SAFE INSTALLATION AND OPERATION RULES:

Before installing your new S&S part it is your responsibility to read and follow the installation and maintenance procedures in these instructions and follow the basic rules below for your personal safety.

- Gasoline is extremely flammable and explosive under certain conditions and toxic when breathed. Do not smoke. Perform installation in a well ventilated area away from open flames or sparks.
- If motorcycle has been running, wait until engine and exhaust pipes have cooled down to avoid getting burned before performing any installation steps.
- Before performing any installation steps disconnect battery to eliminate potential sparks and inadvertent engagement of starter while working on electrical components.
- Read instructions thoroughly and carefully so all procedures are completely understood before performing any installation steps. Contact S&S with any questions you may have if any steps are unclear or any abnormalities occur during installation or operation of motorcycle with a S&S part on it.
- Consult an appropriate service manual for your motorcycle for correct disassembly and reassembly procedures for any parts that need to be removed to facilitate installation.
- Use good judgment when performing installation and operating motorcycle. Good judgment begins with a clear head. Don’t let alcohol, drugs or fatigue impair your judgment. Start installation when you are fresh.
- Be sure all federal, state and local laws are obeyed with the installation.
- For optimum performance and safety and to minimize potential damage to carb or other components, use all mounting hardware that is provided and follow all installation instructions.
- Motorcycle exhaust fumes are toxic and poisonous and must not be breathed. Run motorcycle in a well ventilated area where fumes can dissipate.

DISCLAIMER:

S&S parts are designed for high performance, closed course, racing applications and are intended for the very experienced rider only. The installation of S&S parts may void or adversely affect your factory warranty. In addition such installation and use may violate certain federal, state, and local laws, rules and ordinances as well as other laws when used on motor vehicles used on public highways, especially in states where pollution laws may apply. Always check federal, state, and local laws before modifying your motorcycle. It is the sole and exclusive responsibility of the user to determine the suitability of the product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other obligations, duties, and risks associated therewith.

The words Harley®, Harley-Davidson®, H-D®, Sportster®, Evolution®, and all H-D part numbers and model designations are used in reference only. S&S Cycle is not associated with Harley-Davidson, Inc.

IMPORTANT NOTICE:

Statements in this instruction sheet preceded by the following words are of special significance.

**WARNING**

Means there is the possibility of injury to yourself or others.

**CAUTION**

Means there is the possibility of damage to the part or motorcycle.

**NOTE**

Other information of particular importance has been placed in italic type.

S&S recommends you take special notice of these items.

WARRANTY:

S&S Cycle Inc. does not offer any warranty on race only products.
**S&S Billet Pro Stock Engine**

The S&S Billet Pro Stock is the same engine you have seen used in competition at NHRA and AHDRA races. It is a 160-cubic inch four cam, 60 degree V-Twin pushrod engine. It is built with special S&S billet crankcases, cylinders, and heads, and features an integral 6-speed automatic transmission, and dual downdraft manifolds and large diameter EFI throttle bodies.

- 160ci four-cam, 60 degree pushrod V-Twin
- Billet crankcases with integral transmission housing
- Billet steel Pro Stock style flywheel assembly
- Billet aluminum rods with 1.500” crankpin
- Billet Pro Stock cylinder heads
- Six-speed automatic transmission

**ACCOMPLISHMENTS**

**2004**
Won NHRA’s "Best Engineered Vehicle Award"

**2005 - Current**
- Every race had S&S Pro Stock teams in the 16 bike field on Sunday.

**2007**
S&S powered Buell® motorcycles won championships on three separate continents.
- Matt Smith Racing NHRA Pro Stock bike
- Brett Stevens Racing ANDRA Pro Stock bike
- Tim Tinndahn Racing UEM Pro Stock bike

