CHAPTER FIVE

FUEL SYSTEM

The fuel system consists of a fuel tank, fuel lines, inline fuel filter, and carburetor(s).

All models are equipped with one of 2 types of carburetor, a Tillotson or Mikuni. Tillotson carburetors have an integral fuel pump. Mikuni carburetors are provided fuel through an auxiliary impulse fuel pump operating off differential pressure in the engine crankcase. An air silencer is fitted on some models to quiet incoming air and catch fuel that may spit back out of the carburetor.

This chapter covers removal, installation, and replacement and/or repair of carburetors, fuel pumps, inline filters, and fuel tanks. Carburetor tuning is covered in Chapter Two.

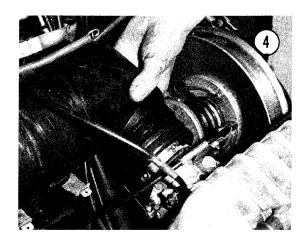
See **Table 1 or 2** at the end of the chapter for carburetor application and specifications.

TILLOTSON CARBURETOR

Three basic types of Tillotson carburetors are used: the HR, HD, and HRM. Refer to **Table 1** for model application. Refer to **Figures 1 and 2** for typical examples of HR and HD type carburetors. Refer to **Figure 3** for a typical example of HRM types.

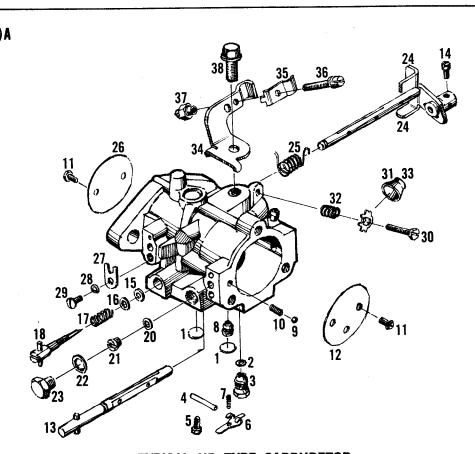
Removal/Installation

1. Remove air intake silencer (Figure 4) on models so equipped.



- 2. Disconnect throttle and choke cables from carburetor.
- 3. Disconnect fuel lines. Tag fuel line to aid installation.
- 4. Open tab locks (Figure 5) and remove nuts and washers securing carburetor to engine.
- 5. Remove carburetor with isolating sleeves and gaskets (**Figure 6**). If applicable, also remove isolating flange and gasket (**Figure 7**).
- 6. Installation is the reverse of these steps. Keep the following points in mind:
 - a. Longer fuel line is return line and is connected to outlet nipple on carburetor.
 - b. Perform carburetor adjustments as outlined in Chapter Two.

E



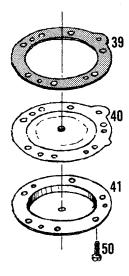
TYPICAL HR TYPE CARBURETOR

- 1. Welch plug
- 2. Inlet seat gasket
- 3. Inlet needle and seat
- 4. Fulcrum pin
- 5. Retaining screw
- 6. Fulcrum lever
- 7. Fulcrum lever spring
- 8. Main nozzle check valve
- 9. Friction ball
- 10. Friction spring
- 11. Shutter screw
- 12. Choke shutter
- 13. Choke shaft
- 14. Wire retaining screw
- 15. Packing
- 16. Washer
- 17. Adjusting screw spring
- 18. Idle mixture adjusting screw
- 19. High speed mixture adjusting screw
- 20. Main fuel jet gasket
- 21. Main fuel jet
- 22. Plug screw gasket
- 23. Main jet plug screw
- 24. Throttle shaft

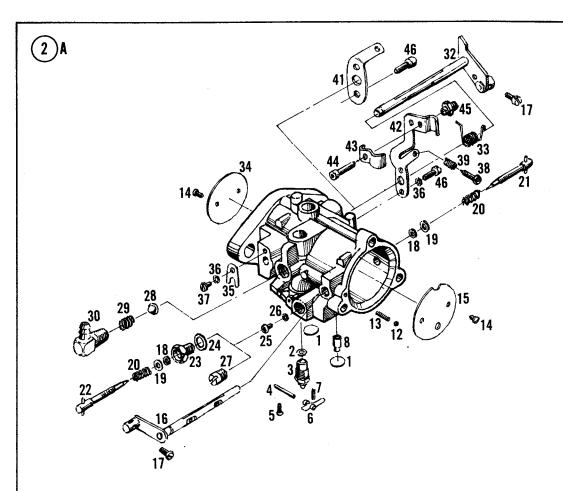
- 25. Throttle shaft spring
- 26. Throttle shutter
- 27. Throttle shaft clip
- 28. Lockwasher
- 29. Retaining screw
- 30. Idle speed adusting screw
- 31. Washer
- 32. Adjusting screw spring
- 33. Cup
- 34. Throttle cable bracket
- 35. Throttle cable clamp
- 36. Cable clamp retaining screw
- 37. Cable clamp retaining nut
- 38. Retaining screw and lockwasher
- 39. Diaphragm gasket
- 40. Metering diaphragm
- 41. Diaphragm cover
- 42. Fuel pump gasket
- 43. Fuel pump diaphragm
- 44. Fuel pump body
- 45. Inet valve gasket
- 46. Inlet valve diaphragm
- 47. Inlet valve body
- 48. Fuel strainer screen
- 49. Fuel strainer gasket

