

A DETAILED LOOK AT CARBURETOR REBUILDING FOR YOUR MG

June 20, 2022

MG 2022 — Peterborough, Ontario

We will cover:

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- **Things Common to ALL SU Carburetors**
- **HS2, HS4 & HS6 Carburetors**
- **HIF4 Carburetors**
- **H2 and H4 Series Carburetors**
- **Zenith Stromberg 150 CDSE and 175 CD5T
(because we can)**

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About Your Presenter



University of Minnesota Grad

Mechanical Engineer, registered in Minnesota

Delegated by FAA to approve aviation propulsion designs

Member of CCMGC, Austin, TX; MMGG, Minnesota

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www.dbraun99.com

Things Common to ALL SU Carburetors

Hints for Disassembly and Assembly

Dashpots and Dampers

Piston Springs (or Lack Thereof)

Overall Advice on Disassembly

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- ❑ **All of the fasteners are BSF, Whitworth, BA or BPT.**
- ❑ **Clean parts and then clean again.**
- ❑ **Never use abrasives on suction chamber and piston.**
- ❑ **Dress mounting flanges on belt sander.**
- ❑ **Inspect all parts before placing order.**
- ❑ **Take more pictures than you think you need.**

Overall Advice on Disassembly

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- ❑ **Never force anything**

- Use PB Blaster or other purpose made lubricant.
- Use Whitworth and BA wrenches; and Pozidriv bits.
- Throttle Screws: Use very close fitting screwdriver.
 - *Offer up blade, strike handle once with a light hammer.*
 - *Turn out screw and discard.*

- ❑ **A bench vise can be very helpful w/disassembly**

Overall Advice on Assembly

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- ❑ **Inspect your order when it arrives.**
- ❑ **Lubricate all threaded connections with 30W oil.**
- ❑ **Poor assembly? Take it apart and try again.**
- ❑ **Make all settings initially on the bench.**
 - **Floats; Jets; Idle Openings.**
- ❑ **Refer to your pictures as you reassemble.**

Overall Advice on Assembly

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- **Perform piston / suction chamber drop test**
 - Tape over holes in bottom of piston.
 - Tape over top of suction chamber if it is “Dustless”.
 - Drop suction chamber OFF piston onto soft towel.
 - -2 (1-1/4) or smaller: 3-5 seconds
 - -4 (1-1/2) and -6 (1-3/4): 5-7 seconds
 - -8 (2 inch): 7-10 seconds

Carburetor Dashpot

9

- **Purpose: to retard the rise of the piston in the suction chamber**
- Provides a richer mixture during acceleration

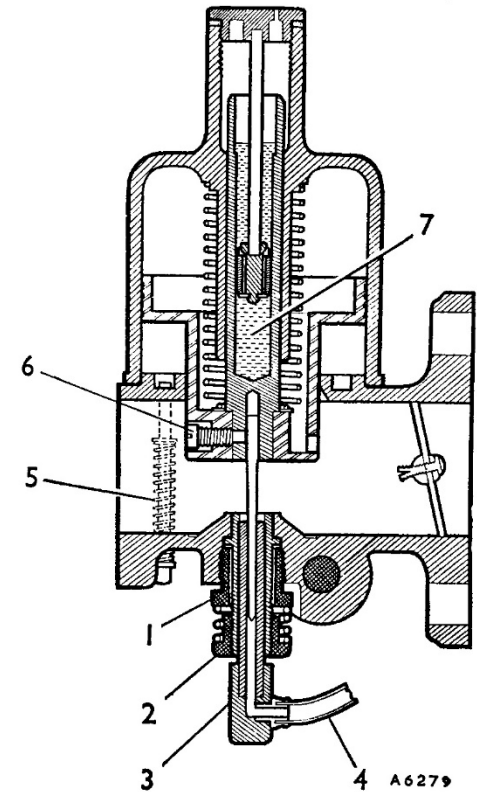


Fig. D.10
A sectional view of the HS4 carburetter

- | | |
|----------------------------------|---------------------------|
| 1. Jet locking nut. | 5. Piston lifting pin. |
| 2. Jet adjusting nut. | 6. Needle securing screw. |
| 3. Jet head. | 7. Oil damper reservoir. |
| 4. Feed tube from float-chamber. | |

Carburetor Dashpot

10

- **Purpose: to retard the rise of the piston in the suction chamber**
 - Provides a richer mixture during acceleration
 - Allows for leaner mixture during idle

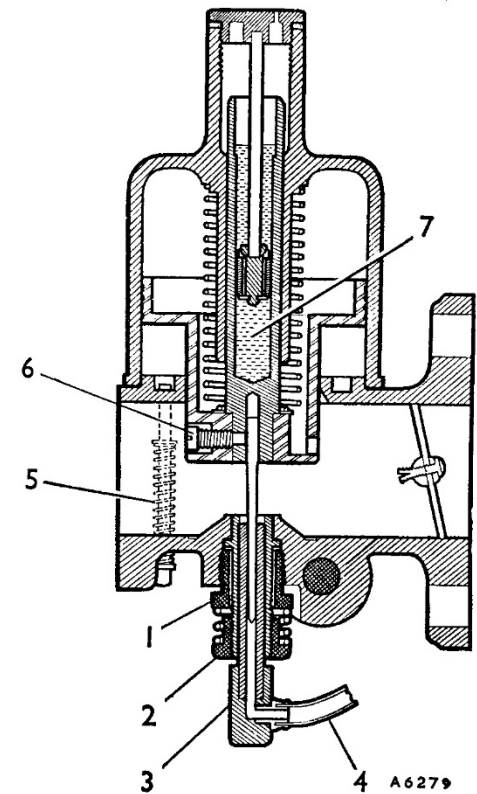


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Carburetor Dashpot

11

- **Purpose: to retard the rise of the piston in the suction chamber**
 - Provides a richer mixture during acceleration
 - Allows for leaner mixture during idle
 - Stabilizes flutter in idle in some cars

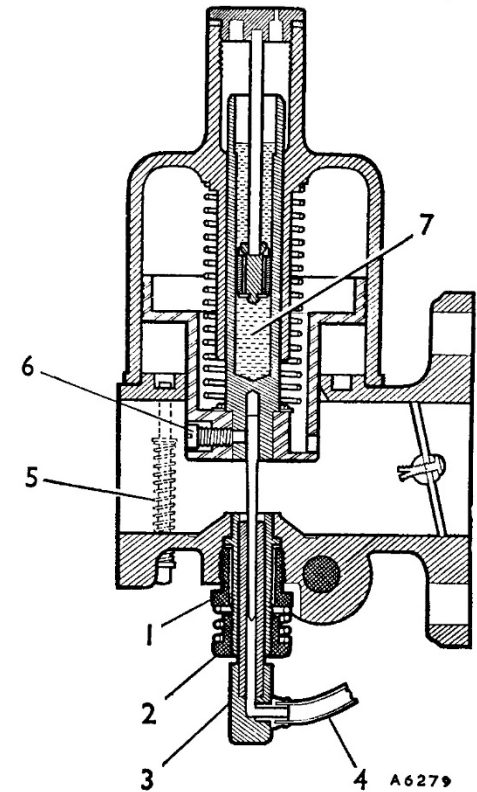


Fig. D.10
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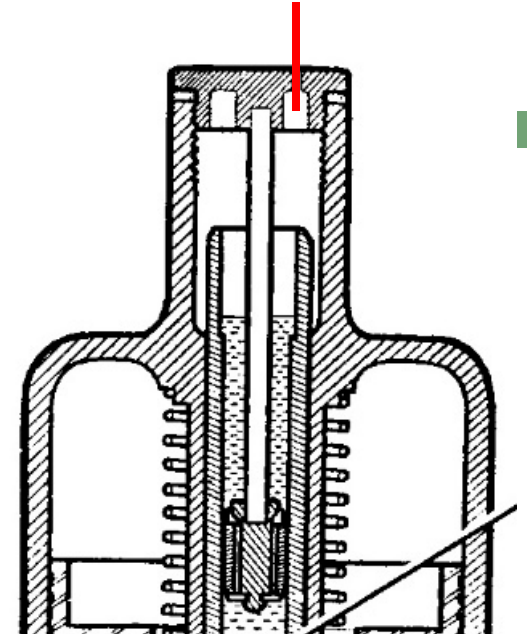
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Carburetor Damper

