TECUMSEH 2-STROKE

UNIT BLOCK MODELS

Model	Bore	Stroke	Displacement
AH440	2.09 in. (50.8 mm)	1.25 in. (31.8 mm)	4.30 cu. in. (65 cc)
AH480, AH490	2.09 in. (50.8 mm)	1.41 in. (35.8 mm)	4.85 cu. in. (73 cc)
AH520, AV520	2.09 in. (50.8 mm)	1.50 in. (35.8 mm)	5.16 cu. in. (77 cc)
AH600, AV600, TVS600	2.09 in. (50.8 mm)	1.75 in. (44.5 mm)	6.00 cu. in. (90 cc)
AH750, AV750	2.38 in. (60.3 mm)	1.68 in. (42.7 mm)	7.50 cu. in. (122 cc)
AH817, AV817	2.44 in. (62.0 mm)	1.75 in. (44.5 mm)	8.17 cu. in. (134 cc)

ENGINE IDENTIFICATION

All models are two-stroke, single cylinder air-cooled engines with a unit block type construction.

Prefixes before type and serial number indicate the following information.

T-Tecumseh
A-Aluminum
V, VS-Vertical crankshaft
H-Horizontal crankshaft

Engine prefix, type number and serial numbers are located as shown in Fig. TP2-1. Figs. TP2-1A and TP2-1B show number interpretations.

Always furnish engine model, type and serial numbers when ordering parts or service material.

MAINTENANCE

SPARK PLUG. The spark plug used will depend on engine application and usage. In some areas a resistor spark plug will be required. Where applicable, follow equipment manufacturer's recommendation. The following recommendations for Champion spark plugs will apply in most cases, although more than one plug is listed for some engines due to a variety of applications: AH440, AH480, AH490—CJ8; AH520—CJ8, RJ-17LM, RJ-18Y; AV520—CJ8, J-17LM, RJ-12YC; AH600—RCJ-8Y; AV600—J-17LM, RJ-12YC; TVS600—J-17LM; AH750, AV750, AH817, AV817—RJ-12YC.

Electrode gap should be 0.030 inch (0.76 mm) for all models.

CARBURETOR. Tillotson HS, Tecumseh diaphragm and Tecumseh float type carburetors are used. Refer to the appropriate following paragraphs for information on specific carburetors.

Tillotson HS Type Carburetor. Refer to Fig. TP2-2 for identification and exploded view of Tillotson HS type carburetor.

Initial adjustment of idle and main fuel mixture screws from a lightly seated position is 1 turn open for idle mixture screw (6) and 1¼ turns open for main fuel mixture screw (5).

Final adjustments are made with engine at operating temperature and running. Operate engine at idle speed and adjust idle mixture screw to obtain smoothest engine idle. Operate engine

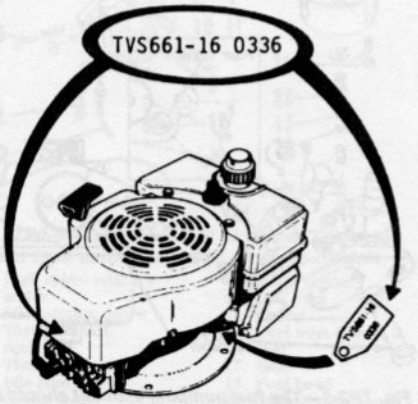


Fig. TP2-1—View showing location of engine model, type and serial number. Refer also to Figs. TP2-1A and TP2-1B.

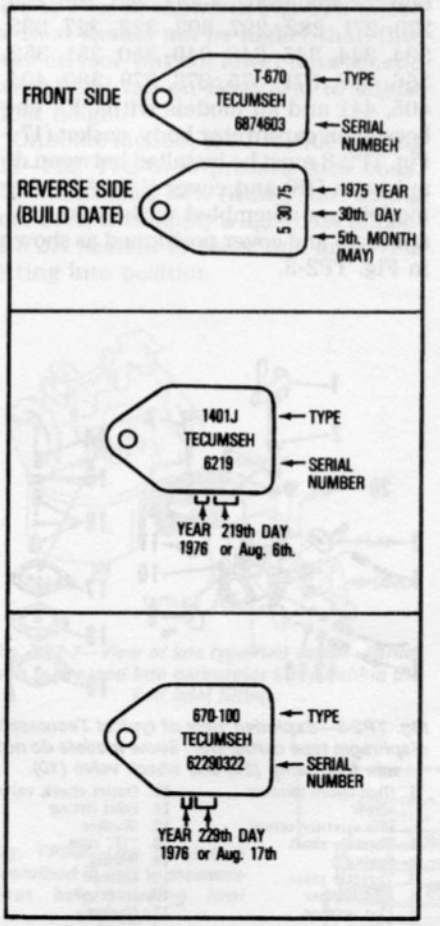


Fig. TP2-1A—View showing identification tag from engine and interpretation of letters and numbers. Refer to text.

