

## **HQRA Inc, Category representatives to CAMS**

# OBJECTS

To foster and promote the sport of circuit motor racing in Australia with particular emphasis on the HQ Holden Class as recognized by the Controlling body;

To provide the HQ Holden Class as a low cost, properly and well organized circuit motor racing category;

To police the HQ Holden Class strongly to provide fair competition for all;

To always keep the regulations of the HQ Holden Class simple, straightforward, and adhering to the principal that “The vehicles are to remain standard unless specifically stated otherwise;”

To never allow any freedom within the regulations of the HQ Holden Class that will allow the Class to deviate from its roots of providing low cost circuit motor racing;

That no points be awarded in any state championship conducted on the same weekend as the Nationals, except for the host state who may make that decision to suit their unique circumstances.

To seek out its own sponsorships and at all times be self funding and financially independent of any other club or organization, save for the relationship with each State Association listed in rule number 16.2.1 (sixteen point two, point one);

To have a united body of competitors able to negotiate with circuit motor racing promoters and The Confederation of Australian Motor Sport as the Controlling Body of the sport for the benefit of the HQ Holden Class;

To provide the means by which anyone wishing to enter, continue or re-enter circuit motor racing can do so at a very realistic cost;

To regularly review the suitability of the HQ Holden Class for circuit motor racing in Australia, and to be in the position of providing a suitable replacement if and when the need arises and is agreed to by each of the Member Associations;

***KENDA***  
**TIRES**

# Administration

## **National Administrator**

### **David Ling**

(W) 08 89477099 (F) 08 89843527  
(M) 0412 336153  
david@aussienascartours.com.au

## **Secretary**

### **Graham Boulter**

(W) 08 82773800 (F) 08 82773773  
(M) 0408 277380  
vip.motors@ace.net.au

## **Treasurer**

### **Greg Goding**

(M) 0418 807437  
greg.goding@fujitsugeneral.com.au

## **National Eligibility Officer**

### **Colin Roper**

(M) 0417 355512  
ciroper@bigpond.com

## **State contacts**

### **QLD**

### **Ian Mundell (President)**

(M) 0423 760004

### **VIC**

### **David Amor (President)**

(M) 0419 315984

### **South Aust**

### **Gavin Porteous (Delegate)**

(M) 0409 882251

### **West Aust**

### **Grant Howlett (Delegate)**

(M) 0407 183800

### **NT**

### **Gavin Thompson (Delegate)**

(M) 0419 819017

### **TAS**

### **Andrew Bird (Delegate)**

(M) 0409341777

### **NSW**

### **Clinton Green (President)**

(M) 0400 032255

*Life  
Members*

*Les Morrall*

*Robert Kramer*

*Ian Beechey*

*Dale Youd*

# Recognition Document

*To be read in conjunction with the CAMS Manual of Motor Sport*

## 1. Model

Descriptions used by the manufacturer for identification and easier ordering of eligible vehicles are:

Holden four door sedan	HQ80169	HQ80269	HQ80369
	HQ80469	HQ81169	HQ81269
	HQ8M69	HQ8N69	HQ8P69

## 2. Dimensions

2.1	Minimum racing weight (with driver)	1365 kg
2.2	Overall length	4810 mm (max)
2.3	Overall width (measured at the centre of the respective axle)	Front 1903 mm Rear 1886 mm
2.4	Wheelbase (maximum)	2847 mm
2.5	Track (maximum)	Front 1631 mm Rear 1590 mm
2.6	Ride height (Minimum ground clearance for any sprung component of the vehicle, excluding exhaust.)	100 mm

## 3. Engine

3.1	Number of engine mounts	2
3.2	Bore :	93.83 mm (3.694")
	Stroke :	82.50 mm (3.250")
3.3	Pistons	Material : Aluminium
		Type : Cast (not forged)
		No. of rings : 3

Pistons must have three ring grooves, each of which must be fitted with piston rings as supplied by the manufacturer and shown in a widely distributed catalogue. The piston crown may be machined for the purpose of reducing compression. Any machining of the piston bowl is to be of concave shape, concentric to the centre of the piston and perpendicular to the cylinder bore, save for the walls of the bowl formed.

