BRIGGS & STRATTON CORPORATION
ASSEMBLY INSTUCTIONS
2006/42/EC

GENERAL INFORMATION

- These basic assembly instructions are intended for use by the Original Equipment Manufacturers (OEM) for the installation of Briggs & Stratton engines into their equipment.
- Reference the Operator's Manual for additional information on the safe operation, use and maintenance of Briggs & Stratton engines.
- For additional technical information or engine installation drawings, please contact your sales representative.
- Customers may wish to visit the Briggs & Stratton website at www.BriggsandStratton.com for additional information.

TECHNICAL INFORMATION

Power Ratings

The power ratings shown for the individual engine series, on the preceding pages, are established in accordance with SAE (Society of Automotive Engineers) test standard J1940 (Small Engine Power & Torque Rating Procedure). Power curves and engine performance data are obtained in accordance with SAE J1349 (Net) or J1995 (Gross) Engine Power Test Standards.

These power curves are developed from laboratory test engines and are corrected to standard conditions:

- Altitude: 100 meters (328 ft)
- Ambient Temperature: 25° C (77° F)

If the engine is operated under ambient conditions different from the above standard conditions, the following factors should be accounted for in estimating the "on site" power output:

- Engine power will decrease 3.5% for each 300m (1000 ft) above sea level and 1% for each 5.6° C (10° F) above standard temperature of 25° C (77° F).
- The actual "on site" power output will also vary depending on other factors including the manner in which the engine is operated, the exhaust system used, the engine speed, the fuel that is used, and the application in which it is installed.

If the maximum speed of the engine specified for a given application is governed to a speed less than the speed at which the Maximum power occurs, the engine will not achieve the Maximum power in that application. For applications requiring operation at other than the recommended engine speeds, complete details of the proposed engine installation should be referred to the Sales Representative or the Briggs & Stratton Engine Application Center for evaluation.

Engine Speed Settings

The speed settings for Briggs & Stratton engines are carefully monitored during the assembly and tests of the engines.

The maximum governed speed of the engines is controlled by either a calibrated governor spring or is manually adjusted, depending on the engine model and governor type. In either case, the maximum speed is checked as part of the engine test in the factory.

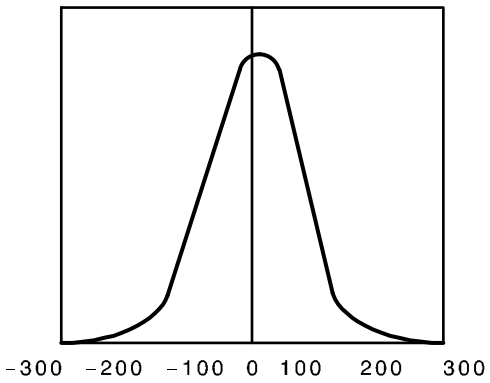
Briggs & Stratton No-Load Test Speed

The Briggs & Stratton no-load test speed is the engine speed that is described in the engine catalog or in an engine "Specification or Quotation." It is important to recognize that this test speed is determined for a new, cold engine that has been run for 30 seconds or less as a free running engine (no load, bare shaft) on an engine test stand. Engine warm-up and break-in can be expected to change the actual engine speed.

To specify the correct engine no-load test speed that will result in the proper operating speed for engine powered equipment, it is necessary to know the expected speed variation of engines built to the Briggs & Stratton specified no-load test speed.

An analysis of engines that are run after warm up has shown that the expected engine no-load speed will generally increase but will usually vary as follows:

Maximum Governed Speed - Normal Distribution



Installed Engine Speed

It is normal for the engine speed to change when the engine is installed and operated in the equipment that it will power. Some common factors that will affect engine speed in addition to warm-up and break-in are listed below:

- Any connected device that operates when the engine is started such as the aerodynamic load of power lawn mower blades or any parasitic load in industrial applications.
- Vibration characteristics of the engine powered equipment
- Decorative engine covers that affect air flow (engines equipped with air vane governors)

Important Application Tests

When specifying the Briggs & Stratton no-load test speed of production engines, it is necessary to allow for the above factors.

The equipment manufacturer should run a sufficient number of test units to be assured that the specified “Briggs & Stratton No-Load Test Speed” produces the desired speed on the final end product.

When running tests to verify the Briggs & Stratton no-load test speed that will be specified, first run the installed engine without any load connected to determine where the test engines fall in the above graph. For this test, engines specified with a lightweight flywheel will need an inertia disk installed in place of the equipment’s inertia source (lawn mower blades, rotors, impellers, etc.), to permit normal starting and operation.

Then test the complete unit at the normal load conditions to verify the proper operational speed.

This test data along with reference to the above graph should make it possible to specify a Briggs & Stratton No-Load Specified Speed that will result in acceptable speed on the end product.

Idle Speed

Idle speeds for all Briggs & Stratton engines are factory set at 1750 RPM unless otherwise specified.

The idle speed is adjusted on each engine during the production test run with a tolerance of plus/minus 100 RPM. Again, it is important to recognize that this adjustment is made for a new, cold engine that has run for 30 seconds or less. It is normal for the engine idle speed to increase as a result of the engine warm-up and break-in.

A readjustment of the idle speed after the engine break-in will minimize the speed change. Many engine models are equipped with a “governed idle” device so that the governor controls the idle speed and change in idle speed will be minimized. Some applications, such as those with centrifugal clutches, will benefit from this feature.

Electric Wiring

An electric wire or cable is like a resistor. If the cross section (gauge) is too small for a given length the result can be a voltage drop. This can impair startability at lower temperatures and possibly lead toward the destruction of the starter motor.

Battery Cables

Recommended battery cable sizes depending on model series and distance between starter motor and battery are listed in the following table.

Total Length of Positive and Negative Cables Added		Model 8 to 15		Model 18 to 61	
Meters	**Feet**	**SAE Gauge**	**Metric mm^2**	**SAE Gauge**	**Metric mm^2**
0.75	2.5	#10	5	#6	13
0.9	3.0	#8	8	#6	13
1.2	4.0	#6	13	#6	13
1.5	5.0	#6	13	#4	19
1.8	6.0	#4	19	#4	19

For battery charging and headlight circuit: (15 amps max.) use #14 ($2mm^2$). A #18 ($0.8mm^2$) is acceptable for all other wiring (engine stop, etc.).

Battery

The amp x hour size of the battery should be large enough to supply sufficient power to the starter motor to enable the starter to generate the required torque to turn over the engine, and get it up to the minimum starting speed of approximately 350 RPM.

The two major factors that may impair engine starting are:

1. Parasitic load
2. Low ambient temperature

Disengaging the driven machinery from the engine during start up, through any type of clutch or belt drive system, is the best way to avoid parasitic load.

With lower ambient temperature, the battery output will decrease while the required cranking power will increase.

In order to minimize the cranking effort, it is mandatory to use the recommended oil viscosity, for the ambient temperature at the time of day the engine is first started, in both the engine and the driven members, such as hydraulic pumps, hydrostatic drive systems and gear boxes.