**2008**
- Brett Stevens Racing ANDRA Pro Stock bike championship

**2009**
- Hector Arana Racing NHRA Pro Stock bike championship
- Ulf Ogge Racing UEM Pro Stock bike championship

**2010**
- Ulf Ogge Racing UEM Pro Stock bike championship

**2013**
- Matt Smith Racing NHRA Pro Stock Bike

**SPECIFICATIONS AND OTHER INFORMATION**

**GENERAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crank Position Sensor Gap</td>
<td>0.030</td>
</tr>
<tr>
<td>Cam Position Sensor Gap</td>
<td>0.060</td>
</tr>
<tr>
<td>Intake Rocker Arm Ratio</td>
<td>2:1</td>
</tr>
<tr>
<td>Exhaust Rocker Arm Ratio</td>
<td>1.85:1</td>
</tr>
<tr>
<td>Primary Drive Ratio, 64-87</td>
<td>1.359:1</td>
</tr>
<tr>
<td>Transmission High (6th) Gear Output Ratio</td>
<td>1.053:1</td>
</tr>
<tr>
<td>Drive Sprocket 16 Teeth 6-30 Chain x 43T Wheel</td>
<td>2.688:1</td>
</tr>
<tr>
<td></td>
<td>15 Teeth 6-30 Chain x 43T Wheel</td>
</tr>
<tr>
<td>Overall Drive Ratio, 41T- 46T, 43 Average</td>
<td>3.847:1</td>
</tr>
</tbody>
</table>

**Torque Specifications:**

- Head Bolt ½” ................................................. 60 ft-lb
- Head Bolt ¼” ................................................. 35 ft-lb

See **Diagram 1** below.

**Diagram 1**

**CYLINDER HEAD - TOP VIEW**

Rocker Arm Stand Bolts ........................................... 100 ft-lb
Use 272 red Loctite—requires TP55 Torx Plus wrench

Rocker Arm Screws .............................................. 28 ft-lb
Use 272 red Loctite—requires TP45 Torx Plus wrench

Timing Cover Screws (Use 242 blue Loctite®) ............... 96 in-lb
Bolts ⅜” .......................................................... 18 ft-lb
Screws ¼” .......................................................... 120 in-lb

Pinion Gear Nut .................................................. 33-2031 nut @ 200 ft-lb
Use 648 green Loctite on gear and 272 red Loctite on nut threads & face.

Cam Gear Nut ...................................................... 33-2031 nut @ 200 ft-lb
Use 648 green Loctite on gear and 272 red Loctite on nut threads & face.

Transmission Trap Door and Case Bolts
(Use 272 red Loctite) .............................................. 18 ft-lb

**Left Side Main Bearing Nut -**
Coat Left Hand threads lightly with non-setting thread sealer such as 592 Loctite and torque with S&S Wrench (PN 53-0211) to 150 ft-lbs.

Coat Right Hand threads lightly with 272 red Loctite and torque with S&S Wrench (PN 53-0211) to 150 ft-lbs.
**EXHAUST PIPES**

Front & Rear Cylinders
- Section 1 (23⁄8" O/D X 71⁄2" long)
- Section 2 (2½" O/D X 1¼" long)
- Section 3 (2¾" OD X 4¾" long)
- Section 4 (3" O/D X 12" long)

**LUBRICATION**

- Engine Oil - 0 or 5wt, 1½ quarts
- Transmission and Primary Lube - 75w90, 2 ounces in primary, fill transmission fluid level to overflow hole, 12 to 14 ounces
- There is a .030 restrictor installed in the oil line that feeds the bottom end, in the cam cover fitting – check it often to ensure that it is free of debris
- There is a .015 restrictor in the left main bearing oil feed line – check it often to ensure it is free of debris
- Oil lines must be made from -4 AN braided hose

**STARTING PROCEDURE**

Due to the large displacement and high compression of this engine, it is important to make sure the front piston is just past TDC on the compression stroke before starting. This gives the starter a chance to get the crankshaft turning before it has to push the engine through a compression stroke.

1. Make sure the ignition switch is turned off.
2. Remove the timing plate in the primary cover.
3. Use a 3⁄4" RATCHET handle and a short extension if needed, insert extension into the engine sprocket and turn the engine counter clockwise (forward) until it rolls over TDC. The compression will make it snap over TDC with some force.
4. Check in the timing window to be sure the front cylinder is at TDC. You may have to turn the engine clockwise (backward) slightly to see the timing mark.
5. If the front TDC timing mark (TF) is visible, the engine is ready to start. If the rear TDC mark (TR) appears in the window, repeat the above procedure.
6. Mark the oil pump pulley for future reference. This eliminates the need to remove the timing window.

