

## ENGINES

### Torque Specifications

When tightening bolts, nuts, or screws, a torque pattern should be followed to insure uniform equal tension is applied to all fasteners. Proper torque application prevents fasteners from loosening or breaking in critical service. It also minimizes wear and eliminates premature or needless repair costs. Following uniform torque application sequence patterns assures optimum performance from precision machined, close tolerance assemblies. On vital engine parts, torquing negligence could be costly.

Torque is a force which tends to produce rotation. The measurement of this force is expressed in units of force and length. There are at present two basic systems of units used to express torque, English and Metric. In the English system, the units of force are the pound or ounce, and the length is the foot or inch.

In the Metric system, the unit of force is expressed in grams (gm) or kilograms (kg), and length as centimeters (cm) or meters (m). The most common units of torque in the English system are ft. lb. and in. lb. In the Metric system, torque is commonly expressed in units of kg/m.

| Multiply | By                      | To Obtain                 |
|----------|-------------------------|---------------------------|
| in. lbs. | .0834<br>1150<br>.01150 | ft. lbs.<br>gm/cm<br>kg/m |
| ft. lbs. | 12<br>13,800<br>.138    | in. lbs.<br>gm/cm<br>kg/m |
| kg/m     | 86.8<br>7.24            | in. lbs.<br>ft. lbs.      |

| Engine   | Cylinder Head   | Crankcase<br>8 mm              | Crankcase<br>10 mm             | Flywheel                       | Cylinder Base<br>Studs         |
|--|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| EC25PS   | 17-18 ft. lbs.<br>2.3-2.5 kg/m  | 17-18 ft. lbs.<br>2.2-2.3 kg/m | 23-25 ft. lbs.<br>3.2-3.5 kg/m | 60-65 ft. lbs.<br>8.3-9.0 kg/m | 24-28 ft. lbs.<br>3.3-3.9 kg/m |
| Air Cooled<br>Twin Cylinder  | 17-18 ft. lbs.<br>2.3-2.5 kg/m  | 17-18 ft. lbs.<br>2.2-2.3 kg/m | 23-25 ft. lbs.<br>3.2-3.5 kg/m | 60-65 ft. lbs.<br>8.3-9.0 kg/m | 24-28 ft. lbs.<br>3.3-3.9 kg/m |
| EC34-2PM   | 18.5-19.5 ft. lbs.<br>2.6-2.7 kg/m  |                                |                                |                                |                                |
| EC34PL<br>EC40PL<br>EC45PL<br>EC50PL<br>EC51PL<br>EC58PL<br>EC60PL<br>EC65PL<br>EC75PL<br>EC80PL | 8 mm<br>17-18 ft. lbs.<br>2.2-2.3 kg/m<br><br>10 mm<br>24-26 ft. lbs.<br>3.6-4.0 kg/m | 17-18 ft. lbs.<br>2.2-2.3 kg/m | 23-25 ft. lbs.<br>3.2-3.5 kg/m | 60-65 ft. lbs.<br>8.3-9.0 kg/m | 24-28 ft. lbs.<br>3.3-3.9 kg/m |

#### WARNING

*Gasoline is extremely flammable and explosive under certain conditions.*

-  Always stop the engine and refuel outdoors or in a well ventilated area.
-  Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored or used.
-  Do not overfill the tank. Do not fill the tank neck.
-  If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately.
-  If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.
-  Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.