



HONDA 160 UT2 TECH MANUAL

USAC NATIONAL TECH COMMITTEE

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2018 UNITED STATES AUTO CLUB



HONDA GX 160 UT2- TECH MANUAL

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FROM 2018 USAC NATIONAL .25 MIDGET RULE BOOK, APPENDIX I 731 Engine Protest Rules (applies to Honda and Briggs classes only)

1. Protest shall be from within the same division of class only, i.e. Jr., Sr., Lt.& Hvy. 120-160, Animal or World Formula only. Competitors in the same division, and in the same race may make a protest on an engine. No protesting in Rookie Class. Handlers may not protest more than one car per event and may not protest same driver more than once per calendar year.
2. Honda Engines and World Formula/Animal Engines may be protested for \$400.00 cash only plus any applicable shipping charges if necessary. No protested related inspection will be started prior to the funds being posted with the proper official.
3. This protest form and cash must be submitted to the Chief Steward, or his/her designee, before the end of the race that the protested engine is participating in I.E. Checkered flag lap complete.
4. The protest can only be made during an A-Main event.
5. The person protesting the motor must have their engine inspected for compliance first. If the "protester's" engine is found illegal the protest is null and void and the protest fee will go to the club. If the "protester's" engine is found legal the protest will continue.
6. The Chief Steward, his/her designee, will hold the protest money until the protested engine has been inspected for legality. The protested engine shall be tagged/marked and sealed as soon as it car comes across the scale if it has not been sealed prior.
7. The protested engine as well as the engine of the protested party shall be immediately taken to impound and/or presented to the Tech Director for inspection. Engine must remain in impound and in the possession of tech officials throughout the entire process, including shipping to USAC Headquarters or designated tech inspection station and the transferring of funds.
8. Both protester and protestee have the option to be present at the time of inspection.

9. Any protest that is withdrawn will be assessed a \$50.00 fee that will be paid to the host club.
10. If the protested engine is found to be illegal, the motor must be completely torn down to check for additional illegalities. The Tech Director must confiscate all illegal parts and related parts from the protested engine and shall immediately forward them to the USAC Headquarters. If engine is found illegal protest money minus \$50 plus any shipping cost will be returned to the person filing the protest.
11. Refusal of protest, destroying or withholding of parts or any other lack of cooperation in this protest or inspection process shall be interpreted as an admission that the engine is illegal and shall subject the driver and handler to the conditions set forth in the Suspensions Program.
12. Any part that was in tech or protested engine, block or part which are deemed to be over maximum wear limits in one or more spots but is under maximum wear limits in other spots is subject to confiscation but not a DQ.
13. Note: Reference to Confiscation due to Wear Limits in "Engine Block Internal Rules" of both Manuals.
14. If the engine is found legal \$400 will be given to the person whose engine was protested.

732 Engine Suspension Rules

Handlers and drivers guilty of having an engine declared illegal at technical inspections shall be disciplined as follows:

1. First offense – up to 30-days and/or 4 race suspension for handler and driver from participating in the respective class at any USAC Sanctioned event.
2. Second offense within one year of first infraction – up to a one-year suspension for handler and driver from participating in the respective class at any USAC Sanctioned event.
3. Third offense within two years of last infraction – Suspended for life from USAC's .25 Midget division.
4. Suspension for life is open to review by USAC.
5. Suspension shall begin immediately.
6. Illegal **Honda, Animal and World Formula** part/s shall be sent within five Business days to the USAC office or designee for review. The Tech director has 48 hours to determine if the part/s are legal or illegal. If the part/s are determined to be legal it shall be returned to handler. Handler shall be notified if part/s are legal or illegal. All illegal or confiscated part/s shall be sent to National Tech Director. All legal parts shall be returned to handler.
7. If a **Honda** motor is found to have a valve oil seal during tech it shall be a race disqualification only.
8. Spark plugs, exhaust and **ignition timing** infractions are a race disqualification only.
9. Failure to go to tech and/or impound will result in a race day DQ. Refusal of tech shall be interpreted as an admission that the engine is illegal and a suspension from the class shall

be immediate with all awards and qualifications being revoked with a six-month suspension driver and handler suspension at any USAC Sanctioned event.

10. For the purpose of this rule only, if a handler has multiple cars competing at one race event and more than one engine is found to be illegal at that event; it will be considered to be one offense.
11. All membership suspensions must be sent to the National Tech Director within 5 Business Days.
12. Illegal Rookie engine parts shall be confiscated (Honda or Animal) but the suspension shall not be levied against handlers or drivers for the first offense. The second offense shall result in a 30 days Suspension from Rookie.
13. The cost to appeal a suspension is \$175 plus any associated fees. The appeal must be made within 3 days of the ruling.

Unless it says you can do it you cannot do it!

GENERAL RULES

1. Only stock Honda GX160 UT-2 HX2 serial # beginning with GCBPT engine and gearbox will be used in this class. All parts will be stock Honda specifically made for the Honda GX 160 UT-2
2. All stock Honda parts must be used and properly installed with the following exceptions:
 - a. Governor system may be partially or fully removed with the exception of the steel drive gear on the crankshaft. This gear must remain intact. If shaft is removed, hole must be plugged. Hole can be taped for thread or epoxy. No welding.
 - b. Factory air cleaner must be removed. Any air filter may be attached to the outside of air filter adapter. Outer wear style or equivalent can be used over carburetor only with no adapter. The approved air filter adapter may be run with or without an air filter. Any air filter may be used with adapter as long as there are no devices inside the air filter or adapter. (I.E. Springs not allowed) Hose from valve cover must go into a catch can. (We are using "outerwear" to define a style not brand name).
3. The use of air filters during qualifying at asphalt and dirt events is illegal. The Senior Tech Official reserves the right to allow filters at any event that it's deemed necessary.
4. Stock Honda fuel tank must be removed.
5. Recoil starter must be removed. Pull cup may be cut down for washer. Must use original cup.
6. Exhaust:

Steel or Stainless are the only materials allowed for exhaust pipes.

- a. Stock Honda muffler will be removed. Mounting flange may be cut off of muffler and used as adapter flange. Any transition from the "D" shape of the exhaust port to round must take place within the thickness (0.250" max.) of the flange. This applies to all exhaust systems. No steps or tapers allowed, grind marks are allowed past 0.250" flange area. No suspension for exhaust flange or pipe infraction just disqualification. If an after market flange is used, maximum allowable flange thickness will be 0.250 inches. If slip on type flange assembly is used, pipe stub will be a maximum 0.880 inches outside diameter tubing with a maximum overall length of 1.500" inches. Pipe stub must be inserted into exhaust pipe at least 0.750 inches and will have minimal exhaust leakage.
 - b. Muffler to be used will be 4 to 8 hp Briggs & Stratton, part number 294599 or equal equivalent. Muffler will be internally unaltered except that the round cup shaped baffle may be welded to the perforated baffle without moving its original location. Threads will not be removed from muffler.
 - c. Exhaust pipe will be a maximum of 1.000" inches outside diameter with a length of 20.0" to 26.0" including a threaded pipe coupler to be welded to the end of the pipe in order to screw muffler in place so that muffler may be removed for inspection. Pipe must be one piece continuous pipe from flange or slip nipple to muffler coupler. No sections of pipe welded together (butt welds). Pipe coupler will be a standard, unaltered, 3/4" NP, threaded coupler. Length will be 1.000" inches minimum to 2.250" inches maximum.
 - d. There will be no steps or tapers in exhaust pipe or flange assembly. Exhaust pipe length will be measured by using a small diameter hose inserted through pipe to measure over all length. Flange and coupler will be included in the overall length when measuring pipe. No coating of any type may be applied to the interior of any part of the exhaust system. The intent of this rule is to have all of the exhaust pass through the muffler. All measurements are to be taken with the component pieces in the same position as they were installed and on the car.
 - e. All 160 1/4 midget mufflers must be Briggs & Stratton Part # 294599 or equivalent. No drilling holes in the baffles. Inside seam of baffle must be straight edged. (NOTE: Some seams may not be parallel in baffle) You cannot cut off the threaded flange if it is to be used in Honda. It is OK to weld a washer or nut on the flange for a place to apply safety wire. Muffler cannot be more than 1/2 turn from being hand tight.
 - f.
7. Choke butterfly & shaft must be removed. Hole may be filled only with silicone. Old shaft may be cut down.