**MAINTENANCE TIPS**

**VISUAL INSPECTION AFTER EACH RUN**

- Moly valve coating for cracking or flaking
- Bottom spring collar for cracks
- Valve tips, lash caps
- Pushrod ends and rocker cups
- Top collar and keepers for excessive wear
- Check valve spring pressure - replace or shim if below 380 lbs. NOTE: Must maintain .060 minimum before coil bind at maximum lift. Recommend replacement of questionable springs rather than shim
- Drain and inspect oil and if necessary, pull pan and check for debris. If OK, oil may be re-used

**VISUAL INSPECTION AS NECESSARY DURING EVENT**

**Cylinders/Pistons**
- Check wristpin for straightness and coating integrity
- Visually inspect for cracks or signs of scuffing
- Verify ring land straightness
- Check piston domes for signs of detonation

**Crankshaft**
- Check rod side clearance against build sheet
- Visually inspect crankpin weld
- Check drive hub and pinion shaft runout – max is .007"

**Cam Chest**
- Inspect cam gears and keys
- Inspect cam shafts for excess wear
- Inspect tappets and tappet blocks for wear or bad bearings

**REBUILD/REPLACEMENT SPECIFICATIONS**

**Heads**
- Run out of valve, service limit is .005 T.I.R.
- Run out of seat, service limit is .005 T.I.R.
- Valve stem wear, service limit is .310 intake, .3105 exhaust
- Measure spring clearance to coil bind, service limit .060 or greater
- Measure spring installed pressure, service minimum is 380 lbs
- Set valve lash cold at .000 - .004, lash hot at approx. .015"
- Replace valves at 50 runs or sooner if necessary
- Replace valve springs at 15 runs or sooner if necessary
- Replace rocker arms at 50 runs or sooner if necessary
Cylinders/Pistons
  • Measure piston/cylinders for fitment, service limit is .011”
  • Measure piston ring land lateral clearance, service limit is .001 1st, .002 2nd
  • New ring installation gaps .023, .063, .070
  • Measure cylinders, service limit is 5.125”
  • Hone cylinder as necessary without exceeding service limit for fitment
  • Replace piston if collapsed, service limit is .002 smaller than specification on original build sheet
  • Check wristpin/piston fitment, service limit is .002
  • Replace pistons at 50 runs or sooner if necessary

Crankshaft
  • Check rod side clearance against build sheet
  • Visually inspect crankpin weld
  • Drive hub and pinion shaft runout not to exceed .007
  • Replace main bearing on crankshaft every 20 runs
  • Replace the pinion bearing every 40 runs
  • Replace crankshaft at 50 runs or sooner if necessary

Cam Chest
  • Tappet blocks and lifters, service limit is .0040 maximum
  • Inspect cam gears and keys
  • Inspect cam shafts for excess wear and cracked welds
  • Inspect tappets and tappet blocks for wear or bad bearings
  • Replace cams at 50 runs or sooner if necessary
  • Replace lifter at 50 runs or sooner if necessary
  • Replace pushrods at 50 runs or sooner if necessary

Transmission
  • Replace transmission bearings as necessary or after failure of any transmission component
  • Replace shift forks after backing out of any gear except sixth or if routine inspection shows sign of wear
  • Replace shift drum after backing out of any gear except sixth or if routine inspection shows sign of wear
  • Replace detent arm spring as necessary
  • Replace shift pawl as necessary

Oil Pump
  • Replace pump if gears/rotors are scored or as necessary
  • Replace pump belt if edges fray or contaminated by oil, etc.
S&S BILLET PRO STOCK ENGINE ASSEMBLY

LOWER END PARTS

PRO STOCK CRANKCASE ASSEMBLY

1. Crankcase assembly
   - With cam chest ........................................................................................................ 31-1025
   - Without cam chest .................................................................................................. 310-0686
2. Mainshaft bearing rebuild kit .................................................................................... 31-4100
   * (Includes PN 31-4090-S and PN 33-4089-S)
3. Cylinder stud ............................................................................................................. 50-0320-S
4. Main bearing, drive side ............................................................................................. 31-4090-S

5. Flywheel assembly
   - Standard porkchop .................................................................................................... 32-3008
   - Full diameter (R86) .................................................................................................. 310-0730
   - Standard porkchop w/1" rods ................................................................................ 320-0558
   - Full diameter (R86) w/1" rods ............................................................................... 320-0559
6. Flywheel to main bearing spacer ................................................................................ 50-0367
7. Bearing, Right, Main, 2000-2003 bt .......................................................................... 31-4085
8. Retaining Ring, Internal, Notched, 2-9/16" ................................................................ 310-0730
9. Ring, Lock, Main Bearing
   RH thread ................................................................................................................ 31-0423
   LH thread ................................................................................................................ 106-3372
10. Seal, Left, Main Bearing, Pro Stock ........................................................................ 31-4091-S
11. Spacer, Driveside ..................................................................................................... 33-3302

