

*Chilton's*

# Repair and Tune-up Guide

for the

# RENAULT

*Illustrated*

PRODUCED BY THE AUTOMOTIVE BOOK DEPARTMENT

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## Conversion—Metric and English Measures

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### Linear Units (distance, length, angle)

- 1 kilometer = 0.6214 miles or 3,280 feet
- 1 mile = 1.6093 kilometers
- Multiply kilometers by 0.6214 to get miles
- Multiply miles by 1.6093 to get kilometers
- 1 kilometer = 1000 meters
- 1 meter = 3.281 feet or 39.370 inches
- 1 centimeter = 0.394 inches
- 1 inch = 2.540 centimeters
- Multiply centimeters by 0.394 to get inches
- Multiply inches by 2.54 to get centimeters
- 1 degree (1°) = 60 minutes (60')
- 1 minute (1") = 60 seconds (60')

### Cubic Units (volume, displacement)

- 1 liter = 1000 cubic centimeters = 61.022 cubic inches
- 1 cubic centimeter (milliliter) = 0.061 cubic inches
- 1 cubic inch = 16.387 cubic centimeters
- Multiply cubic centimeters by 0.61 to get cubic inches
- Multiply cubic inches by 16.387 to get cubic centimeters
- 1 liter = 0.264 gallons = 1.057 quarts = 2.1 pints
- 1 gallon = 3.785 liters = 231 cubic inches
- Multiply liters by 0.264 to get gallons
- Multiply gallons by 231 to get cubic inches

### Engine Displacement

Cubic-inch displacement is found by multiplying the bore by itself; multiplying this answer by 0.7854; multiplying this answer by the stroke; and multiplying this answer by the number of cylinders.

The constant 0.7854 is used rather than  $\pi$  (the mathematical constant, 3.14159) because the bore of the cylinder is the diameter, not the radius. Using  $\pi$ , the formula is:

$$\left(\frac{\text{bore}}{2}\right)^2 \times \pi \times (\text{stroke}) \times (\# \text{ cylinders}) = \text{displacement}$$

The same formula is used to determine the displacement of an engine in metric units (centimeters), but only after the millimeter bore and stroke dimensions are changed to centimeters. Change millimeters to centimeters by dividing by ten.

### Force Units (pressure, torque)

- 1 atmosphere (atm) = 14.7 pounds per square inch (psi)
- 1 pound per square inch = 0.068 atmosphere
- Pressure is measured as force against a surface, not volume. A bicycle tire at 50 psi has far less air in it than a car tire having 17 psi.
- 1 kilogram per square centimeter = 14.223 pounds per square inch
- 1 kilogram-meter = 7.233 foot-pounds

A foot-pound is a unit of force equal to one pound raised one foot high.

An inch-pound is one pound raised one inch high.

**British Imperial Measures  
In Cubic Inches**

	<i>Imperial</i>	<i>U. S.</i>
Gallon	277.4	231
Quart	69.4	57.8
Pint	34.7	28.9

**Gasoline Consumption  
By Miles and Kilometers**

1 mile per gallon	=	0.355 kilometers per liter
30 miles per gallon	=	10.64 kilometers per liter
1 kilometer per liter	=	2.82 miles per gallon
8 kilometers per liter	=	22.6 miles per gallon

**Common Automotive  
Abbreviations**

L	=	liters (measurement of volume) or Luxor (meaning deluxe)
mm	=	millimeters
cc	=	cubic centimeters
ohv	=	overhead valves
CIH	=	camshaft in cylinder head (rocker arm required)
ohc	=	overhead camshaft (no rocker arm needed)
OEM	=	original equipment manufactured
bhp	=	braking horsepower
SAE	=	Society of Automotive Engineers
DIN	=	German Engineering Norms
rpm	=	revolutions per minute
ft.-lbs.	=	foot pounds (unit of force)
in.-lbs.	=	inch pounds
POE	=	port of entry
A.I.R	=	air injection reactor (exhaust emission control system)

