CONVERSION INCHES TO MILLIMETERS
1 inch = 25.4 mm
1 mm = .03947 Decimal Inch

Inches	Decimal Inches	Millimeters
1/64"	0.0156	0.3969
1/32"	0.0313	0.7938
3/64"	0.0469	1.1906
1/16"	0.0625	1.5875
5/64"	0.0781	1.9843
3/32"	0.0938	2.3812
7/64"	0.1094	2.7781
1/8"	0.1250	3.1750
9/64"	0.1406	3.5712
5/32"	0.1563	3.9687
11/64"	0.1719	4.3656
3/16"	0.1875	4.7625
13/64"	0.2031	5.1594
7/32"	0.2188	5.5563
15/64"	0.2344	5.9531
1/4"	0.2500	6.3500
17/64"	0.2656	6.7469
9/32"	0.2813	7.1438
19/64"	0.2969	7.5406
5/16"	0.3125	7.9375
21/64"	0.3281	8.3344
11/32"	0.3438	8.7313
23/64"	0.3594	9.1281
3/8"	0.3750	9.5250
25/64"	0.3906	9.9219
13/32"	0.4063	10.3188
27/64"	0.4219	10.7156
7/16"	0.4375	11.1125
29/64"	0.4531	11.5093
15/32"	0.4688	11.9062
31/64"	0.4844	12.3031
1/2"	0.5000	12.7000
33/64"	0.5156	13.0968
17/32"	0.5313	13.4938
35/64"	0.5469	13.8906
9/16"	0.5625	14.2875
37/64"	0.5781	14.6844
19/32"	0.5938	15.0813
39/64"	0.6094	15.4781
5/8"	0.6250	15.8750
41/64"	0.6406	16.2719
21/32"	0.6563	16.6688
43/64"	0.6719	17.0663
11/16"	0.6875	17.4625
45/64"	0.7031	17.8593
23/32"	0.7188	18.2563
47/64"	0.7344	18.6531
3/4"	0.7500	19.0500
49/64"	0.7656	19.4469
25/32"	0.7813	19.8450
51/64"	0.7969	20.2406
13/16"	0.8125	20.6375
53/64"	0.8281	21.0344
27/32"	0.8438	21.4313
55/64"	0.8594	21.8281
7/8"	0.8750	22.2250
57/64"	0.8906	22.6219
29/32"	0.9063	23.0188
59/64"	0.9219	23.4156
15/16"	0.9375	23.8125
61/64"	0.9531	24.2094
31/32"	0.9688	24.6063
63/64"	0.9844	25.0031
1"	1.0000	25.4000

1 Inch = 2.54 cm
1 Foot = 12 Inch = 30.48 cm
1 Yard = 3 Foot = 91.44 cm
1 Mile = 1760 Yards = 1609.3 mtr

Inches to Metric

Inches to Millimeters:	Inches x 25.4
Feet to Centimeters:	Feet x 30.48
Yards to Meters:	Yards x 0.9144
Land Miles to Kilometers:	Miles x 1.6093

Metric to Inches

Millimeters to Inches:	Millimeterx 0.03937
Centimeters to Feet:	Centimeter x 0.0328
Meters to Yards:	Meter x 1.0936
Kilometers to Miles:	Kilometer x 0.6214

Sq. measures Inches to Metric

Sq. inch to Sq. centimeter:	Sq. inch x 6.4516
Sq. feet to Sq. centimeter:	Sq. feet x 929,0304
Sq. feet to Sq. meter:	Sq. feet x 0.0929
Sq. yard to Sq. meter:	Sq. yard x 0.8361
Acres to Sq. meter:	Acres x 4046.8564

Sq. measures Metric to Inches

Sq. centimeter to Sq. inch:	Sq. centimeter x 0.155
Sq. meter to Sq. inch:	Sq. meter x 1550.0031
Sq. meter to Sq. feet:	Sq. meter x 10.7639
Sq. meter to Sq. yard:	Sq. meter x 1.1960
Sq. meter to Acres:	Sq. meter x 0.0002

US 1 Pint = 0.4732 Ltr
US 1 Quart = 2 Pint = 0.9461 Ltr
US 1 Gallon = 4 Quarts = 3.785 Ltr

Measures of Capacity US to Metric (for fluids only)

Fluid Ounce to Liter:	Fluid ounces x 0.0296
Pints to Liter:	Pints x 0.4732
Quarts to Liter:	Quarts x 0.9464
Gallons to Liter:	Gallons x 3.7854
Barrel to Liter:	Barrels x 119.2404

NOTE: US CAPACITY MEASURES DIFFERT FROM IMPERIAL (UK) CAPACITY MEASURES. ALL CAPACITY MEASUREMENTS FOR GAS TANKS, OIL TANKS, OIL ETC. LISTED IN THIS CATALOG ARE IN US MEASUREMENTS