50. Body screw and lockwasher

WITH INTEGRATED FUEL PUMP



WITHOUT INTEGRATED FUEL PUMP

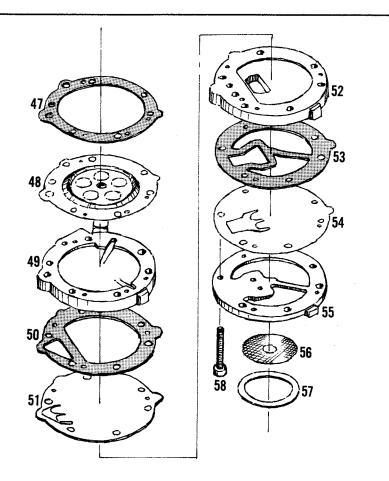


TYPICAL HD TYPE CARBURETOR

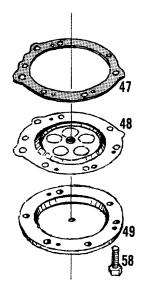
- 1. Welch plug
- 2. Inlet seat gasket
- 3. Inlet needle and seat
- 4. Fulcrum pin
- 5. Retaining screw
- 6. Fulcrum lever
- 7. Fulcrum lever spring
- 8. Main nozzle check valve
- 9. Main nozzle check valve/discharge tube
- 10. Lead shot
- 11. Intermediate nozzle check valve
- 12. Friction ball
- 13. Friction spring
- 14. Shutter screw
- 15. Choke shufter
- 16. Choke shaft
- 17. Wire retaining screw
- 18. Packing
- 19. Washer

- 20. Adjusting screw spring
- 21. Idle mixture adjusting screw
- 22. High speed mixture adjusting screw
- 23. Mixture screw gland
- 24. Fiber gasket
- 25. Main fuel jet
- 26. Main fuel jet gasket
- 27. Main fuel jet plug screw
- 28. Inlet screen
- 29. Inlet screen retaining spring
- 30. Fuel connector
- 31. Body channel plug screw
- 32. Throttle shaft
- 33. Throttle shaft spring
- 34. Throttle shutter
- 35. Throttle shaft clip 36. Lockwasher
- 37. Retaining screw
- 38. Idle speed screw

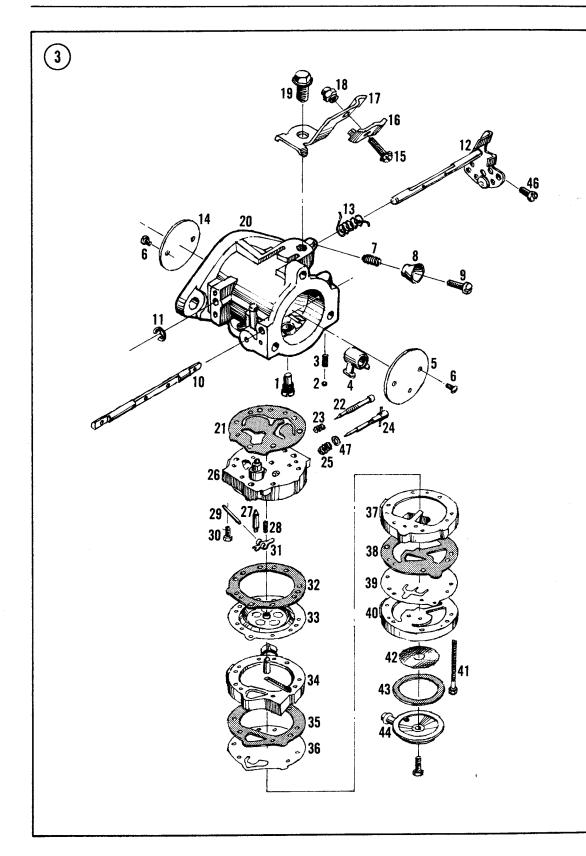
- 39. Idle speed screw spring
- 40. Idle speed screw cup
- 41. Idle speed screw gasket
- 42. Throttle cable bracket
- 43. Throttle cable clamp
- 44. Cable clamp retaining screw
- 45. Cable clamp retaining nut
- 46. Bracket retaining screw 47. Diaphragm gasket
- 48. Metering diaphragm
- 49. Diaphragm cover
- 50. Fuel pump gasket
- 51. Fuel pump diaphragm
- 52. Fuel pump body
- 53. Inlet valve gasket
- 54. Iniet valve diaphragm
- 55. Inlet valve body
- 56. Fuel strainer screen
- 57. Fuel strainer gasket 58. Body screw and lockwasher



