



Briggs & Stratton Animal Tech Manual



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ANIMAL SUSPENSIONS

All suspensions must follow procedure listed in QMA rulebook. Except if otherwise noted in Tech Manuals.

Spark plugs, exhaust, gaskets and ignition timing infractions are race disqualification only.

NOTE:

- Refusal of tech shall be interpreted as an admission that the engine is illegal and a suspension from the Honda class will be immediate with all awards, qualifications being revoked.
- Confiscation of part or parts - only the illegal part and all related parts and not the whole motor will be confiscated. A full motor tear down is required if an illegal part is found.

General Rules

1. Only stock Briggs & Stratton Animal engine and the gearbox M series Model #124432 8203-01 and M updated series model # 8202-01 will be used in these classes. All parts will be stock unaltered Briggs & Stratton Animal specifically made for this engine.
2. No modifications, alterations, additions, subtractions, deletions, or other changes are permitted to be done to these engines or their component parts unless specifically called out in the tech manual..
3. The use of air filter during Qualifying at asphalt events is illegal. The senior Tech official at that event reserves the right to allow filters if deemed necessary.
4. Direct Drive only: Clutches are not allowed.

ALL PARTS ARE SUBJECT TO COMPARISON WITH A KNOWN STOCK PART.

5. Fuel: Gasoline only, no additives. Tech procedure is per QMA Rule Book.
6. ALL PERTINANT PENELTIES WILL APPLY.
7. NO welding, NO addition or removal of any material. NO painting or polishing of any part of engine or gearbox.

Section 2

Required Modifications

1. Gearbox: Only Briggs & Stratton gearbox part # 555721 or 555753 or new style replacement ring gear 555756 is allowed. Crankshaft part number 555722 are allowed. Ring gear may not be altered in any way with the exception of the keyed end of shaft that may be shortened, drilled or tapped or machined for the snap ring groove. Keyway may be cut deeper. No other machining allowed.
2. Electric Starter: blower-housing openings must be covered with a fabricated metal cover. You should not be able to see any of the flywheel.
3. Recoil Starter: Recoil starter must be removed. Starter cup may be cut down or replaced with a flat washer, Briggs Part number 691736 for flat washer. The M series engine comes with a black plastic flywheel-opening screen. This Must be removed as airflow into the engine may not be impeded by this or any other means.
4. Exhaust Options
Optional- J style exhaust system

- a. Must use exhaust port extension in port. Minimum of a 0.475 length measured from the bottom of the exhaust flange to the end of the pipe using a depth micrometer.
- b. The total maximum exhaust header length, not including the muffler, must not be longer than 18 inches in length using a small 1/4 inch wide tape measure in the inside of header tube.
- c. The exhaust header inside diameter cannot be larger than .905 inches for its entire length. Steps or tapers are not legal.
- d. The only approved muffler is the RLV B91 part number 4100.
- e. Muffler holes = .1285 inches max.
- f. Muffler must be clamped to the header tube. All exhaust must exit from the muffler end, leaks are not allowed.
- g. Coatings may be applied to the interior and or exterior of the exhaust pipe.

Optional Right Mount exhaust system-

- a. Must use exhaust port extension in port. Minimum of a 0.475 length measured from the bottom of the exhaust flange to the end of the pipe using a depth micrometer. Any style pipe and max of four, 40 B&S mufflers only. (This is the same exhaust system spec as used in World Formula and Formula Modified engines).
- b. Coatings may be applied to the interior and or exterior of the exhaust pipe and mufflers.
- c. Exhaust systems that use a baffle or deflector mounted at the end of mufflers must have all corners radiused with a 1/2 inch minimum radius for safety reasons.
- d. Muffler exhaust leakage- It is acceptable to have minor exhaust leakage at the muffler factory seam.

A) Exhaust oxygen sensor or temp sensor attached to any part of the Animal exhaust system is illegal.

B) Exposed portions of the exhaust system that are located in front of the right rear tire cannot be higher than a straight line that extends from the top of the right rear nerf bar to the top of the right front tire. This inspection is to be performed with the car sitting on the ground with the driver in their driving position.

Any Infraction in Section 2.4 Exhaust: Found outside of specified limits will result in a Race Day DQ only.

5. Oil Breather: Oil breather must vent to catch can under the tail cone within the engine compartment. Oil breather may include aftermarket parts. No check valves or PCV allowed.
6. The carburetor fuel overflow hose must not drain into the oil catch can container. This overflow hose must drain onto the ground, not into the oil catch can. Only the valve cover crankcase vent hose can exit into the catch can container.
7. Scatter Shield: Scatter shield recommended. Scatter shield may be altered for installation of motor bolts. (see page 12)

Section 3

Allowable Modifications

1. Crankshaft Seal: No tech on the crankshaft seal on gearbox side, seal can be removed.
2. Flywheel Cup: Flywheel cup may be cut or replaced with a washer; Briggs Part number 691736.
3. Fuel Pump: Fuel pump, B & S part number 808656 may be used. If used, fuel pump must be pulsed from a pulse fitting installed in the engine crankcase cover top oil fill hole.
4. Black Top Plate Control Cover: Black control cover B&S part number 555699 and ON/OFF switch part number 557028 may be removed and can be, but not required, replaced with any other type of metal or aluminum cover.
5. Rocker Cover: Rocker cover B & S part number 555679 may be modified for installation of oil breather bypass. Must be attached to catch can. (It is allowable to have secondary drilling of holes in the breather valve area of the valve cover.) Valve cover may be altered for any style breather.
6. The installation of the Briggs Breather By-pass system, part number 555688 or any aftermarket / home made By-pass system can be used but must function the same as the Briggs By-pass OEM design. Check valves and or PVC valves in this By-pass system are not legal. CPC-0716 Bypass system is also legal to use.
7. Plastic Flywheel Ring Gear: Plastic flywheel ring gear may be removed. No other alterations including the addition or subtraction of metal to the flywheel allowed.
8. Heat Dispenser, Briggs part number 555690, may be installed per included ms-3758 7. Head Gasket Fire Ring: Part Number 555698. Non fire ring Part number 555723.
8. Flywheel may be lapped key must be used.

