun roof, seat heating	25
2	Air conditioner, additional fan, seat controls	25
3	Headlight cleaners, convertible top	25

10 Pin Fuse Box

No.	Fused Equipment	Amps
1	Inside lights, clock, radio	5
2	Hazard lights term. 30, central locks	16
3	Fuel pump	25
4	Stop lights, cruise control	8
5	Mirrors, heating regulation	16
6	Heater blower, cigar lighter	25
7	Windshield wipers and washer, rear window wiper, heated spray jet	25
8	Hazard lights term. 15, backup lights	16
9	Turn signal front left	5
10	Turn signal front right	5



9 Pin Fuse Box

No.	Fused Equipment	Amps
1	High beam left	8
2	High beam right	8
3	Low beam left	8
4	Low beam right	8
5	Side marker light left	5
6	Side marker light right	5
7	License plate lights	5
8	Front fog lamps, tail fog lights	16

Flying Fuses in Luggage Compartment

No.	Fused Equipment	Amps
1	Radio Berlin	16
2	Convertible top control unit	T2.5

3 Pin Fuse Box in Engine Compartment

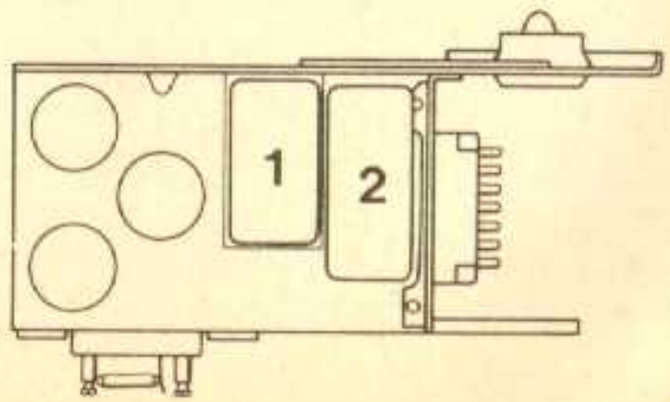
No.	Fused Equipment	Amps
1	Additional blower	16
2	Engine compartment fan	25
3	Rear window defogger/wiper	25

Relays in Fuse Box

A	Air conditioner
B	Fog lamps
C	Two-tone horns
D	Cruise control
E	Oil cooler fan
F	Additional blower
G	Not occupied

Relays in Engine Compartment

1	Engine compartment fan
2	Rear window defogger



Fuse and Relay Chart
911 Turbo – 1984 and 1985 Models

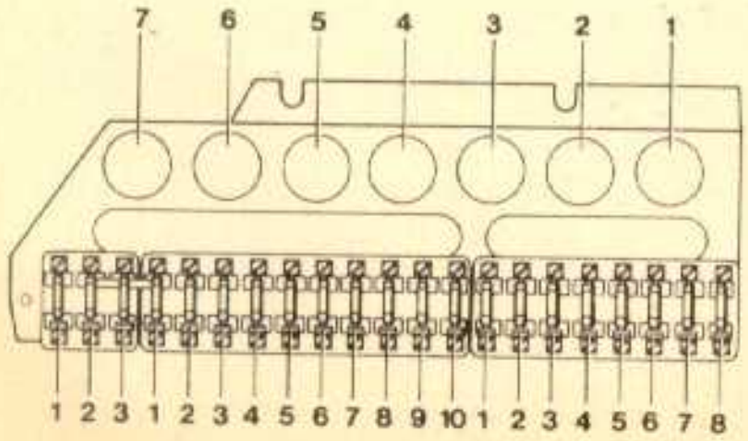
Fuses in Luggage Compartment

3 Pin Fuse Box

No.	Fused Equipment	Amps
1	Electric window controls, sun roof	25
2	Air conditioner	25
3	Headlight cleaners	25

10 Pin Fuse Box

No.	Fused Equipment	Amps
1	Inside lights	5
2	Hazard lights term. 30	16
3	Fuel pump	25
4	Stop lights, cruise control	8
5	Mirrors, heating regulation	16
6	Heater blower, cigar lighter	25
7	Windshield wipers and washer, rear window wiper	25
8	Hazard lights term. 15, backup lights	16
9	Turn signal front left	5
10	Turn signal front right	5



8 Pin Fuse Box

No.	Fused Equipment	Amps
1	High beam left	8
2	High beam right	8
3	Low beam left	8
4	Low beam right	8
5	Side marker light left	5
6	Side marker light right	5
7	License plate lights	5
8	Fog lights	16

