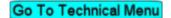
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# **REF: Engine Conversions & Upgrades**

# **Performance Upgrades**

Typical Staged Sportster Engine Upgrades 1)

#### **Paying Taxes**

Stage 0: Stock = HP- 40 for 883, HP- 50 for 1200 (average)

Stage 0.5 (also known as "The Harley Tax")= HP- 50 for 883, HP- 60 for factory 1200 (Example)<sup>2)</sup>

- Stock plus:
  - High flow air Cleaner OR
  - SE Slip-On Mufflers or equivalent

## Stage 1 Upgrades

Quote: Stage 1 and Harley Tax are synonims and include Pipes, Air Filter and Carburetor re-jetting/ ECU re-mapping <sup>3)</sup>

- Stage 1.0 = HP- 60 for 883/1200, HP- 65-70 for factory 1200 (Example) $^{4}$
- High Flow Air Cleaner AND
- High Flow Exhaust AND
- Fuel/Air ratio adjustment: Jetting for carburetor, modify fuel tables in ecm with EFI bikes.

#### **Known Stage 1 883 configurations**

This is just examples of what has worked on some bikes. Each motor may be different in it's own unique way.

#### 883 Engines:

- Carbureted / Year Model / Jetting / Mods:
  - 0 .
  - ο.
  - ο.

0

- EFI:/ Year Model / Jetting / Mods:
  - Screamin' Eagle Air Cleaner/ Screamin' Eagle Slip on exhaust
  - ۰.
  - ο.
  - ۰.
  - ο.

#### **Known Stage 1 1200 configurations**

1200 Engines:

- Carbureted / Year Model / Mods:
  - ο.
  - ο.
  - ۰.
  - 0 .
- EFI:/ Year Model / Mods:
  - ο.
  - ° .
  - ο.
  - ۰.

## Stage 1.5 Upgrades

Stage 1.5= HP-65 for 883/1200, HP- 70 for factory 1200 (Example)<sup>5)</sup>

- Stage 1 plus:
  - ∘ Andrews N2 cams (mild)

## **Stage 2 Upgrades**

Quote: Stage II: Stage I plus cam upgrades 6)

Quote: Stage II: Camshaft, Larger displacement, Higher compression <sup>7)</sup>

- Stage 2: Stage 1.5 plus: (Example)<sup>8)</sup>
  - Andrews N4, N8, or SE bolt-in cams instead of N2
  - ∘ SE S1 Lightning or other bolt-on +/- 10:1 heads
  - ∘ HP=75
    - Options:
      - 2 into 1 header system, add +/- 7 hp
      - SE carb (or equivalent), add +/- 3 hp
      - XR750 (or other) valve springs, no gain

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- Stage 2.5: Stage 2 plus
- Professionally ported 10:1 or higher heads
- Matching (to head) domed pistons
- XR750 valve springs or SE cam kit
- 2 into 1 header system
- SE,S&S Super E, or Mikuni HSR42 carb
- HP=90+
- Options:
  - big valves (big twin size), add +/- 5 hp

## Stage 3 Upgrades

Quote:Stage III: Its on like Donkey Kong! 9)

Quote: Stage III: Boring and/or Headwork and/or Forced Induction and/or Nitrous 10 Stage 3 = HP-????

- Stage 2.5 plus:(Example)<sup>11)</sup>
  - Big-bore cylinders and pistons and/or
  - Stroker kit and/or
  - Nitrous injection and/or
  - Supercharging
  - Options: many

# **Useful Tips Formulas**

## **Formulas**

- Displacement: pi x (radius squared) x height (example: 4 inch bore, 4 inch stroke) = 3.14159 x (2 squared) x 4 = 50.265ci of displacement per cylinder
- Cubic Centimeters to Cubic Inches: cc ÷ (2.54 cubed) (example: 1200cc) = 1200 ÷ (2.54 cubed) = 73.23ci
- Cubic Inches to Cubic Centimeters: ci x (2.54 cubed) (example: 100ci) = 100 x (2.54 cubed) = 1638.7cc
- Horsepower: (torque x rpm)  $\div$  5252 (example: 80 ft-lbs at 4000 rpm) = (80 x 4000)  $\div$  5252 = 60.93hp
- Torque: (horsepower x 5252) / rpm (example: 100hp at 4000 rpm) =  $(100 \times 5252) \div 4000 = 80 \times 4000) / 5252 = 131$  ft-lbs.

#### **Building and Performance Tips**

Hammer Performance Tech Tips

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- NRHS Performance Tech Tips
- Flo Headworks Tech Tips

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