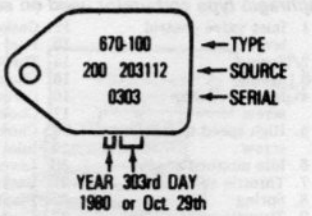


Fig. TP2-1B—View of identification tag from replacement short block and interpretation of letters and numbers.

Illustrations courtesy Tecumseh Products Co.

at rated speed, under a load and adjust main fuel mixture screw for smooth engine operation. If engine fails to accelerate smoothly, it may be necessary to open idle mixture screw slightly past previous setting until engine accelerates properly.

Tecumseh Diaphragm Type Carburetor. Refer to Fig. TP2-3 for identification and exploded view of Tecumseh diaphragm type carburetor. Carburetor identification numbers are also stamped on carburetor as shown in Fig. TP2-4.

Initial adjustment of idle mixture and main fuel mixture screws from a lightly seated position for models with solid adjustment screws (L and H—Fig. TP2-3) is 1 turn open for each mixture screw. There is no initial adjustment for idle and main fuel mixture screws which have a hole in inner end as hole size determines initial fuel mixture. When renewing adjustment screws, make certain hole diameter of replacement screws matches hole diameter of new screw.

Final adjustments are made with engine at operating temperature and running. Operate engine at idle speed and adjust idle mixture screw to obtain smoothest engine idle. Operate engine at rated speed, under load and adjust main fuel mixture screw for smooth engine operation. If engine cannot be operated under load, adjust main fuel mixture needle so engine runs smoothly at rated rpm and accelerates properly when throttle is opened quickly.

When overhauling carburetor, observe the following: The fuel inlet fitting is pressed into bore of carburetor body of some models. On these models, the fuel strainer behind inlet fitting can be cleaned by reverse flushing with compressed air after inlet needle and seat are removed. The inlet needle seat fitting is metal with a neoprene seat, so fitting (and enclosed seat) should be removed before carburetor is cleaned with a commercial solvent. The throttle plate (3) should be installed with short line stamped on plate to top of carburetor and facing out. The choke plate (9) should be installed with flat toward fuel inlet side of carburetor as shown.

When installing diaphragm (18), head of rivet should be against fuel inlet valve (16) regardless of size or placement of washers around rivet. On carburetor Models 0234-252, 265, 266, 269, 270, 271, 282, 297, 303, 322, 327, 333, 334, 344, 345, 348, 349, 350, 351, 352, 356, 368, 371, 375, 378, 379, 380, 404, 405, 441 and all models with "F" embossed on carburetor body, gasket (17—Fig. TP2-3 must be installed between diaphragm (18) and cover (19). All other models are assembled with gasket, diaphragm and cover positioned as shown in Fig. TP2-3.

On models equipped with a fuel pump, pumping element is a rubber boot (20) which expands and contracts due to changes in crankcase pressure. The pump inlet check valve is located in the fuel inlet fitting (11). The pump outlet check valve (10) is pressed into the carburetor body behind the fuel inlet fitting. Engines equipped with this carburetor will operate in any position and the pump will deliver fuel to the carburetor when the fuel supply is below the carburetor.

NOTE: The fuel pumping element should be installed at 45 degree angle as shown in Fig. TP2-5. Incorrect installation may interfere with pumping action.

Two types of fuel pump valves are used. Flap type of valve (Fig. TP2-7) may be located behind plate attached to side of carburetor body. Renew flap type valves after detaching the plate from side of carburetor. Fuel pump valves are pushed into carburetor body of some models (Fig. TP2-3). Clamp the inlet fitting (11) in a vise and twist car-