3 Pin Fuse Box in Engine Compartment

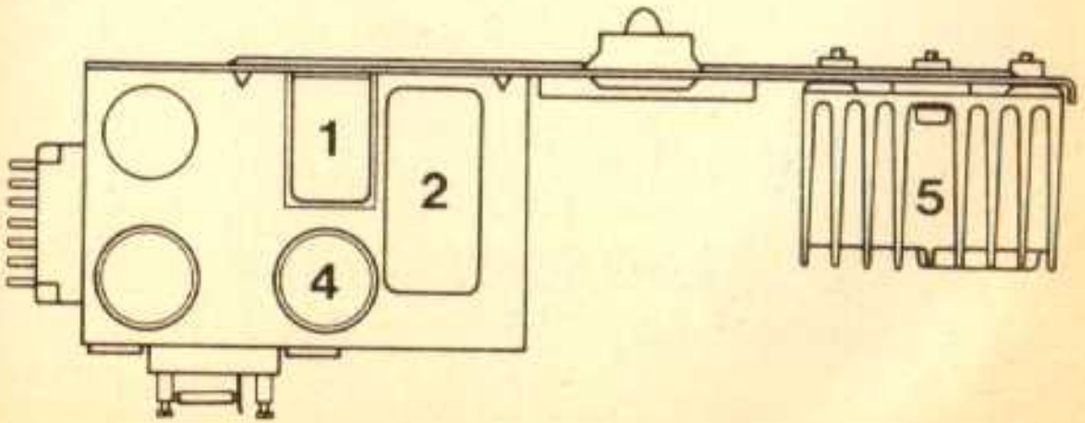
No.	Fused Equipment	Amps
1	Not occupied	
2	Not occupied	
3	Rear window defogger	25

Relays in Fuse Box

1	Air conditioner
2	Front fog lamps
3	Horn
4	Additional blower
5	Not occupied
6	Fuel pump I
7	Fuel pump II

Relays in Engine Compartment

1	Delayed-action relay
2	Rear window defogger
4	Charging pressure air sensor
5	CDI control unit



Fuse and Relay Chart
911 Turbo – 1986 Model

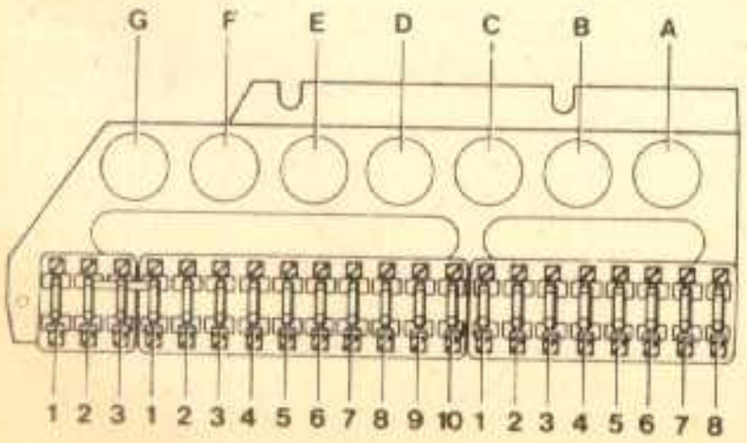
Fuses in Luggage Compartment

3 Pin Fuse Box

No.	Fused Equipment	Amps
1	Electric window controls, sun roof, seat heating	25
2	Air conditioner, additional fan, seat controls	25
3	Headlight cleaners, convertible top	25

10 Pin Fuse Box

No.	Fused Equipment	Amps
1	Inside lights, clock, radio	5
2	Hazard lights term. 30, central locks	16
3	Fuel pump	25
4	Stop lights, cruise control	8
5	Mirrors, heating regulation	16
6	Heater blower, cigar lighter	25
7	Windshield wipers and washer, rear window wiper, heated spray jet	25
8	Hazard lights term. 15, backup lights	16
9	Turn signal front left	5
10	Turn signal front right	5



8 Pin Fuse Box

No.	Fused Equipment	Amps
1	High beam left	8
2	High beam right	8
3	Low beam left	8
4	Low beam right	8
5	Side marker light left	5
6	Side marker light right	5
7	Fog light switch, tail fog light	5
8	Front fog lamps	16

