HONDA 120 UT3 TECHNICAL MANUAL

USAC NATIONAL TECH COMITTEE

TECHNICAL DIRECTOR: D. GROSS

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HONDA GX120 UT3
– Tech Manual -
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FROM 2019 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., light & Heavy. 120-160, Animal or World Formula only. Competitors in the same division, and in the same race may make a protest on an engine. Protesting will not be permitted in the Rookie Classes. Handlers may not protest more than one car per event and may not protest the same driver more than once per calendar year.

2. Honda Engines, World Formula, and Animal Engines may be protested for $400.00
cash only plus any applicable shipping charges if necessary.
Protested related inspection will not 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 an engine must have their engine inspected for compliance first. If the "protester's" engine is fails inspection the protest is null and void and the protest fee will go to the club. If the "protester's" engine passes the protest will continue.

6. The Chief Steward, his/her designee, will hold the protest money until the protested engine has been inspected. 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 protesting party shall be immediately taken to impound and/or presented to the Technical Director for inspection. The engine must remain in impound and in the possession of tech officials throughout the entire process, including shipping to USAC Head-

quarters or designated tech inspection station and the transferring of funds.

8. Both the protester and the protested party 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 Any protest that is withdrawn will be assessed a $50.00 fee that will be paid to the host club.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 fails inspection, the engine must be completely disassembled to inspect for additional violations. The Technical Director must confiscate all failed and related parts from the protested engine and immediately forward them to the USAC Headquarters. If a protested engine fails inspection, the protest money minus $50 plus any shipping cost will be returned to the person filing the protest.
11. The refusal of a protest, destroying or withholding of parts or any other lack of cooperation in a protest or inspection process shall be interpreted as an admission that the engine will not pass inspection and shall subject the driver and handler to the conditions set forth in the Suspensions Program.
12. Any inspected or protested engine, block or part which are over the maximum wear limits in one or more spots but is under maximum wear limits in other spots is subject to confiscation.
13. Note: Reference to Confiscation due to Wear Limits in "Engine Block Internal Rules" of both Manuals.
14. If the protested engine passes inspection the $400 protest fee will be given to the person whose engine was protested.

732 Engine Suspension Penalties

Handlers and/or drivers who's engines fail to pass engine technical inspections may be subject to penalties as follows:

1. First offense – up to a 30-day and/or a 4 race suspension for the handler and the driver from participating in the respective class at any USAC Sanctioned event.
2. Second offense within one year of the first infraction – up to a one year suspension for the handler and the driver from participating in the respective class at any USAC Sanctioned event.
3. Third offense within two years of prior infraction – Indefinite Suspension from USAC's .25 Midget division.
4. Indefinite Suspension is open to review by USAC.
5. Suspension shall begin immediately.
6. **The part(s) that failed inspection used in Honda, Animal and World Formula** shall be sent within five Business days to the USAC office or designee for review. The Technical Director has 48 hours to determine if the part(s) pass or fail inspection. If the part(s) are within specifications the

part(s) shall be returned to handler. The handler shall be notified if part(s) pass or fail inspection. Any part(s) that fail inspection or confiscated part(s) shall be sent to the USAC National Tech Director.

7. If a **Honda** engine is found to have a valve oil seal during inspection it shall be a race disqualification only.
8. Spark plugs, exhaust & ignition timing infractions are a race disqualification only.
9. Failure to go to inspection and/or impound will result in a race day disqualification . Refusal of technical inspection will be interpreted as an admission that the engine is outside of USAC's specifications and a suspension from the class shall be immediate with all awards and qualifications being revoked with a six- month suspension levied to the driver and the handler of 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 Technical Director within 5 Business Days.
12. Rookie Class engine parts that fail inspection 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.

The USAC Honda 120 UT3 Technical Manual outlines modifications and procedures that are permitted. Modifications and procedures beyond this manual should not be made or used without first contacting USAC for approval.

GENERAL RULES

1. **The Honda GX 120 UT3 Engine is approved for USAC competition.**
2. The factory supplied Honda GX120 HX 2 engine and gearbox combination must be used. All parts must be factory supplied Honda parts, specifically made for the Honda GX120UT3 unless otherwise specified. Honda factory supplied 120 replacement blocks may be used. Aftermarket blocks or components will not be permitted.
3. All factory supplied Honda parts must be used and properly installed with the following exceptions:
   a. The 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 the shaft is removed the hole must be plugged. The hole can be tapped for thread

or the use of epoxy is acceptable. Welding will not be permitted.

b. The 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 the carburetor only without an 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 not any devices inside the air filter or adapter. The hose from valve cover must go into a catch can. (* “Outer Wear” defines a style not brand name).

4. The use of air filters during qualifying at asphalt events is not permitted. USAC Officials reserve the right to allow filters at any event that it may be necessary.