WITH INTEGRATED FUEL PUMP

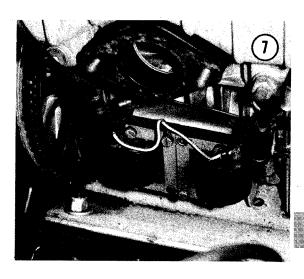


WITHOUT INTEGRATED FUEL PUMP



TYPICAL HRM TYPE CARBURETOR

- 1. Nozzle check valve
- *2. Friction ball
- *3. Spring
- 4. Primary venturi
- *5. Choke shutter
- *6. Screw
- 7. Spring
- 8. Cup
- 9. Idle speed screw
- *10. Choke shaft
- 11. Circlip
- 12. Throttle shaft
- 13. Spring
- 14. Throttle shutter
- *15. Screw
- *16. Throttle cable clamp
- *17. Throttle cable bracket
- *18. Nut
- *19. Bolt
- 20. Carburetor body
- 21. Adjuster
- 22. Idle mixture screw
- 23. Spring
- 24. High speed mixture screw
- 25. Spring
- 26. Adjustment module
- 27. Inlet needle
- 28. Inlet tension spring
- 29. Fulcrum pin
- 30. Retaining screw
- 31. Inlet control lever
- 32. Diaphragm gasket
- 33. Metering diaphragm
- 34. Diaphragm cover
- 35. Fuel pump gasket
- 36. Fuel pump diaphragm
- 37. Fuel pump body
- 38. Inlet valve gasket
- 39. Inlet valve diaphragm
- 40. Body screw and lockwasher
- 42. Fuel strainer screen
- 43. Cover gasket
- 44. Fuel strainer cover
- 45. Cover retaining screw
- 46. Cable retaining screw
- **47. Washer
- * Not applicable on HRM 5A
- ** Applicable only on HRM 5A and HRM 7A



Disassembly

Refer to Figure 1 and 2 for HD and HR types and Figure 3 for HRM type carburetors.

1. Clean exterior of carburetor with a non-flammable solvent.

CAUTION

Never use compressed air to clean an assembled carburetor or diaphragm may be damaged.

- 2. Carefully disassemble carburetor. Pay particular attention to location of different sized screws and springs.
- 3. If necessary to remove welch plugs from carburetor body, carefully pierce plug with a sharp tool such as an awl and pry plug out of carburetor.

CAUTION

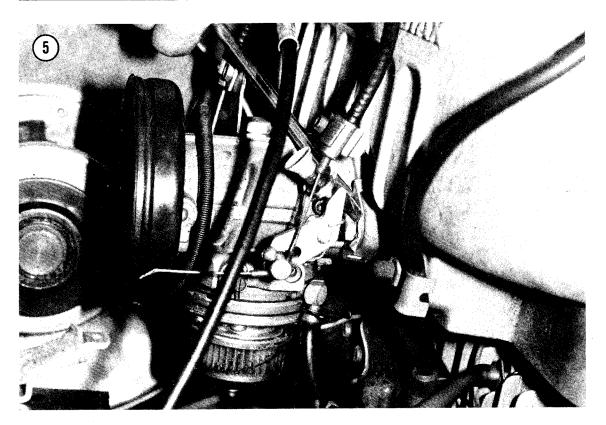
Exercise care when removing choke shaft or choke friction ball and spring may fly out and be lost.

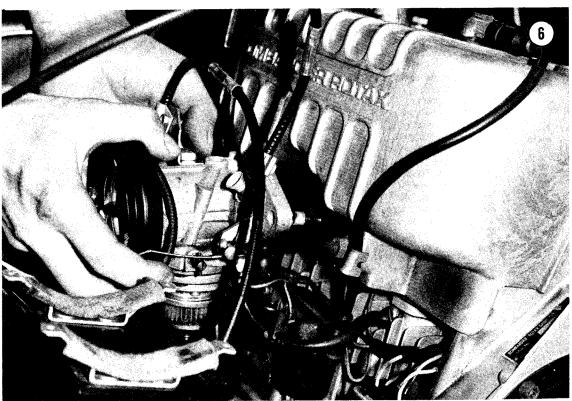
Carefully remove inlet control lever as it is spring loaded and can fly out when retainer screw is removed.

Main fuel jet has left-hand threads. To remove, turn jet clockwise.

- 4. If removing main nozzle check ball assembly (beneath welch plug), perform the following:
 - a. On HR type carburetors, unscrew main nozzle check ball assembly.
 - b. On HD type carburetors, use a small punch and gently tap out main nozzle check ball assembly.

CHAPTER FIVE





5. When carburetor is fully disassembled, perform *Cleaning and Inspection*.

Cleaning and Inspection

WARNING

Most carburetor cleaners are highly caustic. They must be handled with extreme care or skin burns and possible eye injury may result.

1. Clean all metallic parts in carburetor cleaning solvent. Do not place gaskets or diaphragms in solvent or they will be destroyed.

CAUTION

Never clean holes or passages with small drill bits or wire or a slight enlargement or burring of holes will result, drastically affecting carburetor performance.

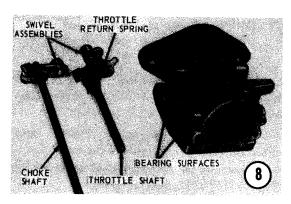
2. After cleaning carburetor parts, dry with compressed air. Make sure all holes are open and free of carbon and dirt.

NOTE: Do not use rags or wastepaper to dry parts. Lint may plug jets or channels and affect carburetor operation.

3. Inspect shaft bearing surfaces in carburetor body (Figure 8) for excessive wear.

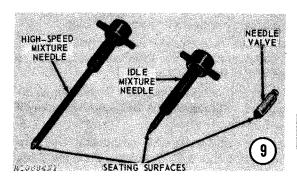
CAUTION

If excessive clearance is found between shafts and carburetor body, worn parts must be replaced. Excessive clearance will allow air to enter, causing a damaging lean mixture.

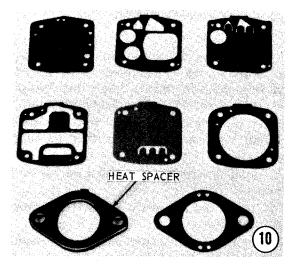


4. Inspect choke and throttle plates for damage. Inspect swivel assemblies on choke and throttle levers for wear. Inspect condition

- of throttle return spring. Replace all worn parts.
- 5. Inspect mixture needles and needle valve seating surfaces for pitting or wear (Figure 9) and replace if worn or damaged.