3.4	Connecting rods (Standard type) Minimum weight	5.250 " (centre to centre) 460 g
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**The use of aftermarket con rod bolts are permissible. No modification or machining of the con rod is permissible for the purpose of con rod bolt fitment.**

3.5	Gudgeon pin (Standard type) Pressed in-no circlip	0.866"
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**Nason Branch Contacts**

VIC	Unit 5,5 Monterey Road DANDENONG 03 9797 1115
NSW	Unit 1,10 Hume Road SMITHFIELD 02 9612 2600
QLD	Unit 2,44 Boyland Ave COOPER PLAINS 07 3717 7300
SA	189 Cormack Road WINGFIELD 08 8368 3700
WA	Unit 4,3 Malliag Way CANNING VALE 08 6254 2099

3.6	Cylinder block	(Red Engine) (casting made on left of block)	202/3300
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It is permitted to use any Holden 202 or 3.3 Red Motor, six-cylinder in-line engine. Any and all engine ancillary components must comply with original HQ Holden specifications. It is not permitted to use any non HQ Series components. (Except as authorized in these regulations). The use of titanium components is prohibited.

3.7	Cylinder head	(Cast numbers)	2811930 9937262
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**Cylinder head:** The cylinder head must be of the large combustion chamber type, using bridge type rocker gear. Casting numbers are: 2811930 / 9937262. Facing or shimming of the rocker bridges is permitted. Six-cylinder rocker arms (PN 2811931 or 92018908) must be used. Adjustable push rods are permitted. The use of a decompression plate is permitted.

The minimum unswept volume achieved by the sum total of combustion chamber, piston bowl and any positive deck volumes measured at top dead centre shall be 45 c.c. per cylinder. Any machining of the piston bowl is to be of concave shape, concentric to the centre of the piston and perpendicular to the cylinder bore, save for the walls of the bowl formed.

**Unswept Volume Procedure**

- 1 Start with CLEAN (as in spotless) heads.
- 2 Be sure to use the same type of spark plugs for CCing that you intend to run.
- 3 Block the head up so that the head surface is flat and even.
- 4 Coat the periphery of the combustion chamber with grease – white heat-resisting brake grease is easy to see and works very well.

- 5 Place the HQRA approved Plexiglas plate over the chamber, with the hole on the high side and the counter sink up. Press evenly and firmly to insure a perfect seal.
- 6 Carefully assemble the burette, stand and clamp.
- 7 Using clean solvent with a couple of drops of food coloring as a measuring fluid, fill the burette to the "O" line. NOTE: The surface of the column of fluid will appear to be concave (or sunken) in the center. This is known as meniscus. For accurate results, align the marks on the burette with the lowest (sunken) portion of the fluid for all measurements.
- 8 With the burette positioned over the countersunk hole, and the head FIRMLY blocked, slowly open the stop-cock and begin filling the chamber. Watch for leaks at the seal of the plate and the head surface (this is where the white grease helps). If a leak develops, be very patient and START OVER.
- 9 Fill the chamber until the fluid just touches the BOTTOM of the hole. Be sure ALL air bubbles are out.
- 10 Carefully read and record the amount of liquid metered into the chamber.  
(Remember what was mentioned about meniscus.)

Valve springs are free subject to there being only one single spring per valve. It is permitted to fit shims under the valve springs. Valve spring shrouds may be removed. It is permitted to machine the valve spring seats to obtain correct installed height. The method of valve retention must be as envisaged by General Motors Holden in this application. Planing of the cylinder head face is permitted subject to angle planing being prohibited. The rocker cover is free.

3.8	Valve size	Inlet (max) Exhaust (max)	42.55 mm (1.675") 34.93 mm (1.375")
3.9	Flywheel	Diameter Minimum Weight Ring gear to clutch face	277.4 mm (not including ring gear) 9800 g  19.56 mm minimum

The use of CAT Head Bolt part number 7X0316 and washer number 8T5360 is permissible. Please note this bolt is a 'stretch bolt' and designed for one use ONLY.

#### 4. Induction

4.1	Carburettor	Number Type  Code Numbers  Venturi	1 Single throat downdraft Stromberg BXV-2 & BXUV-3 23-3052, 23-3053, 23-3075, 23-3076, 23-3084, 23-3073, 23-3091, 23-3092. 30.94 mm
	Maximum size of the flange hole of carburetor exit port		36.40 (early) 40.00 (late)
4.2	Inlet manifold casting numbers		2820781 (early) 2825951 (late)

## 5. Fuel System

5.1	Tank	Number	1
		Material	Steel
		Location	Under rear of vehicle
		Capacity	74 Litres
5.2	Fuel Pump	Number	1
		Location	RHS of engine block
		Type	Mechanical
		Part Number	7415943 (red engine / glass bowl) 9206043(blue engine / no glass bowl)

A 12 volt push type solid state electronic fuel pump with an in built pressure regulator maybe fitted in place of the original mechanical fuel pump. The electronic fuel pump will have a maximum manufacturer specification of 7 psi at the pump outlet. The fuel pump is to be fitted within 50 cms of the existing fuel tank outlet within the confines of the boot compartment. Approved fuel line is to be used for the fitment of the pump utilising as much as practical of the existing standard fuel line. The existing fuel pump mount on the block must be blanked off using an after market fuel pump blanking plate. The fuel line to the carburettor will be by means of an approved fuel hose from the existing fuel outlet at the chassis rail to the fuel line from the existing fuel pump to carburettor fuel line. Wiring of the fuel pump will be in line with current electric fuel pump requirements Schedule C article 10 of the CAMS manual.