5. Any type of throttle linkage may be utilized. The carburetor must be unaltered with the exception of the black plastic piece on the upper end of the throttle shaft. This is the ONLY part of the carburetor that may be altered. Removal of material from the black plastic piece is allowed. Additional material must not be added to the carburetor.(i.e. bolt in black plastic piece or tubing on throttle stop).

6. The factory supplied Honda fuel tank must be removed.

7. The recoil starter must be removed. The pull cup may be cut down and used as a washer , however the original cup must be used.

8. Exhaust:

a. The factory supplied Honda muffler must be removed. The mounting flange may be cut off of the muffler and used as an adapter flange. Any transition from the “D” shape of the exhaust port to round must take place within the thickness of the flange (0.250 maximum thickness). This applies to all exhaust systems. No steps or tapers allowed. Grinding marks are allowed past the 0.250” flange thickness If an after- market flange is used, the maximum allowable flange thickness will be 0.250”. If a slip on type flange assembly is used, pipe stub may be a maximum 0.880 “ outside diameter tubing with a maximum overall length of 1.500”. The pipe stub must be inserted into exhaust pipe at least 0.750” and seal for minimal exhaust leakage. . Infractions that involve the exhaust pipe flange or pipe will result in disqualification.

b. All USAC .25 midget mufflers must be 4 to 8 hp Briggs & Stratton, part number 294599 or equal equivalent. The muffler must not be internally altered except that the round cup shaped baffle may be welded to the perforated baffle without altering the original location. Drilling holes in the baffles will not be permitted. Inside seam of baffle must be straight edged. (NOTE: Some seams may not be straight). Threads must not be removed from the muffler. The welding of a washer or nut on the flange for installing safety wire and/or spring is permitted. Muffler must not be more than (1) one turn from being tight.

c. The exhaust pipe must not exceed a maximum of 1.000” outside diameter with a length of 20.0” to 26.0” including a the threaded pipe coupler that is welded to the end of the pipe in order to attach the muffler to the pipe and

provide removal of the muffler for inspection. The pipe coupler must be a ¾" NPT, threaded coupler with a length of 1.000" minimum to 2.250" maximum. Exhaust pipe length will be measured by using a small diameter hose inserted though pipe to measure overall length. Flange and coupler will be included in the overall length when measuring pipe. Coatings of any type must not 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 and exit at the muffler(s) end. All measurements will be taken with the component pieces in the same position as they were installed and on the car.

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

9. The choke butterfly and shaft must be removed. The vacant holes from the choke shaft may be filled and sealed with silicone sealer. The addition or subtraction of material in the bore or venturi of the carburetor will not be permitted.

10. The oil level switch may be disconnected but switch assembly must remain intact in crankcase.

11. The gearbox may be rotated to any desired position.

12. The On-Off ignition switch may be removed. The vacant hole may be covered, but not welded closed.

13. All pin measuring gauges are plus tolerance. Use Class ZZ pin +0.0002

14. Exhaust oxygen sensor(s) or temperature sensor(s) attached to any part of Honda exhaust system will not be permitted

15. Valve seals are not permitted.

16. Procedures that affect the molecular structure of metal of any Honda parts such as Cryogenics will not be permitted.

17. Taking parts out of service - Reference: Wear limits in Engine Block Internal section.

18. Infractions involving Air filter adapter, Exhaust, Spark plug and Ignition timing will result in disqualification only. In most cases additional penalties will not be accessed.

19. The Honda shroud may be red or black.

20. Honda gaskets for the intake, carburetor, side cover that are green on one side and tan on the other and blue on both sides will be permitted.

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

TECH PROCEDURE

Modifications or machining of any parts except the gasket surface of the block and main jet hole size in order to size them to the specified minimum or maximum specification (blueprinting) will not be permitted.

PROCEDURE FOR CHECKING IGNITION TIMING

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 120 UT3

Rotation speed between 1200 - 2000 RPM

The maximum ignition timing that will be permitted is 17 degrees.

Flywheel key: Offset and or modified key is allowed. The coil leg to flywheel gap: . 035" Max.

Basic Inspection

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

2. 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 device(s) used inside the air filter or adapter. The hose from the valve cover must go into a catch can.

3. The use of air filters during qualifying at asphalt and dirt events will not be permitted.

4. Any type of throttle linkage may be utilized. The carburetor must be unaltered with the exception of the black plastic piece on the upper end of the throttle shaft. This is the ONLY part of the carburetor that may be altered. Removal of material from the black plastic piece is allowed. Additional material must not be added to the carburetor.(i.e. bolt in black plastic piece or tubing on throttle stop).

5. The main jet size is optional and is not inspected.

6. The rear mounting brackets for the Honda fuel tank may be removed.

7. 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.