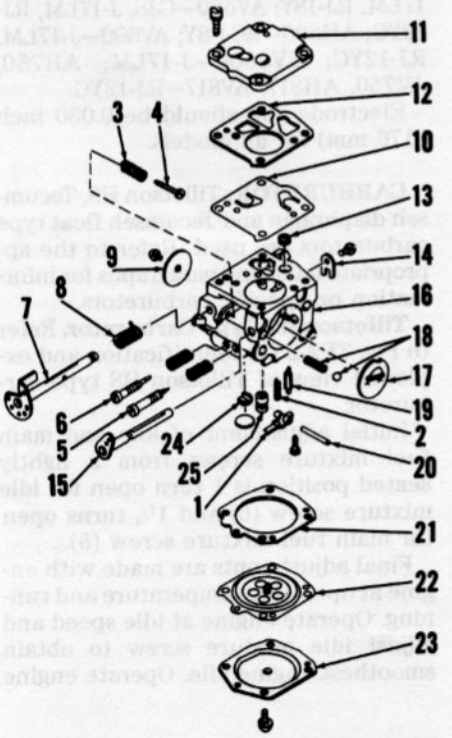


Fig. TP2-2—Exploded view of Tillotson HS diaphragm type carburetor used on some models.

1. Inlet valve control lever
2. Spring
3. Spring
4. Idle speed stop screw
5. High speed mixture screw
6. Idle mixture needle
7. Throttle shaft
8. Spring
9. Throttle plate
10. Fuel pump diaphragm
11. Pump cover
12. Gasket
13. Fuel screen
14. Throttle shaft
15. Choke shaft
16. Carburetor body
17. Choke plate
18. Choke detent
19. Inlet needle
20. Lever pin
21. Gasket
22. Diaphragm
23. Cover
24. Channel reducer
25. Main nozzle & check ball

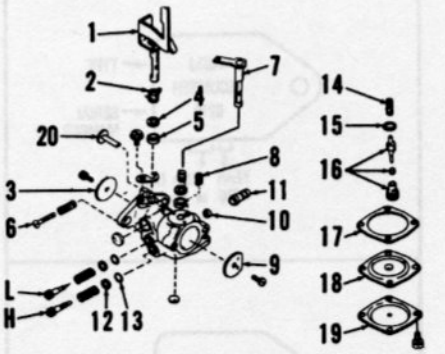


Fig. TP2-3—Exploded view of typical Tecumseh diaphragm type carburetor. Some models do not use fuel pump (20) and check valve (10).

H. High speed mixture screw
L. Idle mixture screw
1. Throttle shaft
2. Spring
3. Throttle plate
4. Felt washer
5. Flat washer
6. Idle stop screw
7. Choke shaft
8. Choke retainer
9. Choke plate
10. Outlet check valve
11. Inlet fitting
12. Washer
13. "O" ring
14. Spring
15. Gasket
16. Inlet valve
17. Gasket
18. Diaphragm
19. Cover
20. Pump element

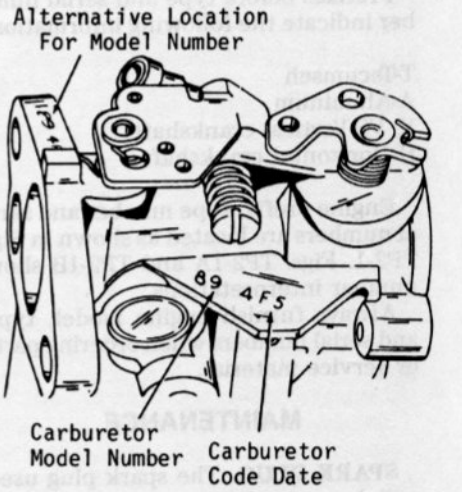


Fig. TP2-4—View showing location of carburetor identification number on Tecumseh diaphragm type carburetor.

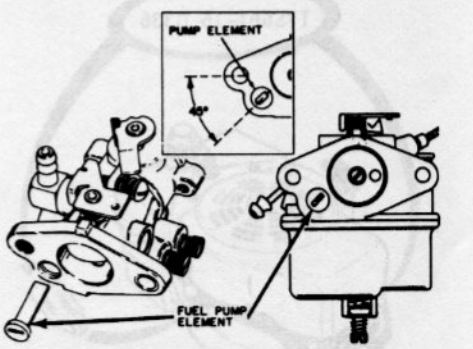


Fig. TP2-5—The fuel pumping element should be installed at 45 degree angle as shown for Tecumseh diaphragm type carburetor (left) and float type carburetor (right).

Illustrations courtesy Tecumseh Products Co.

buretor body from fitting. Using a 9/64 inch drill, carefully drill into outlet check valve (10) to a depth of 1/8 inch (3.18 mm). Take care not to drill into carburetor body. Thread an 8-32 tap into the outlet check valve. Using a proper size nut and flat washer, convert the tap into a puller to remove the outlet check valve from carburetor body. Press new outlet check valve into carburetor body until face of valve is flush with surrounding base of fuel inlet chamber. Press new inlet fitting about 1/3 of the way into carburetor body, coat the exposed 2/3 of the fitting shoulder with Loctite 271 sealer, then press fitting fully into carburetor body.