It is permitted to modify the fuel tank breathers with the addition of suitable tubing further the fuel sender float arm on the sender unit / fuel pick up assembly may be removed.

## 6. Transmission

6.1	Clutch Driven Plate	Type Diameter	Diaphragm 219.08 mm (8.625")
6.2	Gearbox	Three Speed Cluster part number Ratios	7434307 Teeth 17/27 23/20 29/15
		1st - 3.07:1 2nd - 1.68:1 3rd - 1.00:1 Rev. 3.59:1	
6.3	Final Drive	Ratio Number of teeth Type Shimming	3.55:1 39/11 Salisbury or Banjo Single shims only

Any suspended wheel must rotate freely at all times.

**Gearbox:** Only the original three-speed manual gearbox may be used. The extension housing may be replaced by an extension housing sourced from a four-speed, M20 or M21 gearbox. Local modification is allowed for the purpose of the retention of the rear main gear box bearing only.

The steering column gear linkage may be replaced by a floor shift mechanism, in which case it is permitted to modify the bodywork only as necessary for the fitment of the shift mechanism.

When we approved the use of the M20 and M21 extension housing, it was overlooked that this extension housing does not retain the rear gear box main bearing in the gear box housing. The normal 3 speed housing is slightly different in structure that is designed to retain the rear bearing in the main housing. By allowing minor modification rectification of securing the rear main bearing is easily achieved. There is no performance or technical advantage that maybe achieved with this rule modification.

## 7. Brakes

7.1	Master cylinder	Number Location Bore Power assistance Make & Model	1 Firewall 25.4 mm Yes PBR Master Vac
7.2	Rear Drums	Internal diameter Number of shoes Width of shoes Length of shoes	254 mm 2 (per side) 44.4 mm 262.9 mm (maximum)
7.3	Front Discs	Number of pads Calipers per wheel Caliper material Caliper part number  Disc Diameter Maximum thickness Ventilated Pad Surface	2 (per side) 1 Cast Iron PBR LH 9933233 RH 9933234  Girlock LH 9929899 RH 9929900  276 mm 25.4 mm Yes Refer to templates

## 8. Suspension and Steering

8.1	Steering	Type Ratios Power assistance	Recirculating ball 16.7:1 and 20.1 Optional
8.2	Suspension	Front Rear Sway bar (front only)	Wishbone Trailing Arm Diameter 17.5 mm
8.3	Control suspension	As specified in CAMS manual	
8.4	Wheels	Diameter Width (Front & Rear) Tyre size Make of Tyre	14" 7" or 8" 235/60 x 14 Kenda Klever H/P KR15

NOTE: The current control Kumho and Maxxis tyre maybe used until 31st December 2012. However only one brand/type tyre maybe used on the competition vehicle and NO mixing of tyre brands will be permitted.

- 8.5 Later RTS (radial tuned suspension) type chassis rails are not permitted.
- 8.6 It is permitted to use and fit front wheel bearing pre-load spacers.
- 8.7 The flexible steering coupling maybe replaced with any commercially available after market coupling. No modification of steering shaft is permitted for fitment of after market coupling.

## 9 Tyres

Tyres shall be Kenda Klever H/P KR15 P235/60R1496H. All tyres must be marked by one of the state HQ Racing Associations. At any time during practice, qualifying or racing the depth of tread, when measured at any point other than the shoulder of the tyre, shall be not less than 1.5mm.).

## 10 Body

The interior must be complete as manufactured save that:

- floor coverings may be removed,
- seats may be removed and the driver's seat replaced with another in compliance with Schedule C (refer to Section 7 of the CAMS Manual of Motor Sport)
- hood lining may be removed
- door arm rests may be removed
- the steering wheel may be replaced
- the jack and spare wheel may be removed
- the kick panels, pillar linings, sun visors, rear parcel shelf covering and boot floor covering may be removed.
- door trims may be replaced by others of similar materials and appearance to the original.