All seals must have the stock spring installed in the seal and in its proper location.

8. Oil level switch may be disconnected but switch assembly must remain intact in crankcase.
9. Gearbox may be rotated to any desired position.
10. Off-On ignition switch may be removed, and hole covered. (any material; no welding)
11. All pin measuring gauges are plus tolerance.
12. Exhaust oxygen sensor or temp. sensor attached to any part of Honda exhaust system is illegal.
13. Valve seals are illegal. (Event DQ only NO suspension.)
14. Cryogenics of any Honda part is illegal.
15. Taking parts out of service reference to "Wear Limits" in Engine Block Internal section.
16. DQ Only – Not suspension for: Exhaust, Air Filter Adapter, Spark Plug or valve seal, silicone or any type of sealer or epoxy in unapproved areas (approved areas are choke shaft hole and governor shaft hole) or more than one exhaust gasket.
17. Shroud must be factory RED or BLACK.
18. Steel or Stainless are the only materials allowed for the exhaust pipes.
- 19.

TECH PROCEDURE

Modifications or machining of any parts except the gasket surfaces between the cylinder head and block, and main jet in order to bring them to a stated minimum or maximum specs (blueprinting) is not legal.

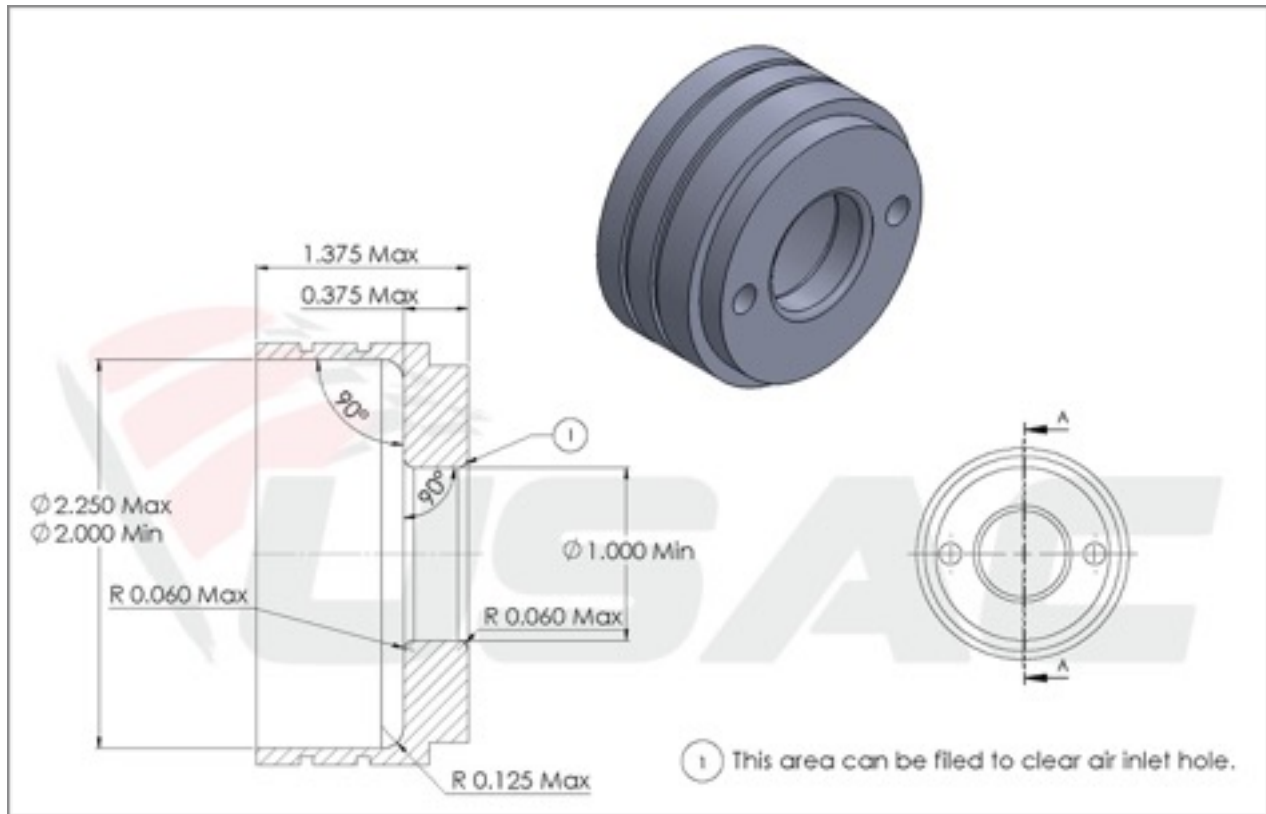
External visual check of engine for required components: muffler, shrouds and sheet metal, oil level sensor (this can be partially observed from outside).

NOTES:

1. Factory air cleaner must be removed. Any air filter may be attached to the outside of air filter adapter. Outerwear style or equivalent can be used over carburetor only with no adapter. The approved air filter adapter may be run with or without an air filter. Any air filter may be used with adapter as long as there are no devices inside the air

filter or adapter. (IE Springs not allowed) Hose from valve cover must go into a catch can. (We are using “outerwear” to define a style not brand name).

2. The use of air filters during qualifying at asphalt and dirt events is illegal. The Senior Tech. Official reserves the right to allow filters at any event that it's deemed necessary.
3. Senior Tech. Official reserves the right to allow filters at any event that it's deemed necessary.
4. Any type throttle linkage may be utilized. Carburetor will be unaltered with the exception of the black plastic piece on upper end of throttle shaft, this is the only part in the carburetor that can be altered.
5. Any type throttle linkage may be utilized. Carburetor will be unaltered with the exception of the black plastic piece on upper end of throttle shaft, this is the only part in the carburetor that can be altered.
 - a. Material may not be added to throttle stop area of black plastic piece or carb body.
2. Rear mounting brackets for Honda fuel tank may be removed.
3. The starter cup that is behind the flywheel-retaining nut can be cut away to leave only the flat washer back piece that retains cooling fan.
4. The keyed end of the ring gear shaft may be shortened, drilled and tapped or machined for snap ring.
5. Heli-coiling threads for shrouds (all), valve cover, existing throttle mounting holes, oil drain, and fill holes, one of the coil bolts, and side cover bolts is allowed. Dowel holes are not to be modified or relocated, also one carburetor mounting bolt. Valve Cover mounting bolts may be replaced with studs, m6 - 1.0 or equivalent decimal or inch size.
6. Honing and deglazing of the bore is allowed.
7. Lapping the valves is allowed.
8. Blocking Air Flow: No device may be used that will/or appear that it may impede air flow 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.



Air cleaner adapter:

ID: 2.250" maximum
 Length: 1.375" maximum
 Flange thickness: 0.375" maximum
 Flange ID: 1.000" minimum

ID hole size straight walled, flat bottomed and parallel with carburetor using existing air cleaner mount holes.

Carb adapters with machined spacers or bosses are legal for use. Carb adapters must meet all the current dimensions with the following additions.