6. Inspect diaphragms for distortion, cracks, or punctures (Figure 10).



7. Inspect carburetor mounting gasket and heat spacer gasket.

Assembly

Refer to Figures 1 and 2 for HD and HR types and Figure 3 for HRM type carburetors.

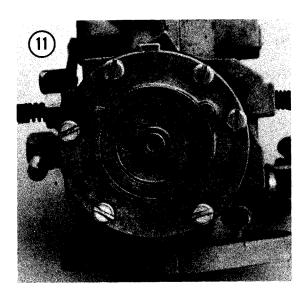
- 1. Install main nozzle check ball assembly (if removed) as follows:
 - a. On HR type carburetor screw assembly in carburetor body.
 - b. On HD type carburetor insert nozzle assembly in carburetor body until nozzle shoulder is flush with bottom of nozzle well.

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- 2. If welch plugs were removed, install new plugs (convex side up) and tap plug with hammer and punch until plug is flat. Ensure that plug completely seals opening.
- 3. Place spring, washer, and packing on idle speed mixture screw and install in carburetor. Lubricate packing with petroleum jelly.
- 4. Install high-speed needle with spring, washer, and packing. Lubricate packing with petroleum jelly.
- 5. On HR and HD types with fixed main jet install jet with gasket and turn *counterclockwise* to tighten.
- 6. Insert choke friction spring and ball into carburetor and hold in position while installing choke shaft.

NOTE: On HRM carburetors install primary venturi with largest section toward front of carburetor.

- 7. Insert choke shutter on shaft and turn shaft to center shutter in carburetor body. Secure choke shutter with screws. Ensure that hole on shutter is down and mark on shutter faces out.
- 8. Install throttle shaft part way. Connect throttle shaft spring and turn shaft one turn clockwise and finish installing shaft.
- 9. Install idle speed screw bracket on HD carburetor.
- 10. Install throttle shaft retainer clip and secure with screw.
- 11. Insert throttle shutter into throttle shaft with location mark facing out. Close throttle shaft to center shutter in carburetor body and secure shutter with 2 screws.
- 12. Install inlet needle seat with thin wall socket. Torque seat to 25-30 in.-lb. (29-35 cmkg) on HR types and 40-45 in.-lb. (46-52 cmkg) on HD type carburetors.
- 13. Install needle seat and inlet control lever. Secure control lever with retaining screw. Adjust inlet control lever so that center of lever that contacts metering diaphragm is flush with metering chamber wall.
- 14. Assembly pump diaphragm assembly. Install assembly to carburetor and tighten 6 screws evenly in a crisscross pattern (Figure 11).



15. Install fuel inlet strainer cover with strainer screen to diaphragm pump body and secure with screw.

MIKUNI CARBURETOR

Refer to Table 2 for model application.

Removal/Installation

- 1. Remove air filter.
- 2. Disconnect fuel and primer lines.
- 3. Unscrew throttle chamber cover and carefully slide throttle slide assembly from carburetor (Figure 12).

NOTE: If carburetor is being removed for cleaning or repair, disconnect throttle cable from throttle slide and remove throttle slide assembly. Note and record what notch E-ring is located in on jet needles to aid installation.

- 4. Remove drain plug from bottom of float chamber and drain fuel into a suitable container. Install drain plug.
- 5. Loosen clamp securing carburetor and remove carburetor from rubber mount.
- 6. Installation is the reverse of these steps. Keep the following points in mind:
 - a. Install E-ring on jet needle in same position noted during removal.
 - b. Ensure that float level is correct. Refer to *Assembly*.

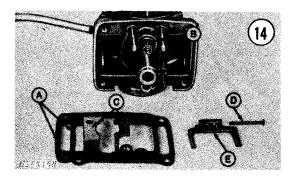


c. Perform carburetor adjustments as outlined in Chapter Two.

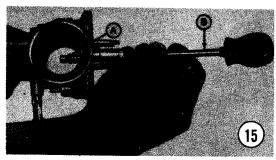
Disassembly

Refer to Figure 13 for this procedure.

- 1. Remove throttle stop screw and spring.
- 2. Remove air screw and spring.
- 3. Remove float chamber as shown in Figure 14. Gently lift out floats from mixing chamber body.



- A. Gaskets
 B. Inlet needle
 valve assembly
- C. Baffle plate
 D. Float air pin
- valve assembly E. Float arm
- 4. Using a 6mm socket or box end wrench, gently remove main jet and ring.
- 5. Remove float arm pin and float arm. Lift off baffle plate and gaskets (Figure 14).
- 6. Gently remove inlet needle valve assembly with washer.
- 7. Gently push needle jet from mixing chamber using an awl or similar sharp pointed device. See Figure 15.



A. Needle jet

B. Awl

Cleaning and Inspection

WARNING

Most carburetor cleaners are highly caustic. They must be handled with extreme care or skin burns and possible eye injury may result.

1. Clean all metallic parts in carburetor cleaning solvent. Do not place gaskets in solvent or they will be destroyed.

CAUTION

Never clean holes or passages with small drill bits or wire or a slight enlargement or burring of hole will result, drastically affecting carburetor performance.