9. Head may be re-cut to QMA spec.
10. Cryogenics of any Briggs & Stratton parts is illegal.
11. Any air filter allowed. **Recommended Briggs Part number 555729 or 555758.** The air filter must attach directly to carburetor. No filter cups, velocity stacks etc. Air filters must attach to filter cup NO ADDITIONAL adaptors are allowed.
12. Any commercially available air filter may be attached to the outside of carburetor air inlet horn. Outerwear style or equivalent can be used over carburetor. Any air filter may be used as long as there are no device(s) used inside the air filter. Any device, manifold, tubing, etc connected between the carburetor and the air filter is not legal.
13. Aftermarket oil drain and fill plugs are allowed.
14. It is allowable to have one (1) broken cooling fin on the cylinder head and one (1) broken cooling fin on the block.
15. The carburetor bolts may be tied/bridged together. The bridge must be external and may not alter in any way the intake path or change how the air is drawn into the engine.
16. The oil filler caps are a non tech item. The use of any style plastic or billet filler plugs are legal.
17. Loctite is allowed on all fasteners.
18. Muffler exhaust leakage- It is acceptable to have minor exhaust leakage at the muffler factory seam.
19. The bolt that holds the cylinder heat shield on can be replaced with a larger bolt.
20. It is legal to connect the 2 carburetor attachment bolts with a rod welded to them or a retaining plate.

Section 4 Tech Procedure

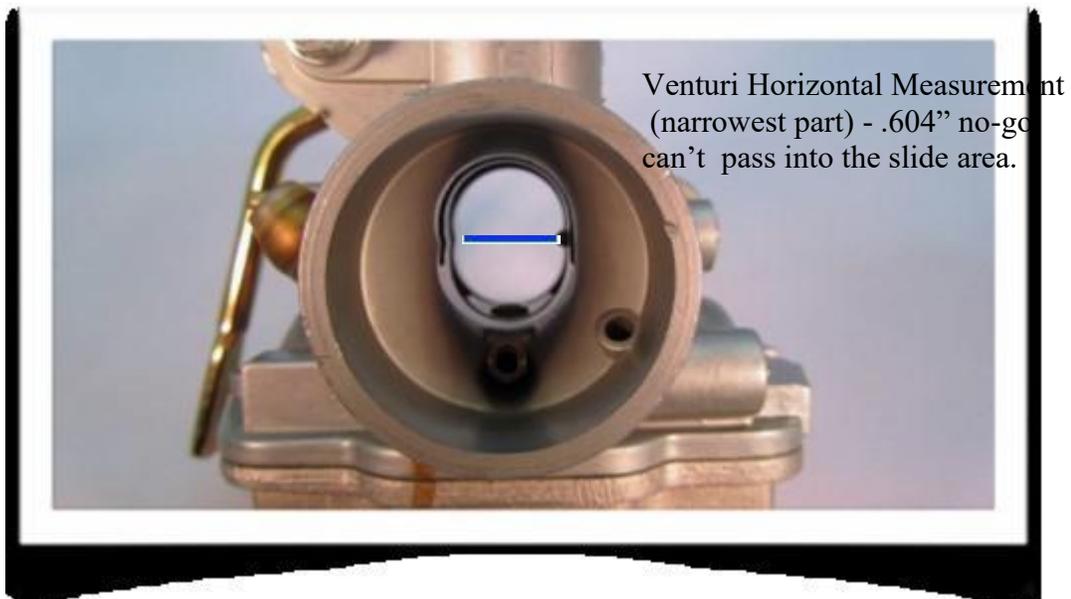
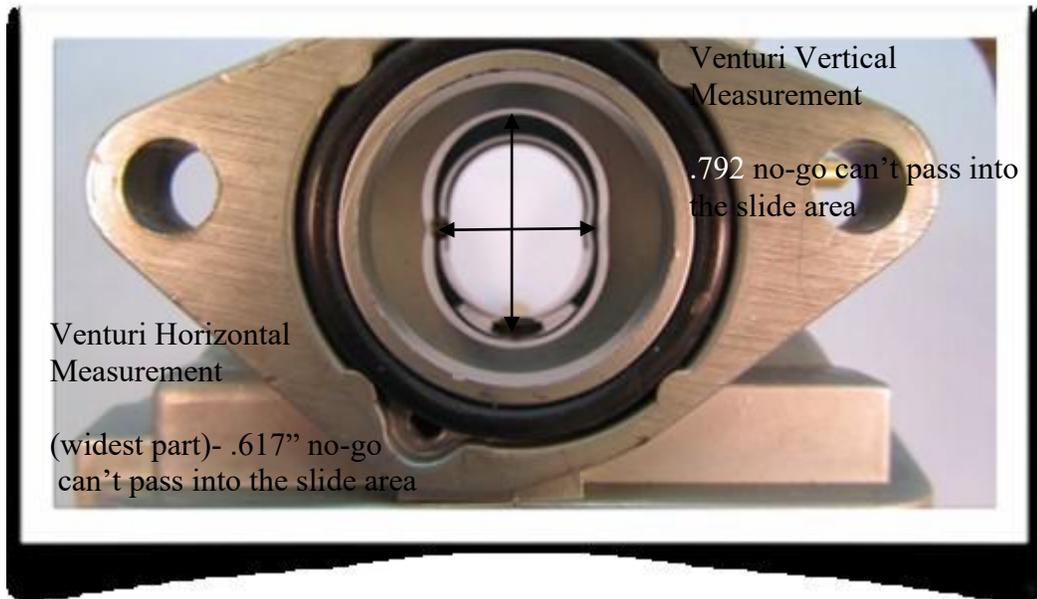
1. General