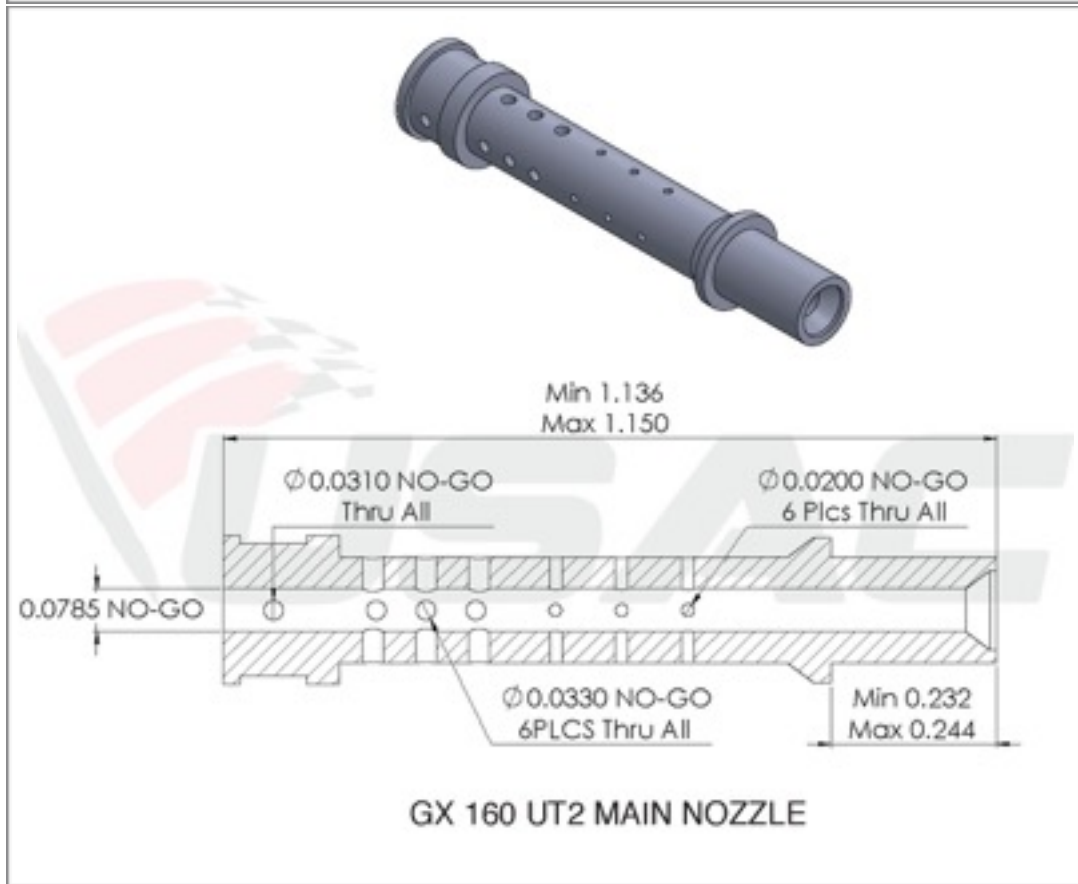
Only 2 bosses may be added for the purpose of mounting to the carburetor. The maximum diameter of the bosses is 0.515

The maximum length of the bosses is 0.625

The top of the bosses must be machined flat. They may not be counter bored or have a radius. A maximum 0.010 radius can be added to break the top edge.

CARBURETOR

1. Check for any alterations or worn parts that would allow additional air into engine: holes, slots, perforations, spacers, loose bolts, warped flanges etc.
2. Carburetor identification number: BE65B, BE65Q, and BE54D.



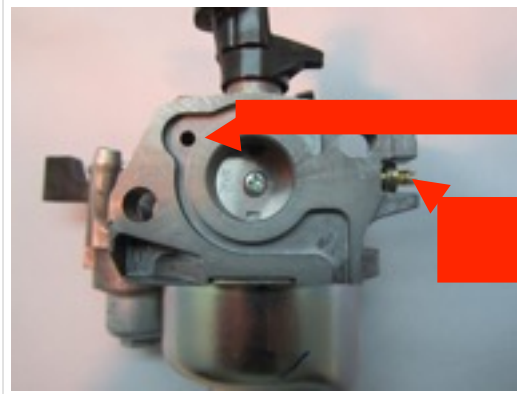


3. Carb Insulator

- a.** Gasket thickness: 0.025" maximum.
- b.** Insulator gasket thickness: 0.025" maximum.
- c.** The Honda UT1 or UT2 insulator is legal.

4. Check carburetor for alterations. Upper choke shaft hole may be sealed with silicone type sealer.

- a.** Carburetor Bore: Intake end: maximum diameter 0.951" ref. Throttle end: maximum diameter 0.710.
- b.** Carburetor venturi bore: 0.523- no/go. This measurement is best made with a no go gauge but may be made using a telescoping gauge as a no go.
- c.** Main jet must be an OEM Honda jet (Brass or Silver). Jets can be drilled to any size. Only modification allowed is drilling the main hole in the jet.
- d.** Main jet – Any size allowed. This specification refers to the main jet primary small center hole only. It is not legal for any other jet modifications and will be compared to a stock known factory jet. Counter boring and/or chamfering of the larger holes of the jet on both the front and back sides of jet are not allowed.



Float Bowl Vent.

**Pilot Screw- Check
tip and Pilot seat.**

- e. Main air jet: maximum #53 (0.0595") no go - at back of hole.
- f. Main jet access passage: maximum #41 (0.096") no go.
- g. Main nozzle bore maximum #47 (0.0785") no go.
- h. Main nozzle will be checked with a No/Go Gauge (0.424" maximum) If gauge goes over main nozzle - carb is illegal.. This is best measured using a 0.519" rod type gauge with a 0.424" flat area to be used as a go gauge.
- i. Air vent holes on the side of the main nozzle must not be plugged.
- j. Main nozzle must not be fastened into the carburetor body by anything other than the main jet. It must not be epoxied or positioned by any other means.

SLOW SPEED SYSTEM:

- 1. Pilot jet: 0.0135" maximum #79 (0.0145") no go.
- 2. Pilot air jet: maximum #55 (0.052") no go.
- 3. Pilot screw: no spec
- 4. Pilot seat diameter: maximum #61 (0.039") no go.
- 5. Float bowl vent : maximum #31 (0.1200") no go.
- 6. Needle valve seat: maximum #50 (0.070") no go.



The **Pilot Air Jet** hole is just inside of this brass piece. This needs to be checked with the proper no-go gauge.

The hole at the end of the arrow is the **Main Air Jet** hole and will be checked using a pin type no-go gauge.

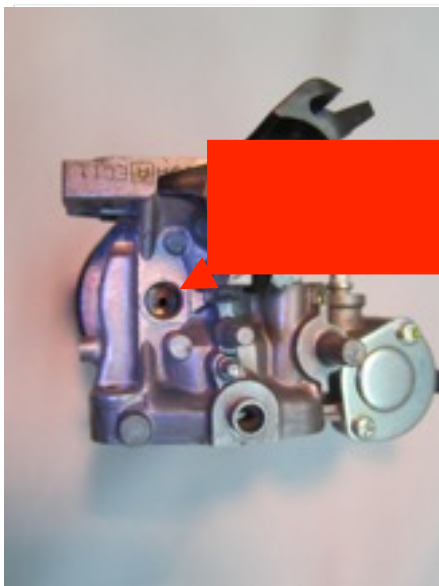
7. The butterfly screw, the butterfly, and the throttle shaft must not be removed from the carburetor. Any evidence of tampering will be a disqualification and suspension.
8. Decimal equivalents of numbered size drills chart on last page.