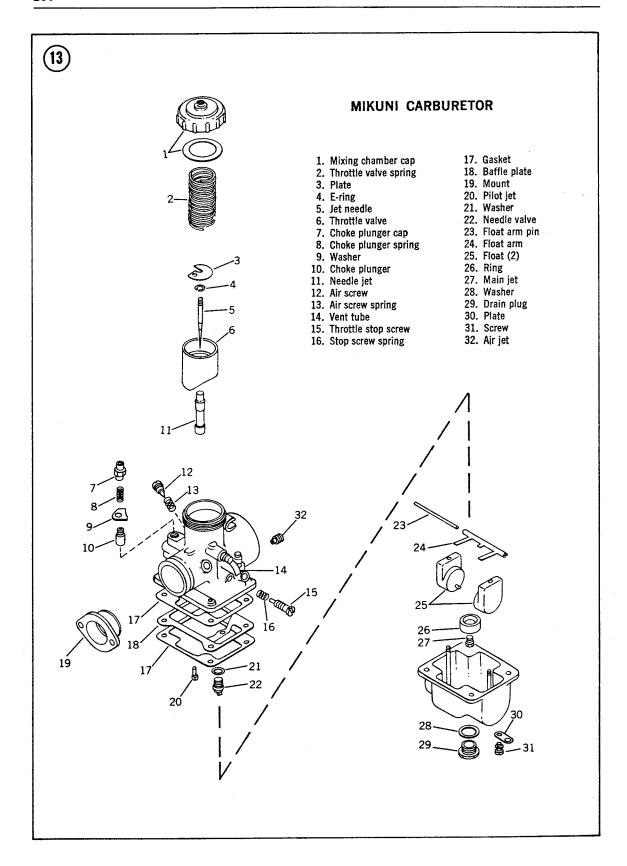
- 2. Inspect float chamber and mixing chamber body for fine cracks or evidence of fuel leaks.
- 3. Check spring for distortion or damage.
- 4. Inspect air screw and throttle stop screw for surface damage or stripped threads.
- 5. Inspect pilot jet and main jet for damage or stripped threads.

CAUTION

Pilot jet and main jet must be scrupulously clean and shiny. Any burring, roughness, or abrasion will cause a lean fuel and air mixture and possible engine damage.

- 6. Remove retainer and inlet valve from valve seat. Carefully examine seating surface on inlet valve and seat for damage. Ensure that retainer does not bind and hinder movement of inlet valve.
- 7. Inspect jet needle and needle jet for damage. Jet needle must slide freely within needle jet.

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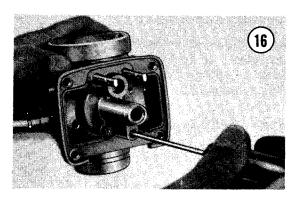
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- 8. Install float guides in float chamber. Move floats up and down several times to ensure that they are not binding on float guides.
- 9. Inspect float arm and float pin to ensure that float arm does not bind on pin.
- 10. Inspect choke plunger. Plunger must move freely in passage of mixing chamber.
- 11. Install throttle valve in mixing chamber body and move several times up and down to check for sticking motion or wear. Ensure that guide pin in mixing chamber body is not broken.

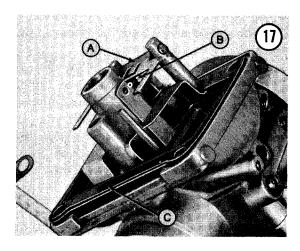
Assembly

Refer to **Figure 13** for this procedure.

1. Using a small screwdriver, install pilot jet in carburetor body as shown in **Figure 16**.



2. Install gaskets and baffle plate on mixing chamber surface (**Figure 17**). Install second gasket on top of baffle plate.

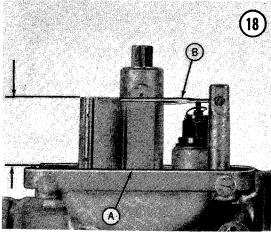


A. Float arm

B. Inlet valve

C. Baffle plate and gaskets

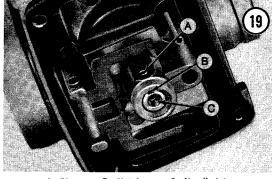
- 3. Place washer on inlet needle valve seat and install seat in mixing chamber body (**Figure 17**). Install inlet valve (point down) and retainer.
- 4. Install float arm and secure float arm with float arm pin.
- 5. Invert carburetor body. Edge of mixing chamber (Figure 18) must be 23-24mm (0.90-0.94 in.) from float arm. Adjust if necessary by bending float arm actuating tab.



A. Mixing chamber

B. Float arm

6. Install needle jet. Make sure notch on needle jet is correctly aligned with pin on bore of mixing chamber (Figure 19). Install ring over needle jet bore (recess in ring next to bore) and screw main jet into needle jet.

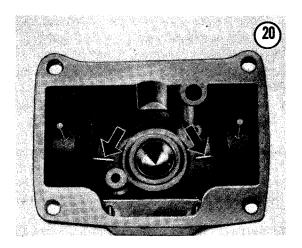


A. Pin

B. Notch

C. Needle jet

- 7. Slide floats over float pin. Pins on float must be down and point to inside of float chamber as shown in **Figure 20**.
- 8. Install float chamber to mixing chamber body and secure with 4 screws.



9. Slide air screw spring over air screw and install air screw gently.

CAUTION

Do not force air screw or seat damage may occur.