- a. Heli-coiled threads for shrouds, (all), valve cover, oil drain, oil fill holes, blower housing, and exhaust pipe attach studs on the head and lower brackets. Exhaust studs may be replaced with any size or style exhaust bolts.
- b. Blocking airflow: No device may be used that will or appears that it may impede airflow into the engine cooling system. This may require that the engine be run at a speed above idle by the tech personnel at the scale, after the car has qualified or raced. Black plastic flywheel cover supplied with engine must be removed.
- c. All dimensional specifications in this tech manual will have a plus or minus .001 inch tolerance when using dial indicators, micrometers, dial calipers or any type of variable gauge, except camshaft dial indicator lobe lift values during profile check do not have the .001 inch tolerance. The .001 inch tolerance does not apply to no/go pins and no/go gauge technical specifications.

2. Carburetor & Intake Manifold Remove Carburetor



- a. Stock Walbro PZ22 carburetor ending in calibration number .15 or New Briggs with Briggs Logo (P/N 590890). No alterations allowed. Except cutting choke lever down to clear for use on the curved intake manifold. Stock needle marked "BGB" is required.
- b. Needle Jet C-clip must be properly installed. But may be installed at any of the 5 factory settings on the needle jet.
- c. Throttle cable cap on the top of the carburetor must be used and properly installed. SEALING GASKET MUST BE IN PLACE. CAP MUST BE TIGHT Choke: Unaltered, but may be fastened open with a spring, rubber band, or zip tie.
- d. Only the top surface of the carburetor may be machined to adjust the slide position.
- e. Idle Jets any size allowed.
- f. Main Jets any size allowed.
- g. Main nozzle- Stock unaltered- hole size = .101 min and .104 max inches. No drilling, reaming, slotting or oblonging of hole.
- h. Emulsion tube- Stock unaltered:
 - 4 small holes = .018 min inches to .021 max inches
 - 4 big holes = .026 min inches to .029 max inches



Note: Pilot and main jets must be factory type- Installed and function as intended by Briggs. Only orifice hole is non-tech.

- i. Venturi Measurement:
- j. Vertical: 0.792 inches Max
- k. Horizontal: .617" + no-go pin cannot pass thru the area between the slide and the inboard flange mounting face at the widest location and the .604" + no-go pin cannot pass thru the area between the slide and the inboard mounting face at the narrowest location.
- l. Air filter: Any style air filter allowed but is not required to be used. Filter adapters are not allowed, the filter must attach directly to the carb airhorn.
- m. Carburetor Overflow: May be vented to the ground.
- n. O-Ring part number B & S part number 555601 is required and must be unaltered.
- o. Plate Opening
 - Jr. Animal: (Blue QMA plate 03-13 or newer three holes 0.251 max). 0.252"-No-Go gauge.

Sr. Animal: (Gold QMA plate 03-13 or newer one hole 0.5725 max). 0.574"-
No-Go gauge.

No-Go gauges must be used to check the restrictor plates effective 5-1-2014

QMA logo on top left of restrictor plate as viewed from carb inlet. Gray gasket available from QMA Office and aftermarket gaskets allowed Gasket must be correctly installed between restrictor plate and manifold. Gasket thickness 0.052 hole size 0.970 measurements on gasket are reference.

- The use of POWRI or USAC restrictor plates are allowed but still must meet the QMA no/go gauge hole specifications as outlined above.

Intake Manifold

Straight Manifold

- 1 Straight intake manifold – max length=1.740 inches min to 1.760 inches max
- 2 Intake manifold – bore diameter= 0.885 inches min. to 0.905 inches max
- 3 Any 6 mm or ¼" bolt can be used to attach the carb to the intake manifold
- 4 Briggs gasket part number 691885 or equivalent is acceptable between the intake manifold and cylinder head port mounted surface. This gasket must not be thicker than .070 inches.



Curved Manifold

Briggs and Stratton part number 555776 can be used. Must be as from factory with no Modifications except clearance for the bolts that holds the intake to the cylinder head
Any 6 mm or ¼" bolt can be used to hold carb to the intake.

3. Engine Cooling Shrouds/Blower Housing
 - a. All pieces of the stock engine cooling shroud/blower housing must be stock and properly installed.
Blower housing thickness 0.115 (reference only) color non tech. No plating.
 - b. Starter cup may be cut down.
Remove the blower housing

Remove valve cover



Check:

1. Max. Valve lift will be checked from the top of the valve spring retainer. Valves must be adjusted to zero clearance.
2. Valve Lift: First camshaft check will be taken at the valve spring retainers. With the lash set at zero, the movement of the valve spring retainers may not exceed the following:
Intake and Exhaust: 0.258 inches max.
3. Install Degree wheel, using positive stop method.