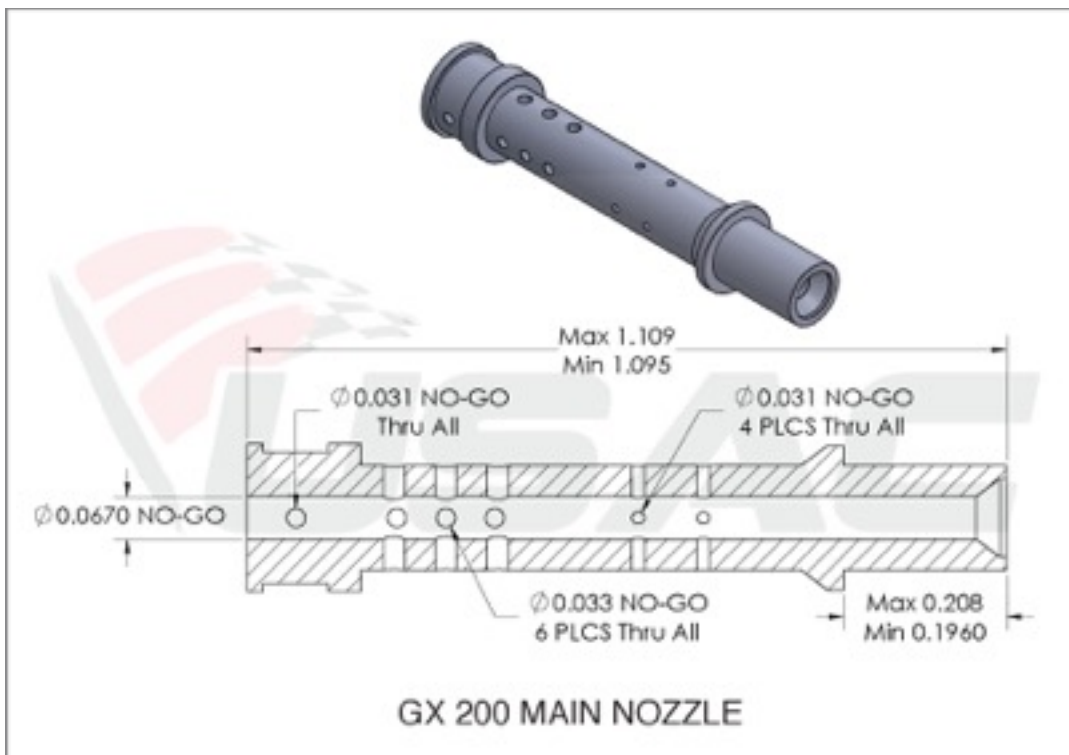
Once you remove the **Needle Valve** you can then check the **Needle Valve seat** dimension.



Remove the idle adjustment screw and then carefully pry up on the **Pilot Air Jet** to remove.



This is where the **Pilot Air Jet** is located. There is not a spec for this hole. The small hole in the bottom of the jet (black plastic) needs to be checked. Also look to make sure that the o-ring on the jet is there and in good condition.



HONDA GX200 CARBURETOR USED IN HEAVY 160

- a. BE64Y Must use Honda part number 16100-Z0V-921.
- b. Must use Honda part number 16211-ZE1-000 insulator for the Heavy 160 class. This is the standard GX-160 Insulator. No modifications allowed.
- c. Carburetor Bore: Intake end: Maximum diameter 0.951" ref.
- d. Throttle End: Maximum diameter 0.751.
- e. Carburetor venture bore: 0.576 – no/go. This measurement is best made with no go gauge, but may be made using a telescoping gauge as a no go.
- f. Main jet must be an OEM Honda jet (Brass or Silver). Jets can be drilled to any size. Only modification allowed is drilling the main hole in the jet.
- g. Main jet – Any size allowed. This specification refers to the main jet primary small center hole only. It is not legal for any other jet modifications and will be compared to a stock known factory jet. Counter boring and/or chamfering of the larger holes of the jet on both the front and back sides of jet are not allowed.
- h. Main air jet: maximum #53 (0.0595") no go – at back of hole.
- i. Main jet access passage: maximum #41 (0.096") no go.
- j. Main nozzle: bore maximum #51 (0.0670") no go.

- k. Main nozzle will be checked with a no/go gauge (0.449" maximum). If the gauge goes over main nozzle – carb is illegal. This is best measured using a 0.572" rod type gauge with a 0.449" flat area used as a go gauge.
- l. Air vent holes on the side of the main nozzle must not be plugged.
- m. Main nozzle must be fastened into the carburetor body by anything other than the main jet. It must not be epoxied, or positioned by any other means.
- n. Pilot jet: +/- 0.001 (0.018").
- o. Pilot air jet: maximum (0.056") no go.
- p. Pilot screw: no spec
- q. Pilot seat diameter: maximum #61 (0.039") no go.
- r. Tip of pilot screw: 0.020" minimum.
- s. Float bowl vent: maximum #31 (0.120") no go.
- t. Needle valve seat: maximum #50 (0.070") no go.
- u. The butterfly screws, butterfly, and the throttle shaft must not be removed from the carburetor. Any evidence of tampering will be a disqualification and suspension.
- v. Fuel inlet can be turned to clear blower cover.

VALVES

1. All pieces of the stock engine-cooling shroud must be properly installed.
2. There must be no addition or subtraction of any material from the shrouding except for the covering of the switch hole. (Any material). Starter cup may be altered to be used as washer retainer for the cooling fan.
3. Remove engine-cooling shrouds. Remove valve cover.
4. Zero dial indicator after exhaust bump. (0.050) ref.
5. Maximum valve lift will be checked from the top of valve spring retainer. Valves may be adjusted to zero clearance or shims may be installed to create zero clearance. This may dictate making special shims, as it is difficult to insert feeler gauge blades so as not to interfere with indicator contracts on retainer.

Valve lift:

Intake: 0.245 Maximum



Exhaust: 0.255 Maximum



CYLINDER HEAD, HEAD GASKET, VALVES, SPRINGS

Remove cylinder head.

Head gasket thickness: 0.008" minimum thickness of inner rim.

Measure from head surface to top of valve head:

Intake: maximum 0.264" Minimum 0.242"

Exhaust: maximum 0.250" Minimum 0.225"

This is best done with a depth micrometer or a bridge type dial indicator. Bridge type does not require removing carbon from head surface. See photo on next page.

Combustion chamber cc: 17.2 cc. Ref. with stock spark plug



Remove valves:

- A. Inspect retainers for alteration that would increase valve spring pressure. Both intake and exhaust must have Honda retainers.
- B. Thickness of retainer will be:
 - Intake: 0.225" minimum - 0.241" maximum
 - Exhaust: 0.225" minimum - 0.241" maximum
- C. Flange thickness of retainer will be:
 - Intake: 0.110" maximum
 - Exhaust: 0.110" maximum
- D. Distance from the flat of the flange to machined surface:
 - Intake: 0.145" min - 0.155" max
 - Exhaust: 0.145" min - 0.155" max
- E. All valve oil seals must be removed. - The use of valve oil seals is illegal and will result in a race event DQ only.

VALVE SPRINGS

Valve springs will be stock Honda springs and will not be altered in any way.