12

- **One way valve**

- Works with the dashpot to retard the rise of the piston.
- Must be 'vented' either at the top, or

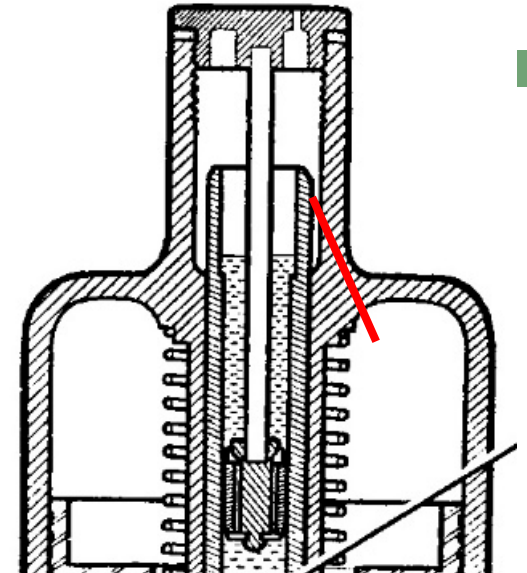


Carburetor Damper

13

□ One way valve

- Works with the dashpot to retard the rise of the piston.
- Must be 'vented' either at the top, or the suction chamber is vented through the 'lug'.

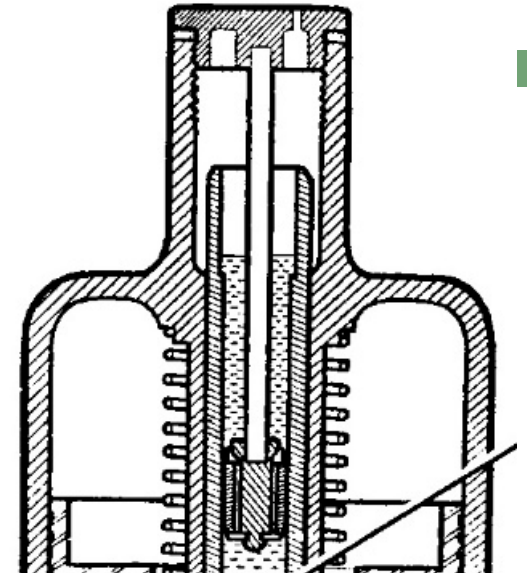


Carburetor Damper

14

□ One way valve

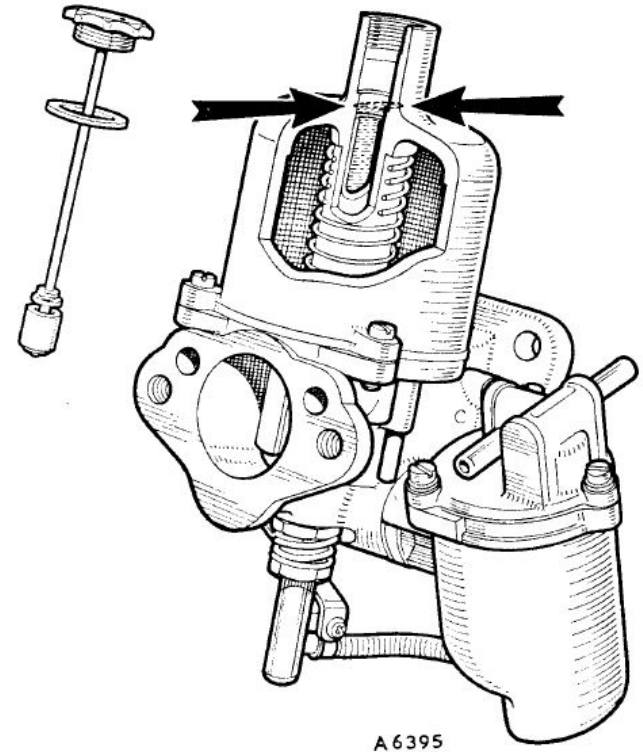
- Works with the dashpot to retard the rise of the piston.
- Must be 'vented' either at the top, or the suction chamber is vented through the side.
- Venting allows the pressure to bleed off during the rise.



Carburetor Dashpot Oils

15

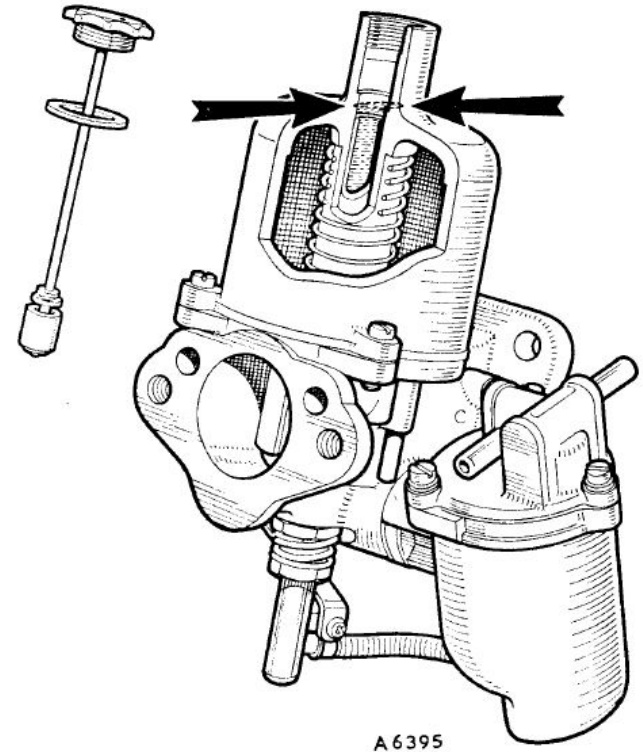
- **Check once per season**



Carburetor Dashpot Oils

16

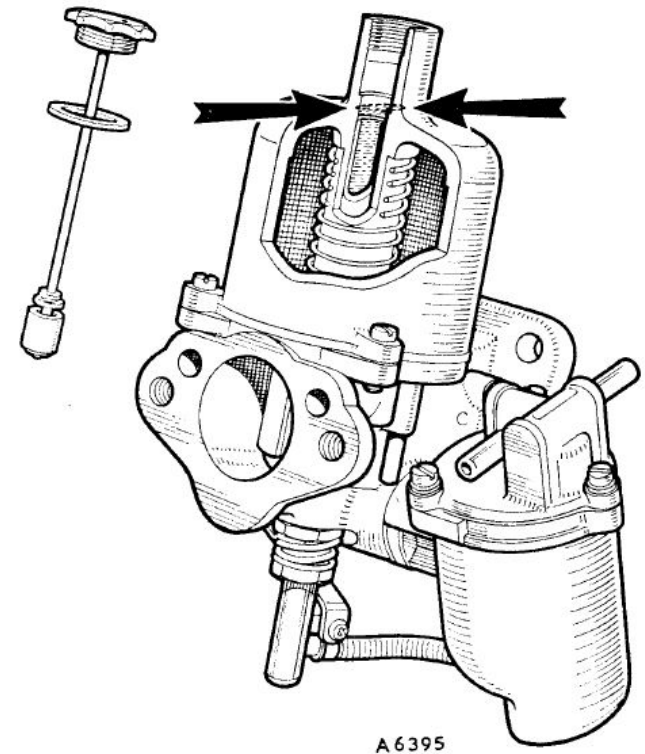
- **Check once per season**
- **How full is full?**
 - **1/2 inch from the screw threads**