Recommend using a 9" to 11" Degree wheel to Check ignition timing. Reference with the right edge of the magnet, (not the magnet holder), aligned with the right edge of the notch of the right leg of the coil, the engine must be no more than 31 degrees BTDC.

4. Cylinder Head & Head Gasket
Remove cylinder head.

Head Gasket:

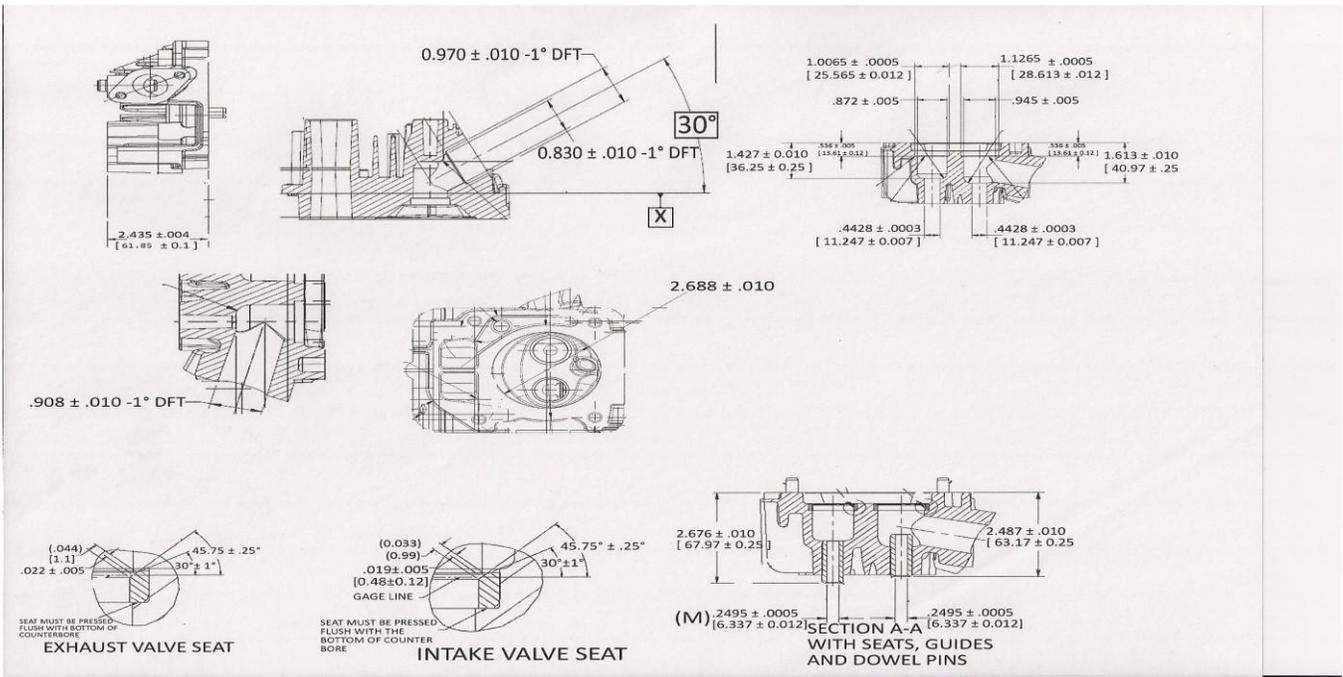
- a. Stock, unaltered B&S part numbers 555698 or 555723 or Cometic #MLS H3590040S are the only legal head gaskets. Suggested part #BSA-304-45. Cometic Spring Plate Gasket P/N EC1424060HTS is allowed. Maximum thickness .065
- b. Minimum gasket thickness between head bold holes .038"
- c. Measurements are to be made with dial caliper from inside of fire ring for gasket part number 555698.



Head:

- A. Cylinder head, 555635 must be stock, unaltered and be in "as cast" and in factory machined condition except head gasket deck surface may be machined to the following specs.
 - 1) Depth of head at shallow part of head 0.011 inches MIN ref. (This measurement to be taken with a depth gage on both the combustion and spark plug sides of the cylinder head).
 - 2) Depth at floor of the head between the valves is 0.319 inches MIN.
 - 3) Depth to top of valve seat is 0.315 inches min to 0.360 inches max.
 - 4) Head thickness from head gasket surface to head plate gasket surface is 2.405 inches MIN. No additions to or subtractions from any part of head with the exception of Heat Disperser, Briggs Part number 555690 may be installed per included ms-3758. No deburring, machining, honing, grinding, polishing, sanding, media blasting, etc, etc.
- B. Exhaust pipe attachment studs may be Heli-coiled. Or removed and replaced with any size or style exhaust bolts.
- C. No alterations of any kind may be made to the intake or exhaust ports.
- D. Intake Port: 0.918 inches MAX
- E. Exhaust Port AS CAST:
 - Maximum ID of shoulder in bottom of exhaust port = 0.854 inches.
- F. Valve Seats, Intake and exhaust: Must remain factory spec. and configuration with one 45 degree and a small 30 degree top angle only. Multi-angle valve seats are not permitted. Valve seats of additional angles and/or angles not comparable to the factory stock are not permitted. Valve maintenance permitted (valve job). Valve seats must remain with the factory specification of 45 and 30 degree angles only. Valve seats of additional angles and/or excessive material removed when compared to the factory stock is prohibited
- G. Intake valve seat diameter inside = 0.965 to 0.972 inches.
- H. Exhaust valve seat diameter inside = 0.838 to 0.850 inches.
- I. Head surface to intake valve guide 1.255 inches max
- J. Head surface to roof of combustion chamber between valves 0.319 inches Minimum.
- K. Head surface to top of valve seat 0.3150 to 0.360 inches.