8. They keyed end of the ring gear shaft may be shortened, drilled and tapped or machined for snap ring.

9. Thread repair 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.

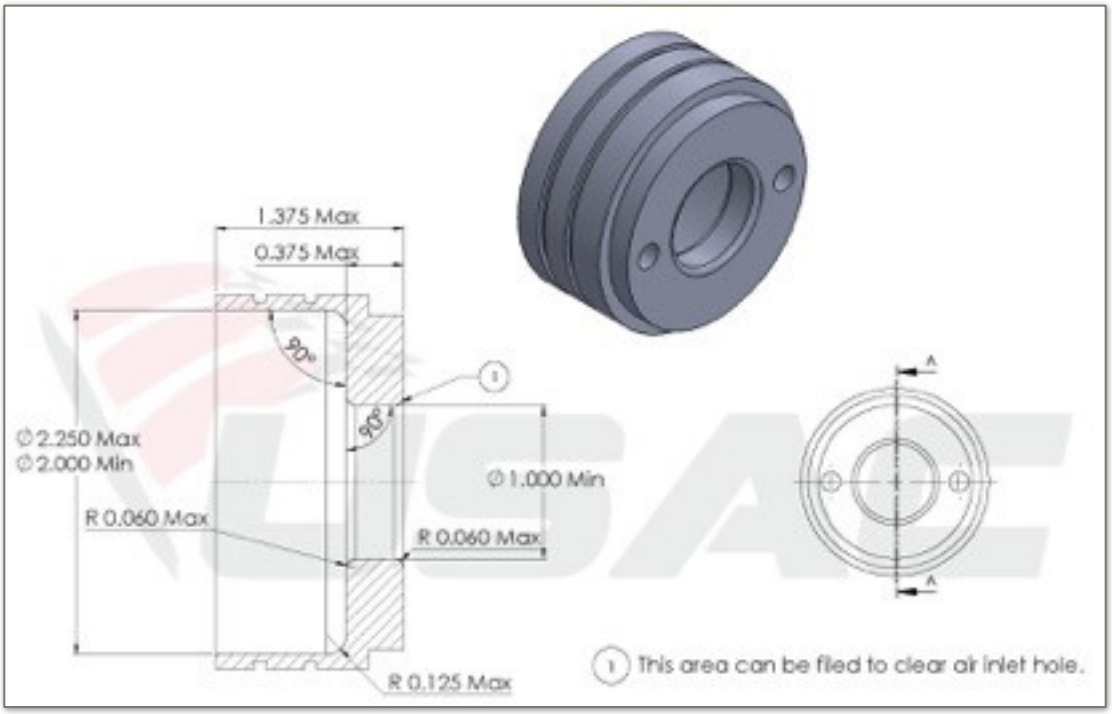
10. Honing and deglazing of the cylinder bore is allowed.

11. Lapping of the valves is allowed.

12. Blocking air flow: Device(s) must not be used that impede or appear to impede the air flow into the engine cooling system. This may require that the engine be run at a speed above idle by the USAC officials at the scale after the car has qualified or raced for verification of air flow.

<u>The HONDA 120 carburetor insulator must be used</u>

<u>USAC approved air filter adapter</u>



Remove Carburetor:

Air filter adapter:

a. ID: 2.250” maximum
b. Length: 1.375” maximum
c. Flange thickness: 0.375” maximum
d. Flange ID: 1.000” minimum
e. ID hole size straight walled, flat bottomed and parallel with carburetor using existing air cleaner mount holes.
f. Carburetor adapters with machined spacers or bosses are permitted.
g. Carburetor adapters must meet the 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.

Restrictor Plates

Red Rookie (Honda) - Red plate with single hole .3125” maximum

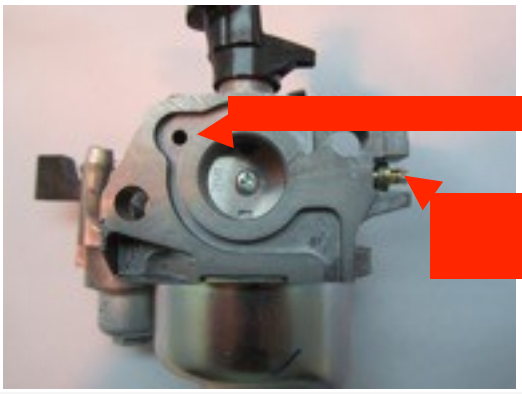
Blue Rookie (Honda) - Blue plate with single hole .4375” maximum

Jr. Honda (Honda) - Blue plate with single hole .4375” maximum

The use of approved USAC restrictor plates is recommended. Red and Blue QMA restrictor plates will be permitted. All blue restrictor plates must be dated 03/09 or newer.

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

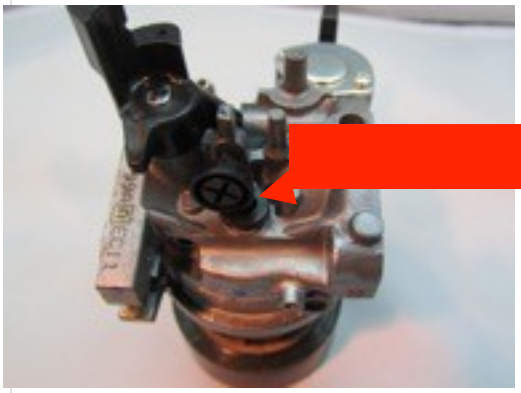
The hole at the end of the arrow is the **Main Air Jet** hole and will be checked using a pin type no-go gauge.



