



# HONDA TECH MANUAL GX 160



## HONDA ENGINE RULES

### GENERAL RACING RULES SPECIFICALLY FOR HONDA CLASS ONLY

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**HONDA CLAIMER RULE - For GX160 QMA Type Engines**

- 1 Claims will be from within the same division of class only (Junior, Senior, Light GX160, Heavy GX160).
- 2 Engine may be claimed for \$450.00 cash or certified funds or a complete new (still in box) same type Honda engine. This is the option of the person being claimed.
- 3 Only competitors participating in the same division may make a claim on an engine.
- 4 This claim must be submitted to the Race Director before the end of the race the claimed engine is in.
- 5 The Race Director will hold the claim (money or engine) until the claimed engine has been inspected for legality.
- 6 The claimed engine will be immediately taken to the Tech Director for inspection or sealing. Inspection of claimed motor may be waived.
- 7 Both claimor and claimee have the option to be present at the time of inspection.
- 8 Multiple claims on one engine will be decided in a lottery system. Owner, handler, or family member cannot claim their own engine.
- 9 Claimed party will retain exhaust system and throttle linkage.
- 10 If the claimed engine is found to be legal the Race Director will deliver said engine to the person making the claim and shall deliver the claim (money or engine) to the person who's engine was claimed.
- 11 If the claimed engine is found to be illegal, the motor must be completely torn down to check for the illegalities. The Tech Director and or Race Director shall confiscate the parts and related parts from the claimed engine and shall forward them to the National Tech Director. The claim, (money or engine) will be returned to the person filing the claim.
- 12 Refusal of claim shall be interpreted as an admission that the engine is illegal and will subject the driver/handler to the conditions set forth under Sec. 2 of this article (Honda Suspensions).

**HONDA SUSPENSIONS**

- 1 Handlers and drivers guilty of having a Honda engine declared illegal at technical inspection shall be disciplined as follows:
  - 1.A First offense – 30 day suspension for handler and driver from participating in the respective Honda class.
  - 1.B Second offense within one year of first infraction – one-year suspension for handler and driver from participating in the respective Honda class.
  - 1.C Third Offense within two years of last infraction – suspended for life from QMA.
- 2 Suspension will begin immediately, (unless there is an appeal) at which point the illegal part/s will be sent within five days to the Region Tech Director or designee for review. If the part/s are found illegal at this point the suspension will start at that time by the Region Tech notifying the person. Verified illegal parts will be sent to the National Tech Director, legal parts will be returned to person.
- 3 Suspension for life is open to review by the QMA National Board.
- 4 For the purposes of this rule only, if a handler has multiple cars competing in the Honda class (GX120 or GX160) 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.
- 5 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.
- 6 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.
- 7 **Novice Honda:**

The novice program and its implementation fall under the Regional Directors. Therefore illegal Honda engine parts will be confiscated but the suspension will not be levied against handlers or drivers for the first offense only.

## GENERAL RULES

1. Only stock Honda GX160K1 HX2 engine and gearbox will be used in this class. All parts will be stock Honda specifically made for the Honda GX160OK1 HX2.
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 tapped for thread or epoxy. No welding.
  - B. Air cleaner may be removed. If used, all parts except for top cover and foam filter must be removed. If have stock air filter, must have vent hose connected to air filter. If factory air filter is removed, then hose from valve cover must go into a catch can.
  - C. Stock Honda fuel tank must be removed.
  - D. Recoil starter must be removed. Pull cup may be cut down for washer.
  - E. Exhaust: 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 .25" 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. 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 it's original location. Threads will not be removed from muffler. 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 welded to the end of the pipe in order to screw muffler in place so that muffler may be removed for inspection. Pipe coupler will be a standard, unaltered, 3/4" NP, threaded coupler. Length will be 1.000" inches minimum to 2.250" inches maximum. 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.
  - F. Choke butterfly and shaft must be removed. Hole may be filled only with silicone
  - G. Oil level switch may be disconnected but switch assembly must remain intact in crankcase.
  - H. Gearbox may be rotated to any desired position.
  - I. Main jet in carburetor may be a maximum of #80.
  - J. Off-On ignition switch may be removed, and hole covered. (any material; no welding)