160 Spring

- A. Wire diameter: 0.071" Maximum
- B. Outside diameter of spring: 0.790" Maximum
- C. Number of total coils: 5.3
- D. Spring pressure: 11 LBS max. at 0.812"
- E. Stacked length will be: 0.394" Maximum

140 Spring

- A. Wire diameter: 0.079" Maximum
- B. Outside diameter of spring: 0.816" Maximum C . Number of total coils: 7



- C. Spring pressure: 16 LBS max. at 0.812"
- D. Stacked length will be: 0.524" Maximum

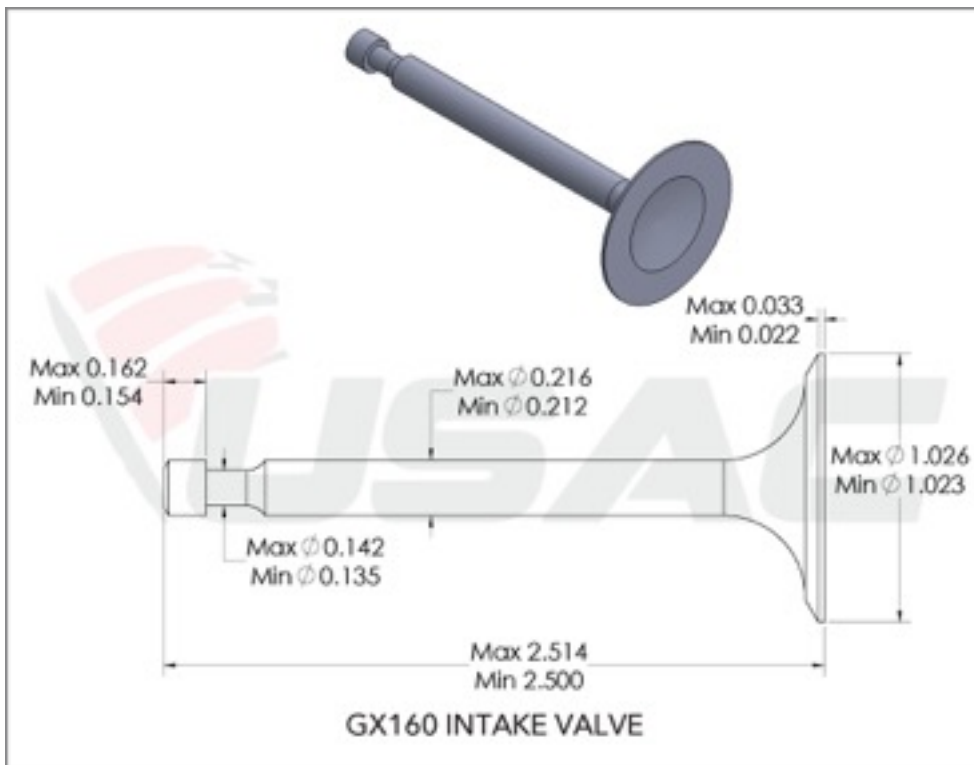
ROCKER ARMS - PUSH RODS -STUDS

Rocker arms will be stock Honda and will not be altered in any way. Rocker arm studs will be stock Honda. They or their mounting position may not be altered in any manner. No heli-coiling of mounting holes. No bending of studs. Push rods will be stock Honda and will not be altered in any way.

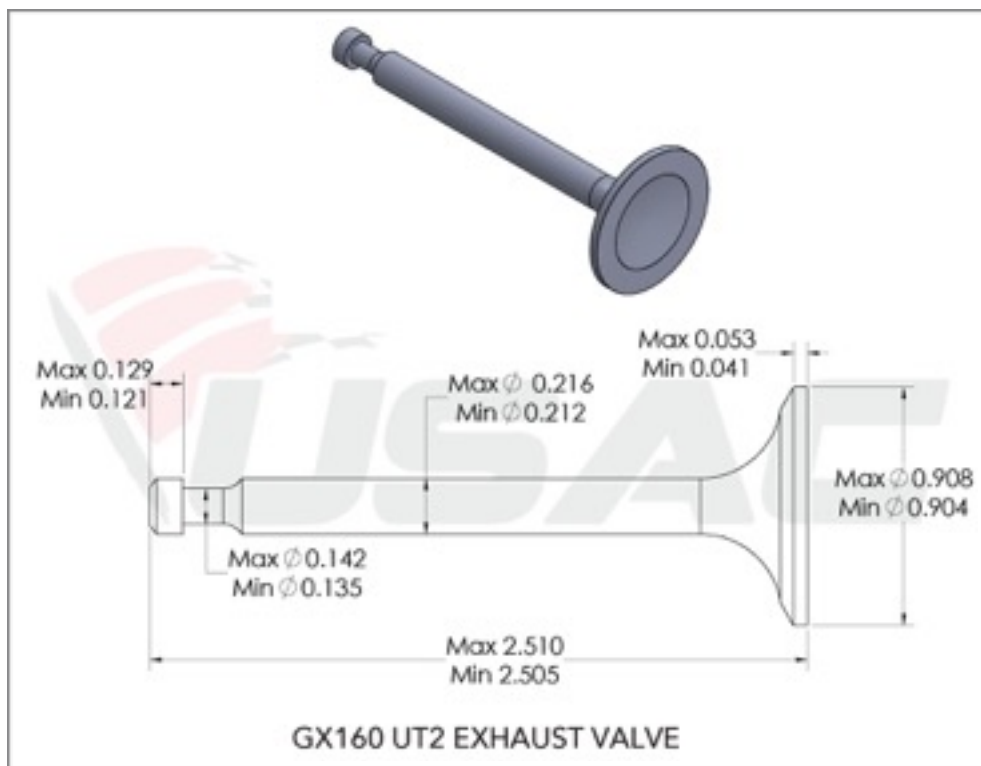
Push rod length will be 5.279" maximum

VALVES

1. Check valves for dimensions and weight. Valve seating surface must be factory ground to a single angle only, 45 degrees. There will be no other angles ground on any part of valve. Valves must not be polished, lightened or altered in any way.
 - b. Valve weight:
 - Intake 22 grams minimum
 - Exhaust 20.5 grams minimum



2. Drawing of valve dimensions (Intake Valve followed by Exhaust Valve)



HEAD

1. Cylinder head will be in “as cast” and in factory machined condition and there must be no addition or subtraction of metal or any other substance of metal except for cylinder head gasket surface
2. No use of any substance to the inside or outside of the cylinder head. This include no type of machining or grinding to increase compression or airflow. No milling, angle milling etc. or any alteration that could increase valve spring pressure. Note: Do not use abrasive material in cleaning head and cylinder deck that will alter factory finish. Heads with grinding or filing in will NOT be legal. It is your responsibility to make sure your motor’s head hasn’t been ground or filed. HPD has replacement heads available.
 - a. Measure from flat of head surface down to valve seat. This dimension will be: maximum 0.305” minimum 0.287”
 - b. Measure from surface of head to top of valve guide. This dimension will be: 1.010” Maximum



3. Measure from surface of head to lowest machined area in the bowl of the port. This dimension will be:

Intake: 1.062 - 1.170” maximum

Exhaust: 1.103 - 1.122" maximum

4. Thickness of head. This will be measured from valve cover surface to head gasket surface at the side at a position in line with upper intake & exhaust flange bolt.

Maximum 2.917" Minimum 2.909"

INTAKE AND EXHAUST PORTS

1. Ports will be "as cast" and in factory machined condition and there must be no addition or subtraction of metal or any other substance to the inside or outside of the cylinder head.
2. No alterations of any kind to be made to the intake or exhaust port.
3. This includes any grinding, polishing, etching, sand blasting or glass beading to interior surface.
4. Valve seats must be a stock single 45 degree angle. Multi angle valve seats are not permitted. Value seats must not be replaced.
5. Intake and Exhaust ports at valve: Intake: Max 0.952" Exhaust: Max 0.832"

ENGINE BLOCK

HONDA Performance Development has Honda replacement blocks available.