**KENDA**  
**TIRES**

# TECHNICAL MANUAL

## GROUP 3H HQ HOLDEN'S

*Prepared and Authorised by HQ RACING AUSTRALIA in conjunction with CAMS*

### 1. INTRODUCTION

In accordance with the CAMS rules pertaining to Group 3H HQ Holden's, this manual and the regulations for the 3H HQ Holden's as published in the CAMS manual will be the basis for examinations of eligibility of group 3H HQ Holden racing cars.

#### 1.1 INTERPRETATIONS

All regulations must be strictly adhered to, and unless a modification or departure from a standard HQ Holden is specifically allowed in the regulations then it is prohibited. All components must remain as originally manufactured unless specifically allowed in the regulations. The manufacturers sitting of components must be respected unless specifically allowed in the regulations. The following procedures will apply when seeking and obtaining interpretations to the CAMS regulations or this manual.

- 1.1.1 All requests for interpretation must be made in writing to the Technical Manager at CAMS.
- 1.1.2 The Technical Manager may make a determination, or circulate such requests to all state HQ association Technical Officers to resolve any ambiguous interpretations of the regulations.
- 1.1.3 The state Technical Officers must return their Interpretation to the originating Technical Officer within seven (7) days of receiving the request.
- 1.1.4 In the absence of unanimous agreement between the state Technical Officers within thirty (30) days, the matter shall be referred to the eligibility committee of CAMS for determination.
- 1.1.5 The interpretation shall be issued to each state association for inclusion in the appropriate appendix of this manual, and for distribution to the members.
- 1.1.6 A written reply shall be given to the member requesting the interpretation.
- 1.1.7 If required the regulation that led to the need for interpretation should be subject to revision via consultation with CAMS.

PBR CALIPER  
INNER PAD SURFACE

PBR CALIPER  
OUTER PAD SURFACE



GIRLOCK CALIPER  
INNER PAD SURFACE

GIRLOCK CALIPER  
OUTER PAD SURFACE



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## **1.2 SCRUTINEERING POLICY AND AUTHORITY**

The following scrutineering policy and authority applies to the scrutineering of HQ Holdens for eligibility.

- 1.2.1 The state Technical Officer may at any race meeting he attends, advise the Chief Scrutineer of the meeting on matters relating to eligibility.
- 1.2.2 Engines, gearboxes and diffs are to be sealed in accordance with the sealing procedures in this manual.
- 1.2.3 Persons eligible to seal engines, gearboxes and diffs will be appointed by each State Association.
- 1.2.4 Each State Association will publish, for the benefit of their members, the names and addresses of authorized sealers, and will notify the Technical Manager at CAMS.
- 1.2.5 No sealer shall engage in collusion to seal an engine/gearbox or diff to provide a material advantage to a particular competitor.
- 1.2.6 Seals and approved sealing wire shall be provided by each State Association, the Association shall keep records of seals going to each sealer.
- 1.2.7 The sealer will be issued with the approved paperwork necessary for him to record the required information. The paperwork will record the number and location of every seal, the number of the CAMSHAFT, and any comments the sealer feels necessary to record. The paperwork will be in triplicate, the top copy going to the owner, the second copy to be forwarded to the State Association monthly, and the third copy is to be retained by the engine sealer. An audit is to be made annually of all seals, this audit is to be carried out by an Association approved person who will sign and date the sealers records if found to be correct.
- 1.2.8 It is the responsibility of the competitor to maintain the condition of a competition vehicle to a standard satisfactory to race scrutineers.
- 1.2.9 The seals and sealing books will always remain the property of HQRA and HQRA retain the right to remove seals from a race vehicle.