Carburetors utilizing a remote primer bulb are equipped with a check valve (10—Fig. TP2-3) which is either brass or Teflon. The brass check valve is the same as check valve described in the previous paragraph for fuel pump valve. The Teflon disc type valve is accessible after removing the fuel inlet fitting. Place a drop of oil on disc to hold it in position when installing fitting. Apply Loctite 271 sealer to shank of fuel inlet fitting before pressing fitting into carburetor body.

Tecumseh Float Type Carburetor. Refer to Fig. TP2-6 for identification and exploded view of Tecumseh float type carburetor.

Initial adjustment of idle and main fuel mixture screws from a lightly seated position is 1 turn open for each screw.

Final adjustments are made with engine at operating temperature and running. Operate engine at rated speed and adjust main fuel mixture screw (H) for smoothest engine operation. Operate engine at idle speed and adjust idle mixture screw for smoothest engine idle. Set idle speed at idle stop screw (6). If engine fails to accelerate smoothly, slight adjustment of main fuel mixture screw may be necessary.

When overhauling carburetor, check adjustment screws for excessive wear or other damage. The inlet valve fuel needle seats against a Viton rubber seat (16) which is pressed into carburetor body. Remove the rubber seat before cleaning carburetor in commercial cleaning solvent. The seat is removed using a 10-32 or 10-24 tap and must be renewed after removing. Install new seat using a punch that will fit into bore of carburetor and is large enough to catch the shoulder of the seat. Moisten seat with oil, then insert seat with grooved side down into carburetor body (fuel inlet needle seats against smooth side of seat). Drive needle seat into bore until seat is against bottom of bore. Install throttle plate (3) with the two stamped lines facing out and at 12 and 3 o'clock positions. Install choke plate (9) with flat side toward bottom of carburetor.

To measure float level, position Tecumseh tool 670253A at a 90 degree angle to float hinge pin and resting on nozzle boss as shown in Fig. TP2-8. Toe of float should not be higher than first step on tool, but not lower than second step. Bend tab on float arm to adjust float height.

On some models, the fuel inlet fitting (11—Fig. TP2-6) is pressed into body. When installing new fitting, start fitting into bore, then apply a light coat of Loctite 271 sealant to the shank and press fitting into position.

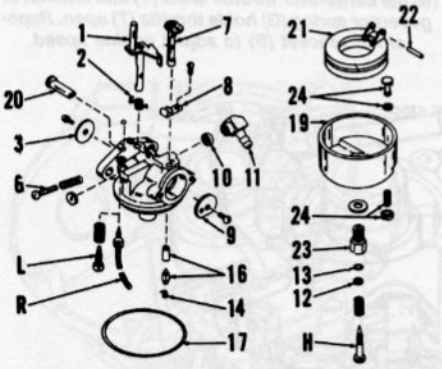


Fig. TP2-6—Exploded view of typical Tecumseh float type carburetor used on some models.

H. High speed mixture screw
L. Idle mixture screw
1. Throttle shaft
2. Spring
3. Throttle plate
6. Idle stop screw
7. Choke shaft
8. Choke retainer
9. Choke plate
10. Outlet check valve
11. Inlet fitting
12. Brass washer
13. "O" ring
14. Spring
16. Fuel inlet needle & seat
17. Seal
19. Fuel bowl
20. Pumping element
21. Float
22. Pivot pin
23. Bowl retaining nut
24. Bowl drain

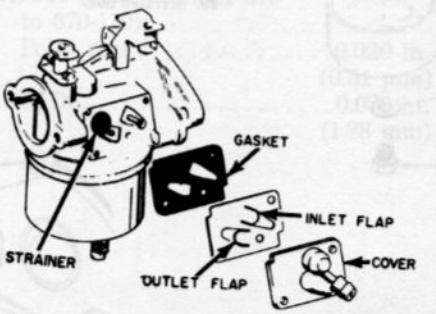


Fig. TP2-7—View of late type fuel valves. Earlier type is pressed into carburetor body behind the fuel inlet fitting.

When installing float bowl, (19), make certain that correct "O" ring (17) is used. Some "O" rings are round section, others are square.

Fuel hole and the annular groove in retaining nut (23) must be clean. The flat stepped section of fuel bowl (19) should be below the fuel inlet fitting (11). Tighten retaining nut (23) to 50-60 in.-lbs. (6-7 N·m). The high speed mixture screw (H) must not be installed when tightening nut (23).