PRO STOCK OIL PICK-UP PLATE

1. Oil pick-up plate with hardware ................................................................................ 56-5052
2. Oil adapter fitting with hardware .............................................................................. 56-5053
3. O-ring string .............................................................................................................. 50-0296-S
4. O-ring ...................................................................................................................... 50-8204-S
5. Screw ....................................................................................................................... 50-0071
6. Magnet ...................................................................................................................... 50-8335
7. Screw ....................................................................................................................... 50-0066
### LOWER END PARTS

#### PRO STOCK CAM CHEST

1. Intermediate plate assembly ............................................. 31-6526
2. Cam pinion/drive gear kit .................................................. 33-4280
3. Cam chest cover assembly .................................................. 31-6525
4. Pushrod tube cover set (4 Pieces) ........................................... 93-4045
5. Upper pushrod tube o-ring .................................................. 50-7964-S
6. Lower pushrod tube o-ring .................................................. 50-8188-S
7. Tappet block set (Front & Rear) ............................................. 33-5400
8. Cam chest (Part of 31-1025) .................................................. N/A
9. O-ring string ........................................................................ 50-0296-S
10. Pinion shaft bearing ........................................................... 33-4089-S
11. O-ring, (-022), Viton* ......................................................... 50-8005
12. O-ring, (-012), .375" ID x .500" OD, Viton* ............................... 50-8006
13. Bearing, Needle, Cam, Late 1958-’90 XL .............................. 31-4061
14. Washer, Cam, Thrust, Double, .062", Steel .......................... 33-5210
15. Washer, Cam, Thrust, Single, .062", Steel ........................... 33-5211
16. Bearing, #2 Cam, PS160 ..................................................... 56-5100
17. Retaining Ring, Internal, 2.054" x .062", Carbon Steel, SAE 1060-1090 .................................................. 50-8053
18. Gear, Cam Drive, #2, 96 Tooth, PS160 ................................. 33-4282
19. Key, Woodruff, .188" x .500", PS160 ....................................... 50-8236
20. Nut, HH, 3/4-20 UNEF-3B x .233", Black, Steel, 4140 ..................... 33-2031
21. Gear, Pinion, 48 Tooth, PS160 ............................................. 33-4281
22. Pin, Dowel, 1/4" x 1-1/4" ........................................................ 50-8189-S
23. Seal, Cam ........................................................................... 31-4094-S
24. Seal, Pinion ......................................................................... 31-4096-S
25. Washer .............................................................................. 50-7017
26. Screw .................................................................................. 50-0008
27. Screw .................................................................................. 50-0066