Carburetor Dashpot Oils

17

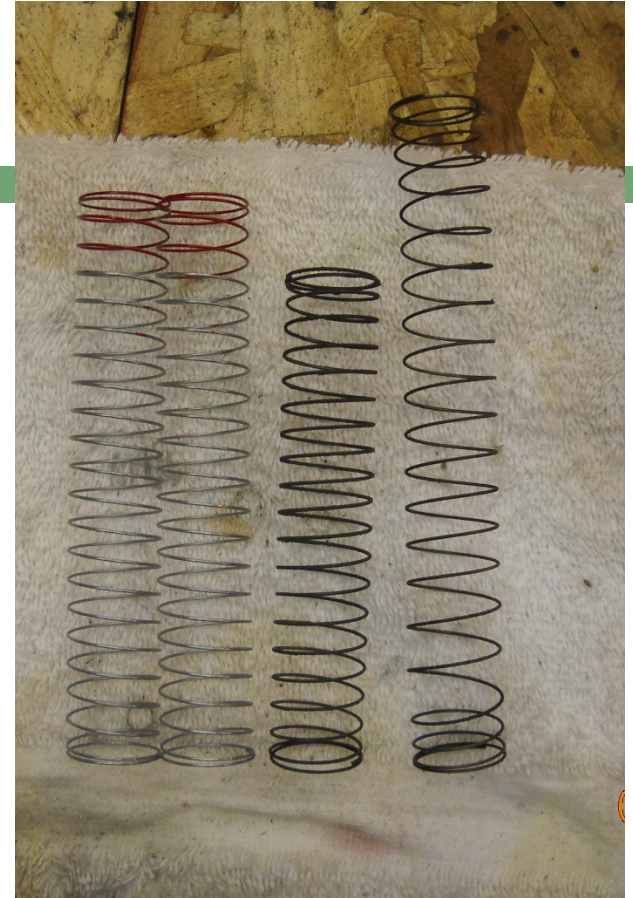
- **Check once per season**
- **How full is full?**
 - 1/2 inch from the screw threads
- **If you overfill?**
 - Lubricates piston assembly
 - Stabilizes with time
 - < an ounce



Piston Springs

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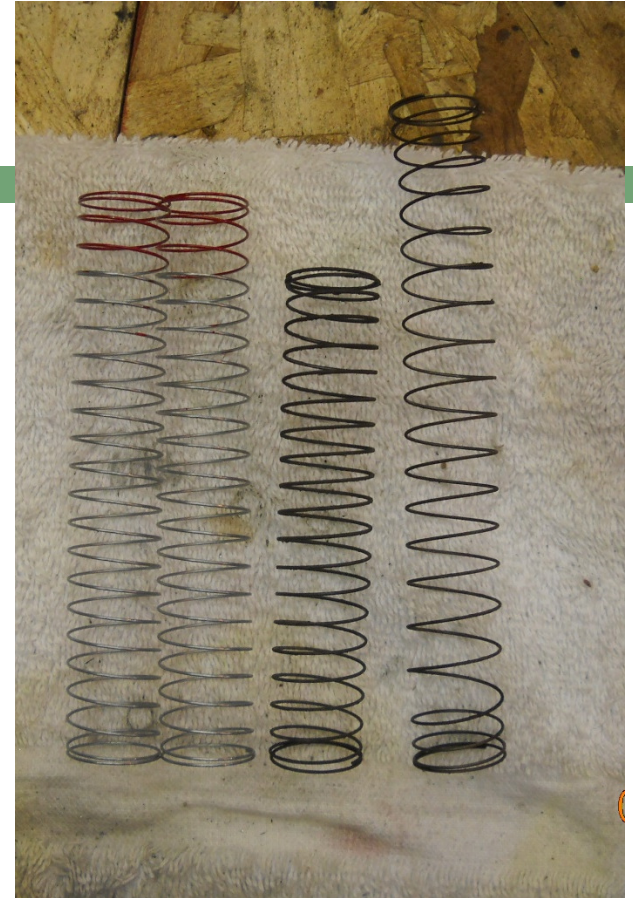
- **Compare on disassembly**
 - Yellow 8 oz @2-3/4 length
 - Red 4-1/2 oz @2-5/8 length
 - Blue 2-1/2 oz @2-5/8 length
 - Yellow on -6; Red on -4; Blue on -2



Piston Springs

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- **Compare on disassembly**
 - Yellow 8 oz @2-3/4 length
 - Red 4-1/2 oz @2-5/8 length
 - Blue 2-1/2 oz @2-5/8 length
 - Yellow on -6; Red on -4; Blue on -2
- **Springs Mimic Piston Weight**



Throttle Shaft Bushes

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- **Rebush throttle shafts**
 - ▣ Preferable to going oversize
 - ▣ Requires special reamers
 - ▣ DO NOT DRILL!
- **Rarely rebush HS2s**
- **HIFs have 'split' bushes**



Throttle Shaft Bushes

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- **Bush removing reamer**
 - Stepped 0.3720 (cutting) to 0.3100 (piloting)
 - A stop collar is installed to depth of bushing



Throttle Shaft Bushes

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- **Final bush reamer**
 - Stepped 0.3125 (cutting) to 0.3070 (piloting)



Needle Bias

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- **Centering Biased Needles**

- Needle always rides on edge of orifice.

- **Centering Non-Biased Needles**

- Use Special Tool -or-



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Needle Bias

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- **Centering Non-Biased Needles**
 - Install jet, needle and spring with suction chamber and piston.
 - Nearly tighten jet locking nut.
 - Check drop of piston, should 'thunk' against 'Bridge'.*
 - Tighten jet locking nut and confirm.



HS2 AUC990; AUD136; 266; 328; 404; 502; 549

AUC990 '61 – '62 Midget 948cc

AUD136 '63 – '67 Midget 1098cc

AUD266 '68 Midget 1275cc

AUD328 '69 Midget 1275cc

AUD404 '70 – '71 Midget 1275cc

AUD502 '72 Midget 1275cc “Early”

AUD549 '72 – '74 Midget 1275

“Horizontal, Short Body”

HS4 AUD52; 135; 265; 326; 405; 465

AUD52 '62 – '65 MGB

AUD135 '66 – '67 MGB

AUD265 '68 MGB

AUD326 '69 MGB

AUD405 and 465 '70 – '71 MGB

“Horizontal, Short Body”

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HS6 AUD287; 342

AUD287 '68 MGC

AUD342 '69 MGC

“Horizontal, Short Body”

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HS4



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HS4 Bodies

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- **Non-vented (Early); crankcase vented (Late)**



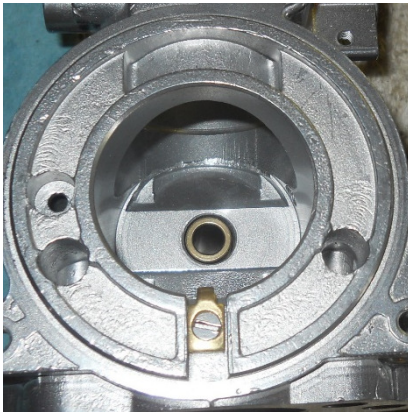
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Early – Fixed Needles (Also H Series)

30

- ❑ **Pistons to match**
- ❑ **Jet bearings to match**
- ❑ **Jet bearings “Adjustable”**



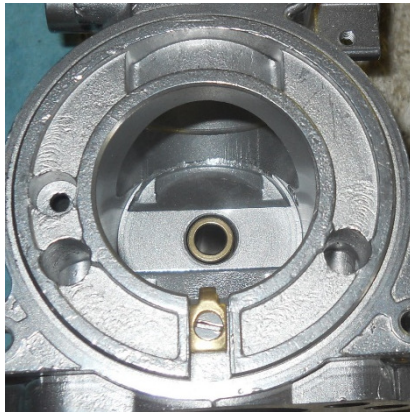
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Late – Biased Needles (Also on HIF)

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- ❑ **Pistons to match**
- ❑ **Jet bearings to match**
- ❑ **Jet bearings “Fixed”**



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Carburetor Damper

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- ❑ **One way valve**
 - Vented cap shown, without hole is called “Dustless”.
 - Cannot have both vented damper caps and vented suction chambers.
 - Some of the plastic caps have built in sealing surfaces.



Carburetor Damper

33

- **HS2 Midget carburetors**
 - Do not have webbed suction chambers, and therefore the caps are always vented.