Some models are equipped with a fuel pump. The fuel pumping element (20) is a rubber boot which expands and contracts due to changes in crankcase pressure. The pumping element should be at 45 degree angle as shown in Fig. TP2-5. Incorrect installation may interfere with pumping action.

On early models, fuel is drawn in through a check valve in the fuel inlet fitting (11—Fig. TP2-6). The outlet check valve (10) is pressed into bore behind the inlet fitting. The inlet fitting (11) is removed and installed in normal manner. To renew the outlet check valve (10), drill into the outlet check valve with a 9/64 inch drill to a depth of 1/8 inch (3.78 mm). Do not drill into carburetor body. Thread an 8-32 tap into the outlet valve and pull valve from the carburetor body. Press new outlet valve into carburetor body until face of valve is flush with base of the fuel chamber.

TVS Carburetor. Refer to Fig. TP2-9 for identification and exploded view of TVS carburetor. No idle or main fuel adjustment screws are provided on one model, and only an idle fuel adjustment screw is provided on others.

Initial adjustment of idle mixture screw (Fig. TP2-10) is 1 turn open from a lightly seated position. Idle fuel mixture on models without idle fuel mixture screw and main fuel mixture on all models is controlled by a fixed jet within carburetor. With engine at operating temperature and running, adjust idle mixture (as equipped) screw to obtain smooth engine idle.

To check float level, invert carburetor and measure from free end of float to float bowl mating surface of carburetor. Measurement should be 7/32 inch (5.56 mm). Carefully bend float lever tang which contacts fuel inlet needle as necessary to obtain correct float level.

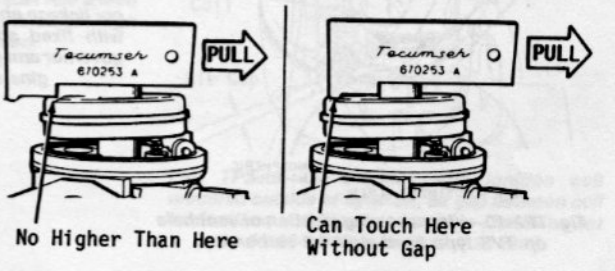


Fig. TP2-8—Use procedure described in text to measure float height using tool 670253A.

Illustrations courtesy Tecumseh Products Co.

GOVERNOR. An air vane type governor located on the carburetor throttle shaft is used on some models. On models with variable speed governor, the high speed (maximum) stop screw is located on the speed control lever as shown in Fig. TP2-14. On models with fixed engine speed, rpm is adjusted by moving the governor spring bracket (B—Fig. TP2-11 or TP2-12) or relocating governor spring arm (R—Fig. TP2-13). To increase engine speed, bracket or arm must be moved to increase governor spring tension holding throttle open.

On some TVS series engines, a highly sensitive air vane (22—Fig. TP2-9) is attached to the choke shaft, independent of the choke shutter. The governor air vane is attached to the throttle arm (11) by the governor spring (19). The governor spring can be adjusted to vary the tension, causing the engine to run faster or slower as desired. One increment movement of sleeve (27) on serrated disc (28) will vary engine speed approximately 100 rpm.

IGNITION SYSTEM. Engines may be equipped with either a magneto type (breaker points) or a solid-state ignition system. Refer to the appropriate paragraph for model being serviced. Refer to FLYWHEEL paragraph in REPAIRS section when removing flywheel.