10. Install throttle stop screw with spring. Install screw until it is just flush with inside of bore.

AIR INTAKE SILENCERS

Air intake silencers are installed on snow-mobiles to quiet the sound of rushing air and to catch fuel that spits back out of the carburetor throat. Refer to Figures 21, 22, 23, and 24 for typical examples.

The silencer is not intended to filter incoming air. Operate snowmobiles only in clean, snow covered areas.

CAUTION

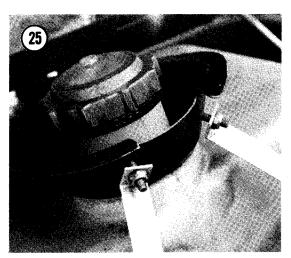
Do not operate snowmobile with silencer removed. Loss of power and engine damage may result due to a leaner mixture.

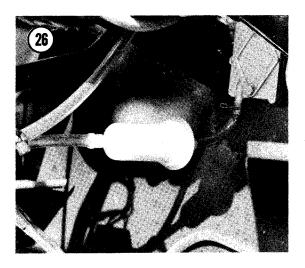
Service of air intake silencers is limited to removal and cleaning of components.

FUEL TANK

Refer to Figures 21, 22, 23, and 24 for typical fuel tank installations.

NOTE: On 1970 Olympiques and some T'NT models, the fuel tank is built in. Service is limited to draining tank and removing fuel lines and fuel line adaptor.