# **TECHNICAL ADVISER & STATE BASED ELIGIBILITY / TECHNICAL OFFICER**

## **Selection Criteria**

1. A sound working knowledge of the CAMS Manual of Motor Sport
2. Be conversant with the application of the General Requirements regarding schedules and Specifications with particular reference to Group 3H
3. To have an intimate knowledge of, be able to interpret and apply the specifications contained in the Group 3H Regulations, Technical Regulation manual and to be thoroughly familiar with the workshop and parts manuals as published by General Motors- Holden Automotive Ltd.
4. The applicant must have a mechanical background. They should have a thorough knowledge of engine building procedures and specifications and mechanical repairs.
5. They must be conversant with and be capable of using specific measuring devices for measuring such dimensions as bore, stroke of crankshafts, engine blocks, camshafts, cylinder heads and flywheels etc.
6. Where possible, they should have a racing (competition or preparation) knowledge of the sport so as to be able to better understand and relate to competitors in explaining the rules as laid down in the CAMS manual of motor sport
7. For Technical Adviser it is preferable that they have served as an HQ Eligibility / Technical Officer for a period of at least 12 months with an HQ Racing Association within the last 3 years.
8. The State based Eligibility / Technical Officer should be able to attend most race meetings in his or her State of residence.
9. If present at interstate race meetings, he or she may be called on in conjunction with, or in the absence of, that State's Eligibility / Technical Officer to carry out their duties
10. Prior to the commencement of practice or competition each day at any race meeting they intend to exercise their authority, they may make themselves known to the Chief Scrutineer of the meeting and advise of their intentions in regard to that meeting.
11. In conjunction with the Chief Scrutineer, the State based Eligibility / Technical Officer shall carry out such eligibility checks as they deem necessary.
12. The State based Eligibility / Technical Officer can be called upon to give evidence or interpretations at any Steward's or any other judicial enquires.
13. In the event of any matter requiring interpretation not covered within the Group 3H regulations or Technical Regulation manual, it should be referred to the State Eligibility / Technical Officer who in turn may contact the National Technical Adviser.

14. They should make himself available to competitors and CAMS alike at their convenience to answer technical questions at the questioner's expense.
15. They should train an understudy as their eventual equal or replacement
16. It is preferred that an appointed Technical Adviser / Eligibility Officer not currently be competing in Group 3H or have any allegiance or links to a Group 3H team or vehicle, or be a Group 3H car constructor or engine builder.

## **COMPONENT SEALER**

### **Duties**

1. Each State Association is to appoint at least one or more Group 3H component sealer as is required by member numbers and member's location.
2. The sealer should be readily available for the purpose of after hour sealing within reason.
3. The sealer should be available to attend most race meetings in his or her state of residence where Group 3H are competing.
4. A component sealer must have a mechanical background. They should have a thorough knowledge of engine, gear box and differential building procedures, specifications and mechanical repairs.
5. They must be conversant with and be capable of using specific measuring devices for measuring such dimensions as bore, stroke of crankshafts, engine blocks, camshafts, cylinder heads and flywheels etc.
6. It is preferred that an appointed sealer not be a current competitor or have an allegiance or links to a current competing Group 3H racing team.
7. A component sealer will not have the authority to seal ANY Group 3H race car component the he or she has had any involvement in the assembly or repair of.
8. Component sealing and sealing procedures are to be in line with the current HQRA Technical Regulations manual.
9. A component sealer must keep a log of all seals, date and placement of the seal.
10. This log must be forwarded to the State based HQRA Delegate on a regular basis.
11. Distribution of component seals to the State appointed component sealers will be by liaison between the State Based HQRA Delegate and the National Technical Commissioner.
12. Cost of seals and sealing wire will be borne by the States controlling Group 3H body.

## 2. SEALING PROCEDURES

### 2.1 INTRODUCTION

The following scrutineering procedures apply to all racing HQ HOLDEN'S and must be carried out by registered sealers. On completion of scrutineering (ie: component assembly), approved seals, the only seals that shall be recognised for this purpose are 'Roto Seals', are to be secured by the sealer on the approved sealing wire, so as to ensure that key engine, transmission and differential parts cannot be modified or replaced without removing the seals. All relevant sealing documents must be made available upon request.

### 2.2 SCRUTINEERING OF ENGINES

All engine measurement must be carried out with the components at ambient temperature to avoid errors arising from differential expansion.

#### 2.2.1 CHECKING THE INTERNAL COMPONENTS OF THE ENGINE

Before assembling examine all parts for signs of modification, e.g. addition or removal of material, polishing, grinding etc., other than which is constant with normal automotive reconditioning procedures and balancing.

Check that all components comply with the regulations. It is not permitted to apply coatings to any component. Bead blasting is an accepted method of cleaning.

Connecting rods	(Standard).
Connecting rod bolts	(Standard).
Crankshaft	(Standard, other than reconditioning of journals and heat or chemical treatment).
Pistons	(Must be of non forged construction).
Valve Lifters	(Must be hydraulic operation, maximum diameter 0.8428").
Block	(Check that the block has not been angle planed).
Oil Strainer	(Is free, but the pick up tube is to remain unmodified above the strainer).
Bore (Max)	(3.694").
Stroke (Max)	(3.250").



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## 2.2.2 CYLINDER HEAD ASSEMBLY

Check cast numbers	2811930 / 9937262	
	Check that the head has not been angle planed.	
Valve guide bore	Inlet Min	0.3420"
	Exhaust Min	0.3430"
Valve head size	Inlet Max	1.675"
	Exhaust Max	1.375"
Valve Spring	One only.	
Rocker Arms & Bridges	Standard	

Valve head to combustion chamber wall dimension 0.125" Max

The valve guide boss must not be modified (*diagram 1/A*).