Flying Fuses in Luggage Compartment

No.	Fused Equipment	Amps
1	License plate lights	T2.5

3 Pin Fuse Box in Engine Compartment

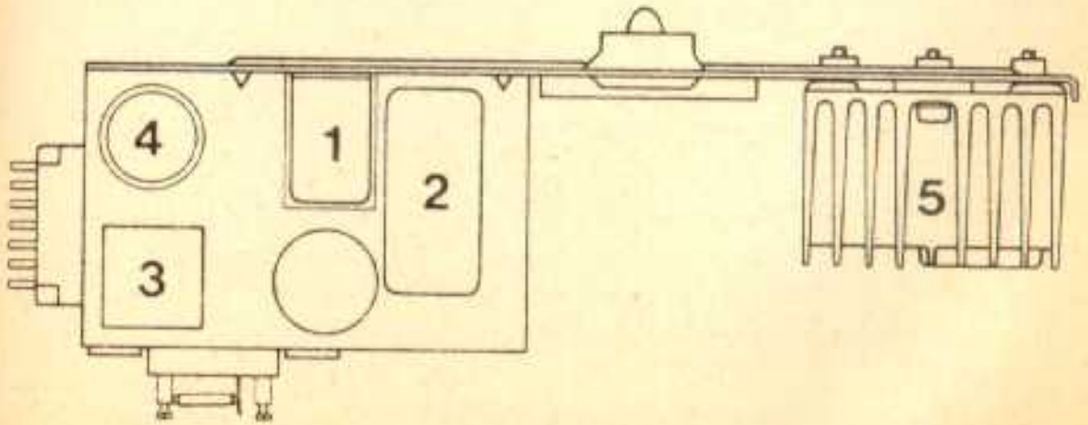
No.	Fused Equipment	Amps
1	Oxygen sensor	8
2	Not occupied	
3	Rear window defogger, rear window wiper	25

Relays in Fuse Box

A	Air conditioner
B	Front fog lamps
C	Horn
D	Additional blower
E	Not occupied
F	Fuel pump I
G	Fuel pump II

Relays in Engine Compartment

1	Delayed action
2	Rear window defogger
3	Charge air pressure sensor
4	Oxygen sensor heating
5	CDI control unit



Fuse and Relay Chart
911 Turbo – 1987 Model

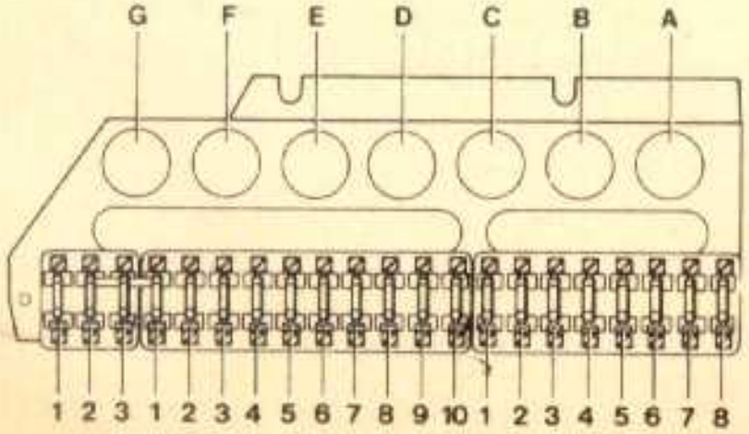
Fuses in Luggage Compartment

3 Pin Fuse Box

No.	Fused Equipment	Amps
1	Electric window controls, sun roof, seat heating	25
2	Air conditioner, additional fan, seat controls	25
3	Headlight cleaners, convertible top	25

10 Pin Fuse Box

No.	Fused Equipment	Amps
1	Inside lights, clock, radio	5
2	Hazard lights term. 30, central locks	16
3	Fuel pump	25
4	Stop lights, cruise control	8
5	Mirrors, heating regulation	16
6	Heater blower, cigar lighter	25
7	Windshield wipers and washer, rear window wiper, heated spray jet	25
8	Hazard lights term. 15, backup lights	16
9	Turn signal front left	5
10	Turn signal front right	5



8 Pin Fuse Box

No.	Fused Equipment	Amps
1	High beam left	8
2	High beam right	8
3	Low beam left	8
4	Low beam right	8
5	Side marker light left	5
6	Side marker light right	5
7	License plate lights	5
8	Front fog lamps, tail fog lights	16