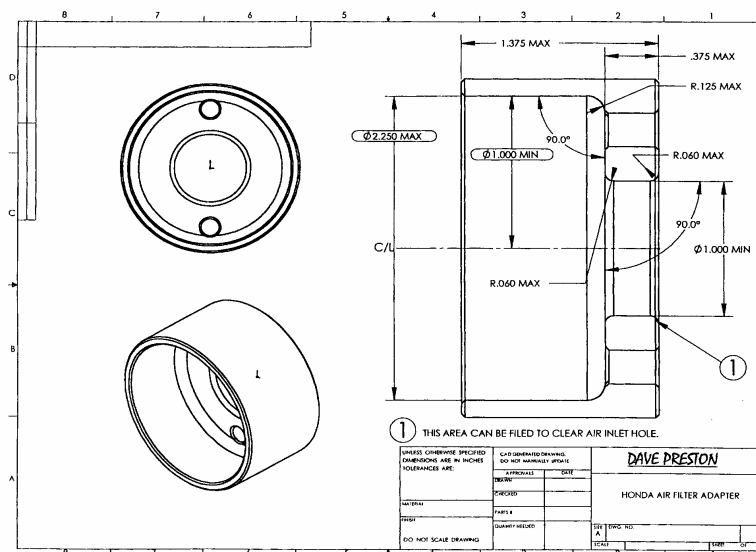
## TECH PROCEDURE

Modifications or machining of any parts in order to bring them to stated minimum or maximum specs (*blueprinting*) is not legal.

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

### NOTES:

- A. Air cleaner may be removed. Any air filter may be attached to the outside of the air filter adapter. No device(s) may be used inside the air filter or adapter that will alter the airflow into the carburetor. Air cleaner adapter will be maximum ID 2.250" and a maximum of 1.375" long in length, flange thickness 0.375" max. Flange ID 1.000" minimum hole size straight walled, flat bottomed and parallel with carburetor using existing air cleaner mount holes. If air cleaner is removed, the air cleaner adapter must also be removed. (Air filter adapter must be used with after market air filter.) (vent hole in carburetor must be open) . If have stock air filter, must have vent hose connected to air filter. If factory air filter is removed, then hose from valve cover must go into a catch can.



- B. 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, and #80 maximum jet size.
- C. Rear mounting brackets for Honda fuel tank may be removed.
- D. 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.
- E. The keyed end of the ring gear shaft may be shortened, drilled and tapped or machined for snap
- F. **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. Honing and deglazing of the bore is allowed. Lapping the valves is allowed.**

- G. Blocking AirFlow: No device may be used that will/or appear 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.**

## **CARBURETOR**

Remove Carburetor:

- A. Check for any alterations or worn parts that would allow additional air into engine: holes, slots, perforations, spacers, loose bolts, warped flanges etc.



1. Gasket thickness: 0.025" maximum.
2. Insulator gasket thickness: 0.025" maximum.

- B. Carburetor identification number: BE 65 B  
C. Check carburetor for alterations. Upper choke shaft hole may be sealed with silicone type sealer.  
D. Carburetor Bore:

Intake end: maximum diameter 0.951" ref.  
Throttle end: maximum diameter 0.710.

- G. Carburetor venturi bore: 0.521 0.522- no go. This measurement is best made with a no go gauge but may be made using a telescoping gauge as a no go.  
H. Main jet and main nozzle:





## ENGINE COOLING SHROUDS

- A. All pieces of the stock engine-cooling shroud must be properly installed.
- B. 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.

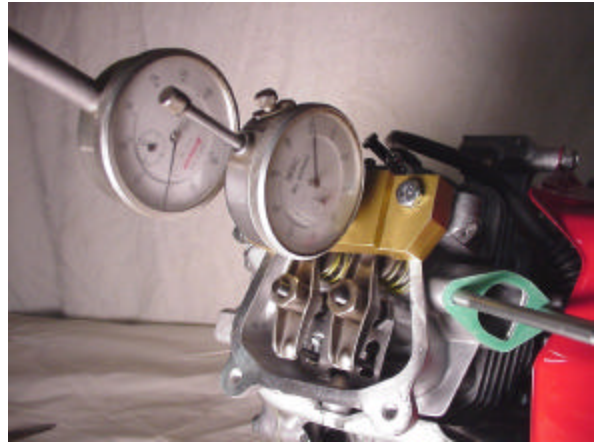
Remove engine-cooling shrouds. Remove valve cover.