The area around the spring seat can be machined to obtain the correct height (*diagram 1/B*).

Under the valve seat check that the throating does not go beyond the valve guide boss (*diagram 1/C*).

Multiple or compound taper machining from the valve seat area towards the valve guide boss is not allowed. Machining of the throat must be a constant taper or parallel to the axis of the valve guide.

The valve guide boss may be machined to achieve a minimum O/A guide length of 2.0" (50.8mm). All machining must use the guide axis for the cutter. No further modification is permitted except for re-radiusing in the top of the throat. (*diagram 1/C*)

No burrs etc. formed by the cutters are to be removed by any means.

Examine closely the combustion chamber, the inlet and exhaust ports of the cylinder head to ensure that no modification, (other than which is permitted) has been carried out.

Where the throat meets the port a distinct edge is formed, it cannot be modified (*diagram 1/D*)

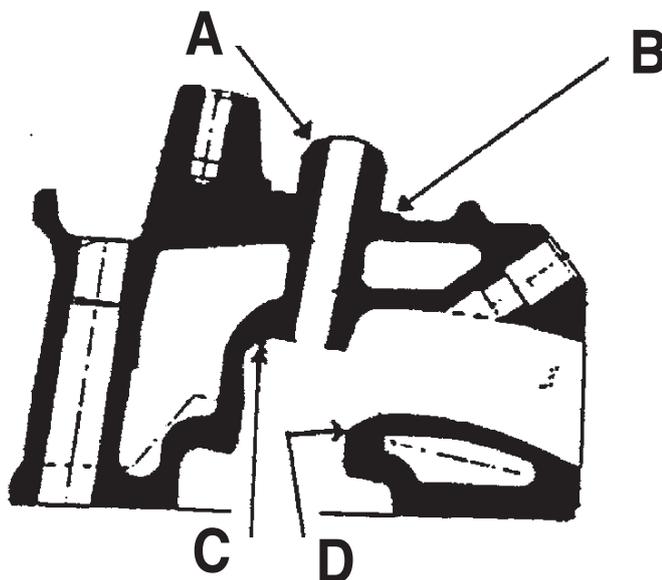


DIAGRAM 1

## UNSWEPT VOLUME PROCEDURE

- 1 Start with CLEAN (as in spotless) heads.
- 2 Be sure to use the same type of spark plugs for CCing that you intend to run.
- 3 Block the head up so that the head surface is flat and even.
- 4 Coat the periphery of the combustion chamber with grease – white heat-resisting brake grease is easy to see and works very well.
- 5 Place the HQRA approved Plexiglas plate over the chamber, with the hole on the high side and the counter sink up. Press evenly and firmly to insure a perfect seal.
- 6 Carefully assemble the burette, stand and clamp.
- 7 Using clean solvent with a couple of drops of food coloring as a measuring fluid, fill the burette to the “O” line. NOTE: The surface of the column of fluid will appear to be concave (or sunken) in the center. This is known as meniscus. For accurate results, align the marks on the burette with the lowest (sunken) portion of the fluid for all measurements.
- 8 With the burette positioned over the countersunk hole, and the head FIRMLY blocked, slowly open the stop-cock and begin filling the chamber. Watch for leaks at the seal of the plate and the head surface (this is where the white grease helps). If a leak develops, be very patient and START OVER.
- 9 Fill the chamber until the fluid just touches the BOTTOM of the hole. Be sure ALL air bubbles are out.
- 10 Carefully read and record the amount of liquid metered into the chamber. (Remember what was mentioned about meniscus.)

### 2.2.3 CHECKING OF CAMSHAFTS

*This check should be carried out by ALL engine sealers.*

**To carry out this check you will need the following:**

- 1 A dial indicator with magnetic base.
- 2 A plate that will mount onto the head using the rocker cover attaching studs.

**The following is the procedure to be used.**

- 1 Mount the plate on the side of the head so the dial indicator when sitting on the plate can reach the push rods of any cylinder.
- 2 From the cylinder you choose, remove the rocker arms and let the dial indicator rest on the inlet pushrod.
- 3 Turn the motor over so that you are sure the lobe of the cam is in the fully closed position.
- 4 Zero the dial indicator, turn the motor over in the correct direction of rotation until the indicator reads .035”.
- 5 Remove the indicator from the inlet valve pushrod and install it on the exhaust pushrod, zero the indicator, continue to rotate the motor until the indicator stops moving, it should read between .029” - .031”.