Remove Valves

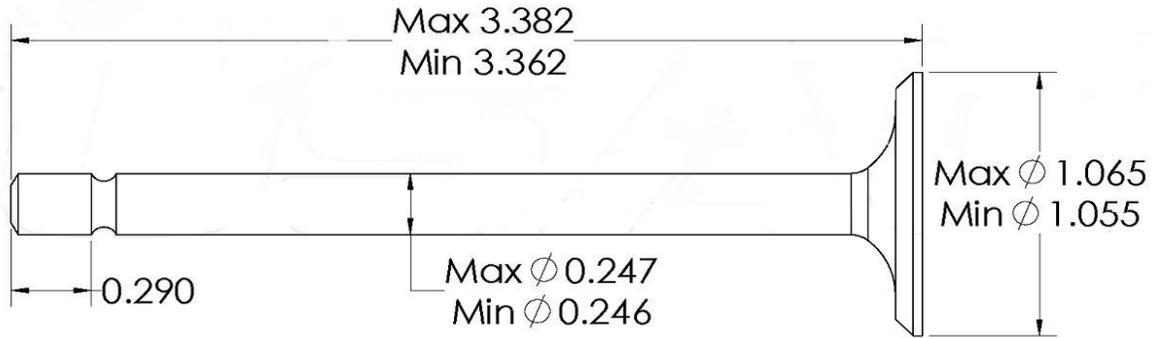
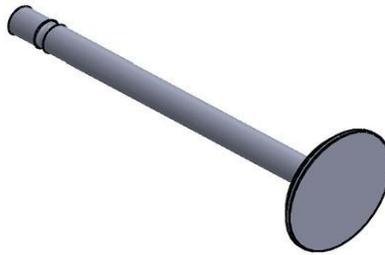
Inspect retainers for alterations that would increase valve spring pressure. Both intake and exhaust must have stock B & S valve keepers.

- a. Retainer Dia .0785 inches Max.
- b. Top thickness. 0.055 inches min to 0.075 inches max. 5. Valves
- a. Check valves for dimensions and weight. Stock and unaltered B & S part #555552 (exhaust) and #555551 (intake). Valve surface must be unaltered factory ground and have one 45-ANGLE only. There will be no other angles ground on any part of the valve.
- b. Intake Valve:

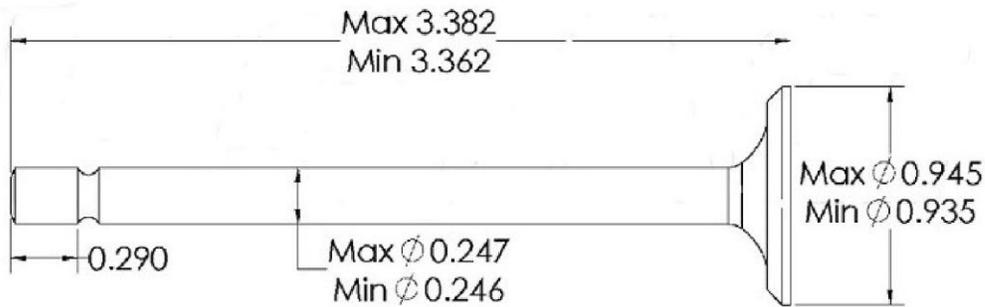
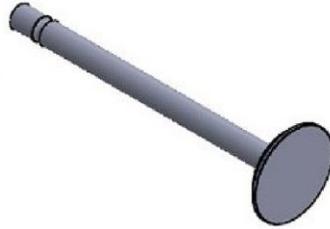
Minimum Weight of Valve	27.90 grams min.
Valve Length	3.372+/-0.010 inches

Diameter of Valve Stem	0.246 to 0.247 inches	Diameter of Valve Head	1.055 to 1.065 inches
Diameter of Valve Seat	0.964 to 0.972 inches	ID	Top of valve stem to top of retainer groove 0.290 reference.

- c. Exhaust Valve:
- | | |
|---|--------------------------|
| Minimum Weight of Valve | 27.70 grams min. |
| Valve Length | 3.372+/-0.010 inches |
| Diameter of Valve Stem | 0.246 to 0.247 inches |
| Head | 0.935 to 0.945 inches |
| Diameter of Valve Seat | 0.844 to 0.850 inches ID |
| Top of valve stem to top of retainer groove | 0.290 reference. |



ANIMAL INTAKE VALVE



ANIMAL EXHAUST VALVE

6. Valve Springs

- Valve Springs will be single coil stock, unaltered B & S part # 555553 or #26826
- 4.00 to 4.75 coils.
- Spring wire diameter 0.103 to 0.107 inches
- 0.965 inches max length
- 15 lbs at 0.812 inches

7. Rocker Arms and Rocker Arm Studs

- Rocker arms will be stock B & S part # 555546 or # 797443 and will not be altered in any way.
- Rocker arm length 2.820 inches Minimum.
- Rocker studs will be stock, unaltered B & S part #694544 (1/4-28 thread) or #797441 (M8 x 1.00 thread) and in stock location. #797443 rocker must be used with #797441 stud and #555711 rocker must be used with #694544 stud.
- Rocker Ball must be stock.
Diameter 0.590 inch min. to 0.610 inch max.
- Rocker arm mounting positions may not be altered in any manner. No heli-coiling of mounting holes. No bending of studs. Rocker arm stud plate #698214 or #797442 must be bolted to the head with one stock B&S gasket or Cometic gasket only- no alterations. Max thickness of gasket is .065 inches.
B & S gasket only - no alterations.