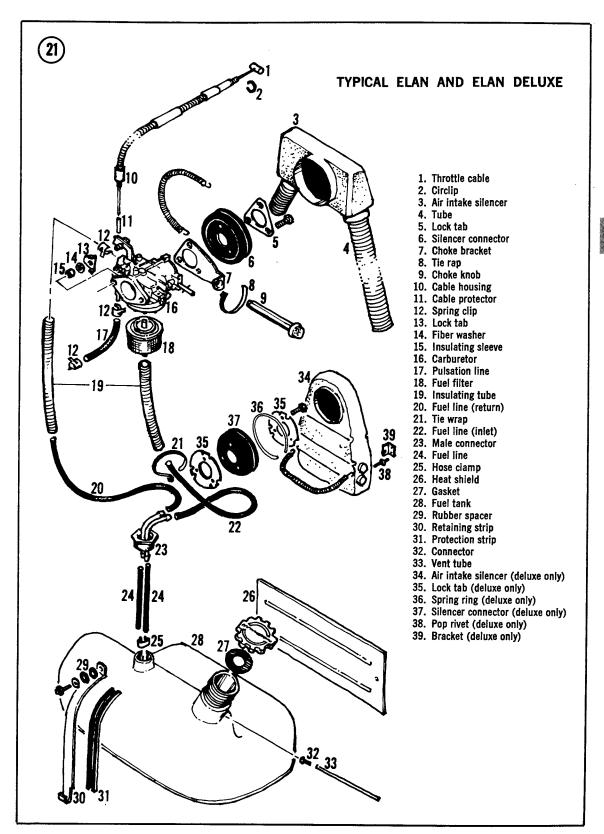


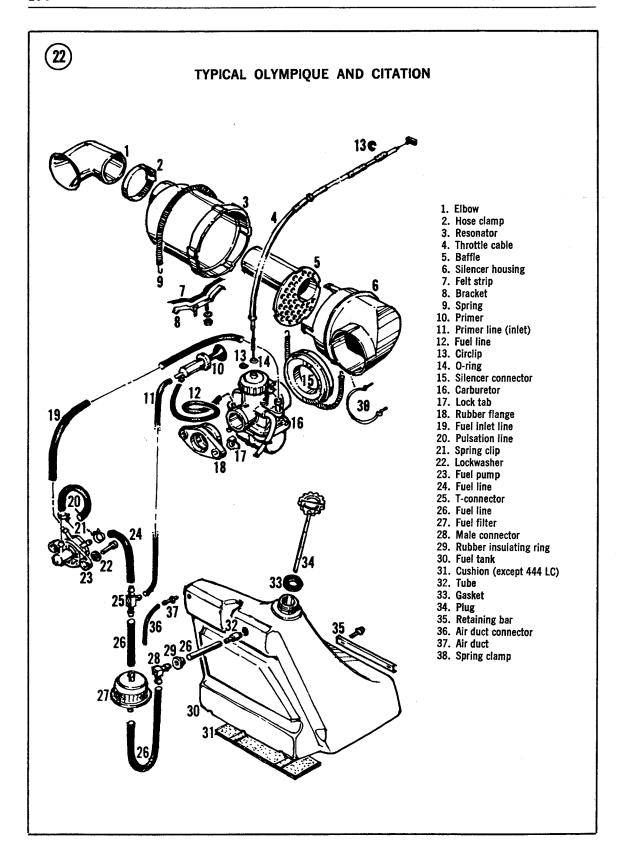
Removal/Installation

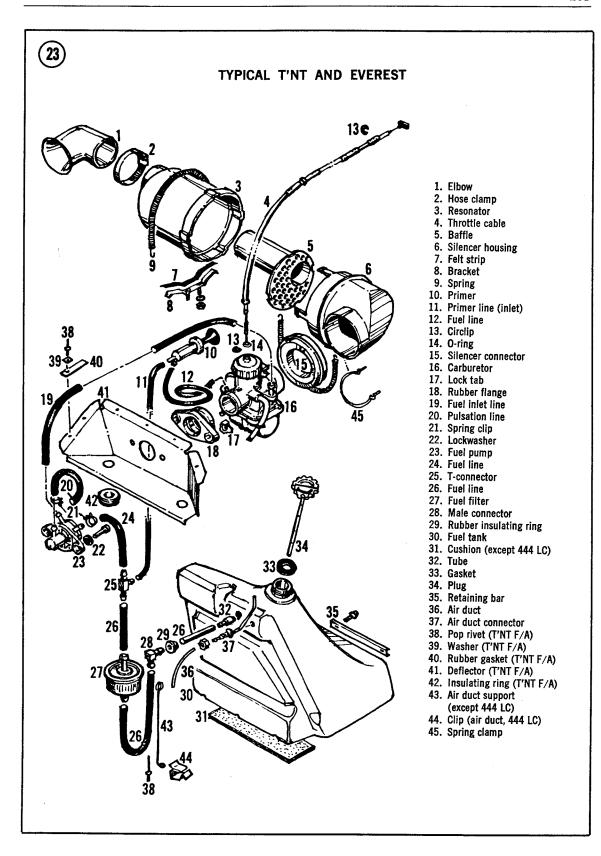
- 1. Siphon fuel from tank into a suitable container.
- 2. Disconnect fuel lines from fuel line adaptor. Tag lines to aid reconnection.
- 3. Loosen clamp and unscrew fuel line adaptor from tank.
- 4. Remove bolts and nuts securing tank mounting straps (Figure 25) and remove tank.
- 5. Installation is the reverse of these steps. Install fuel line adaptor so fuel nipples point toward rear of machine and tighten clamp.

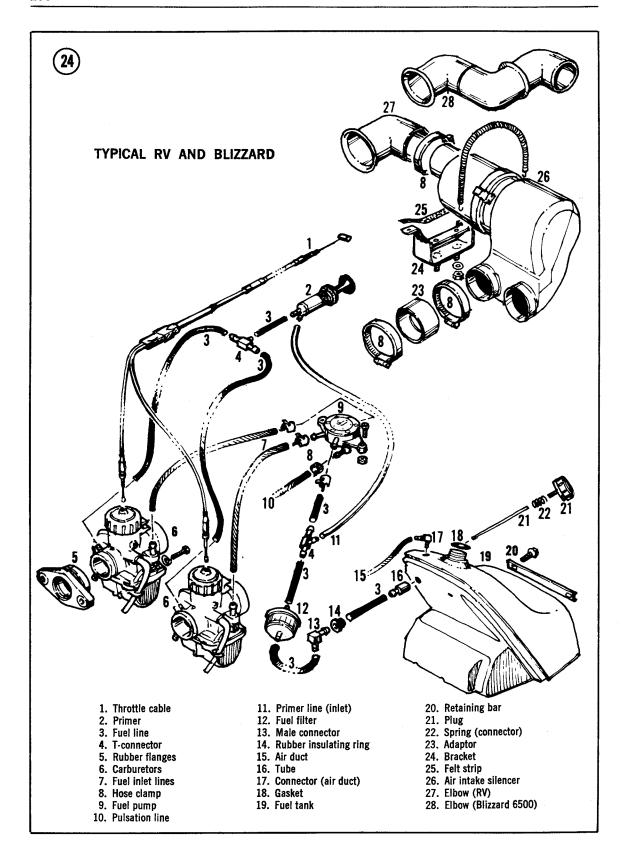
FUEL FILTER

Service of fuel filter (**Figure 26**) is limited to cleaning of screen type filter or replacement of paper element filters.







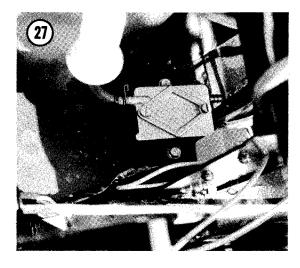


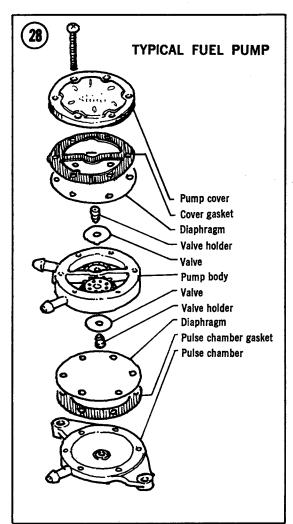
To clean screen type filter, disassemble and flush with gasoline or solvent and blow dry with compressed air.

Paper element filters should be replaced annually or when contamination builds up at the base of the element.

FUEL PUMP

To check fuel pump (Figure 27) operation, disconnect fuel line from pump to carburetor at the carburetor. Make sure ignition is off and pull recoil starter and check for fuel flow at fuel line. If fuel flow from pump is unsatisfactory, replace pump. Refer to Figure 28 for an exploded view of a typical fuel pump.