- 6 Alternatively you can use the measurement of .070” for the inlet valve and .010” for the exhaust.
- 7 If after carrying out the above check you cannot get the correct readings, contact WADE CAMS straight away.
- 8 In the event of any discrepancy, the camshaft is to be held by the engine sealer pending further action.

## 2.3 SCRUTINEERING OF GEARBOXES

Check the cluster Ratios	(Part NO. 7434307)		
	1st - 3.07:1	Teeth	17/27
	2nd - 1.68:1		23/20
	3rd - 1.00:1		29/15
	Rev. 3.59:1		
Extension housing	Standard 3 speed		
Bell housing	Late model bell housing can be used.		
<b><i>Check that there have been no modifications carried out.</i></b>			

## 2.4 SCRUTINEERING OF DIFFERENTIALS

Check that no modifications have been made to any of the diff gears or the diff gear carrier and also check that only one shim per sun/planetary gear is being used. The sun/planetary gears must rotate freely by hand prior to sealing of the diff and once the diff assembly is complete the suspended wheel must rotate freely at all times.

## 2.5 ATTACHING SEALS

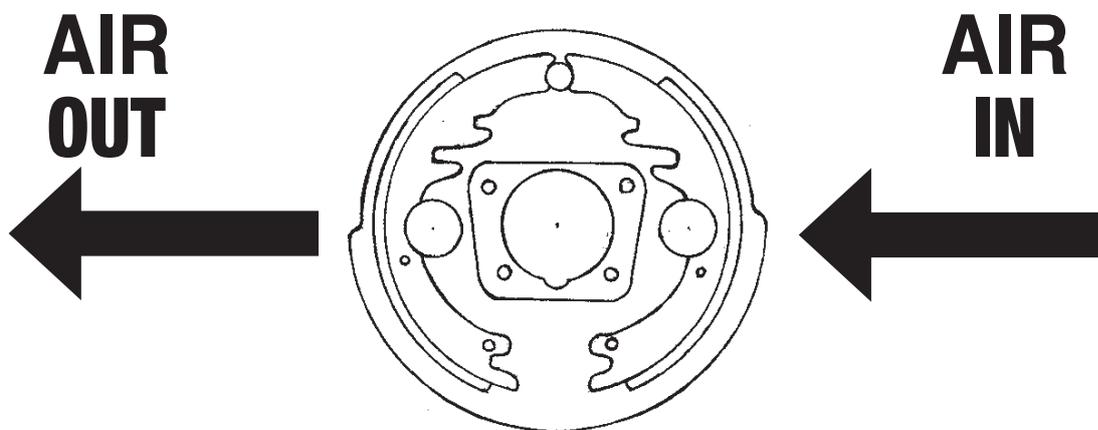
- 2.5.1 Seals are to be attached so that the wire is tight and the ends of the wire are tied inside the seal. The seal, and/or the part the seal is sealing on to the vehicle, are not to be able to be removed without breaking the seal.
- 2.5.2 Components to be sealed are;  
Engine(head, sump and camshaft) Gearbox and Differential.
- 2.5.3 When sealing the head, a hole is to be drilled through the casting, which is on the right hand side in the centre of the head. A hole will be drilled in the casting, which is situated between the side cover plates on the block. The sealing wire will be threaded through the hole in the head, twisted tightly and passed through the hole in the block, again twisted tightly and the seal is to be fitted with the ends in the seal.
- 2.5.4 To seal the sump on the right hand side, a hole is to be drilled in the cast web (vertical) of the engine mount front bolt, and a hole in the edge flange of the sump. Again a wire is to be threaded between these two components twisted

tightly and the seal fitted. To seal the sump on the left hand side do the same as above, but drill the front horizontal web, this makes it easier to read the seal when the motor is assembled and in the vehicle. Alternative methods of sealing sumps is acceptable save that the sump must be sealed on both sides.

- 2.5.5 To seal the camshaft, seal the timing cover on by drilling the heads of the two bolts located just below and to the drivers side of the water pump inlet OR seal the oil pump on by drilling the heads of two pump to block attaching bolts.
- 2.5.7 To seal the gearbox drill two holes in two side cover attaching bolts, or two bolts on the extension housing.
- 2.5.8 To seal the diff drill two holes in the retaining bolts/nuts on either the rear cover (Salisbury) or the retaining bolts (Banjo).

### 3. BRAKE DIAGRAMS

## Optional Rear Brake Cooling



Inlet and outlet holes will have metal removed by drilling or other suitable method to a maximum diameter of 40mm.

Centre line of inlet and outlet holes to be in line with center of backing plate in a horizontal plane plus or minus 10mm.