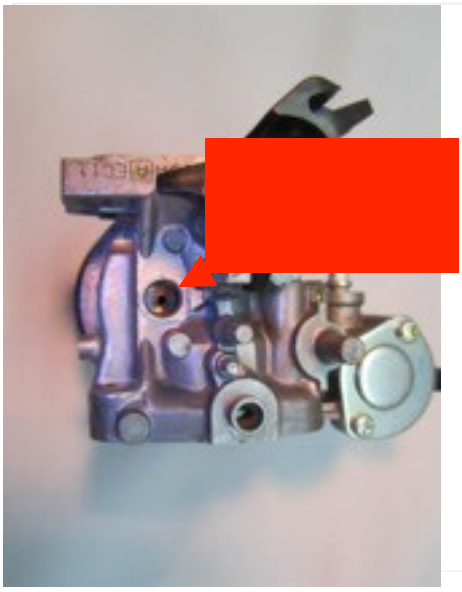
Float Bowl

Pilot Screw- Check

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.

GX 120 MAIN NOZZLE

GX 160 UT1 MAIN NOZZLE

GX 160 UT2 MAIN NOZZLE

1. Check for the restrictor, and installation. The restrictor must be installed between carburetor and carburetor insulator with factory Honda gasket(s) on each side of restrictor. Only the factory Honda insulator gasket between the black plastic insulator and the cylinder head is permitted. The gasket thickness is: 0.025" maximum. The air passageway in the insulator must not be altered in any way. All Junior Honda's must use the blue USAC approved slotted restrictor plate or the blue QMA restrictor plate. Restrictor plates must be dated 03/09 or newer. Failure to use proper restrictor plate, alteration of restrictor plate, or improper installation of plate in a designated class will result in disqualification and/or applicable suspensions.
   a. Restrictor - Jr. Honda - Blue Plate -Hole .4375" maximum
2. Restrictor thickness: 0.0625" maximum.
3. Insulator gasket thickness: 0.025" maximum
4. Check for any alterations or worn parts that would allow additional air into engine: holes, slots, perforations, spacers, loose bolts, warped flanges, etc.
5. (2) Two stock Honda intake gaskets may be used between the carburetor and the plastic insulator.
6. Carburetor identification number:
   a. Jr. Honda and Sr. Honda: The Honda model 99L is the only carburetor that will be permitted for use on the Honda 120 UT3 engine.
   b. Heavy Honda: Honda carburetor models BE65B, BE65Q and BE54D -with main nozzle 16166-ZH8-W50 are permitted for use on the Honda 120 UT3 engine.
8. Inspect carburetor for alterations. The choke shaft holes may be sealed with silicone type sealer.

9. **<u>Honda 120 UT3 carburetor for Jr. and Sr. Honda classes</u>**

IT IS RECCOMENDED THAT THE HONDA UT2 MAIN NOZZLE BE USED IN THE UT3 CARBURETOR. Honda Part #16166-ZK7-S91 and #16166-ZH7-W50 will be permitted.

   a. The carburetor bore: intake end: Maximum diameter 0.951" Ref.
   b. The carburetor bore: throttle end: Maximum diameter 0.632".
   c. The carburetor venturi bore: 0.456" no go. This measurement is best made with a no go gauge but may be measured using a telescoping gauge as a no go.
   d. Only a Honda OEM main jet will be permitted. (Brass or Silver Jet) The jet may be drilled to any size. Additional modifications will not be permitted.
   e. The main jet specification refers to the main jet primary small center hole only. Other main jet modifications will not be permitted. Main jets will be compared to an OEM factory main 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.

f. The main air jet: 0.060" no go. Measured at the back of hole.

g. The Main jet access passage: 0.098" no go.

h. The main nozzle bore: 0.070" no go.

i. The main nozzle: 0.429 no go. The main nozzle will be checked with a no go gauge 0.429" maximum The no go gauge must not go over the main nozzle. This is best measured using a 0.452" rod type gauge with a 0.429" flat area machined into it to be used as a no go gauge.

j. The air vent holes on the side of the main nozzle must not be plugged.

k The main nozzle must not be fastened into the carburetor body by anything other than the main jet. It must not be installed by any other methods.

l. The pilot jet: 0.0150" no go.

m. The pilot air jet: 0.051" no go.

n. The pilot screw: no specification

o. The pilot seat diameter: 0.038" no go

p. The tip of the pilot screw: 0.013" minimum.

q. The float bowl vent: 0.120" no go.

r. The needle valve seat: 0.067" no go.

s. The butterfly screw, the butterfly, and the throttle shaft must not be removed from the carburetor. Any evidence of tampering will not be permitted.