8. Push Rods

- Push rods will be stock, unaltered B & S part # 555531 or 693517.
- Push rod length 5.638 minimum to 5.658 inches maximum.

- c. Push rod diameter 0.183 minimum to 0.190 inches maximum.

9. Engine Block

- a. Engine block must be in "as cast - stock factory machined condition with no alterations. There must be no addition or subtractions of metal or any substance to the inside or outside of the cylinder block. The only exceptions are the deck surface and the oil drain back hole between the lifters may be enlarged.
- b. Deck surface is a non-techable item.
- c. There will be no polishing, sand blasting, or glass beading to any interior surface.
- d. Cylinder bore will not be bored oversize.
- e. Cylinder bore will not be re-sleeved.
- f. Cylinder bore position will not be moved or tipped in any manner.
- g. Cylinder Bore Dimension: 2.693 inches max. (Taken at the top or bottom of bore.)
- h. Check Stroke: 2.206 inch MAX. Push piston down to take up rod play.
- i. Machining of the deck surface is permitted. Piston pop up is .007 inches max. Piston pop up to be checked with a flat bar in the center of the piston parallel to the piston pin and then again checked 90 degrees to the piston pin. Angle milling or peak decking is not allowed. It is allowable to remove carbon buildup if needed to meet .007 max pop up rule.

Cam Shaft Profile Limits

- a. First camshaft check will be taken at the valve spring retainers. With the lash set at zero, (0), the movement of the valve spring retainer may not exceed 2.56 inches. Camshaft must be supplied with compression relief. The counterweight may be cut on compression release to aid in starting.
- b. Install fixture on cylinder block. Cam profile to be ran from lifters.
- c. It is legal to have one profile number out of spec on the intake and one on the exhaust, with the exception of the maximum lift.

9” to 11” Degree Wheel Recommended

Intake Degrees

Exhaust Degrees

0.005 55 TO 65 BTDC	0.005 277 TO 284 BTDC
0.020 12 TO 19 BTDC	0.020 236 TO 241 BTDC
0.050 0 TO 5 ATDC	0.050 219 TO 224 BTDC
0.100 17 TO 21 ATDC	0.100 202 TO 206 BTDC
0.150 32 TO 38 ATDC	0.150 185 TO 190 BTDC
0.200 53 TO 58 ATDC	0.200 165 TO 171 BTDC
0.225 66 TO 72(split) ATDC	0.225 152 TO 156 (Split) BTDC

0.259 MAX (104 TO 107 CL.)

0.260 MAX. (113 TO 116 CL.)

0.225 141 TO 145 (split) ATDC	0.225 71 TO 76(split) BTDC
0.200 154 TO 159 ATDC	0.200 58 TO 62.5 BTDC
0.150 174 TO 179 ATDC	0.150 38 TO 43 BTDC
0.100 191 TO 196 ATDC	0.100 21.5 TO 26 BTDC
0.050 208 TO 213 ATDC	0.050 4.5 TO 9 ATDC
0.020 225 TO 232 BTDC	0.020 7 TO 13 ATDC
0.005 268 TO 276.5 BTDC	0.005 47 TO 59 ATDC

10. Flywheel

No modifications allowed to flywheel.

- a. Stock B & S part # 555683 only. No machining, glass beading, sand blasting, painting or coating of flywheel is allowed.
- b. **The plastic flywheel fan part number 692592 and 555778 are both legal.** Flywheels with broken fins must be replaced.
- c. **Flywheel timing key - The flywheel timing key is a non tech configuration. Aluminum or steel key, can be machined or filed and offset designs are all legal. However a key must be present.**
- d. Can use a Briggs part number 691736 flat washer under flywheel nut. You can use the factory cup cut down for washer. Briggs flywheel nut # 792723 or 699359 may be used.
- e. It is legal to lap the flywheel to the crankshaft.
- f. The 2 flywheel fan bolt holes can be heli coiled and or the stock fan bolts can be replaced with any size and style of fastener.