![](image_url)
<table>
<thead>
<tr>
<th>1.</th>
<th>Cam chest, assembly, packaged, natural, billet, PS160, (1 Req)</th>
<th>310-0525</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Bearing, assembly, needle, 2013 PS160, (5 Req)</td>
<td>310-0347</td>
</tr>
<tr>
<td>4.</td>
<td>Washer, flat, .325&quot; x .548&quot; x .062&quot;, Zinc, low carbon steel, (6 Req)</td>
<td>50-7025</td>
</tr>
<tr>
<td>5.</td>
<td>Fitting, pipe, 45°, 1/4-18 npt x .500&quot;, Zinc, brass PS160, (2 Req)</td>
<td>50-0394-s</td>
</tr>
<tr>
<td>6.</td>
<td>Plug, pipe, 3/4 taper, 1/8-27 nptf x .188&quot;, Zinc, steel, (2 Req)</td>
<td>50-8331a</td>
</tr>
<tr>
<td>7.</td>
<td>Pin, dowel, .312&quot; x 1&quot;, steel, (8 Req)</td>
<td>50-8171</td>
</tr>
<tr>
<td>8.</td>
<td>Pin, dowel, .250&quot; x .500&quot;, Steel, (2 Req)</td>
<td>50-8022</td>
</tr>
<tr>
<td>9.</td>
<td>Plug, press-in, black, plastic, (2 Req)</td>
<td>50-9928</td>
</tr>
<tr>
<td>10.</td>
<td>Fitting, pipe, 90°, -4N to 1/8 NPT, dichromate, steel PS160, (2 Req)</td>
<td>50-0412-s</td>
</tr>
<tr>
<td>11.</td>
<td>SHCS, 10-32 x 1/4&quot;, (2 Req)</td>
<td>50-0476</td>
</tr>
<tr>
<td>12.</td>
<td>O-ring, (-162), 5.750&quot; Id x 5.937&quot; OD, nitrile, PS160, (Req) 1</td>
<td>50-8205-s</td>
</tr>
<tr>
<td>13.</td>
<td>Plug, drain, magnetic, zinc, steel, (1 Req)</td>
<td>31-2006</td>
</tr>
<tr>
<td>14.</td>
<td>Cover, assembly, cam chest, packaged, natural, billet, PS160, (1 Req)</td>
<td>310-0523</td>
</tr>
<tr>
<td>15.</td>
<td>Cup, cam position sensor, PS160, (1 Req)</td>
<td>106-0144</td>
</tr>
<tr>
<td>16.</td>
<td>Seal, cam cover/cam, .656&quot; X 1.254&quot; X .250&quot;, Nitrile, PS160, (1 Req)</td>
<td>31-4094-s</td>
</tr>
<tr>
<td>17.</td>
<td>Screw, SHCS, w/ flat washer, 1/4-20 x 1&quot;, zinc, ASTM A574-92A, (9 Req)</td>
<td>50-0092-s</td>
</tr>
<tr>
<td>18.</td>
<td>O-ring, cord stock, .103&quot; Od x l, black, Viton, a75 durometer, (34&quot; Req)</td>
<td>50-0296-S</td>
</tr>
<tr>
<td>19.</td>
<td>Seal, cam cover/pinion shaft, .469&quot; X .840&quot; X .188&quot;, PS160, (1 Req)</td>
<td>31-4096-S</td>
</tr>
<tr>
<td>20.</td>
<td>Screw, SHCS, 10-24 x 1/2&quot;, alloy, (2 Req)</td>
<td>50-8211-S</td>
</tr>
<tr>
<td>21.</td>
<td>Plate, assembly, cam support, packaged, PS160, (1 Req)</td>
<td>310-0519</td>
</tr>
<tr>
<td>22.</td>
<td>Screw, SHCS, w/ Flat Washer, 5/16-18 x 1&quot; (11 Req)</td>
<td>50-0115-s</td>
</tr>
<tr>
<td>23.</td>
<td>Bearing, inner primary, 25mm x 47mm x 12mm, (5 Req)</td>
<td>56-5100</td>
</tr>
<tr>
<td>24.</td>
<td>Retaining ring, internal, 2.054&quot; X .062&quot;, Carbon steel, SAE 1060-1090, (6 Req)</td>
<td>50-8053</td>
</tr>
<tr>
<td>25.</td>
<td>Plate, assembly, pinion, packaged, natural, billet, PS160, (1 Req)</td>
<td>310-0521</td>
</tr>
<tr>
<td>26.</td>
<td>Bearing, pinion shaft, PS160, (1 Req)</td>
<td>33-4089-S</td>
</tr>
<tr>
<td>27.</td>
<td>Camshaft, set, 2013 PS160 (available seperately - not included in kit), (1 Req)</td>
<td>310-0185</td>
</tr>
<tr>
<td>28.</td>
<td>Gear, idler, packaged, PS160, (1 Req)</td>
<td>330-0370</td>
</tr>
<tr>
<td>29.</td>
<td>Pushrod cover, set, PS160, (1 Req)</td>
<td>930-0031</td>
</tr>
<tr>
<td>30.</td>
<td>O-ring, pushrod cover, 28mm x 34mm, Viton, 75 durometer, PS160, (4 Req)</td>
<td>500-0278</td>
</tr>
<tr>
<td>31.</td>
<td>Retaining ring, external, inverted, 25MM, (4 Req)</td>
<td>500-0212</td>
</tr>
</tbody>
</table>
## PRO STOCK PRIMARY COVER