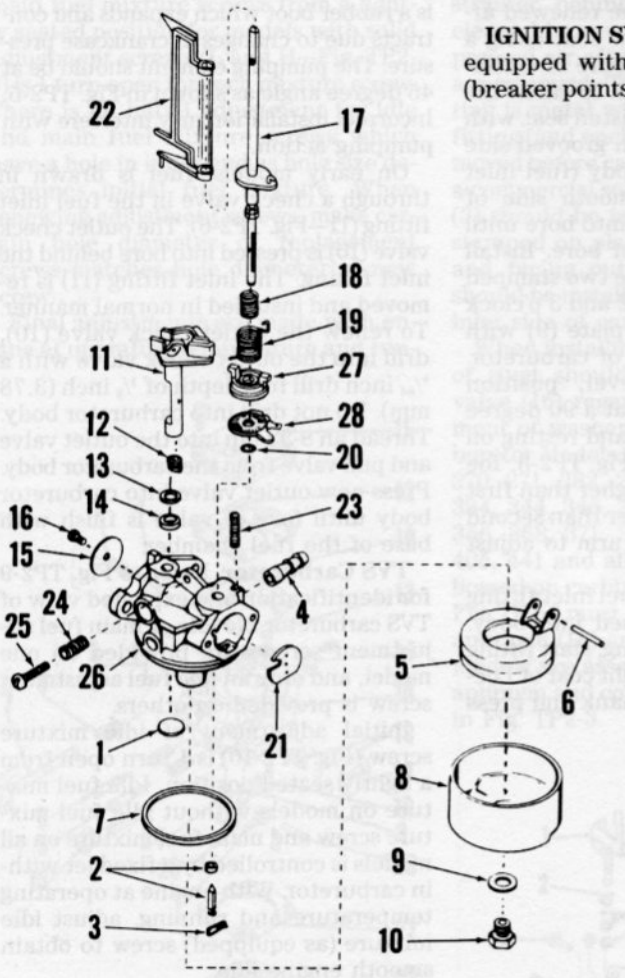


Fig. TP2-9—Exploded view of typical TVS type carburetor.

1. Welch plug
2. Fuel inlet valve & seat
3. Clip
4. Fuel inlet fitting
5. Float
6. Float shaft
7. Bowl gasket
8. Float bowl
9. Gasket
10. Bowl retainer
11. Throttle shaft
12. Return spring
13. Washer
14. Seal
15. Throttle plate
16. Screw
17. Choke/governor shaft
18. Spring
19. Governor spring
20. Washer
21. Choke plate
22. Air vane
23. Spring
24. Spring
25. Idle speed stop screw
26. Body
27. Sleeve
28. Serrated disc

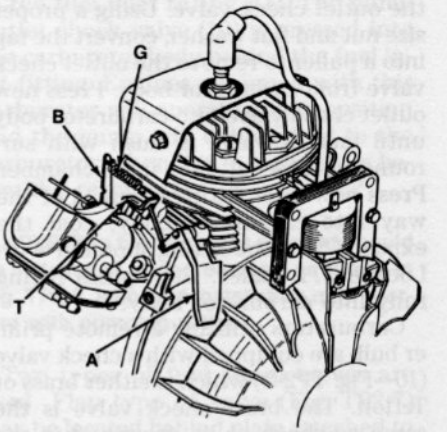


Fig. TP2-11—View of horizontal engine using a plastic air vane (A). The air vane is attached to the carburetor throttle shaft (T) and tension of governor spring (G) holds throttle (T) open. Bend tab (B) to adjust engine speed.

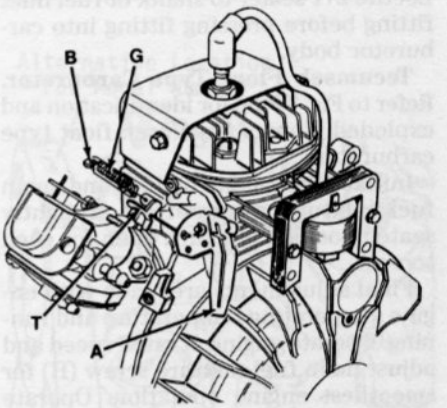


Fig. TP2-12—View of horizontal engine using an aluminum air vane (A). The air vane is attached to the carburetor throttle shaft (T) and tension of governor spring (G) holds throttle (T) open. Reposition bracket (B) to adjust engine speed.

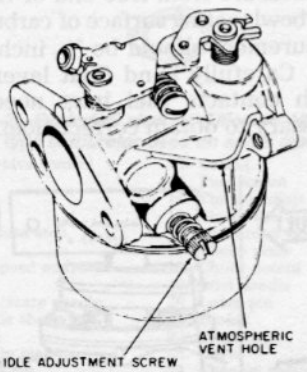


Fig. TP2-10—View showing location of vent hole on TVS type fixed main jet carburetor.

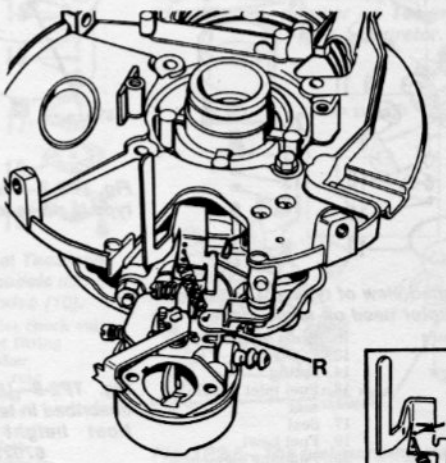
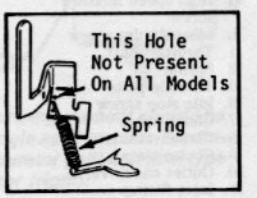


Fig. TP2-13—View of governor linkage on vertical engine with fixed speed. Relocate governor arm (R) to adjust engine speed.