HS Special Notes

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□ Piston Stops

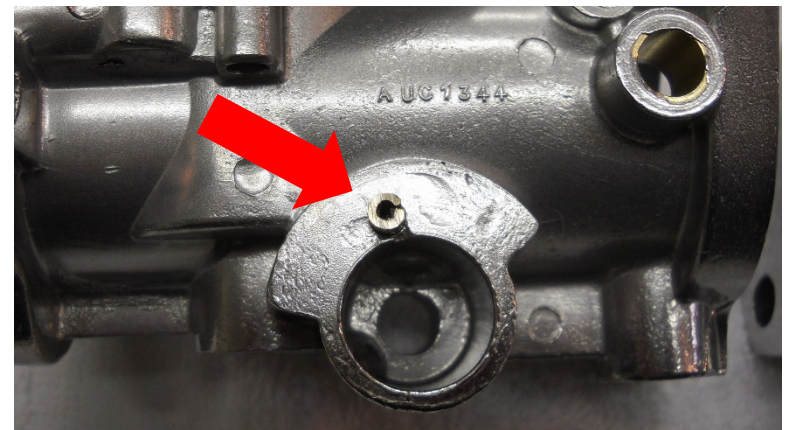
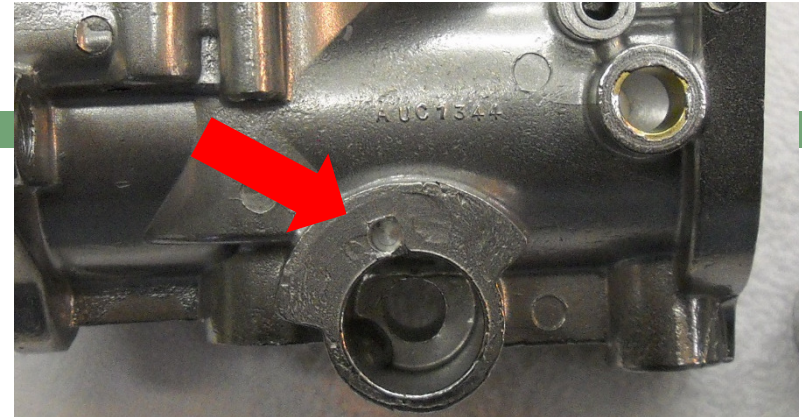
- Must stand proud of the piston
- Replace if not



HS Special Notes

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- ❑ **Broken Float Bowl Lugs**
 - ❑ Replace with 5/32 x 3/8 roll pin
- ❑ **Process**
 - ❑ Drill 5/32 hole 3/16 deep
 - ❑ Drive roll pin and set with LocTite



HS Special Notes

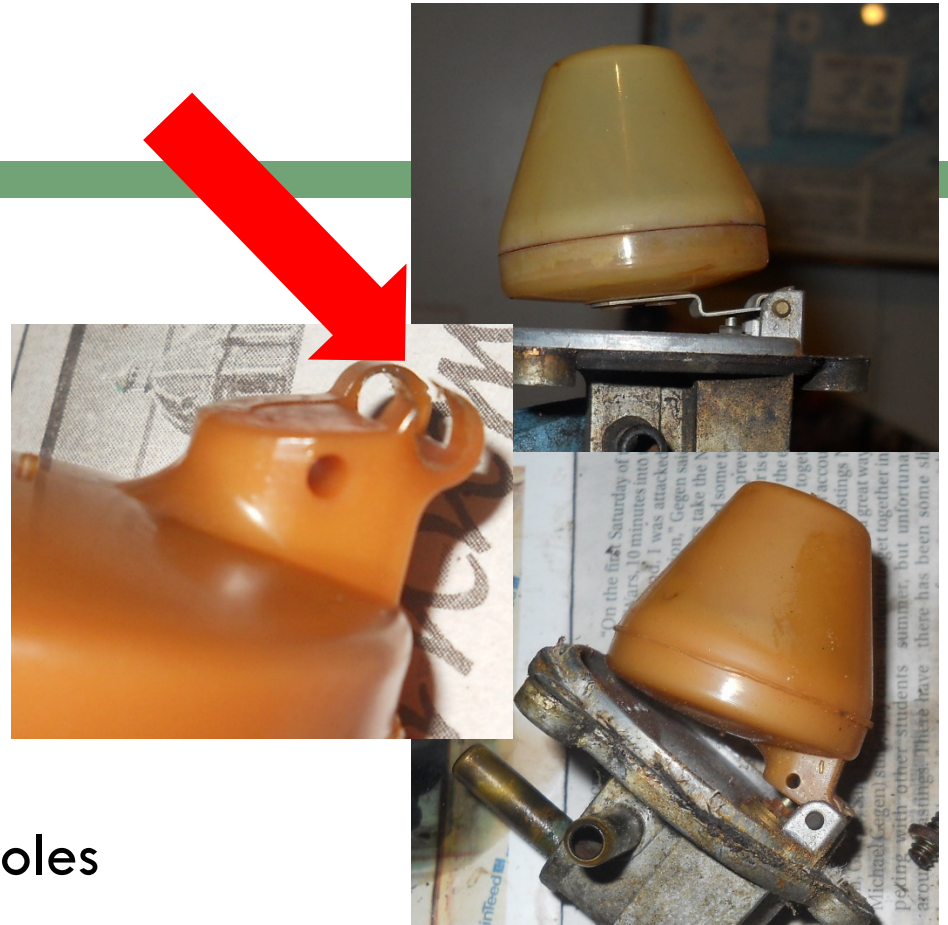
36

□ Floats

- Nylon with metal arm
- Nylon with Nylon arm
- “Stay-up” Nitrophyl 378-470
- Weigh 6.5-7.5g

□ Test in warm water

- Shake; inspect mounting holes



HS2 Vs. HS4

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- **Narrower Carburetor**
 - Enrichment linkage lacks the stand-off
 - Enrichment linkage attaches on near side of jet
 - No throttle shaft bushings in body (1/4 in Shafts)
 - No venting lugs on suction chamber



HS4 Disassembly and Assembly

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- ☐ Disassembly
- ☐ Assembly

HIF4 (38) AUD493; 550; 630

AUD493 '72 MGB

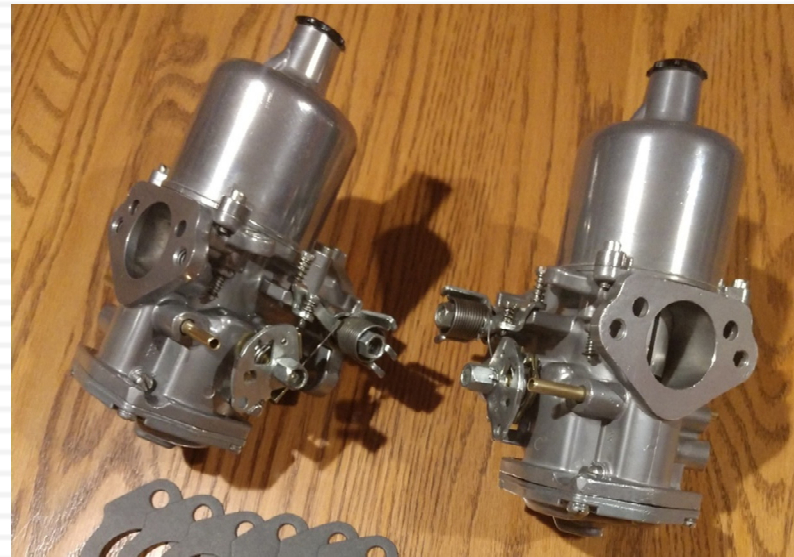
AUD550 '72 – '74 MGB

AUD630 '74 MGB

“Horizontal, Integral Float Chamber”