Check:

1. 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: 0.040" minimum thickness of inner rim.

Measure from head surface to top of valve head:

Intake:	maximum 0.262"	Minimum 0.242"
Exhaust:	maximum 0.250"	Minimum 0.230"

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:  
15.6cc minimum with stock spark plug.



Remove valves:

Retainer:

A. Inspect retainers for alteration that would increase valve spring pressure. Both intake and exhaust must have stock Honda retainers. Exhaust valve only can have lash cap and corresponding retainer.

B. Thickness of retainer will be:

Intake: 0.228" minimum

Exhaust: 0.251" minimum

C. Flange thickness of retainer will be:

Intake: 0.100" maximum

Exhaust: 0.070" maximum

D. From flat of flange to machined surface:

Intake: 0.148" minimum

Exhaust: 0.165" minimum

## 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: 12 LBS max at 0.812" (13/16")

E. Stacked length will be: 0.394" Maximum

### 140 Spring

A. Wire diameter: 0.079" Maximum

B. Outside diameter of spring: 0.808" Maximum

C. Number of total coils: 7

D. Spring pressure: 16 LBS max at 0.812" (13/16")

E. 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 5.259-5.279”.

## VALVES

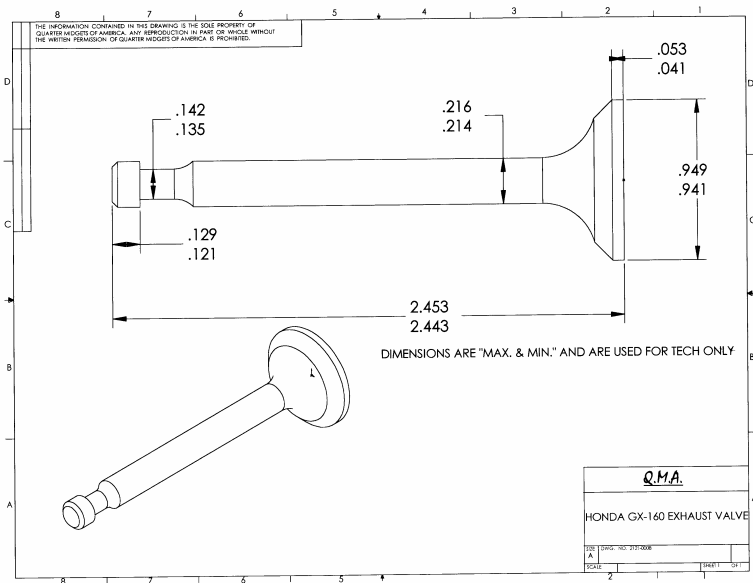
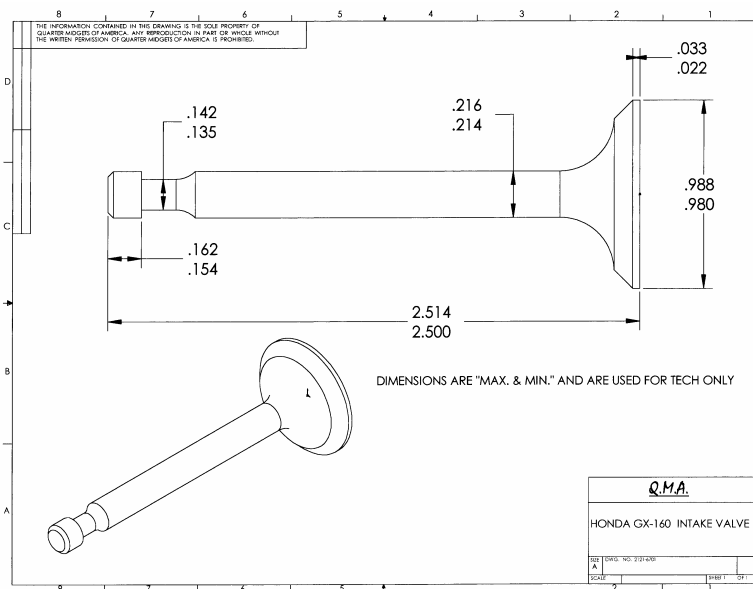
A. Check valves for dimensions and weight. Valve seating surface must be factory ground to a single angle only, 45 degrees. There will be no other angles ground on any part of valve. Valves must not be polished, lightened or altered in any way.