Illustrations courtesy Tecumseh Products Co.

Breaker-Point Ignition System. Breaker-point gap at maximum opening should be set before adjusting the ignition timing. On some models, ignition timing is not adjustable.

Some models may be equipped with external coil and magnet laminations. Air gap (Fig. TP2-15) between external ignition coil laminations and flywheel magnet should be 0.005-0.008 inch (0.13-0.20 mm).

Ignition points and condenser are located under flywheel and flywheel must be removed for service. Refer to the following specifications for point gap and piston position before top dead center (BTDC) when breaker points just begin to open to correctly set ignition timing.

AH440:
Point gap ..... 0.017 in. (0.43 mm)
BTDC ..... 0.122 in. (3.10 mm)

AH480, AH490:
Point gap ..... 0.017 in. (0.43 mm)
BTDC (aluminum bushing rod) ..... 0.100 in. (2.54 mm)
BTDC (needle bearing rod ..... 0.135 in. (3.43 mm)

AH520 (type number 1500 to 1549):
Point gap ..... 0.020 in. (0.51 mm)
BTDC ..... 0.062 in. (1.575 mm)

AH520 (type number 1550 to 1577 & 1581 to 1582A):
Point gap ..... 0.017 in. (0.43 mm)
BTDC ..... 0.110 in. (2.79 mm)

AH520 (type number 1583 to 1589):
Point gap ..... 0.017 in. (0.43 mm)
BTDC ..... 0.062 in. (1.58 mm)

AH520 (aluminum bushing rod):
Point gap ..... 0.017 in. (0.43 mm)
BTDC ..... 0.110 in. (2.79 mm)

AH520 (needle bearing rod):
Point gap ..... 0.017 in. (0.43 mm)
BTDC ..... 0.185 in. (4.70 mm)

AH520 (type number 1601 to 1617):
Point gap ..... 0.020 in. (0.51 mm)
BTDC ..... *

AV520 (type number 638 to 650):
Point gap ..... 0.018 in. (0.48 mm)
BTDC ..... 0.100 in. (2.54 mm)

AV520 (type number 642-02E, F, 642-07C, 642-08, 642-13 to 14C & 642-15 to 23):
Point gap ..... 0.020 in. (0.51 mm)
BTDC ..... 0.085 in. (2.16 mm)

AV520 (type number 642 to 642-14C):
Point gap ..... 0.018 in. (0.46 mm)
BTDC ..... 0.110 in. (2.79 mm)

AV520 (type number 670 to 670-110):
Point gap ..... 0.020 in. (0.51 mm)
BTDC ..... 0.070 in. (1.78 mm)

AH600 (type number 1624 and 1631):
Point gap ..... 0.020 in. (0.51 mm)
BTDC ..... *

AV600 (type number 641):
Point gap ..... 0.018 in. (0.46 mm)
BTDC ..... 0.100 in. (2.54 mm)

AV600 (type number 643-needle bearing rod):
Point gap ..... 0.020 in. (0.51 mm)
BTDC ..... 0.085 in. (2.16 mm)

AV600 (type number 643-aluminum bushing rod):
Point gap ..... 0.018 in. (0.46 mm)
BTDC ..... 0.090 in. (2.29 mm)

AV600 (type 660-2 to 660-38):
Point gap ..... 0.020 in. (0.51 mm)
BTDC ..... 0.070 in. (1.78 mm)

TVS600 (type 661-02 to 661-29):
Point gap ..... 0.020 in. (0.51 mm)
BTDC ..... *

AH750:
Point gap ..... 0.017 in. (0.43 mm)
BTDC ..... 0.100 in. (2.54 mm)

AV750:
Point gap ..... 0.018 in. (0.46 mm)
BTDC ..... 0.100 in. (2.54 mm)

AH817:
Point gap ..... 0.018 in. (0.46 mm)
BTDC ..... 0.113 in. (2.87 mm)

AV817:
Point gap ..... 0.020 in. (0.51 mm)
BTDC ..... 0.118 in. (2.80 mm)

*External coil, timing is not adjustable. Set coil air gap to specified dimension.