40

HIF4 (38) AUD493; 550; 630



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HIF Special Notes

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□ Floats

- Expensive
- Only Nylon available
- “Saddle” set 1mm below float chamber lip



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HIF Special Notes

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□ Floats

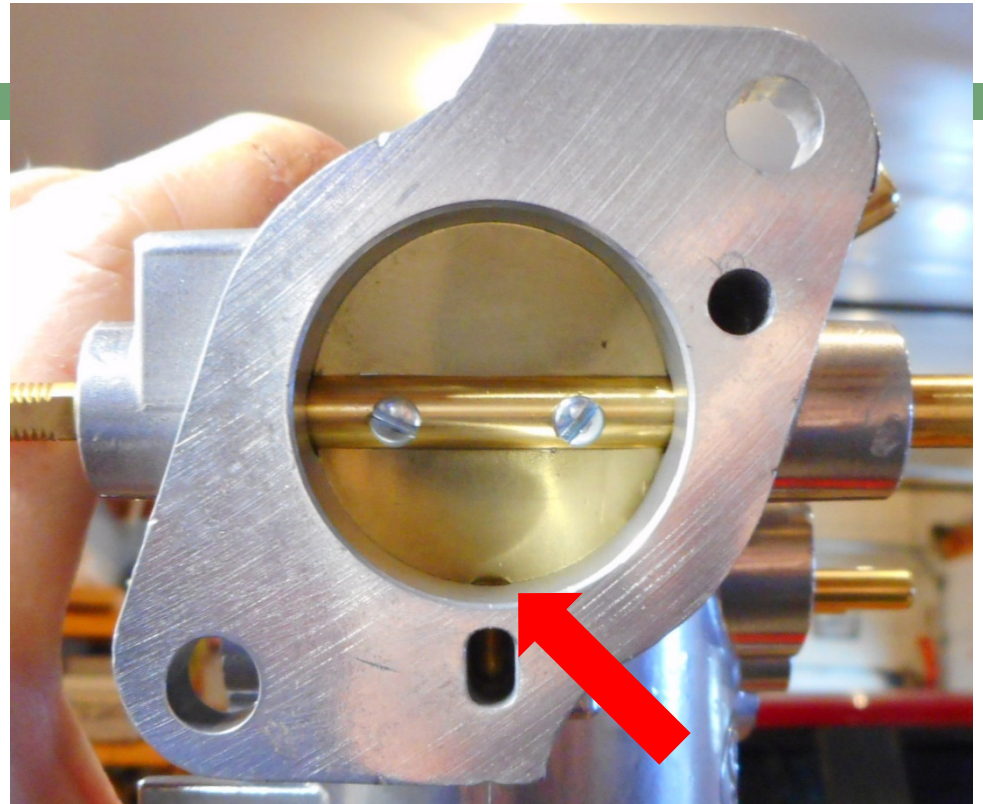
- Test in warm water.
- Hold them down
- Look for bubbles
- Shake
- Weigh 7-7.5g



HIF Special Notes

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- **Throttle Disks**
 - Slotted for protruding emulsion outlet.
 - Not slotted for flush emulsion outlet.



HIF Special Notes

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□ Part Throttle By-pass Emulsion System

- Slot in piston face
- Extended bridge with emulsion inlet

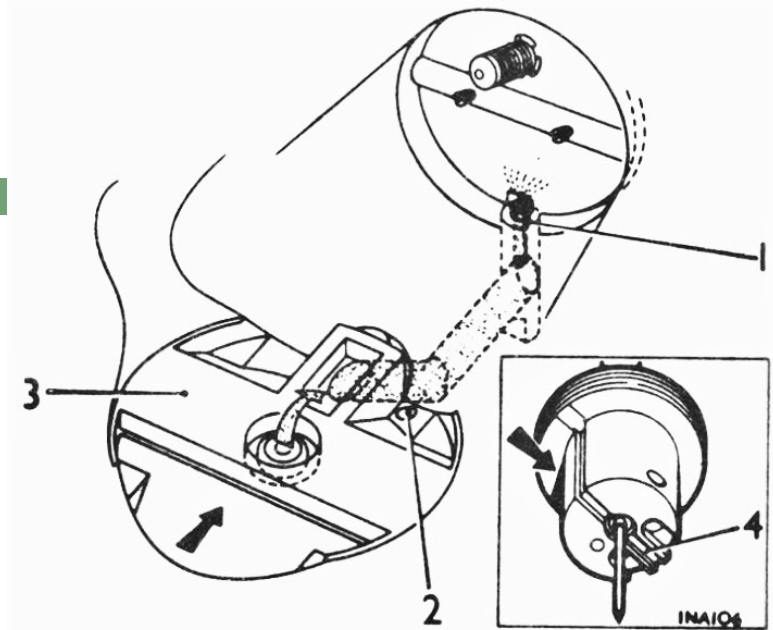


Fig. 77 – Part throttle by-pass emulsion system

1. *By-pass emulsion outlet*
2. *Cold start enrichment outlet*
3. *Carburettor bridge*
4. *Slot in piston*

HIF Special Notes

45

□ ***Split Throttle Shaft Bushes***

- Take care to stop inserting them before they protrude in the throat.
- Dust seals



HIF Special Notes

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- **Jets**

- Various forms



HIF Special Notes

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□ Jets

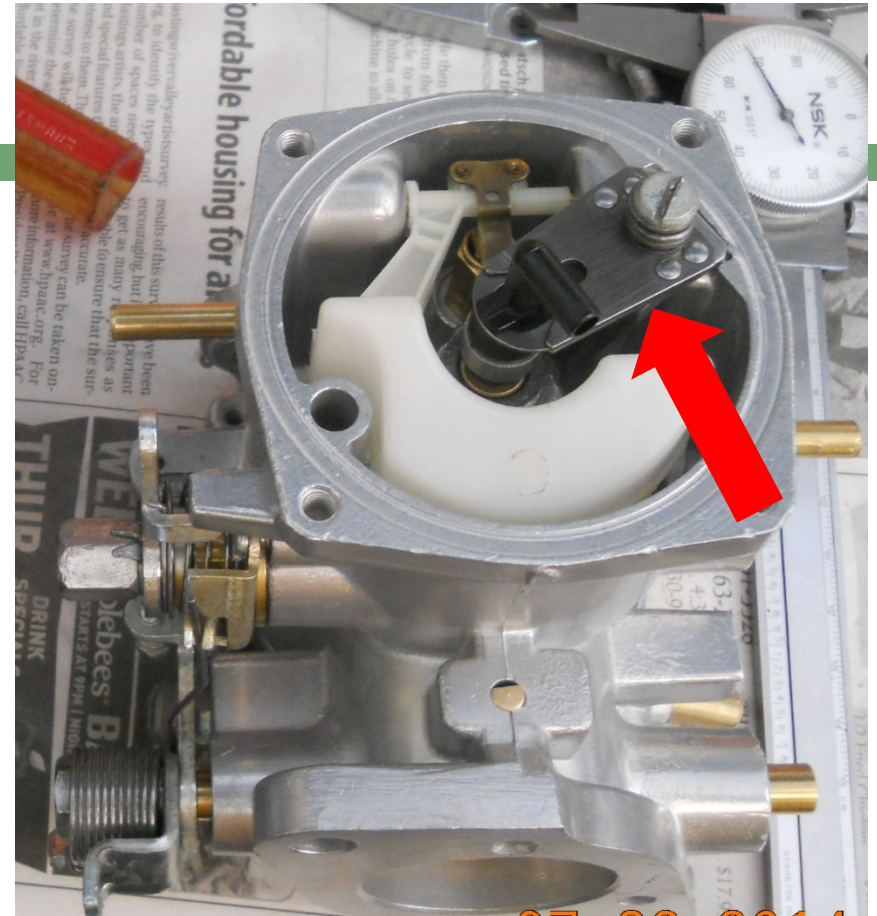
- Are “Handed” for interaction with bi-metallic arm and to clear float