B. Valve weight:

Intake 22 grams minimum

Exhaust 22 grams minimum

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



## HEAD

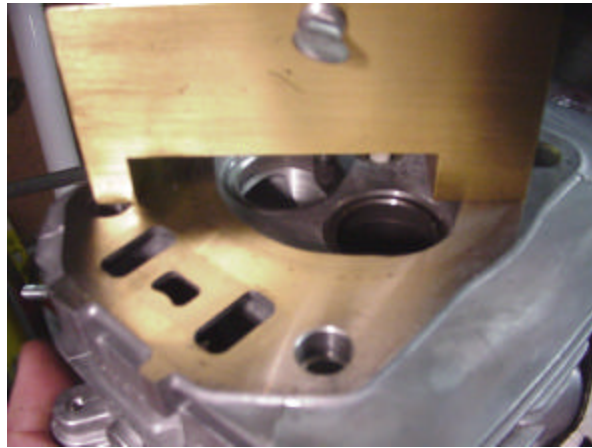
Cylinder head will be in “as cast” and in factory machined condition and there must be no addition or subtraction of metal or any other substance to the inside or outside of the cylinder head. This includes no type of machining or grinding to increase compression or airflow. No milling, angle milling 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.

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:

0.902” maximum



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

Intake:                      1.062” maximum  
Exhaust:                    0.993” maximum

D. 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                    2.912”

## INTAKE AND EXHAUST PORTS

A. Ports will be in “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 cylinder head.

- B. No alterations of any kind to be made to the intake or exhaust port.
- C. This includes any grinding, polishing, etching, sand blasting or glass beading to interior surface.
- D. Valve seats must be a stock single 45 degree angle. Multi angle valve seats are not permitted.  
Valve seats must not be replaced.
- E. Intake and Exhaust ports at valve:

Intake:	maximum	0.915"	minimum	0.900"
Exhaust:	maximum	0.863"	minimum	0.858"

## ENGINE BLOCK

This engine block must be in "as cast" and 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:

- A. Removal of rear gas tanks brackets is permitted.
- B. 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.
- C. Addition of brackets, fittings etc. to accommodate throttle linkage, tachometer, temperature gauge is allowed.

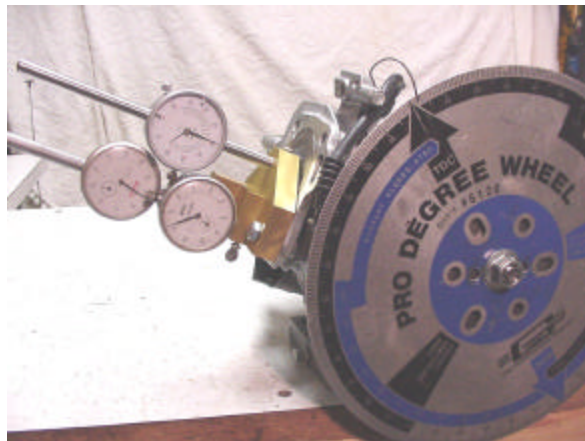
Check bore: 2.681" maximum  
NOTE: All measurements taken at top of bore or very bottom of bore.

Check stroke: 1.778" maximum to 1.765" minimum

Measure amount that piston is up or down from block surface at T.D.C. This will be measured at edge or highest part of piston, not in center or relieved area. This dimension will be:

0.000" minimum -0.016" maximum

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.