Coil Part #555718

Flywheel Part #557126

Green Coil Only - No Other Allowed

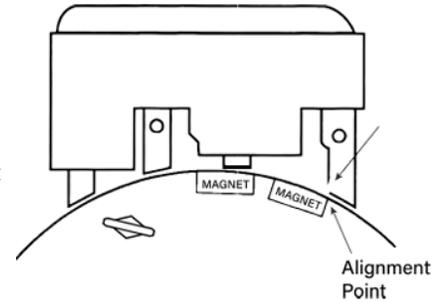
11. Ignition System and Ignition Timing

- a. Unaltered B&S stock ignition part #555718 or #84011138 with the green shell is mandatory. If using part #84011138, the LED must flash green when the engine is running. Maximum RPM: 6,150. Ignition coil or its position, other than air gap may not be altered in any way. Coil mounting bolts must be stock and cannot be altered in any way to advance or retard timing. Attachment bolts and/or bolt holes may not be altered.
- b. Spark plug: Any automotive type 14mm $\frac{3}{4}$ inch reach with 14mm thread only, unaltered with stock washer allowed. Indexing washers are not allowed. No taper seat plugs allowed.
 - c. The magneto air gap is non-tech.
- d. Timing: Max. = 31 degrees BTDC at 2000 RPMs
- e. Max. valve lift will be checked from the top of the valve spring retainer. Valves must be adjusted to zero clearance.
- f. Valve Lift: With the valve lash set at zero, the movement of the valve spring retainers must not exceed the following: Intake and exhaust: .256 inches max lift.
- g. Ignition timing is to be checked with a degree wheel and a fixed pointer mounted on the engine. Use a piston stop tool inserted in the spark plug hole to properly locate the piston top dead center (TDC) position. Using a hand held electric drill (The Dewalt drill number DWD520) is a good choice. or electric motor powered test bench. Rotate the engine in a clockwise direction and with a timing light to check the ignition timing.

- h. **Timing must be checked with the spark plug that was used in that race.**
31 degrees maximum at 2000 +/- 50 RPM
Coil to flywheel gap is a non tech item.
- i. This method may be used for a preliminary check; however, adherence to standard ignition timing is required for any disqualification.

Quick Reference Static check for timing:

- Install a degree wheel using a positive stop method.
- With the left edge of the first magnet aligned with the start of the lead leg of the ignition (refer to photo), the engine must not exceed 26 degrees with air gap set at .016". Timing checked in the direction the engine operates.



12. Gear Box

B&S555721 Gear Reduction Box

- a) Briggs & Stratton gearbox part numbers 555721 and 555753 are the only approved gearboxes. Gearbox number 555753 includes new sun gear part number 555756 as a direct replacement to the current sun gear in gearbox 555721. Must be in stock form and color.
- b) It is allowable to machine additional keyway slots (straight or woodruff), drill/tap and or snap ring groove in gearbox sun gear output shaft. Also the end of the sun gear shaft can be shortened.
- c) Aftermarket gaskets are approved between the gear box and engine side cover, one gasket only
- d) **The lower drain plug is now a non tech item. This rule change is to allow a lower profile drain plug to prevent it from dragging the ground. A good option drain plug is the McMaster Carr part number 97313111.**



Part # 555721 complete gear box

13. Crankcase Cover

Remove crankcase cover

- a. Cover must be in stock, unaltered, "as cast in factory" condition. No alterations or subtractions of metal or any other substance to crankcase cover.
- b. Aftermarket gaskets are approved, however they must be of the same size and material as stock gaskets. Only one gasket is allowed.
- c. Thread locking compound is permitted on the 6 crank case cover to engine block bolts

14. Piston

Remove rod and piston.

- a. Stock and unaltered B & S Animal piston Part number 555660 piston must be used. Briggs logo inside of piston near pin boss.
- b. Minimum from top of piston to top of wrist pin on circlip side is .658 inches.

- c. Minimum piston length is 1.762 in.
 - d. Oversized pistons are not allowed.
 - e. Arrow on top of the piston must point towards the flywheel side.
15. Rings
- a. Must be stock; unaltered B & S rings part # 555664 only.
This set contains file to fit top ring.
 - b. No decreasing of ring tension by heating, machining or any other means. (This includes oil ring expander).
 - c. Three rings mandatory
 - 1. Top compression ring must have chamfer or O toward top of piston.
 - 2. Second scraper ring must be installed with inside chamfer down and O toward the top of piston.
 - 3. Oil ring must be installed as from factory.
 - d. Minimum width of top two rings is 0.095 inches.
 - e. Thickness of top two rings is 0.059 to 0.064 inches. (Each ring)
 - f. Minimum width of oil ring is 0.065 inches. Ring groove must be present.
 - g. Thickness of oil ring is 0.098 to 0.102 inches.
 - h. **All 3 rings including oil expander ring must be in 1 piece when removed from engine during tech. Broken rings are not allowed.**

16. Wrist Pin

- a. Must be stock, unaltered B & S part # 555520 wrist pin and lock part # 555521
- b. Wrist Pin:
 - Maximum I.D. = 0.414"
 - Max. O.D. = 0.626"
 - Minimum length – 1.901"

17. Connecting Rod

- a. Must be stock, unaltered B & S part # 555626 Briggs logo on rod beam.
- b. Rod length, measurement from bottom of wrist pin hole of top of crank journal hole is 2.419 inches minimum to 2.429 inches maximum.
- c. Diameter of big end = 1.105 inch max
- d. Diameter of small end– .6265 in max

18. Crankshaft

- a. Stock B & S part # 555722 crankshaft must remain unaltered. Briggs logo cast in crankshaft. Briggs Key part # 798972 for updated crankshaft.
- b. Crankshaft journal diameter = 1.094 inches to 1.100 inches.
- c. Stock, unaltered B & S part # 555573 or #690824 and #555527 or #798538 bearings required.
- d. B & S part # 555054 key-flywheel.
- e. Shim, (s), Briggs Part number 55619, if used must be installed as from factory.
- f. Stock, unaltered part # 555574 timing gear installed in stock location on crankshaft only.
- g. No offset keyways allowed on cam gear for crankshaft
- h. Splines are non tech. No welding on crank shaft
- i. **Crankshaft keyway for drive gear, maybe stacked & or locked tight.**



19. Camshaft

- a. Stock, unaltered B & S part # 555532 OEM # 696813 camshaft.
- b. There will be no additions or subtractions from any part of the camshaft.
(Exception) Compression release counterweight tabs may be trimmed to ease starting.
- c. Compression release will remain intact.
- d. Lobe center angle will not be altered by any means.
- e. Lobe profile will not be altered in any way.