HIF Special Notes

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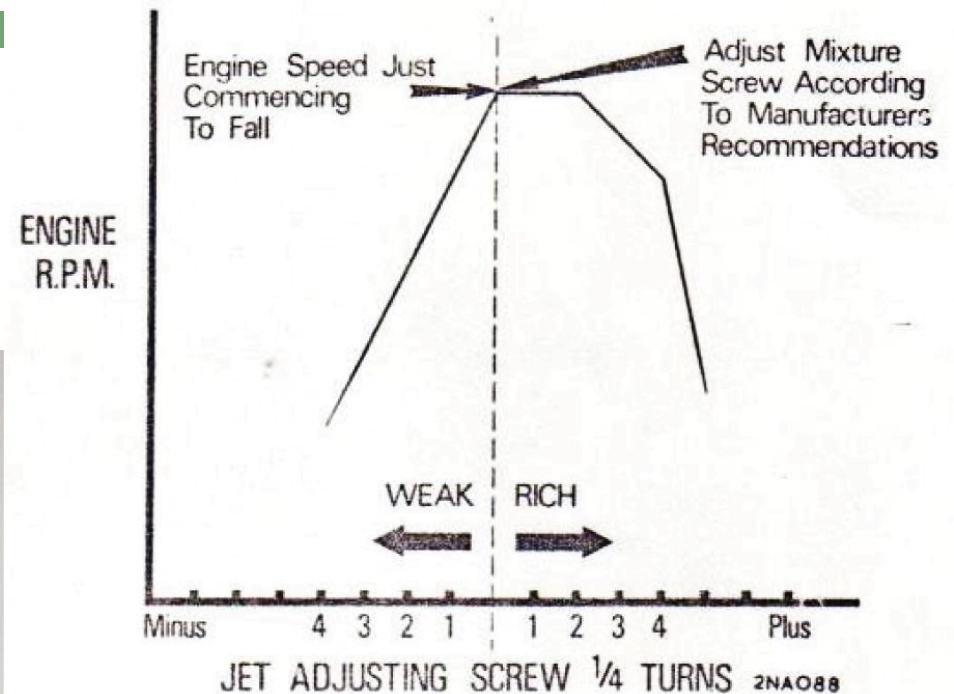
- **Temperature Compensating**
 - Senses fuel temperature
 - Density of fuel changes with temperature
 - Maintains stoichiometric A/F ratio



HIF Special Notes

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- **Setting HIF**
 - Engine compartment fully warmed up.



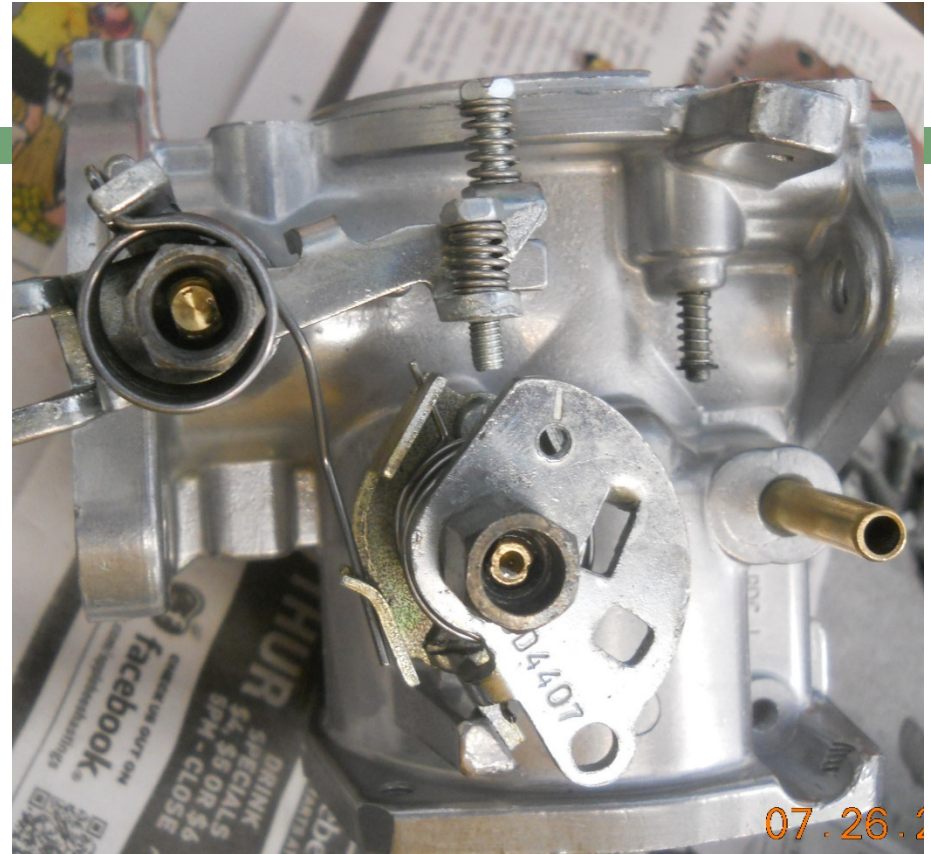
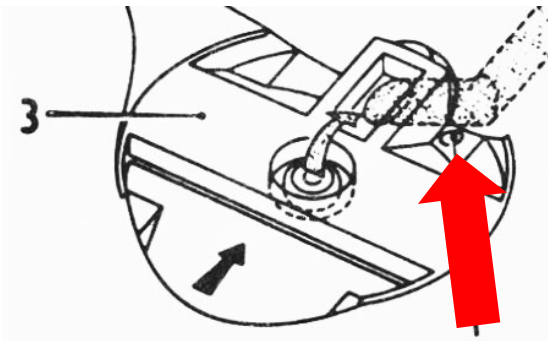
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HIF Special Notes

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- **“Choke” Enriches**
 - ▣ Doesn't drop jet
 - ▣ Provides extra fuel past bridge position.



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HIF4 (38) Disassembly and Assembly

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- Disassembly
- Assembly
- Ported vs. Manifold Vacuum

H2 and H4

H2 '39 – '55 TB, TC, TD

H4 '52 – '61 TD/C, TF, MGA, ZA, ZB

“Horizontal” (note: TF had a special short body)

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H2 and H4



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H Special Notes

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□ Float Bowl Attach

■ Three styles

- *Fiber washers with copper washers*



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H Special Notes

55

□ Float Bowl Attach

■ Three styles

- *Rubber isolators with steel washers*
- *Banjo bolts*



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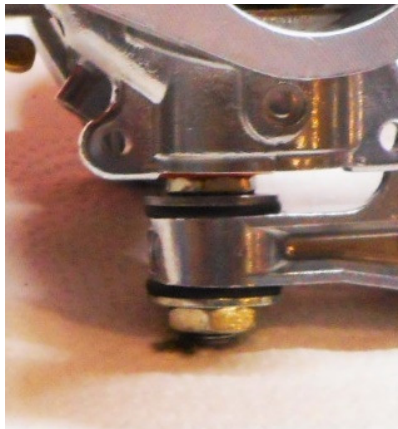
H Special Notes

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□ Float Bowl Attach

■ Three styles

- *Rubber isolators on banjo studs*
steel washers
- *Nuts*



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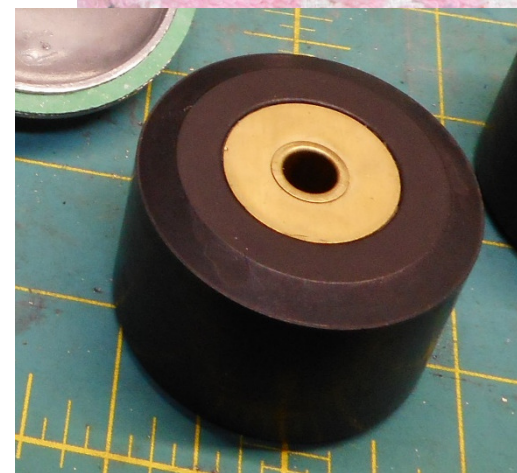
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H Special Notes

57

□ Floats

- Brass floats
- Often are work hardened
- Check every one
 - *Shake, immerse in warm water*
- Weigh 21 g
- Replace with Nitrophyl floats

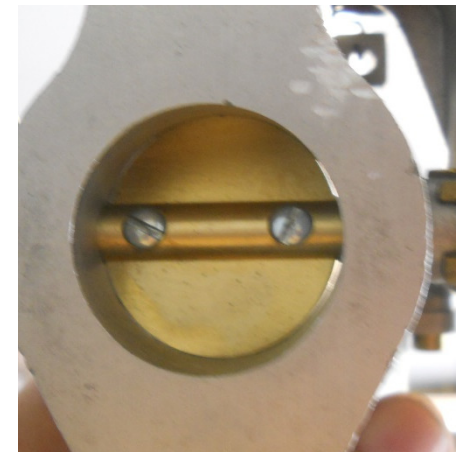


H Special Notes

58

□ H Series are Hard on Shafts

- The excessive spring return force wears on the shafts
- Destroys the bushing in the body
- Causes the disk to “Float” ruining the side edge



H Special Notes

59

□ Banjo Fittings

■ Float Bowl Lids

■ *Filters, inset grooves, fiber washers & non-standard hose banjo.*



H Special Notes

60

□ Jet Assembly

- Oil soak all cork and carbon impregnated cork jet seals for 24 hrs.