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 positions are very critical in this operation.

Zero indicator on base circle of cam. Be sure that compression release does not effect zeroing exhaust indicator.

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					
IN TAKE			EXHAUST		
	Degrees			Degrees	
0.020"	3-1/2 to 6-1/2	BTDC	0.020"	224-1/2 to 232-1/2	BTDC
0.050"	10-1/2 to 13-1/2	ATDC	0.050"	207-1/2 to 210-1/2	BTDC
0.100"	26-1/2 to 29-1/2	ATDC	0.100"	190-1/2 to 193-1/2	BTDC
0.150"	45 to 48	ATDC	0.150"	171-1/2 to 174-1/2	BTDC
0.200"	71 to 74	ATDC	0.200"	145 to 148	BTDC
Maxlift .227"	Peak 104 - 107	ATDC	Maxlift .229"	Peak 107-1/2 - 110-1/2"	BTDC
0.200"	136 to 139	ATDC	0.200"	70-1/2 to 73-1/2	BTDC
0.150"	162-1/2 to 165-1/2	ATDC	0.150"	44-1/2 to 47-1/2	BTDC
0.100"	180-1/2 to 183-1/2	ATDC	0.100"	26-1/2 to 29-1/2	BTDC
0.050"	197-1/2 to 200-1/2	ATDC	0.050"	9-1/2 to 12-1/2	BTDC
0.020"	213-1/2 to 216-1/2	ATDC	0.020"	5 to 8	ATDC

Check max lift at intake and exhaust.

## FLYWHEEL, FAN AND IGNITION SYSTEM

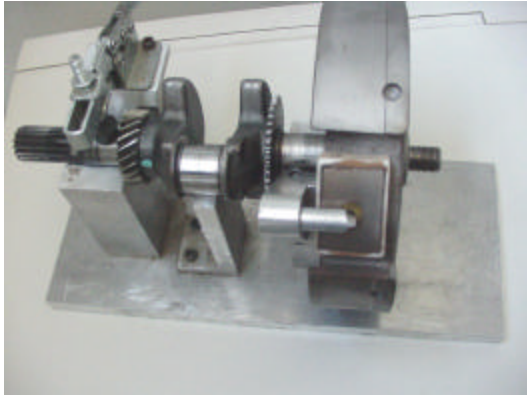
**Caution should be used when removing flywheel. Do not hit with hammer or other heavy objects. Service manual show flywheel to be removed with commercially available 6" puller. Another method is inertia type knocker that threads onto crankshaft end.**

The transistorized magneto ignition is fixed at 25 degrees BTDC and may not be altered in anyway. Firing must not exceed 0.104 " or 26 degrees BTDC.

Quick check: Turning flywheel clockwise-if the leading edge of the depression of flywheel rim where the magnet is mounted is not still under the right hand coil leg at .115" BTDC, it is probably illegal and should be checked further. If timing needs to be checked further see page 19.



- A. Flywheel keyway or its position must not be altered.
- B. Key may not be deleted or altered in any way.
- C. Magnet and its position may not be altered in any way.
- D. 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.



E. 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.

F. All nylon blades on the cooling fan must be intact.



G. No metal may be added or removed from the flywheel.

Flywheel weight will be: 2525 grams minimum 89.06 oz

H. A stock Honda spark plug cap must be used.

I. Any automotive spark plug with the same reach is permitted.

J. No plug indexing washers allowed.

K. If temperature sensor is used under spark plug, factory washer may 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 tapped or machined for snap ring groove. No other machining, drilling, grinding etc. to ring gear. Keyway may be cut deeper.



## **CRANKCASE COVER**

Remove crankcase cover.

A. Cover must be in “as cast” and 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  $\pm 0.005$ ”. There will be no alterations to crankcase cover. This excludes any alteration to crank bearing and camshaft holder position and height in an attempt to alter valve timing.