1. Clutch cover with hardware ................................................................. 56-5050
2. Clutch hub cover spacer kit ................................................................. 56-3039
3. Primary cover with hardware .............................................................. 56-5051
4. Clutch cable tab with hardware .......................................................... 56-3024
5. Timing hole cover with hardware ....................................................... 31-4099
6. Outboard bearing support assembly .................................................. 31-3906
7. Drive hub with hardware ................................................................... 33-2060
8. Primary drive gear, 64 teeth, with hardware ....................................... 56-5041
9. Reluctor wheel with dowel pins .......................................................... 33-2064
10. O-ring string ...................................................................................... 50-0296-S
11. 20 tooth oil pump drive pulley ........................................................... 31-3901
12. 23/8" external retaining rings ............................................................ 50-8341-S
13. Outboard support bearing ................................................................. 31-0421-S
14. Clutch assembly, 87 teeth ................................................................. NA
15. Screw, SHC, 10-24 x 1/2", Alloy ......................................................... 50-8211-S
16. Spacer, Outer, Primary Cover Bearing, 1.906 x 2.500 x .075 .............. 56-5049
17. Spacer, Inner, Primary Cover Bearing, 2.170 x 2.500 x .075 .............. 56-5048
18. Pin, Dowel, 1/2" x .437", Alloy PS160 .................................................. 50-0431
19. Screw, SHCS, Machined, 10-32 x 3/4", PS160 ...................................... 50-5052
20. Screw, SHCS, w/ Flat Washer, 1/4-20 x 1", Zinc, ASTM A574-92A .... 50-0092-S
21. Screw, SHCS, w/ Flat Washer, 1/4-20 x 3/4", Zinc, ASTM A574-92A PS160 ................................................................. 50-0066
22. Washer, Flat, .260" x .425" x .060", Chrome, Steel .............................. 50-7017
23. Screw, SHCS, 1/4-20 x 1-1/4", Zinc ................................................... 50-0008
24. Plug, Pipe, w/ Sealant Patch, 3/4" Diameter, 1/8-27 NPTF x 0.188", Zinc, Steel 50-8331A
25. Screw, SHCS, 1/4-20 x 1-1/4", Zinc ................................................... 50-0008
26. Suzuki parts not included:
   - Seal, Clutch Shaft ................................................................. 09263-15012
   - Bearing, Needle, Clutch Shaft, Inner ............................................ 09263-12014
   - Shaft, Clutch ................................................................. 23261-45400
   - Bearing, Needle, Clutch Shaft, Outer ............................................ 09263-15012
CYLINDER HEADS AND PARTS

1. Head Assembly
   Front head assembly ................................................................. 90-1465F
   Rear head assembly ................................................................. 90-1465R

2. Valve
   Intake .......................................................................................... 90-2131-S
   Exhaust ....................................................................................... 90-2132-S

3. Valve Guide
   Intake .......................................................................................... 900-0932
   Exhaust ....................................................................................... 900-0933

4. Valve Seat
   Intake .......................................................................................... 900-0860
   Exhaust ....................................................................................... 900-0861

5. Exhaust flanges with gaskets and hardware - Front and rear .......... 16-0251
6. Exhaust flange gasket .................................................................. 16-0253-S

7. Screw, SHC, 5/16-18 x 1", Zinc, ASTM A574-92A .................. 50-0101
8. Rocker cover with hardware ......................................................... 90-4133

9. Screw, SHC, w/ Flat Washer, 1/4-20 x 3/4", Zinc, ASTM A574-92A 50-0066
10. Rocker arm support set with hardware - Front and rear .......... 90-4162
11. Bolt, rocker arm, Torx® head ...................................................... 50-0321-S
12. Button-head cap screw .............................................................. 50-0322-S

13. Pushrod cover with hardware
   Front ........................................................................................... 93-4098
   Rear ............................................................................................ 93-4099

14. Cylinders
   Cylinder set – front and rear without pistons .......................... 91-4032
   Front cylinder only ...................................................................... 91-4032F
   Rear cylinder only ...................................................................... 91-4032R

15. Stud, cylinder head attachment .................................................. 31-2327-S
16. O-ring, head and base ................................................................. 50-7953-S
17. Hardware, cylinder stud, billet PS ............................................. 50-4000
18. Lash caps ................................................................................... 90-2166-S
19. Keepers ...................................................................................... 900-0941
20. Titanium top collars (4 pack) .................................................... 90-2134
21. Cup, spring ................................................................................ 90-2162A
22. Seal, valve guide, 5/16” .............................................................. 900-0942
23. O-ring string ............................................................................. 50-0296-S
PISTON PART
1. Circlips – Each ........................................................................................................ 94-9276
2. Wristpin – Each ..................................................................................................... 94-9281