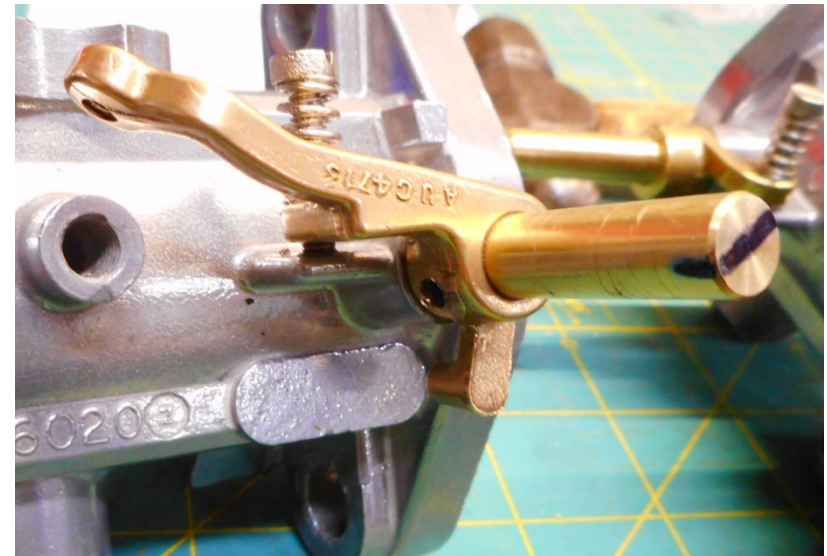
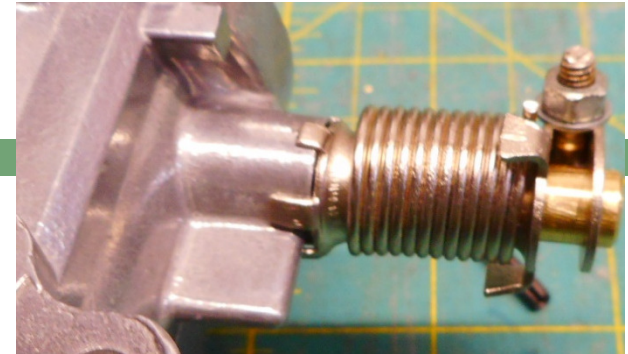
- *Assemble, and center jet*



H Special Notes

61

- **Pinning Throttle Shafts**
 - Position shafts and set spring clamps
 - *Align levers to be pinned*
 - *Install idle screws*
 - *Hand drill 1/8 hole to match sever*
 - *Install roll pin or original pin*



H Special Notes

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□ Linkages

- Unique to each size and type of carburetor
- Magnette and MGA very similar
- All T-Series very similar
- Take photos!



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H2 Disassembly and Assembly

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- ☐ Disassembly
- ☐ Assembly

150 CDSE C3754; 3755; 3838; 3963; 3962; 3963

C3754 '75 – '76 Midget Except CA

C3755 '75 – '76 Midget CA Only

C3838 '77 Midget Except CA

C3863 '77 Midget CA Only

C3962 '78 – Midget Except CA

C3963 '78 – Midget CA Only

“Constant Depression, Separate Metering Orifice for Cold Starts, Emissions”

175CD5T C3824; C3766; C3851

C3824 '75 – '76 MGB Except CA

C3766 '75 – '76 MGB CA Only

C3851 '77 – '80 MGB

“Constant Depression, Separate Metering
Orifice for Cold Starts, Emissions”

66

175CD5T and 150CDSE



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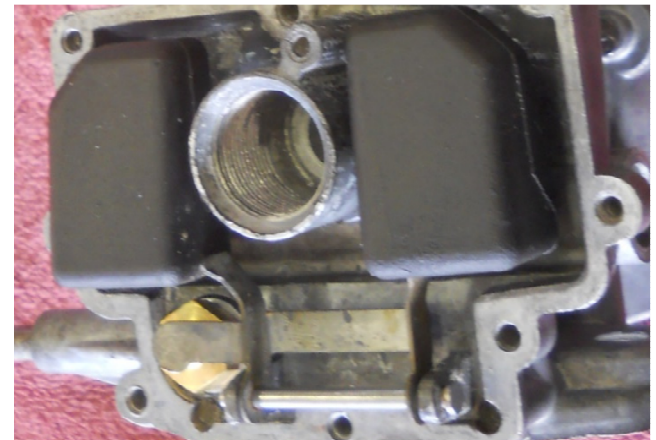
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CD Special Notes

67

□ Floats

- Expensive nylon available
- Inexpensive Nitrophyl available
- Check float in water!
- Weight ~13.5-18g
- Highest point of float above lip of body is 16 to 17mm

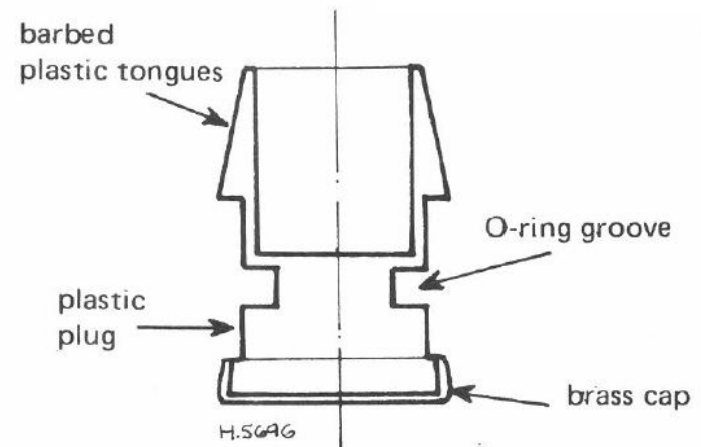


CD Special Notes

68

□ Adjustable Needle Float Plug

- Susceptible to heat from exhaust
- If O-ring perishes it will leak
 - *If it leaks your car will burn*
- Book warns not to remove...
 - *Nonsense, just take care with the Nylon barbs.*

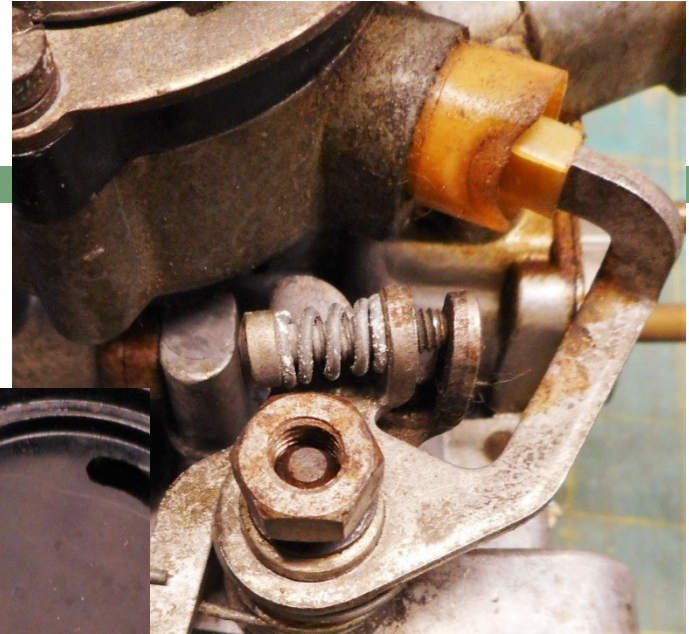


CD Special Notes

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□ Other Concerns

- All Nylon parts on carburetor are susceptible to damage due to heat from exhaust



CD Special Notes

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- **Throttle shafts subject to wear**
 - Spring return force
 - Results also in worn throttle disks



CD Special Notes

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- **Manual Choke is a Rotating Bar**
 - If water choke becomes unrepairable, it's an option



CD Special Notes

72

- **Body is full of passages**
 - Take care on your approach to cleaning.
 - I dip the bodies.
 - I NEVER tumble them.
 - I DO soda blast them.
 - I blow air throughout.