This engine block must be "as cast" and in factory machined condition. There must be no addition or subtraction of metal or any other substance to the inside or outside of the cylinder block, crankcase cover, crankshaft, rod, piston, pin, rings, flywheel or coil with the following exceptions:

1. Removal of rear gas tanks brackets is permitted.
2. Removal of governor. Governor system may be partially removed with the exception of the steel gear on the crankshaft. This gear must remain intact. Governor arm and shaft may be removed, tied forward or altered to accommodate throttle linkage or return springs.
3. Addition of brackets, fittings etc. to accommodate throttle linkage, tachometer, temperature gauge is allowed.

4. Cylinder head gasket surface may be milled.

Check Bore: 2.682" maximum.

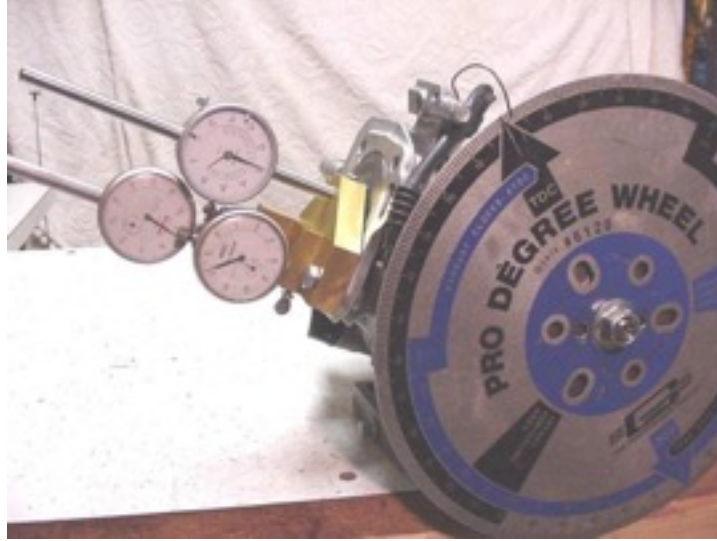
NOTE: All measurements taken from the top to the bottom of the bore, preferred method of measurement is dial bore gauge, dial calipers may be used. Take out of service with no DQ or suspension.

“Wear Limits/Parts Out Of Service” USAC reserves the right to confiscate 160 Honda engine parts deemed illegal or at USAC maximum wear limits. EXAMPLE: Cylinder Bore will be 2.682 Max. All measurements taken from the top to the bottom of the bore parallel to crank, 90 degrees from crank. Any cylinder block that has one measurement over USAC maximum wear limits will be taken out of service. If no measurements exceed USAC maximum wear limits the part of block will not be confiscated. Handler has the right to have confiscated parts returned to them but will be rendered unusable

Check stroke: 1.778 maximum to 1.758" minimum

1. Measure amount that piston is up or down from block surface at T.D.C. This will be measured at the edge of piston top and bottom, and side to side. When measuring top and bottom of piston take an average of the numbers measured. i.e. top = .003, bottom = -.003 the piston to deck would be .000. Measurement must NOT be taken in the center or relieved part of the piston. The dimension will be .000" Max.
2. NO PISTON POP UP!! Carbon may be removed to check piston pop up.

Install degree wheel on flywheel. Install pointer in order to read degrees. Locate accurate T.D.C. This should be done with a positive stop type fixture and not established with indicator alone.



3. Cam will be checked with indicator reading off the top end of tappets which will provide zero clearance. The inverted radius of the top of the tappet presents some problem to get accurate readings and to prevent binding of indicator stem. Indicator holder and pistons are very critical in this operation.
4. Zero indicator on base circle of cam. Be sure that compression release does not affect zeroing exhaust indicator. Zero dial indicator after exhaust bump (0.050) ref.
5. Turning engine in normal rotation, clockwise facing flywheel, take reading at specified opening. Readings must fall between specified degrees on the following chart.

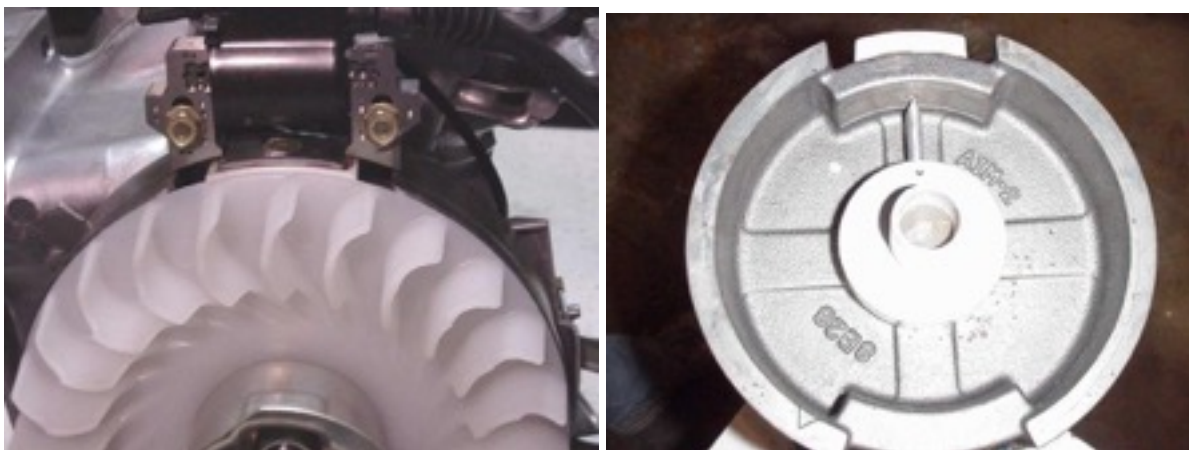
CAMSHAFT PROFILE LIMITS

CAMSHAFT PROFILE INFORMATION							
INTAKE DEGREES				EXHAUST DEGREES			
0.050"	4 - 8	ATD		0.050"	208 - 212	BTD	
0.100"	22 - 27	ATD		0.100"	191 - 195	BTD	
0.150"	42 - 46.5	ATD		0.150"	172 - 176	BTD	
0.200"	71 - 75	ATD		0.200"	144 - 149	BTD	
MAX LIFT	0.227"			MAX LIFT	0.229"		
0.200"	144 - 147	ATD		0.200"	69 - 74	BTD	
0.150"	172 - 175.5	ATD		0.150"	41.5 - 45	BTD	
0.100"	192.5 - 195.5	ATD		0.100"	22 - 25	BTD	
0.050"	210.5 - 214	ATD		0.050"	4.5 - 8.5	BTD	

Check max lift at intake and exhaust.

FLYWHEEL, FAN AND IGNITION SYSTEM

Caution should be used when removing flywheel. Do not hit with hammer or other heavy objects. Service manual show flywheel to be removed with commercially available 6" puller. Another method is inertia type knocker that threads onto crankshaft end.



1. 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, rotate the engine in a clockwise direction and with a timing light check the ignition timing.

Honda 160 UT2 -

Rotation speed between 1200 - 2000 RPM

Max. timing = 20 degrees

Flywheel key = Offset and or modified is allowed.

Coil leg to flywheel gap = .035" Max.