INTAKE MANIFOLDS AND PARTS
1. Radiused inlet and hardware
   Front ..................................................................................................................... 11-2158
   Rear ..................................................................................................................... 11-2159
2. Throttle body assembly
   Front ..................................................................................................................... 16-5097
   Rear ..................................................................................................................... 16-5098
3. Intake manifold with hardware
   Front ..................................................................................................................... 16-3574
   Rear ..................................................................................................................... 16-3575
4. Injector hat ......................................................................................................... 55-5053
5. Throttle position sensor – Rear manifold only .................................................. 550-5036
6. Screw .................................................................................................................. 50-0066
7. Screw .................................................................................................................. 50-0084
8. Screw .................................................................................................................. 50-0079
9. Washer ............................................................................................................... 50-7017
### Miscellaneous Parts

1. MSD spark plug wires, 8.5mm (Set of 4) .......................................................... 55-1203
2. Map sensor ........................................................................................................ 55-1037
3. Air temperature sensor ................................................................................... 55-5041
4. Crank position sensor ...................................................................................... 31-2090
5. Head temperature sensor ............................................................................... 55-1014
6. Champion spark plugs .................................................................................... 55-1202-S
7. 1/8” Drive sprocket spacers ............................................................................ 56-5046A
8. 1/4” Drive sprocket spacer ............................................................................. 56-5047A
9. Dailey oil pump ............................................................................................... 31-6226
10. Oil pump trash screen ................................................................................... 31-3922-S
11. 18 Tooth oil pump driven pulley with set screw .......................................... 31-3900
12. Oil pre-filter, with hardware (2 pack) ........................................................... 90-2253
13. 90° fitting ........................................................................................................ 50-0326-S
14. 45° fitting ....................................................................................................... 50-0394-S
15. Threaded Lock Ring Tool ............................................................................... 53-0211