**Conversion—Millimeters to Decimal Inches**

<i>mm</i>	<i>inches</i>	<i>mm</i>	<i>inches</i>	<i>mm</i>	<i>inches</i>	<i>mm</i>	<i>inches</i>	<i>mm</i>	<i>inches</i>
1	.039 370	31	1.220 470	61	2.401 570	91	3.582 670	210	8.267 700
2	.078 740	32	1.259 840	62	2.440 940	92	3.622 040	220	8.661 400
3	.118 110	33	1.299 210	63	2.480 310	93	3.661 410	230	9.055 100
4	.157 480	34	1.338 580	64	2.519 680	94	3.700 780	240	9.448 800
5	.196 850	35	1.377 949	65	2.559 050	95	3.740 150	250	9.842 500
6	.236 220	36	1.417 319	66	2.598 420	96	3.779 520	260	10.236 200
7	.275 590	37	1.456 689	67	2.637 790	97	3.818 890	270	10.629 900
8	.314 960	38	1.496 050	68	2.677 160	98	3.858 260	280	11.032 600
9	.354 330	39	1.535 430	69	2.716 530	99	3.897 630	290	11.417 300
10	.393 700	40	1.574 800	70	2.755 900	100	3.937 000	300	11.811 000
11	.433 070	41	1.614 170	71	2.795 270	105	4.133 848	310	12.204 700
12	.472 440	42	1.653 540	72	2.834 640	110	4.330 700	320	12.598 400
13	.511 810	43	1.692 910	73	2.874 010	115	4.527 550	330	12.992 100
14	.551 180	44	1.732 280	74	2.913 380	120	4.724 400	340	13.385 800
15	.590 550	45	1.771 650	75	2.952 750	125	4.921 250	350	13.779 500
16	.629 920	46	1.811 020	76	2.992 120	130	5.118 100	360	14.173 200
17	.669 290	47	1.850 390	77	3.031 490	135	5.314 950	370	14.566 900
18	.708 660	48	1.889 760	78	3.070 860	140	5.511 800	380	14.960 600
19	.748 030	49	1.929 130	79	3.110 230	145	5.708 650	390	15.354 300
20	.787 400	50	1.968 500	80	3.149 600	150	5.905 500	400	15.748 000
21	.826 770	51	2.007 870	81	3.188 970	155	6.102 350	500	19.685 000
22	.866 140	52	2.047 240	82	3.228 340	160	6.299 200	600	23.622 000
23	.905 510	53	2.086 610	83	3.267 710	165	6.496 050	700	27.559 000
24	.944 880	54	2.125 980	84	3.307 080	170	6.692 900	800	31.496 000
25	.984 250	55	2.165 350	85	3.346 450	175	6.889 750	900	35.433 000
26	1.023 620	56	2.204 720	86	3.385 820	180	7.086 600	1000	39.370 000
27	1.062 990	57	2.244 090	87	3.425 190	185	7.283 450	2000	78.740 000
28	1.102 360	58	2.283 460	88	3.464 560	190	7.480 300	3000	118.110 000
29	1.141 730	59	2.322 830	89	3.503 903	195	7.677 150	4000	157.480 000
30	1.181 100	60	2.362 200	90	3.543 300	200	7.874 000	5000	196.850 000

To change decimal millimeters to decimal inches, position the decimal point where desired on either side of the millimeter measurement shown and reset the inches decimal by the same number of digits in the same direction. For example, to convert .001 mm into decimal inches, reset the decimal behind the 1 mm (shown on the chart) to .001; change the decimal inch equivalent (.039" shown) to .00039").

## Conversion—Common Fractions to Decimals and Millimeters

INCHES			INCHES			INCHES		
Common Fractions	Decimal Fractions	Millimeters (approx.)	Common Fractions	Decimal Fractions	Millimeters (approx.)	Common Fractions	Decimal Fractions	Millimeters (approx.)
1/128	.008	0.20	11/32	.344	8.73	43/64	.672	17.07
1/64	.016	0.40	23/64	.359	9.13	11/16	.688	17.46
1/32	.031	0.79	3/8	.375	9.53	45/64	.703	17.86
3/64	.047	1.19	25/64	.391	9.92	23/32	.719	18.26
1/16	.063	1.59	13/32	.406	10.32	47/64	.734	18.65
5/64	.078	1.98	27/64	.422	10.72	3/4	.750	19.05
3/32	.094	2.38	7/16	.438	11.11	49/64	.766	19.45
7/64	.109	2.78	29/64	.453	11.51	25/32	.781	19.84
1/8	.125	3.18	15/32	.469	11.91	51/64	.797	20.24
9/64	.141	3.57	31/64	.484	12.30	13/16	.813	20.64
5/32	.156	3.97	1/2	.500	12.70	53/64	.828	21.03
11/64	.172	4.37	33/64	.516	13.10	27/32	.844	21.43
3/16	.188	4.76	17/32	.531	13.49	55/64	.859	21.83
13/64	.203	5.16	35/64	.547	13.89	7/8	.875	22.23
7/32	.219	5.56	9/16	.563	14.29	57/64	.891	22.62
15/64	.234	5.95	37/64	.578	14.68	29/32	.906	23.02
1/4	.250	6.35	19/32	.594	15.08	59/64	.922	23.42
17/64	.266	6.75	39/64	.609	15.48	15/16	.938	23.81
9/32	.281	7.14	5/8	.625	15.88	61/64	.953	24.21
19/64	.297	7.54	41/64	.641	16.27	31/32	.969	24.61
5/16	.313	7.94	21/32	.656	16.67	63/64	.984	25.00
21/64	.328	8.33						

## Multiple Terminology for Automobile Parts

In some cases there is more than one name for an automobile part or assembly. Equivalent meanings are given below. "Br." stands for British.

### Carburetor

air correction jet (Br), high-speed air bleed  
butterfly, throttle valve, throttle plate  
choke tube (Br), venturi  
emulsion tube (Br), main vent tube  
idle speed screw, throttle stop screw  
main jet (Br), main metering jet  
pilot jet (Br), idling jet  
pilot jet air bleed (Br), idle air adjusting screw  
progression circuit (Br), second idle stage  
slow-running adjustment (Br), idle speed adjustment  
slow-running volume adjustment (Br), idle mixture adjustment  
strangler (Br), choke

### Engine

bearing insert, bearing shell, bearing  
core plug (Br), welsh plug, drain plug  
crankpin, journal

gudgeon pin (Br), piston pin, wrist pin  
retaining clip, circlip, snap ring  
scraper ring, oil ring  
clutch driven plate, drive disc  
oil sump, oil pan  
slave cylinder, servo cylinder, operating cylinder

### Electrical

alternator, AC generator  
dynamo (Br), generator  
earth (Br), ground  
distributor shaft, driving spindle

### Suspension

king pin slant, steering knuckle inclination,  
swivel axle angle  
control arm, control link  
cross member, assembly member

### Miscellaneous

filling up, topping up  
bushings, bushes, shell bearings  
fork, yoke  
brake backing plate, securing plate