Honda 160 carburetor for Heavy Honda

The Honda 120 part number 16211-ZE0-000 Insulator must be used for the Heavy Honda class. This is the standard GX-120UT3 Insulator. Modifications will not be permitted.

a. BE65B, BE65Q and BE54D -main nozzle 16166-ZH8-W50 may be used

b. The carburetor bore: Intake end: maximum diameter 0.951" ref.

c. The carburetor bore: Throttle end: maximum diameter 0.710.

d. The 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.

e. Only a Honda OEM main jet must be used. (Brass or Silver) main jets may be drilled to any size.

f. The main jet specification refers to the main jet primary small center hole only. Other main jet modifications will not be permitted. Main jets will be compared to an OEM factory main jet. Counter boring and/or cham-

fering of the larger holes of the jet on both the front and back sides of jet are not allowed.

g. The main air jet: 0.059" no go, Measured at back of hole.

h. The main jet access passage: 0.096" no go.

i. The main nozzle bore: 0.078" no go.

j. The main nozzle: 0.429 no go. The main nozzle will be checked with a no go gauge 0.429" maximum The no go gauge must not go over the main nozzle. This is best measured using a 0.452" rod type gauge with a 0.429" flat area machined into it to be used as a no go gauge.

k. The air vent holes on the side of the main nozzle must not be plugged.

l. The main nozzle must not be fastened into the carburetor body by anything other than the main jet. It must not be installed by any other methods.

m. The pilot jet: 0.0145" no go.

n. The pilot air jet: 0.052" no go.

o. The pilot screw: no specification

p. The pilot seat diameter: 0.039" no go

q. The tip of the pilot screw: 0.020" minimum.

r. The float bowl vent: 0.120" no go.

s. The needle valve seat: 0.120" no go.

t. The butterfly screw, the butterfly, and the throttle shaft must not be removed from the carburetor. Any evidence of tampering will not be permitted.

Engine Cooling Shrouds

1. The Honda factory supplied engine cooling shroud must be used as produced and properly installed.

2. Addition or subtraction of any material to or from the shrouding except for the covering of the switch hole (any material) will not be permitted. The starter cup may be altered to be used as washer / retainer for the cooling fan.

3. Remove engine cooling shrouds.

Camshaft Lift Inspection

1. Remove valve cover.
2. Mount a suitable dial indicator to the engine.
3. Zero dial indicator after exhaust bump. (0.050) ref.

4. The maximum valve lift will be checked from the top of valve spring retainer. The valves may be adjusted to zero clearance or shims may be installed to create zero clearance. This may require the use of special shims, as it is difficult to insert feeler gauge blades that will not to interfere with indicator contacts on retainer.

5. Valve lift:

   Intake: 0.245” maximum

   Exhaust: 0.255” maximum

Camshaft Profile Inspection

1. 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.
2. Cam can be checked with indicator reading off the top end of tappets or end of top end of pushrod 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 positions are very critical in this operation.
3. Zero indicator on base circle of cam. Be sure that compression does not affect zeroing exhaust indicator. (zero dial indicator after exhaust bump) ref.
4. Turning engine in normal rotation, clockwise facing flywheel, take reading at specified opening. Readings must fall between specified degrees on the following chart.
5. Check max lift at intake and exhaust.

CAMSHAFT PROFILE INFORMATION

INTAKE DEGREES				EXHAUST DEGREES			
0.050”	10.5 – 14.5	ATDC		0.050”	206 – 210.5	BTDC	
0.100”	26.5 – 30.5	ATDC		0.100”	189 – 193.5	BTDC	
0.150”	45 – 49.5	ATDC		0.150”	170 – 174.5	BTDC	
0.200”	71 - 76	ATDC		0.200”	144 - 148	BTDC	
MAX LIFT	0.227”			MAX LIFT	0.229”		
0.200”	135 - 141	ATDC		0.200”	70.5 – 74.5	BTDC	
0.150”	162 - 167	ATDC		0.150”	44 – 48.5	BTDC	
0.100”	180 - 185	ATDC		0.100”	25.5 – 29.5	BTDC	

0.050”	**197 - 201**	**ATDC**		**0.050”**	**8.5 – 12.5**	**BTDC**	

CYLINDER HEAD, HEAD GASKET, VALVES, SPRING RETAINERS, SPRINGS, ROCKER ARMS, and STUDS.

Thailand TKI and ATA series cylinder head are the ONLY approved cylinder heads for use on the Honda GX-120UT3 engine for USAC competition. The use of any other cylinder head is not permitted.

1. Remove the cylinder head.
2. The head gasket thickness: 0.008” minimum thickness of inner rim,(steel shim style only).
3. The Honda factory supplied cylinder head must not be modified. The cylinder head casting and all machining must be exactly as produced by Honda. The addition of or removal of any material will not be permitted.
4. Any attempts to increase airflow by machining, grinding, chemically treating, or any other method will not be permitted. Modifications that change valve location, will not be permitted. The cylinder head must be used as produced by Honda.
5. Cleaning, (abrasive blasting), procedures that modify the factory finish of the external casting, combustion chamber, or the gasket sealing surfaces, will not be permitted.
6. The minimum cylinder head thickness is 2.938”. The thickness of the head will be measured from the valve cover surface to head gasket surface on the side, at a position in line with the upper intake and exhaust flange bolt.