20. Tappets

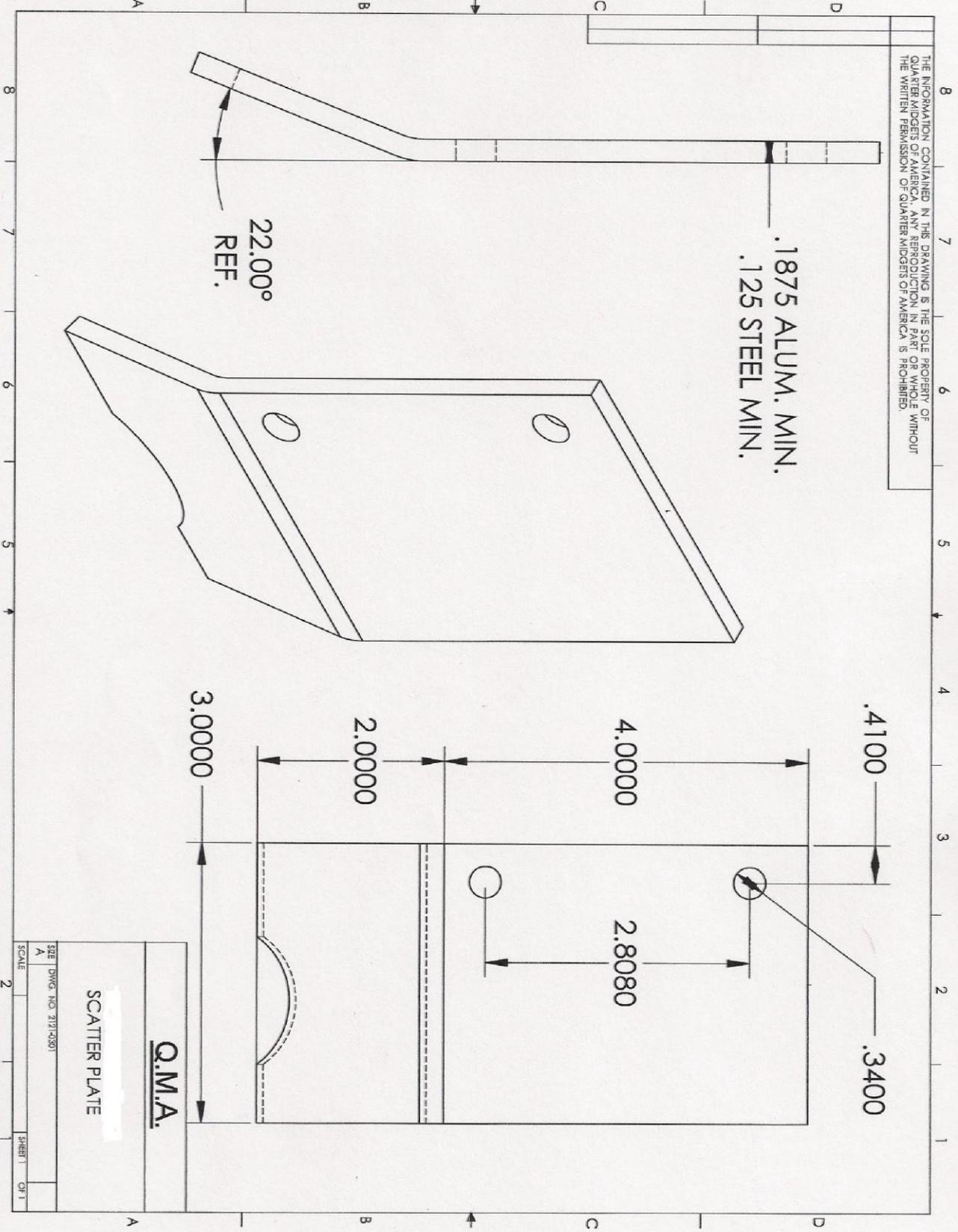
- a. Stock, unaltered B & S part # 555307 or #690977 tappets only.
- b. Tappet diameter = 0.820 min to 0.860 max
- c. Tappet overall length = 1.515 min to 1.525 max

Torque Specifications:

Non-Tech, recommended by B & S

Flywheel Nut	55-75 ft. lbs. (74.5-101 Nm)
Cylinder Head	180-22- in. lbs. (20-25 Nm)
Connecting Rod	120-140 in. lbs. (13.5-15.8 Nm)
Crankcase Cover	120-140 in. lbs. (13.5-15.8 Nm)
Cylinder Head Plate	70-90 in. lbs. (8-10 Nm)
Rocker Arm Stud	70-11- in. lbs. (8-12.5 Nm)
Valve Cover	30-60 in. lbs. (3.5 -7 Nm)
Spark Plug	95 - 145 in. lbs. (11-16 Nm)
Intake and Exhaust	Measured at TDC .005 -.007 in. (.127 - .178mm)
Flywheel Holder Tool	Part # 19372
Valve Lash	Cold

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Q.M.A.
SCATTER PLATE
SIZE DWG. NO. 219-0301
A
SCALE 2
SHEET 1 OF 1