Centre of inlet and outlet holes to be 80mm from center of backing plate plus or minus 5mm.

Air inlet hole with 40mm OD tube welded to rear of backing plate. Length of tube between 40mm and 80mm, for inlet and/or outlet hole.

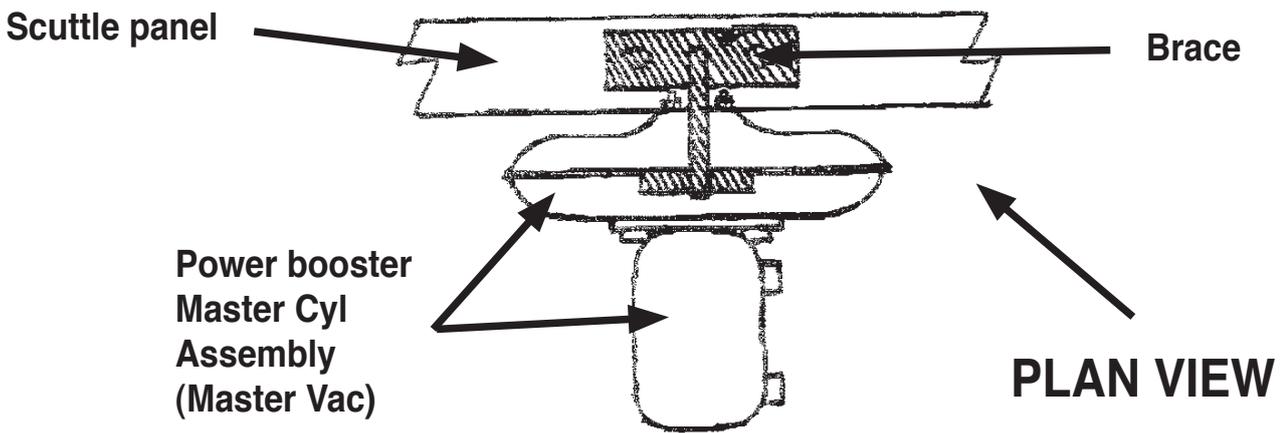
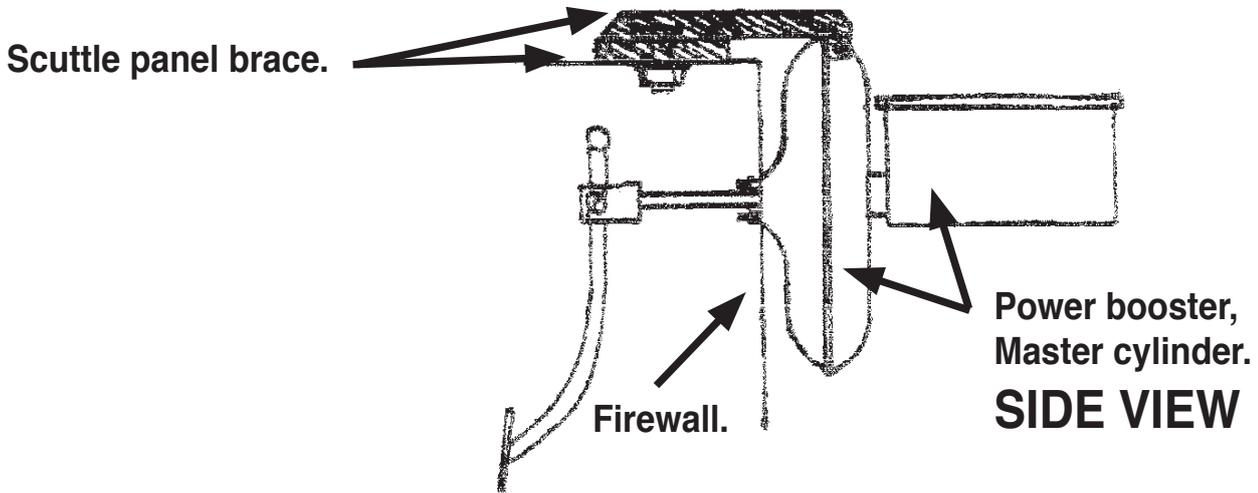
Optionally, the same specified area of inlet and outlet holes may be drilled with any combination of smaller holes to provide additional strength, although not necessary.

Brake ducting allowed to existing rule sizes. Suggested clamping point is to lower spring saddle area.

# Brake Booster Bracing

Fitment of a simple bracket is optional.

This diagram is the preferred design but not mandatory.



It is permitted to fit a brace to the scuttle panel to restrict movement of the power booster.