Measures of Capacity Metric to US

Liter to Fluid ounces:	Liter x 33.8140
Liter to Pints:	Liter x 2.1134
Liter to Quarts:	Liter x 1.0567
Liter to Gallons:	Liter x 0.2642
Liter to Barrels:	Liter x 0.0084

Imp 1 Pint = 0.5682 Ltr
Imp 1 Quart = 2 Pint = 1.1365 Ltr
Imp 1 Gallon = 4 Quarts = 4.456 Ltr

Measures of Capacity Imperial to Metric (also for non fluids US)

Gill to Liter:	Gill x 0.1420
Pints to Liter:	Pints x 0.56826
Quarts to Liter:	Quarts x 1.1365
Gallons to Liter:	Gallons x 4.546

Measures of Capacity Metric to Imperial (also for non fluids US)

Liter to Gill:	Liter x 7.039
Liter to Pints:	Liter x 1.7597
Liter to Quarts:	Liter x 0.8789
Liter to Gallons:	Liter x 0.2199

Cubic measures US to metric

Cubic Inch to Cubic centimeter:	Cubic Inch x 16.3871
Cubic Feet to Cubic Meter:	Cubic feet x 0.0283

Cubic measures Metric to US

Cubic centimeters to Cubic Inch:	Cubic c.meter x 0.0610
Cubic meter to Cubic Feet:	Cubic meter x 35.3147

Weights US to Metric

Grains to Gram:	Grains x 0.0648
Ounces to Gram:	Ounces x 28.3495
Pounds to Kilogram:	Pounds x 0.4536

Weights Metric to US

Gram to Grains:	Gram x 15.4326
Gram to Ounces:	Gram x 0.0353
Kilogram to Pounds:	Kilogram x 2.2046

Temperatures

Fahrenheit to Celsius:	5/9 x (F - 32)
Celsius to Fahrenheit:	(9/5 x C) + 32

Torque

Foot pound to Newton meter:	ft/lbs x 1.35
Newton meter to Foot pound:	Nm x 0.74

$$\text{Torque} = \frac{\text{Horsepower x 5252}}{\text{RPM}}$$

Example: Harley-Davidson has rated the Evolution motor at 69 horsepower at 5000 RPM. What is the torque?

$$\text{Torque} = \frac{69 \times 5252}{5000} = 72.5$$

Pressure

1 PSI = 1 Pounds per sq. Inch
1 Bar = 1 Kilogram per sq. centimeter
PSI to Bar: PSI x 0.07
Bar to PSI: Bar x 14.29

1 Horsepower

= 550 foot/pound per second = 76.04 kg/mtr per second
1 Horsepower = 0.736 Kilowatt
1 Kilowatt = 1.36 Horsepower

$$\text{Horsepower} = \frac{\text{torque x RPM}}{5252}$$

Example: Harley-Davidson has rated the Evolution motor at 82ft.-lbs. of torque at 3600 rpm. What is the Horsepower?

$$\text{Horsepower} = \frac{82 \times 3600}{5252} = 56.2$$

Engine Displacement:

Bore x Bore x Stroke x 0.7857 x number of cylinders

Example: Stock Big Twin Evolution Engine has 3.5" bore and 4.25" stroke
Bore x Bore x Stroke x .7857 x 2 cylinders
3.5" x 3.5" x 4.25" x .7857 x 2 = 81.81 Cubic inches

in Cubic Centimeter:

Bore 3.5" = (3.5 x 2.54) 8.89 cm
Stroke 4.25" = (4.25 x 2.54) 10.798 cm
8.89 x 8.89 x 10.798 x 0.7857 x 2 = 1341.01 cc

Compression ratio

$$\frac{\text{Displacement + Combustion chamber volume}}{\text{Combustion chamber volume}} : 1$$

Example for stock Evolution Big Twin Engine
Measured combustion chamber volume 83.8 cc
Displacement (1 cylinder) 670.5 cc

$$\frac{670.5 \text{ cc} + 83.8 \text{ cc}}{83.8} : 1 = \frac{754.3}{83.8} : 1 = 9 : 1$$

For correct piston play, bore sizes and wear limits refer to the OEM service manual. If you are using special pistons and/or cylinders follow the manufacturer instructions for bore sizes.

Polarizing generators and regulators

The following information and instructions are for your use, so your warranty will by in effect. No warranty can be in effect if these instructions are not followed. Whenever any component of a generator charged electrical system is serviced it is necessary to re-polarize the complete system, making sure it has the correct polarity so the system will charge in the right direction. If the system is put into service with the wrong polarity it may result in burned relay points, a dead battery and damage to both the regulator and generator.

Instructions:

1. To polarize a generator system with a mechanical regulator, momentarily connect a jumper wire of adequate gauge (a battery cable is ideal) between the "bat" and the "gen" terminal on the regulator after all wires have been properly connected and before starting the motor.
2. To polarize a generator system with electronic regulator/ rectifier. Before mounting the generator of the vehicle, place the generator on a non conducting work surface (like a wooden bench) and connect the positive terminal of a battery to the armature terminal of the generator. Then momentarily "flash" the negative battery terminal to the generator field terminal.