Flying Fuses in Luggage Compartment

No.	Fused Equipment	Amps
1	Radio Berlin	16

3 Pin Fuse Box in Engine Compartment

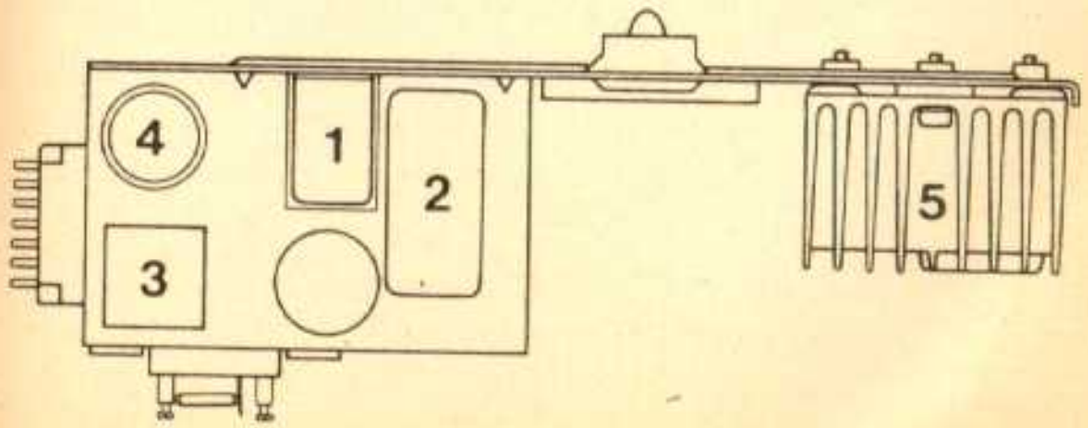
No.	Fused Equipment	Amps
1	Oxygen control	8
2	Not occupied	
3	Rear window defogger/wiper	25

Relays in Fuse Box

A	Air conditioner
B	Front fog lamps
C	Two-tone horn
D	Additional blower
E	Oil cooler blower
F	Fuel pump I
G	Fuel pump II

Relays in Engine Compartment

1	Delayed action
2	Rear window defogger
3	Charge air pressure sensor
4	Oxygen sensor heating
5	CDI control unit



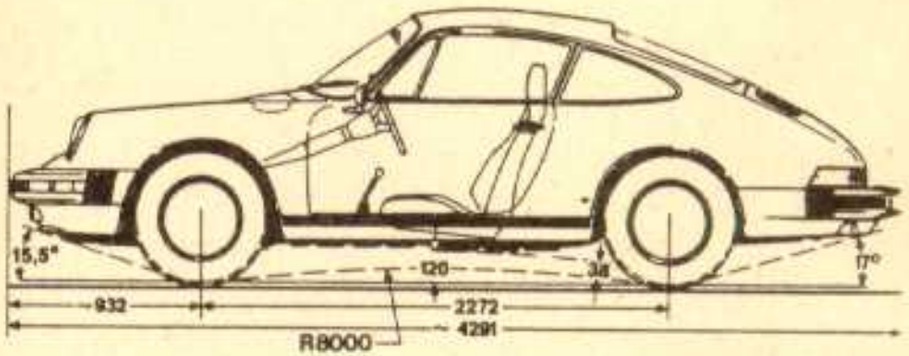
Bulb Chart

Location	Wattage	Base DIN (SAE)	Remarks
Main headlights H 4	60/55 W	P 43 t-38	
Additional headlights H 3 Front fog lamps 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 Tail fog lights	21 W 18 W	BA 15 s	
Side marker lights License plate lights	5 W	BA 9 s	
Trunk light	10 W	BA 15 s	
Inside lights Engine compartment light	10 W	SV 8.5-8	
Lamps for instrument, indicator and ashtray lights	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/side marker lights	32/3 cp	(1034)	USA
Turn signals Backup lights	32 cp	(1073)	USA
Sign light	2 cp	2.9 × 4.6	USA
Side marker/ license plate lights	2 cp	(1895)	USA

Dimensions

(at specified total weight)	911 Carrera	911 Turbo, Turbo Look
Length	4291 mm	4291 mm
Width	1652 mm	1775 mm
Height at curb weight	1320 mm	1310 mm
Wheelbase	2272 mm	2272 mm
Ground clearance	120 mm	120 mm
Track width – front	*1372 mm	*1432 mm
Track width – rear	*1380 mm	*1501 mm
Turning circle	10.95 m	10.95 m
Overhang – front	15.5°	14.5°
– rear	17.0°	16.0°