CD Special Notes

73

□ Float Chamber Screws

- Two short; four long
- First pass, tighten in a diagonal pattern, snug
- Then second pass tight.

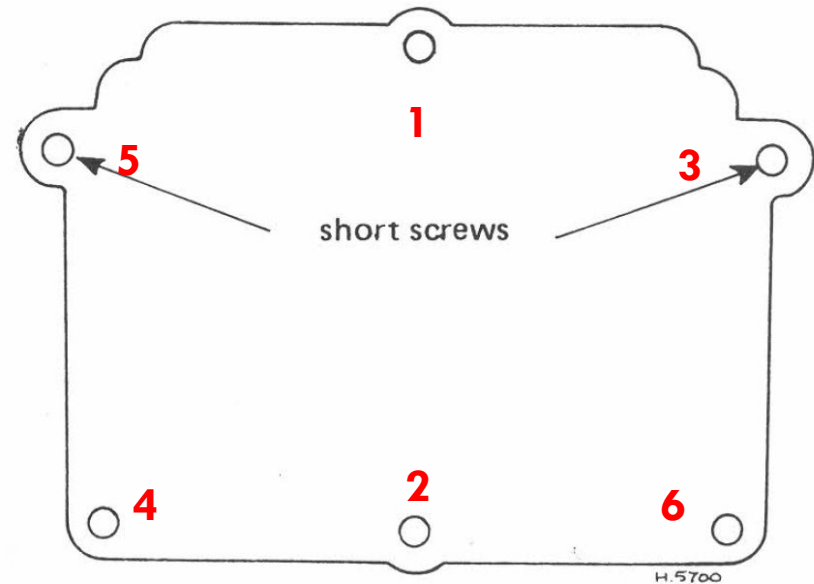
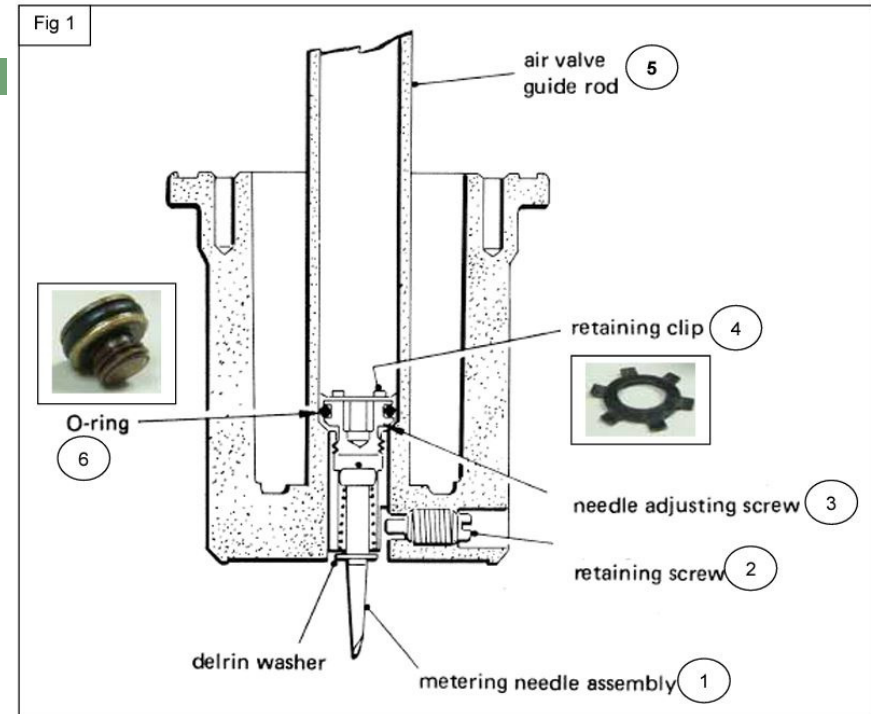


Fig. CDSE10 View of the underside of the float chamber, showing the order of tightening of the fixing screws

CD Special Notes

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- **Needle adjusting screw O-ring**
 - Can cause leakage of damper oil
- **Procedure:**
 - Remove needle
 - Drive up clip, adjusting screw, retainer using old throttle shaft
 - Fit new O-ring, lubricate with 30W
 - Hand press adjusting screw using old throttle shaft
 - Drop in retaining clip, hand press.



CD Special Notes

75

- ❑ **Rubber Diaphragm**
 - ❑ Takes the place of SU machined tolerances
 - ❑ Never spray carb cleaner into CD
 - ❑ Carry a diaphragm with you.
 - ❑ Install noting orientation notches.



CD Special Notes

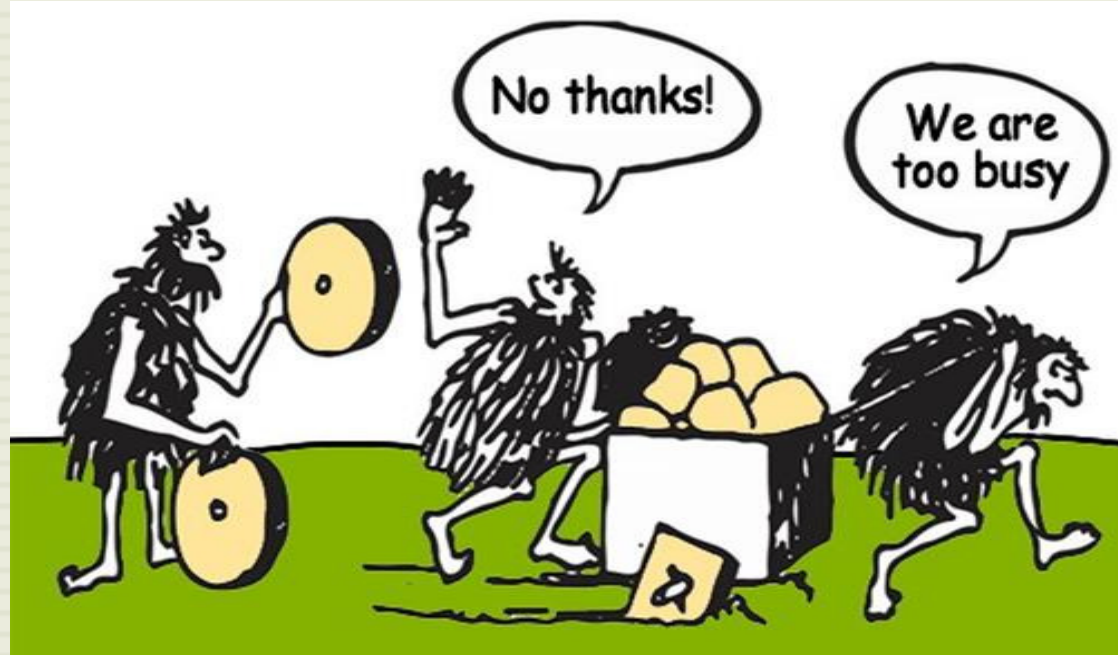
76

- **If out of sorts, they tend to run rich**
 - Exacerbates the “Hot Exhaust” issue with the nylon parts.
- **Typical Causes:**
 - Sooted air cleaner; leaks at exhaust manifold
 - Automatic choke loose of body or misadjusted
 - Choke lever and fast idle cam stuck partly open
 - Passageway for the vacuum kick piston is sooted
 - The carb mounting flange is warped

CD Disassembly and Assembly

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- ☐ Disassembly
- ☐ Assembly



78

Questions?

Thanks for attending!

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