## PISTON – WRIST PIN AND PISTON RINGS

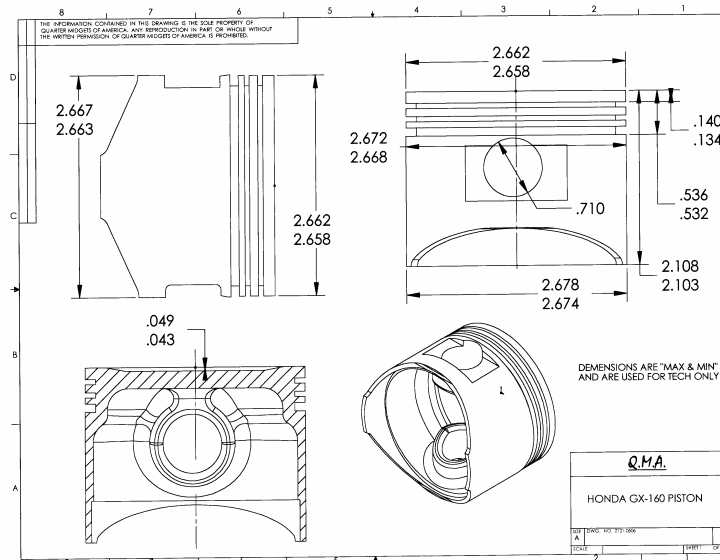
Remove rod and piston - triangle on top of piston must point toward push rods - piston, wrist pin and rings must be absolutely stock and not altered in any manner.



## PISTON NOTES

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

- A. Oversized pistons must not be used.
- B. All three piston rings must be used and installed properly.
  1. Top ring: Chrome compression ring installed with “N” on rail up. No expander under ring.
  2. Middle ring: Oil scraper ring installed with “N” or on rail up. No expander under ring.
  3. Bottom ring: Three (3) piece oil rings are allowed.
- C. Piston may not be knurled, grooved or coated.
- D. Piston weight: With rings, pin, and clips 200 grams minimum.
- E. Piston weight with rings, retainers, and rod 363 grams minimum.
- F. See drawing for dimensions.



## RINGS

- A. Must be stock Honda rings with stock size and configuration.
- B. No decreasing of ring tension by heating, machining or any other means.

C Ring thickness:

Compression:	0.056"	min.
Scraper:	0.056"	min.
Oil Ring:	0.097"	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.

- A. Connecting rod big end size: 1.182" minimum - 1.184" maximum
- B. Pin end bore is: .7100" maximum
- C. Length from bottom of pin bore to top of big end bore will be:  
2.3755" maximum                      2.3655" minimum
- D. Rod weight with bolts: 184 grams

E. No oil grooves on bearing surface of either end.

## CRANKSHAFT

Stock Honda crankshaft with no alterations.

### Notes:

- A. No removal or addition of any metal from or to the crankshaft is allowed.
- B. No balancing of the crank is allowed.
- C. No oil grooving is allowed on the crank journal.
- D. Governor drive gear can not be removed.
- E. 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.
- F. Keyway location must not be altered in any manner.

## CAMSHAFT

Camshaft must be stock Honda with no alteration of any kind.

- A. There will be no additions to or subtractions from any part of the camshaft.
- B. Compression release will remain intact and unaltered.
- C. Lobe center angle will not be altered by any means.
- D. Lobe profile will not be altered in any way.



## CAMSHAFT SPECIFICATIONS

### INTAKE

Heel to Heel . 0.865" - 0.869"  
Heel to Peak 1.079" - 1.093"

### EXHAUST

Heel to Heel 0.866" - 0.870"  
Heel to Peak 1.081" - 1.095"

Length - thrust flange to thrust flange:

3.137" minimum                      3.142" maximum

Cam bearings are 0.547" - 0.551" and unaltered

## **TAPPETS**

A. Tappets must be stock Honda with no alterations.

B. Base diameter:

0.910" minimum                      no maximum spec

C. Stem diameter:

0.3147" minimum

D. Base thickness:

0.076" minimum                      0.090" maximum

E. Length:

1.181" minimum                      1.220" maximum

F. Weight:

17 grams minimum

## **ENGINE BLOCK**

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.

A. Cylinder bore will be 2.680" maximum.

NOTE: All measurements taken at top of bore or very bottom of bore.