* At curb weight according to DIN



Weights

	911 Carrera	Turbo Look	911 Turbo
Curb weight acc. to DIN	1210 kg	1260 kg	1335 kg
Gross vehicle weight	1530 kg	1580 kg	1680 kg
Max. axle load – front	680 kg	700 kg	700 kg
Max. axle load – rear	940 kg	950 kg	1050 kg
Max. trailer load without brakes**	480 kg	480 kg	911 Turbo is
Max. trailer load with brakes**	800 kg	800 kg	not designed for
Max. car/trailer weight	2330 kg	2380 kg	trailer
Max. drawbar load	50 kg	50 kg	hauling.
Max. roof load***	75 kg	75 kg	75 kg
Targa and convertible only with original Porsche roof luggage carrier	35 kg	35 kg	

* Gross vehicle weight must not be exceeded.
Important: Payload is reduced accordingly after installation of additional equipment (air conditioner, etc.).
** For gradients up to 16 % (only applicable with original Porsche trailer hitch).
*** Only when using original Porsche roof luggage carrier, otherwise 35 kg roof load.

Filling Capacities

		911 Carrera	911 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 of which about 8 ltr. reserve	ltr. approx.	85	85
Brake fluid tank	ltr. approx.	0.2	0.2
Washing fluid tank	ltr. approx.	8.0	8.0
Intensive cleaning fluid tank	ltr. approx.	0.6	0.6

* **911 Carrera 1984/85/86 mod.** approx. 3 liters of SAE 75 W 90 gear lube in API-Classification GL 5 (or Mil-L 2105 B)

911 Carrera 1987 model approx. 3 liters of SAE 90 gear lube in API Classification GL 5 (or Mil-L 2105 B)

911 Turbo approx. 3.7 liters of SAE 90 gear lube in API Classification GL 5 (or Mil-L 2105 B)

Performance Figures, Consumption

		911 Carrera	911 Carrera with Cat. Conv.	911 Turbo
Top speed with manual transmission	km/h	245	240	260
Acceleration from 0 to 100 km/h	s	6.1	6.7	5.4
Kilometer from standing start	s	26.1	27.0	24.0
Fuel consumption (acc. to DIN 70030, Part 1)				
at 90 km/h	l/100 km	6.8 *7.8	9.7	
at 120 km/h	l/100 km	9.0 *10.1	11.8	
City test	l/100 km	13.6 *14.9	15.5	
Oil consumption	l/1000 km	approx. 1.5	approx. 1.5	approx. 1.5

* Turbo Look

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 inspite 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 Carrera

Dimension	Description	mm
A	Control arm take-up front inside	565.1 ± 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 1987 Model	1550 ± 3 1518 ± 3
I	Axle tube/transmission take-up – inside engine mount bolting points 1987 Model	1323 ± 5 1357 ± 5
K	Rear floor plate – inside engine mount bolting measuring point	1557 ± 5 135
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 1987 Model	1220 ± 3 1257 ± 3

All dimensions are measured horizontally from centerline of hole.