Oil filters

The oil system of Harley-Davidson changed between the Evolution and Twin Cam models. On Evolution models the oil filter system is in the return section and uses a 30 micron filter. On Twin Cam models the oil filter system is on the pressure side and uses a 10 micron filter. Oil filters can not be changed over!

Gas Tanks

The zinc-chromate primer finish, on some of our tanks, is provided for protection of the tanks during shipment and storage. It is not recommended as a primer finish for paint applications without proper surface preparation. As with any fuel tank, particularly one where custom paint is to be applied, all the tanks must be pressure tested, then cleaned and sealed with tank sealer (ZPN 232020) before painting, to protect the final finish and prevent internal rust during winter storage.

Exhaust systems

Except where mentioned differently, all exhaust systems, mufflers, drag-pipes, etc. shown in our catalog, are for closed course competition or in show competition only. They will not meet legal noise standards.

Harley Sportster Displacement in CI

Stroke \ Bore	3"	3 3/16"	3 1/4"	3 5/16"	3 3/8"	3 7/16"	3 1/2"
3 13/16"	53.9	60.8	63.2	65.7	68.2	70.7	73.3
4 1/16"	57.4	64.8	67.4	70.0	72.6	75.3	78.1
4 3/16"	59.1	66.8	69.4	72.1	74.9	77.7	80.5
4 5/16"	60.9	68.8	71.5	74.3	77.1	80.0	82.9
4 7/16"	62.7	70.8	73.6	74.4	79.3	82.3	85.3
4 1/2"	63.6	71.8	74.6	77.5	80.5	83.5	86.5
4 5/8"	65.3	73.8	76.7	79.7	82.7	85.8	89.0
4 13/16"	68.0	76.8	79.8	82.9	86.0	89.3	92.5
5"	70.6	79.8	82.9	86.1	89.4	92.7	96.1

Harley 74 & 80 Displacement in CI

Stroke \ Bore	3 7/16"	3 1/2"	3 5/8"	3 11/16"	3 3/4"	3 13/16"
3 31/32"	73.6	76.3	81.8	84.7	87.6	90.5
4 1/4"	78.8	81.7	87.6	90.7	93.8	96.9
4 1/2"	83.4	86.5	92.8	96.0	99.3	102.7
4 5/8"	85.8	89.0	95.5	98.8	102.2	105.6
4 3/4"	88.1	91.3	97.9	101.4	104.8	108.5
5"	92.7	96.1	103.1	106.7	110.3	114.1

LIMITED WARRANTY

Zodiac warrants to the original owner that any Zodiac product sold hereunder, if properly installed, maintained, and operated under normal good conditions shall be free from any defects in material and workmanship, for a period of 6 (six) months from the date the goods are sold to the customer. Zodiac warrants that any electrical part sold hereunder, if properly installed, maintained, and operated under normal good conditions shall be free of defects in material and workmanship for a period of 90 (ninety) days from the date the electrical parts are sold to the customer. The obligation of Zodiac, and the customers sole and exclusive remedy shall be limited to replacement or repair of any goods or electrical parts which are returned to Zodiac, transportation, shipping and postal charges pre-paid. In the event the Zodiac goods are discontinued or obsolete, the customer shall be entitled to a refund of the purchase price.

IMPORTANT: DEALERS MUST NOT REPLACE ANY PART FOR THEIR CUSTOMERS UNLESS AUTHORIZED BY ZODIAC.

GOODS MANUFACTURED BY OTHERS

Goods manufactured by others are warranted only to the extend of the original manufacturer's warranties and Zodiac shall have no obligations with respect to any claims or obligations arising as a result of any such warranties.

IMPROPER CARE OR MISUSE

Zodiac shall have no obligation hereunder in the event the Zodiac goods have been modified by any other person or organization, or where the Zodiac goods or electrical parts become defective in whole or in part as a result of improper installation, improper use, improper maintenance, improper use, abnormal operation, or any other misuse or mistreatment of the Zodiac goods or electrical parts.

PROOF OF PURCHASE

Zodiac shall have no obligation hereunder in the event the customer is unable to present a receipt evidencing the date when the customer purchased the Zodiac goods or electrical parts.

CONSEQUENTIAL DAMAGES

Zodiac shall not be liable for any consequential damage or incidental damages arising from the breach of any warranties, the failure to deliver, delay in delivery, delivery in non conforming conditions, or for any other breach of contract or duty between Zodiac and the customer.

SUBSTITUTION AND PRODUCT CHANGES

From time to time some of our catalog items are discontinued or not available. When this occurs we reserve the right to substitute an item of equal or better quality. We also reserve the right to discontinue any product(s) at such time as considered necessary. Zodiac also retains the right to make changes in design, construction, or specifications of the products it distributes and/or manufactures at any time without incurring any obligation in incorporating such changes in products previously sold.

Standard conditions of sales lodged with the County Court of Utrecht, The Netherlands under ref. number 69/88