B. Cylinder bore will not be bored oversize.

C. Cylinder bore will not be re-sleeved.

D. Cylinder bore position will not be moved or tipped in any manner.

E. Cylinder block deck will not be resurfaced by any means. There will be no polishing, sand-blasting or glass beading to any interior surface.

F. Deck height:

5.123" minimum                      5.127" maximum

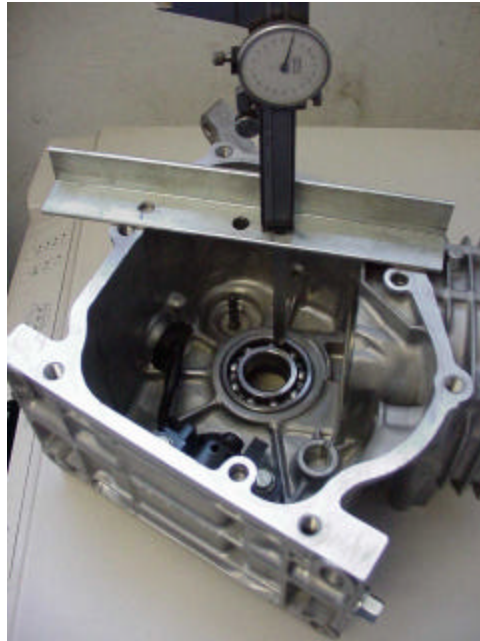
G. Machined surface of block down to thrust face of cam boss:

3.220" minimum                      3.224" maximum

H. Machined surface of block down to bearing face:

3.416" minimum                      3.420" maximum

I. Oil level sensor will be intact and unaltered. Wires may be externally disconnected or cut off.



## **PROCEDURE FOR CHECKING TIMING**

A. With degree wheel or indicator located at 0 degrees or TDC., mark both the flywheel and some fixed point (such as right hand side of aluminum block casting right above flywheel) with aligning marks. Turn the flywheel clockwise and stop at 26 degrees BTDC or 0.103"- 0.104" BTDC on your indicator. Make another mark on the block casting that aligns with your mark on the flywheel.

B. Remove dial indicator so it will not be damaged by engine rotation.

C. Install timing light to a battery, if not self powered, and clamp inductive pickup to spark plug wire. Wire should be hooked to standard spark plug gapped to 0.025". Using a drill, with an extension that is cut off or turned to fit drill, place socket on flywheel nut and rotate engine in clockwise direction.

D. Fire the timing light and observe. If the reference mark on the flywheel is between the two marks on block casting that are TDC and 0.104 " or 26 degrees BTDC, the timing is legal. If mark is not between marks on block casting when rotating, the engine will be disqualified.

E. Other pictures and text indicate methods of detecting which particular part is not in spec.

### DECIMAL EQUIVALENTS OF NUMBER SIZE DRILLS

No.	Size in Decimals	No.	Size in Decimals	No.	Size in Decimals	No.	Size in Decimals
1	.2280	21	.1590	41	.0960	61	.0390
2	.2210	22	.1570	42	.0935	62	.0380
3	.2130	23	.1540	43	.0890	63	.0370
4	.2090	24	.1520	44	.0860	64	.0360
5	.2055	25	.1495	45	.0820	65	.0350
6	.2040	26	.1470	46	.0810	66	.0330
7	.2010	27	.1440	47	.0785	67	.0320
8	.1990	28	.1405	48	.0760	68	.0310
9	.1960	29	.1360	49	.0730	69	.0292
10	.1935	30	.1285	50	.0700	70	.0280
11	.1910	31	.1200	51	.0670	71	.0260
12	.1890	32	.1160	52	.0635	72	.0250
13	.1850	33	.1130	53	.0595	73	.0240
14	.1820	34	.1110	54	.0550	74	.0225
15	.1800	35	.1100	55	.0520	75	.0210
16	.1770	36	.1065	56	.0465	76	.0200
17	.1730	37	.1040	57	.0430	77	.0180
18	.1695	38	.1015	58	.0420	78	.0160
19	.1660	39	.0995	59	.0410	79	.0145
20	.1610	40	.0980	60	.0400	80	.0135

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