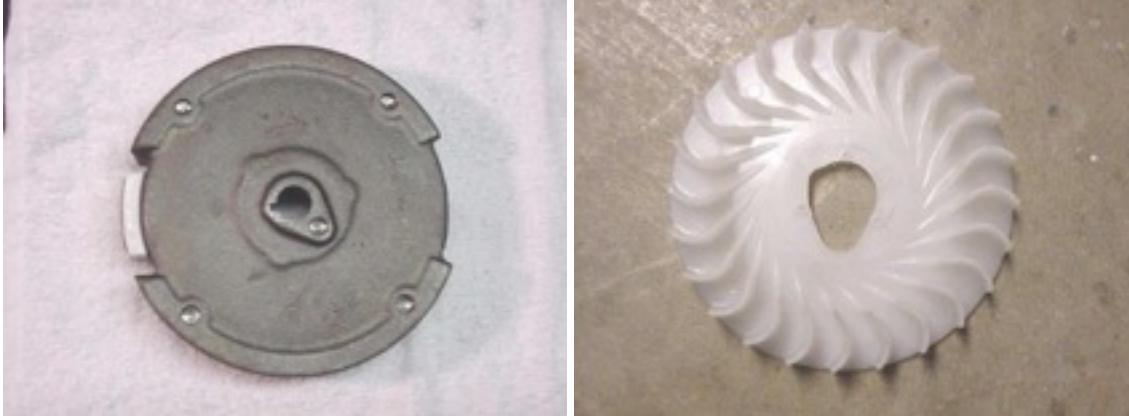
Penalty for going over 20 degrees BTDC is a race day DQ only with loss of all point for that particular class.

2. You may use any key on Flywheel to reach maximum timing of 20 degrees.
3. Magnet and/or its position cannot be altered in any way.
4. Magnet retaining screw may not be altered in any way. Screw may not be replaced with larger or smaller screw. No heli-coiling of mounting hole.
5. Ignition coil and/or its position, may not be altered in any way. The air gap on the coil is a tech item with a max gap dimension, see (d) below.
 - a. Coil mounting bolts must be stock and cannot be altered in any way to advance or retard timing. Coil attaching bolts will be stock 6mm cap screw 1-1/16" long.
 - b. There can be no more than 3/8" of unthreaded portion of bolt that does not measure 0.230" diameter. This restricts movement of coil to a position that could make ignition timing illegal.
 - c. If a coil support mount becomes stripped, it is permissible to heli-coil. However, only one leg may be repaired, if both legs are heli-coiled, the crankcase becomes illegal.



- d. Max air gap 0.035" - this can be accomplished with a set of feeler gauges. The gauge can't pass under the full length of each leg of the coil and the flywheel OD.
5. All nylon blades on the cooling fan must be intact. Race day DQ for any missing blades.
 6. No metal may be added or removed from the flywheel.
 7. Flywheel weight will be:
2300 grams minimum
 8. Flywheel diameter- magnet area:
6.285
 9. A stock Honda spark plug cap, (wire end at resistor), must be used.
 10. Any **unaltered automotive type spark plug & unaltered spark plug washer may be used.**
 11. No plug indexing washers allowed.
 12. If temperature sensor is used under spark plug, factory washer may be removed.

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. Coil attaching bolts will be stock 6mm cap screw 1-1/16" long. There can be no more than 3/8" of unthreaded portion of bolt that does not measure 0.230" diameter. This restricts movement of coil to a position that could make ignition timing illegal. If a coil support mount becomes stripped, it is permissible to heli-coil. However, only one leg may be repaired, if both legs are heli-coiled, the crankcase becomes illegal.



- E. No metal may be added or removed from the flywheel.
 - a. Flywheel weight will be: 2300 grams min
- F. A stock Honda spark plug cap, (wire end and resistor), must be used.
- G. Any automotive type spark plug with 3/4" reach maximum is allowed. Tapered seat plugs are not allowed. Race DQ only.
- H. No plug-indexing washers allowed.
- I. If temperature sensor is used under spark plug, factory washer must be removed.

GEAR BOX AND RING GEAR

- A. Gear box may not be altered in any way. May be rotated to desired position.
- B. Ring gear may not be altered in any way with the exception of the keyed end of shaft that may be shortened, drilled and taped or machined for snap ring groove. No other machining, drilling, grinding etc. to ring gear. Keyway may be cut deeper.
- C. Ring gear may not be altered in any way including polishing or use of any compound or abrasive on gear shaft where bearings ride.
- D. Two gaskets maximum between gear box halves.



CRANKCASE COVER

Remove crankcase cover.

- A.** Cover must be “as cast” and in factory machined condition and there must be no addition or subtraction of metal or any other substance to crankcase cover.
- B.** Crankcase cover gasket must be stock Honda. Only one gasket may be installed with a maximum thickness of 0.025”

Critical dimensions are - thrust face of camshaft holder and position of crank bearing. Place a straight edge over crank bearing and cam boss thrust face. These surfaces should be level. Maximum tolerance will be + 0.005”. There will be no alterations to crankcase cover. This includes any alteration to crank bearing and camshaft holder position and height in an attempt to alter valve timing.

PISTON - WRIST AND PISTON RINGS

Remove rod and piston – dot on top of piston must point toward push rods - piston, wrist pin and rings must be absolutely stock and not altered in any manner.

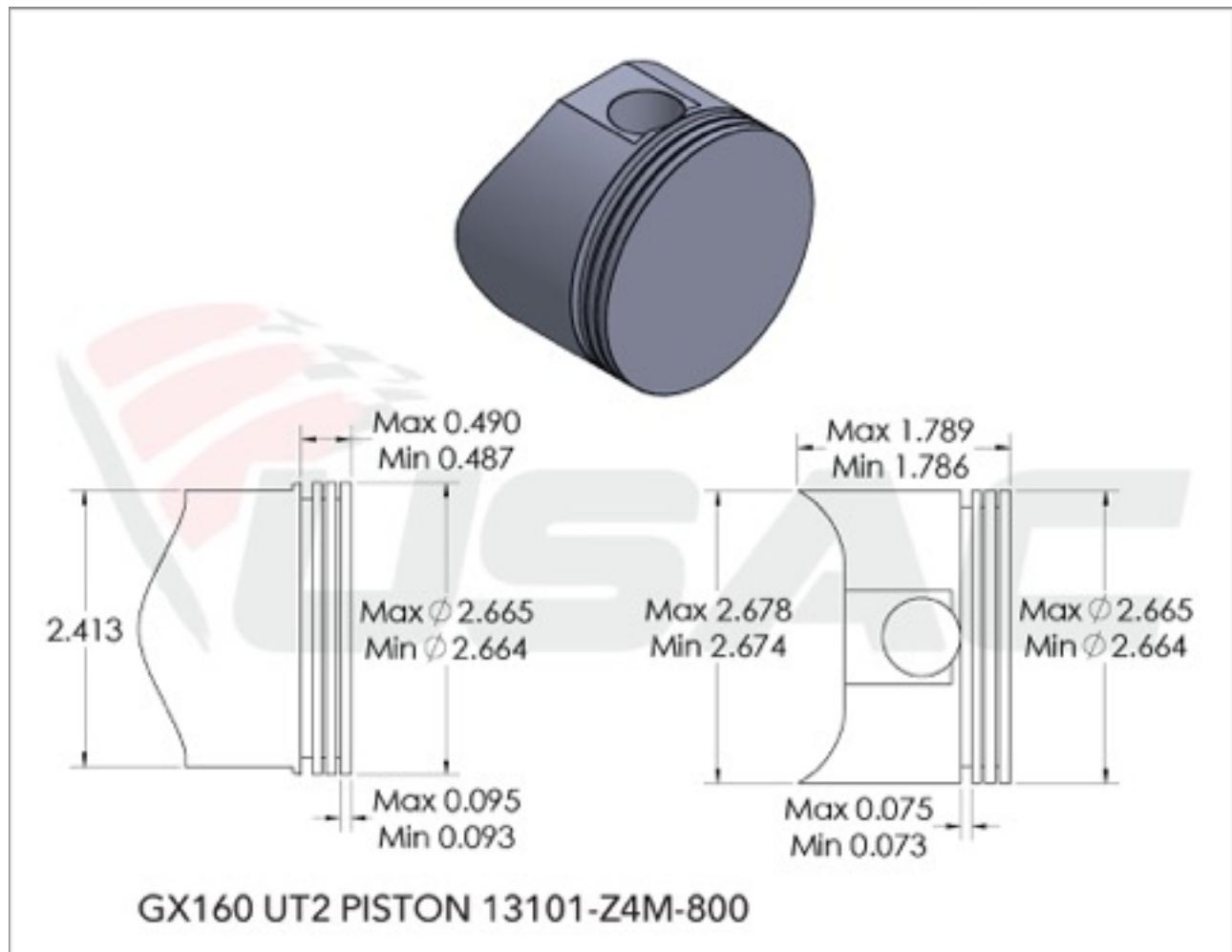


PISTON NOTES

Piston will be stock Honda standard size and will not be altered in any way.