### Additional Parts Not Shown

16. Plug, NPT 1/8-27 ......................................................................................... 50-8331A
17. SCHS, 1/4-20 x 3/4 .................................................................................... 50-0066
18. O-Ring String ................................................................................................. 50-0296-S
19. #4 AN fitting, straight, .015” restrictor ......................................................... 50-0411
20. #4 AN fitting, 90°, .030” restrictor ................................................................. 50-0412
21. Woodruff key, 1/8” x 1/2” ........................................................................... 50-8223
22. Washer .......................................................................................................... 50-7017
23. Washer .......................................................................................................... 50-7025
TRANSMISSION PARTS
1. Left side trap door assembly .................................................. 56-3010
2. Right side trap door assembly .............................................. 31-0405
3. Hardware Kit, ........................................................................ 56-5059
4. Transmission sensor bracket with screws .......................... 56-3005
5. Gear shift cam stopper with hardware ................................. 56-5062
6. Left shifting cover with hardware ........................................ 31-0402
7. Right shifting cover with hardware ...................................... 56-5063
8. 1/4 x 1/2 90 degree vent fitting ........................................... 50-0326-S
9. Transmission speed sensor rotor with magnets ..................... 56-3036
10. Retaining ring ................................................................. Liberty’s Gears Part 56-1116
11. Second gear input, 15 teeth ................................................. Liberty’s Gears Part 56-1113
12. Splined bushing ............................................................... Liberty’s Gears Part 56-1036
13. Sixth gear input, 19 teeth .................................................... Liberty’s Gears Part 56-1112
14. Splined input thrust washer ................................................ Liberty’s Gears Part 50-7147
15. Spring, coil ........................................................................ Liberty’s Gears Part 50-8407
16. Fourth gear input, 18 teeth ................................................ Liberty’s Gears Part 56-1111
17. Gear spacer ........................................................................ Liberty’s Gears Part 56-1117
18. Third gear input, 18 teeth .................................................... Liberty’s Gears Part 56-1110
20. Fifth gear input, 22 teeth ..................................................... Liberty’s Gears Part 56-1109
21. Input shaft .......................................................................... Liberty’s Gears Part 56-1021
22. Spacer, right side output shaft .......................................... 56-3023A
23. Output shaft ....................................................................... Liberty’s Gears Part 56-1022
24. Second gear output, 29 teeth, 1.933 ratio ......................... Liberty’s Gears Part 56-1108
25. Washer, splined output thrust .......................................... Liberty’s Gears Part 56-1093
26. Ring, external retaining, 1.077” diameter x .050” thick, Liberty’s Gears Part 56-1096
27. Sixth gear output, 20 teeth, 1.053 ratio Liberty’s Gears Part 56-1107
28. Bearing, splined-plain Liberty’s Gears Part 56-1095
29. Fourth gear output, 23 teeth, 1.278 ratio Liberty’s Gears Part 56-1106
30. Ring, external retaining, 1.093” diameter x .075” thick, Liberty’s Gears Part 56-1094
31. Third gear output, 27 teeth, 1.500 ratio Liberty’s Gears Part 56-1105
32. Fifth gear output, 25 teeth, 1.136 ratio Liberty’s Gears Part 56-1104
33. Thrust washer Liberty’s Gears Part 50-7146
34. Bearing, plain Liberty’s Gears Part 56-1098
35. First gear output, 31 teeth, 2.8185 ratio Liberty’s Gears Part 56-1103
36. Ring, external retaining, constant cross-section, .082” diameter x .050”, Liberty’s Gears Part 56-1097
37. Spring long Liberty’s Gears Part 50-5066
38. Spring medium Liberty’s Gears Part 50-5064
39. Spring short Liberty’s Gears Part 50-5063
40. Output forks Liberty’s Gears Part 31-6107
41. Shift fork shaft out Liberty’s Gears Part 56-1023
42. Pole gear shift no. 1 Suzuki Part 25323-34201
43. Pole gear shift no. 2 Suzuki Part 25324-32401
44. Shifting pawl roller Suzuki Part 09261-05003
45. Spring, shift pawl Suzuki Part 09440-04003
46. Gear shift cam Suzuki Part 25322-31310
47. Shift drum Liberty’s Gears Part 56-1020
48. Output shaft retaining washer 50-7006A
49. 1/4 - 28 1” FHCS output shaft 50-0324-S
50. Spacer clutch, trans input, pro stock B60 Liberty’s Gears Part 56-3006
51. Input fork Liberty’s Gears Part 31-6108
52. 1/2” x .040 thick washer shaft input Liberty’s Gears Part 56-1024
53. Retaining Ring, Internal, 2.0702” x .0780”, Carbon Steel, SAE 1060-1090 50-8052
54. Bearing, Ball, 20mm x 47mm x 14mm, 1991-2003 XL 56-3027
55. Retaining Ring, Internal, 2.054” x .062”, Carbon Steel, SAE 1060-1090 50-8053
56. Bearing, Transmission Output Shaft 50-1120-S
57. Retaining Ring, Internal, 1.625” 94-9248-S
58. Bearing, Left, Transmission Shift Drum 31-3304-S
59. Bearing, Right, Transmission Shift Drum 31-3303-S
60. Bearing, Input Shaft 56-1119-S
61. Seal, Sensor, Right Side Trap Door 50-8216-S
62. Bushing, Output, Second Gear Liberty’s Gears Part 56-1035
63. Bearing, Output Shaft 56-1118-S
64. Seal, Transmission Output Shaft 56-3037-S
65. O-ring, (-162) 50-8205-S
66. Washer, Compression Release, 3/4” x .715” x .070”, Zinc, Low Carbon Steel 50-7094
67. Plug, Drain, w/ O-ring, Magnetic, 1/2-20, Zinc, Steel 50-8335
68. Spring, Gear Shift Shaft, Transmission Suzuki Part 09444-2610
69. Spacer, Return Spring, .473” x .781” Suzuki Part 09168-14404
70. Guide, Gear Shift Cam, Drum Stopper Suzuki Part 25331-49201
71. Guide, Gear Shift Cam, Pawl Stopper Suzuki Part 25341-18000
72. Shaft, Gear Shift, Short Suzuki Part 25510-00400
73. Detent Arm Liberty’s Gears Part 11-2128
74. Detent Arm Spring 11-2157
75. Shift Fork Shaft, Input Liberty’s Gears Part 56-1024
76. Screw, Detent Arm Spring 56-5066
77. O-ring 50-8206-S
78. Oring 50-7964-S

NOTE: Parts indicated as “Liberty’s Gears Part” or “Suzuki Part” are not available from S&S, and must be ordered directly from the manufacturer.