Intake and Exhaust ports

1. The Honda factory supplied cylinder head ports, (intake and exhaust) must not be modified. The cylinder head casting and all machining must be exactly as produced by Honda. The addition of or removal of any material will not be permitted.
2. Modifications to the ports that are not permitted include, but are not limited to grinding, polishing, chemically etching, sand blasting and / or glass beading to interior surface.
3. The valve seats must be as produced with (1) one 45 degree angle. Compound angles on the valve seats will not be permitted. The valve seats must not be replaced.

Thailand TKI and ATA cylinder head measurements.

a. Measure from the head deck surface to valve cover surface. 2.938” MIN

b. Measure from head deck surface down to the top of the valve
Intake 0.200" Minimum 0.215" Maximum
Exhaust 0.180” Minimum 0.195” Maximum

c. Remove valves

d. Measure from head deck surface down to the top of the valve seat.
Intake & Exhaust 0.245” Minimum 0.260” Maximum

e. Measure from head deck surface to the top of the valve guide.
Intake and Exhaust 0.925” Maximum

f. Measure from head deck surface down to the lowest machined area of the bowl.
Intake 1.040” Maximum Exhaust 0.968” Maximum

g. Intake and Exhaust port diameter at the valve.
Intake 0.906” Minimum 0.916” Maximum
Exhaust 0.668” Minimum 0.678” Maximum

**IT IS RECOMMENDED THAT WHEN MEASURING THE DEPTH OF THE INTAKE & EXHAUST BOWL, THAT IT IS DONE AS CLOSE TO THE VALVE GUIDE AS POSSIBLE. ON THE INTAKE BOWL, MEASURE ON THE SIDE THAT THE INTAKE RUNNER ENTERS THE BOWL. ON THE EXHAUST SIDE, MEASURE THE SIDE THAT THE EXHAUST RUNNER EXITS THE BOWL.

Intake Valve

1. Inspect the valve for dimensions and weight.
2. The valve seating surface must be factory ground using (1) one single 45 degree angle. Compound angles will not be permitted. The valve must not be polished, lightened, or modified in any way.
3. Intake valve length 2.444” / 2.458”
4. Intake valve stem diameter .212” / .216”
5. Intake valve face diameter .978” / .986”
6. Intake valve weight 21 grams minimum

Exhaust Valve

7. Inspect the valve for dimensions and weight.

8. The valve seating surface must be factory ground using (1) one single 45 degree angle. Compound angles will not be permitted. The valves must not be polished, lightened, or modified in any way.

9. Exhaust valve length 2.461" / 2.475"

10. Exhaust valve stem diameter .212" / .216"

11. Exhaust valve face diameter .744" / .752"

12. Exhaust valve weight 16 grams minimum

Valve Spring Retainer

1. Inspect retainers for modifications. Both the intake and the exhaust valve spring retainers must be Honda factory supplied retainers without any modification.

Valve stem oil seals are not permitted and must not be used.

2. The use of a shim under the intake spring is permitted. - **.030" max thickness.**

3. The use of a shim under the exhaust spring is not permitted.

4. Measure retainers and compare to specifications:

a. The overall thickness of the valve spring retainer will be:

Intake: 0.230" minimum

Exhaust 0.230" minimum

b. The flange thickness of the valve spring retainer will be:

Intake: 0.100" maximum

Exhaust: 0.100" maximum

c. The measurement from the flat of the flange to the machined surface:

Intake: 0.148" minimum

Exhaust: 0.148" minimum

Valve springs

1. The Honda GX120 or GX140 valve springs will be permitted for use. The Honda springs must be used as supplied without any modification.

2.

GX 120 valve springs

a. Wire diameter: 0.071" maximum

b. The maximum outside diameter of spring: 0.790"

c. The total number of coils: 5.3

d. Spring pressure: 11 lbs maximum at 0.812"

e. The stacked length of the spring: 0.394" maximum

GX 140 valve springs

a. Wire diameter: 0.079" maximum

b. The maximum outside diameter of spring : 0.816" maximum

c. The total number of coils: 7

d. Spring pressure: 16 lbs. maximum at 0.812"

e. The stacked length of the spring: 0.524" maximum

Rocker arms, Push rods, Rocker arm studs

1. Honda factory supplied rocker arms must be used without any modification.

2. Honda factory supplied rocker arm studs must be without any modification. The studs, stud mounting, and mounting location must not be modified from the Honda factory location and angle. Thread repair of mounting holes will not be permitted.

3. Honda factory supplied UT3 aluminum push rods must be used without any modification. The push rod length will be: 4.790" max.