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Table 1 TILLOTSON CARBURETOR SPECIFICATIONS

Model	Carburetor	Low Speed Adjustment (Turns)**	High Speed Adjustment (Turns)**	Idle Speed (rpm)
Elan				
250, 250 E (1971,1972, early 1973)	HR-73A	3/4	11/4 ①	*
250 (late 1973-1975)	HR-133A	3/4	Fixed	*
292 SS (1972)	HD-22B	3/4	11/4	*
250 T (1973)	HR-136A	3/4	Fixed	*
250 T, 250 Deluxe (1974)	HR-155A	1	Fixed	*
250 Deluxe (1975)	HR-165A	1	Fixed	*
250 (1976)	HR-173A	1	Fixed	*
250 SS (1973)	HR-143A (2)	3/4	Fixed	*
294 SS (1974)	HR-161A	3/4	Fixed	*
300 SS (1975)	HR-166A	3/4	Fixed	*
250 SS (1976)	HR-172A	i	Fixed	1,500-1,800
250 (1978-1979)	HR-173A	1	Fixed	1,800-2,000
250 Deluxe (1978-1979)	HR-172A	1	Fixed	1,800-2,200
Dlympique				
300 (1971-early 1973)	HR-74A	3/4	11/4	*
300 (late 1973-1974)	HR-132A	3/4	1	*
300 (1975 and 1976 twin)	HR-169A	1	- Fixed	1,500-1,800
300 (1976 single)	HR-174A	1	Fixed	1,200-1,500
335 (1970)	HR-176	3/4	11/4	*
335 (1971-1973)	HR-75A	³ / ₄ ②	11/4 ②	*
340 (1973-1974)	HR-131A	3/4	Fixed	*
340 (1975-1976)	HR-170A, B	1	Fixed	1,500-1,800
399 (1970)	HR-16B	3/4	11/4	*
399 (1971-1972)	HR-76A	⁷⁴ ³ / ₄	11/4	*
400 (early 1973)	HR-76A	1	1½6	*
400 (late 1973-1974)	HR-134A	3/4	Fixed	*
440 (1973-1974)	HR-135A	74 7/8	Fixed	*
440 plus (1976)	HR-176A	78 1	Fixed	1,500-1,800
7NT			A Section 19	
I'NT 292, 340 (1970, 1971,	HD-22A, B	3/4	11/4	*
and 1972 292)	UD-EZM, D	74	± - /4	
340 (1972)	HD-98A	11/8	1	*
294 (1973)	HR-137A (2)	3/4	Fixed	*
340 (1973)	HD-107A	7/8	Fixed	*
300 (1974)	HR-164A	1	1	*
340 (1974-1975)	HD-134A	1	1	*
340 (1976)	HD-148A	1	1	1,500-1,800
399 (1970)	HD-21A	3/4	11/4	*
440 (1971)	HD-73A	3/4	11/4	*
	(00	ntinued)		

Table 1 TILLOTSON CARBURETOR SPECIFICATIONS (continued)

Model	Carburetor	Low Speed Adjustment (Turns)**	High Speed Adjustment (Turns)**	Idle Speed (rpm)
T'NT (con't.)				
440 (1972)	HD-83A	11/4	11/4	*
440 (1973)	HD-109A	1	1	*
440 and Everest (1974-1975)	HD-138A	1	1	妆
440 and Everest (1976)	HD-147A	1	1	1,500-1,800
400 F/A (1972)	HD-104A (2)	3/4	11/4	*
340 F/A (1973-1974)	HR-149A (2)	1	11/8	*
400 F/A (1973-1974)	HD-123A (2)	1	5/8	*
340 F/A (1975)	HR-168A (2)	1	11/8	*
440 F/A (1974)	HRM-3A (2)	1	11/4	*
440 F/A (1975)	HRM-5A (2)	1	1	*

^{*} Unless otherwise specified, idle speed is 1,800-2,200 rpm.

Table 2 MIKUNI CARBURETOR SPECIFICATIONS

Model	Carburetor	E-ring Position (From Top)	Air Screw Turns (± 1/4 Turn)
T'NT R/V 245 (1975)	VM 34-72	2	1
T'NT 340-340E kit (1976)	VM 34-109	3	1
T'NT 440-440E kit (1976)	VM 34-105	2	1
Olympique 340-340E kit (1976)	VM 34-104	3	1
Olympique 300-300E kit (1976)	VM 34-103	3	1
T'NT R/V 250 (1976)	VM 34-93	2	1
T'NT R/V 340 (1976)	VM 34-94	2	1
Olympique 440 plus kit (1976)	VM 32-117	3	1 1/2
Olympique 300 (twin—1977-1978)	VM 30-90	3	1 1/2
Olympique 340-340E (1977-1979)	VM 30-91	3	1 1/2
Everest 340-340E kit (1977-1979)	VM30-98	3	11/2
Olympique 440 (1977)	VM 32-113	4	11/2
T'NT 340 F/A (1977-1978)	VM 34-118	3	1
T'NT 440 F/A (1977)	VM 36-53	2	1
T'NT 440 (1977)	VM 34-110	3	1 1/2
R/V 340 (1977-1978)	VM 34-135	4	1
Everest 440-440E (1977)	VM 34-110	3	1 1/2
Everest 440 L/C (1977)	VM 34-150	4	1
Citation 300 (1978)	VM30-94	3	1 1/2
Citation 300 (1979)	VM 30-104	3	1 1/2
Everest 440, 440E (1978)	VM 34-165	3	2
T'NT 440 F/C (1978)	VM 34-165	3	2
Everest 444 L/C	VM 34-150	4	11/2
Blizzard 6500	VM 34-184	4	1 1/2
Blizzard 9500	VM 36-78	4	1
Blizzard 5500	VM 34-203	3	1 1/2
Blizzard 7500 and Cross Country	VM 34-199	2	11/2

^{**} Tolerance for all adjustments is $+\frac{1}{8}$ -0 turn.

① Fixed jet on later 1973 models.

② On 1973 models turn low-speed needle $\frac{7}{8}$ and high-speed needle $1\frac{1}{16}$.