1. Oversized pistons must not be used.
2. All three piston rings must be used and installed properly.
 - c. Top ring: Chrome compression ring installed with 1 R on rail up. No expander under ring.
 - d. Middle ring: Oil scraper ring installed with R on rail up. No expander under ring.
 - e. Bottom ring: Check oil ring expander for alterations that will alter ring tension (cutting ends of expander ect.)
3. Piston may not be knurled, grooved or coated
4. Total Piston weight: With rings, pin, and clips 195 grams minimum
5. Minimum total combined weight: 337 Grams = (Piston, rings, complete rod w/ bolts wrist pins & retainers.)

See drawing for dimensions



RINGS

1. Must be stock Honda rings with stock size and configuration.
2. No decreasing of ring tension by heating, machining or any other means.
3. Ring thickness GX 160 UT2
 - a. Compression: 0.036" min.
 - b. Scraper: 0.036" min.
 - c.
 - d. Oil Ring: 3 piece oil ring = 0.076 min.

WRIST PIN

Stock Honda wrist pin and retainer.



OD: Minimum	0.708" Maximum 0.709"
Length: Minimum	2.120" Maximum 2.128"
ID:	0.556" ref +/-
Weight:	40 grams minimum

CONNECTING ROD

Stock Honda rod with no alterations

1. Connecting rod big end size: 1.176 " minimum - 1.184" maximum
2. Pin end bore is: .710" ref.
3. Length from bottom of pin bore to top of big end bore will be:
2.441" maximum 2.441" minimum
4. Rod weight with bolts: 140 grams
5. No oil grooves on bearing surface of either end.

CRANKSHAFT

Stock Honda crankshaft with no alterations.

Notes:

1. No removal or addition of any metal from or to the crankshaft is allowed.
2. No balancing of the crank is allowed.
3. No oil grooving is allowed on the crank journal.
4. Governor drive gear cannot be removed.
5. Crankshaft drive gear should not be removed. This gear is installed by Honda to any accuracy of $\pm 1/2$ degree. If this gear is not installed to this degree of accuracy, engine may not be legal when camshaft is checked by the procedure under engine block.
6. Keyway location must not be altered in any manner.

Measure thrust to crank gear side = .

Factory heat treating markings must be present on gearbox end of crankshaft and must be evident on all non –contact areas . The only cleaning method allowed is on the flywheel side of crankshaft for the purpose of removing calcium, rust etc. from the exposed end of the crankshaft. This is permitted only from the seal groove out to the end of the thread of the crankshaft where the flywheel bolts on. Only a wire wheel may be used in the cleaning process. The use of Scotchbrite, sandpaper or any other compounds or abrasives is illegal. No material may be added or removed from crankshaft. Crankshaft main journal at flywheel and gearbox ends may not be altered in any way. Thailand crankshafts have no heat treat marks.

CAMSHAFT

Camshaft must be stock Honda with not alteration of any kind.

1. There will be no additions to or subtractions from any part of the camshaft.
2. Compression release will remain intact and unaltered.
3. Lobe center angle will not be altered by any means.
4. Lobe profile will not be altered in any way.



CAMSHAFT SPECIFICATIONS

INTAKE EXHAUST

Heel to Heel .865" - .869" Heel to Heel .866" - .870"

Heel to Peak 1.079" - 1.093" Heel to Peak 1.081" - 1.095"

Length - thrust flange to thrust flange:

3.135" minimum

3.142" maximum

Cam bearings are .547”-.551” and unaltered (Under .547 minimum to be taken out of service no DQ)

TAPPETS

1. Tappets must be stock Honda with no alterations.

2. Basediameter:

.910” minimum no maxspec

3. Stem diameter:

.312” minimum

4. Base thickness:

.073” minimum .090” maximum

5. Length:

1.180” minimum 1.220” maximum

6. Weight:

16 grams minimum

ENGINE BLOCK INTERNAL

The engine block must be in an “as cast” and factory machined condition and there must be no addition or subtraction of metal or any other substance to the inside or outside of the block except for cylinder head gasket surface may be milled to achieve 0.00 piston pop up.

A. Cylinder bore will be 2.682” maximum.

NOTE: All measurements taken from the top to bottom of the bore, preferred method of measurement is dial bore gauge, dial calipers may be used. Take out of service with no DQ or suspension.

“Wear Limits/Parts Out Of Service” USAC reserves the right to confiscate 160 Honda engine parts deemed illegal or at USAC maximum wear limits. EXAMPLE: Cylinder Bore will be 2.682 Max. All measurements taken from the top to the bottom of the bore parallel to crank, 90 degrees from crank. Any cylinder block that has one measurement over USAC maximum wear limits will be taken out of service. If no measurements exceed USAC maximum wear limits the part of block will not be

confiscated. Handler has the right to have confiscated parts returned to them but will be rendered unusable. Handler has the right to have confiscated parts returned to them but will be rendered unusable.

1. Cylinder bore will not be bored oversize.
2. Cylinder bore will not be re-sleeved.
3. Cylinder bore position will not be moved or tipped in any manner.
4. There will be no polishing, sandblasting, or glass beading to any interior surface.
5. Machined surface of block down to thrust face of cam boss:
3.220" minimum 3.235" maximum
6. Machined surface of block down to bearing face:
3.416" minimum 3.435" maximum

Tech officials have the right to tech any or all cars in any class at their discretion.

Parts in question that need further review, must be sealed and boxed up at the track in front of the handler. The handler and tech director must also sign a slip indicating that they both acknowledge the part is in question. The part must then be shipped to the USAC National office at 4910 West 16th Street, Speedway, IN, 46224.

No.	S i z e of Drill
1	.2280
2	.2210
3	.2130
4	.2090
5	.2055
6	.2040
7	.2010
8	.1990
9	.1960
10	.1935
11	.1910
12	.1890
13	.1850
14	.1820
15	.1800
16	.1770
17	.1730
18	.1695
19	.1660
20	.1610

No.	S i z e of Drill
21	.1590
22	.1570
23	.1540
24	.1520
25	.1495
26	.1470
27	.1440
28	.1405
29	.1360
30	.1285
31	.1200
32	.1160
33	.1130
34	.1110
35	.1100

36	.1065
37	.1040
38	.1015
39	.0995
40	.0980

No.	Size of Drill
41	.1065
42	.1040
43	.1015
44	.0995
45	.0980
46	.0960
47	.0940
48	.0920
49	.0900
50	.0880
51	.0860
52	.0840
53	.0820
54	.0800
55	.0780
56	.0760
57	.0740
58	.0720
59	.0700
60	.0680

No.	Size of Drill
61	.0390
62	.0380
63	.0370
64	.0360
65	.0350
66	.0330
67	.0320
68	.0310
69	.0292
70	.0280
71	.0260
72	.0250

73	.0240
74	.0225
75	.0210
76	.0200
77	.0180
78	.0160
79	.0145
80	.0135

Decimal Equivalents of Number Size Drills