Inspect and Measure Crankshaft Stroke

Crankshaft stroke specification:

1.705" minimum

1.715" maximum

Inspect and Measure Piston to Cylinder Block Deck Clearance

Measure the amount that the piston is up or down from the block deck surface with the piston at top dead center (T.D.C.) This measurement will be measured from the Honda machined reference at the center of the piston to the cylinder block deck surface. The piston to deck surface dimension must not exceed 0.000" Carbon may be removed to facilitate this measurement.

Flywheel, Fan, Ignition System, Gear box, and Ring gear

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. The only flywheel permitted is the Honda 120UT3 version with a **green** magnet. The magnet and/or the magnet location and installation must not be modified in any way.

2. The magnet retaining screw must not be modified in any way. The mounting screw must not be replaced with larger or smaller screw. Thread repair of the magnet retaining screw hole is permitted on (1) one

mounting hole. Thread repair on both mounting holes is not permitted.

3. The ignition coil and/or the ignition coil location and installation must not be modified in any way. Measure the air gap between the flywheel and the coil. The air gap must not exceed 0.035"
   - **a.** Max air gap 0.035" - this can be accomplished with a set of feeler gauges.
   - **b.** The gauge can't pass under the full length of each leg of the coil and the flywheel OD.
4. Flywheel modifications are not permitted. All nylon blades on the cooling fan must be intact.
5. Flywheel weight must be:
   1630 grams minimum
6. Flywheel diameter – magnet area:
   6.285" minimum
7. A factory supplied Honda spark plug cap, (wire end at resistor), must be used.
8. Any commercially available spark plug is permitted.
9. Spark plug indexing washers are not permitted.
10. If a temperature sensor is used under spark plug, the factory washer may be removed.

GX-120UT3 FAN
GEAR BOX AND
RING GEAR

1. The Honda factory supplied gearbox must be used. Modifications to gearbox are not permitted. The gearbox may be rotated to desired position.
2. The ring gear must not be modified in any way with the exception of the keyed end of shaft that may be shortened, drilled and tapped or machined for snap ring grove. Other modifications such as machining, drilling, grinding etc. to ring gear are not permitted. The key- way in the shaft may be cut deeper.
3. Polishing or the use of any compounds or abrasives on gear shaft at the bearing location will not be permitted.
4. A maximum of (2) two gaskets may be used between the gear box halves.

CRANKCASE COVER

1. Remove crankcase cover.
2. The Honda factory supplied crankcase cover must be used. Modifications to the crankcase cover are not permitted. The addition of and /or the removal of any material to the crankcase cover will not be permitted.
3. The only crankcase cover gasket must be supplied by Honda with a maximum thickness of 0.025". Only one crankcase cover gasket may be used.
4. The critical dimensions of the crankcase cover are the thrust face of camshaft holder and the position of crank bearing.
   - **a.** Place a straight edge over the crank bearing and the cam boss thrust face. These surfaces must be level. A maximum tolerance of 0.005" will be permitted.
   - **b.** Modifications to the crankcase cover will not be permitted. This includes, but is not limited to any modification to the crank bearing and/or the camshaft holder position and height.

CAMSHAFT

1. The camshaft must be The Honda factory supplied camshaft for the Honda 120 UT2 engine. Modifications of any kind to the camshaft will not be permitted.
There must not be any additions to or subtractions from any part of the camshaft.

2. The compression release must remain intact without modification.
3. The camshaft lobe center angle must not be modified.

4. Camshaft specifications:
Camshaft Lobes:

INTAKE	EXHAUST
Heel to Heel 0.864" – 0.869"	Heel to Heel 0.865" – 0.870"
Heel to Peak 1.079" – 1.093"	Heel to Peak 1.081 – 1.095"

Camshaft length – measured from thrust flange to thrust flange:
3.135" minimum
3.142" maximum
Camshaft bearings:

0.547" – 0.551" Modifications not permitted.

TAPPETS

1. The tappets must be Honda factory supplied without any modifications.
2. Tappet specifications:
Tappet Base diameter:
0.935" minimum
Tappet Stem diameter:
0.312" minimum
Tappet Base thickness:
0.076" minimum
0.090" maximum
Tappet Length:
1.181" minimum

1.193” maximum

Tappet Weight:

17 grams minimum

PISTON,WRIST PIN, AND PISTON RINGS

1. Remove the connecting rod and piston. The triangle or boss on top of the piston must point toward push rods

PISTON

1. The piston must be the Honda factory supplied 120 UT3 standard size piston. Modifications of any kind will not be permitted. The Honda machined reference at the center of the top of the piston must remain unmodified.

2. Oversized pistons will not be permitted.

3. All three piston rings must be used

4. The top ring:

The chrome compression ring must be installed with “N” or “T” on the rail up.

An expander under the ring will not be permitted.

The second ring:

The oil scraper ring must be installed with “N” or “T” on the rail up.

An expander under the ring will not be permitted.

The bottom ring:

Three (3) piece oil rings are permitted.