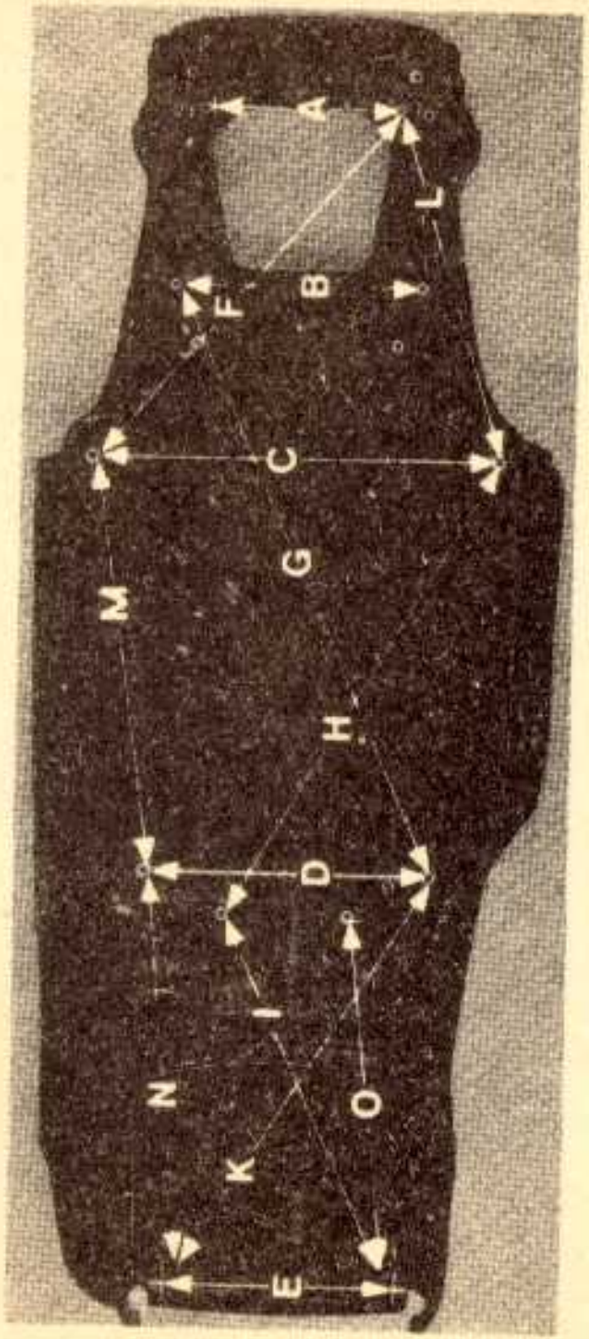
Note:
Dimensions to bolting points of engine mounts are to be measured direct (inclined dimensions).

Important:
The difference between left and right for length dimensions must not exceed specified tolerances.

Control Dimensions for Floor Assembly — 911 Curbo

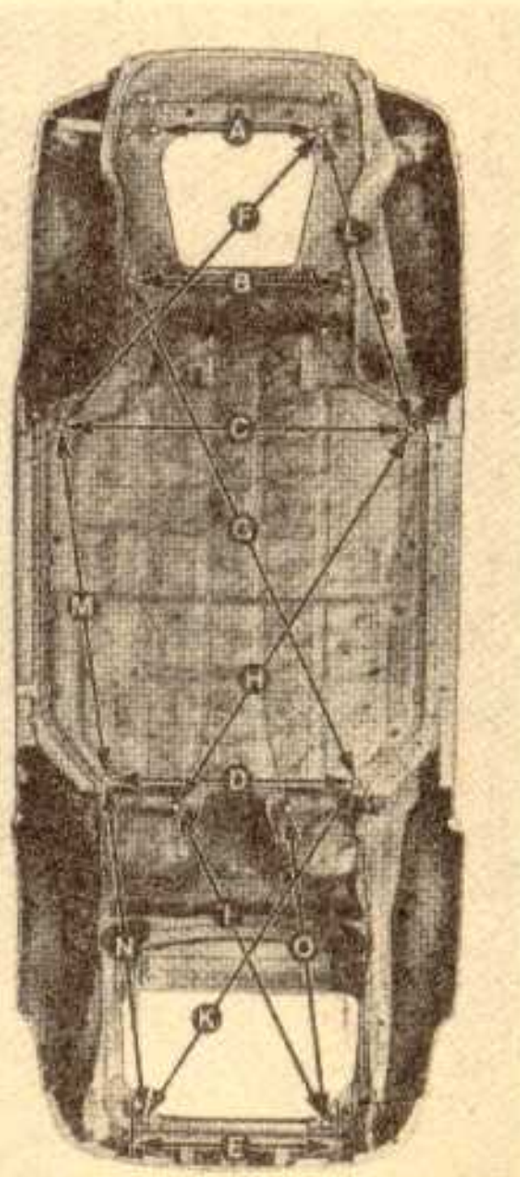
Dimension	Description	mm
A	Control arm take-up front inside	565.5 ± 2
B	Auxiliary platform take-up	726 ± 1
C	Front floor plate measuring points	1200 ± 2
D	Rear floor plate measuring points	850 ± 2
E	Engine mounts	752 ± 3
F	Front floor plate – inside control arm take-up measuring point	1327 ± 3
G	Rear 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 ± 3 135
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



Control Points

911 Carrera – 1987 Model



Convertible – Checking Dimensions

Dimension A / front wall:	Take-up for pin and B pillar outside bolting point.
Dimension B / front wall diagonally:	Take-up for pin and B pillar outside bolting point.
Dimension C	Outside bolting point of B pillar left to right.