5. The piston must not be knurled, grooved or coated.

6. Weight specifications:

Piston weight:

95 grams minimum.

Total Piston weight with rings, pin, and clips:

130 grams minimum.

Total Piston weight with rings, pin, clips, complete with rod and bolts:

250 grams minimum.

PISTON RINGS

1. The piston rings must be Honda factory supplied piston rings and used as produced by Honda. Decreasing of the piston ring tension by heating, machining or any other procedures will not be permitted.

Piston ring specifications:

Compression (top) ring thickness 0.036”minimum.

Scraper (second) ring thickness 0.036” minimum.

Oil Ring, 3 piece lower ring 0.075” minimum.

WRIST PIN

1. The Honda factory supplied wrist pin and retainer must be used without any modification.
2. Wrist pin specifications:
   Outside diameter 0.510 ref.
   Inside diameter 0.354" ref.
   Length 1.844" Minimum
   1.850" Maximum
   Weight 25 grams Minimum

CONNECTING ROD

1. The Honda factory supplied connecting rod and fasteners must be used. Modifications to the connecting rod or fasteners will not be permitted.
2. Connecting rod specifications:
   Connecting rod crankshaft bore size:
   1.021" minimum
   1.0265" maximum
   Connecting rod wrist pin end bore is 0.5111 ref.
   The connecting rod length from the bottom of the wrist pin bore to the top of the crankshaft bore must be
   2.111" maximum
   2.101" minimum
2. Connecting rod weight with bolts 118 grams minimum
3. Oil grooves on the bearing surfaces of either of the connecting rod bores will not be permitted.

CRANKSHAFT

1. The Honda factory supplied UT3 crankshaft must be used. Modification to the crankshaft of any kind will not be permitted.
2. Removal of or the addition of any metal or materials either from or to the crankshaft is not permitted.
3. Balancing of the crankshaft is not permitted.
4. Grooving of the crank shaft journal is not permitted.
5. The governor drive gear must not be removed.
6. The crankshaft drive gear must not be removed. This gear is installed by Honda to a high degree of accuracy. If this gear is not installed to this degree of accuracy; the engine may not be within specification when camshaft is checked by the procedure outlined in this manual.
7. The crankshaft keyway location must not be modified.
8. The measurement from the thrust to the crank gear side: 3.340 Minimum.
9. 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 abrasives or any other compounds will not be permitted.

10. The crankshaft main journal at the flywheel and the gearbox ends must not be modified.

ENGINE BLOCK

1. The Honda 120 UT3 engine block must be utilized. This engine block must be as produced by Honda in its entirety. The block casting and all of the machining schedules must be without modification unless further outlined in this manual. There must not be any addition or subtraction of metal or any other material to the inside or outside of the engine block.

2. Modifications to the Honda UT3 engine block that are permitted:

a. Removal of rear gas tanks brackets is permitted.

b. Removal of the governor. The governor system may be partially removed with the exception of the steel gear on the crankshaft. This gear must remain intact. The governor arm and shaft may be removed, tied forward or altered to accommodate throttle linkage or return springs.

c. The addition of brackets, fittings etc. to accommodate throttle linkage, tachometer and temperature gauge will be permitted.

d. Milling or surfacing of the engine block (deck) head gasket surface will be permitted providing the surface to the piston top measurement stays within the specifications as outlined in this manual. Angle milling is not permitted.

3. Inspect and measure the cylinder bore. 2.366" maximum.

NOTE: Cylinder bore measurements are measured throughout the entire bore from the top to bottom of the bore. The preferred method of measurement is performed using a dial bore gauge, however dial calipers and telescoping gauges may be used.

4. The cylinder bore must not be sleeved or relocated in the engine block. The cylinder bore must remain as produced by Honda with the exception of honing within the maximum cylinder bore diameter specification.

5. Abrasive blasting, sanding, grinding, and polishing to any interior surface will not be permitted.

6. The machined surface of the block measured to thrust face of the cam boss must be: 3.228" minimum 3.235" maximum

7. The machined surface of the block measured to the bearing face must be:

3.430" minimum

3.437” maximum

8. The oil level sensor must be intact and unaltered. The wires may be externally disconnected or cut off.

“Wear Limits/Parts Out of Service” USAC reserves the right to confiscate Honda 120 UT3 engine parts or components determined to be out of specification or at the USAC maximum wear limits.

EXAMPLE: The cylinder bore must not exceed 2.366". The cylinder is measured along the cylinder bore from the top to the bottom of the bore parallel to crankshaft and 90 degrees from crankshaft centerline. A cylinder bore that has one measurement over the USAC maximum specification will be taken out of service. If none of the measurements exceed the USAC maximum specifications the block will not be confiscated. If a part or component is confiscated or taken out of service, the handler may request to have the confiscated part returned. In that case the part or component will be rendered non usable by USAC officials before the part or component is returned.

USAC officials have the right to inspect 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 the technical director must also sign a form 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 for a final determination.