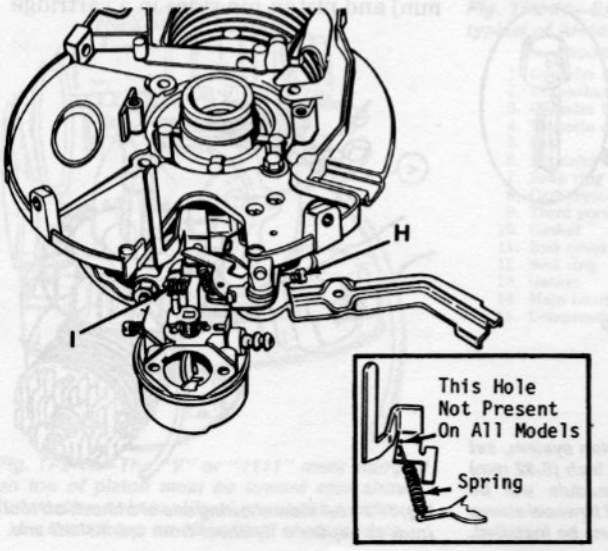


Fig. TP2-14—View of governor and carburetor linkage on vertical engine with variable engine speed control. Turn screw (I) to adjust idle speed and screw (H) to adjust high speed.

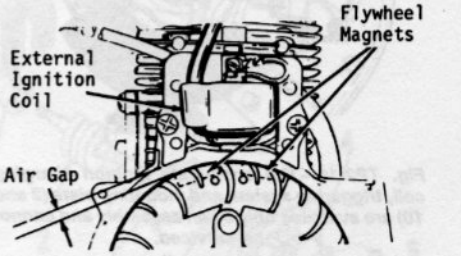


Fig. TP2-15—On engines with ignition coil mounted outside of flywheel, air gap between coil laminations and flywheel magnets should be set to 0.005-0.008 inch (0.13-0.20 mm).

Illustrations courtesy Tecumseh Products Co.

Solid-State Ignition System. The Tecumseh solid-state ignition system does not use ignition points. The only moving part of the system is the rotating flywheel with the charging magnets. Early systems utilize individual components contained under the flywheel as shown in Fig. TP2-16, while later systems are modular with a one-piece ignition coil and ignition module externally mounted as shown in Fig. TP2-17. Note that module is square as opposed to a breaker-point ignition coil which is round.

On early systems, the ignition charging coil, electronic triggering system and mounting plate are available only as an assembly. If necessary to renew this assembly, place the unit in position on the engine. Start the retaining screws, turn the mounting plate counterclockwise as far as possible, then tighten retaining screws to 5-7 ft.-lbs. (7-10 N·m).

The ignition coil/module on later models is a one-piece unit. The module is marked with "GOLD KEY" on the module and a gold colored crankshaft key and a gold colored flywheel sleeve must be used. See Fig. TP2-17. The correct air gap setting between the flywheel magnets and the laminations on ignition module is 0.0125 inch (0.32 mm). Use Tecumseh gage 670297 or equivalent thickness plastic strip to set gap as shown in Fig. TP2-17. Tighten mounting screws to 30-40 in.-lbs. (3.4-4.5 N·m).

LUBRICATION. Engines are lubricated by mixing a good quality engine oil designed for two-stroke, air-cooled engines with unleaded, regular grade gasoline. Oil must be SAE 30 or 40; automotive or multiviscosity type oils are not recommended. Manufacturer states that gasoline containing methanol must not be used, and if gasohol is used, it must not contain more than 10 per cent ethanol. For engines operating below 3600 rpm, mix 0.5 pint (0.24 L) of oil with each gallon of gasoline. For engines operating above 3600 rpm, mix 0.75 pint (0.36 L) of oil with each gallon of gasoline.

CARBON. Muffler and exhaust ports should be cleaned after every 50 to 75 hours of operation. The cylinder head, piston and cylinder wall should be cleaned of carbon if excessive carbon buildup is noted.

REPAIRS

FLYWHEEL. Disengage flywheel brake as outlined in FLYWHEEL BRAKE section. If flywheel has tapped holes, use a suitable puller to remove flywheel. If no holes are present, screw a knock-off nut onto crankshaft as shown in Fig. TP2-18 so there is a small gap between nut and flywheel. Gently pry against bottom of flywheel while tapping sharply on nut. After installing flywheel, tighten flywheel nut to 22-27 ft.-lbs.(30-36 N·m).

On engines with a ball bearing at flywheel end of crankshaft, using a knock-off nut may result in bearing and crankshaft moving toward pto end. This will reduce clearance between crankshaft and crankcase. Rap sharply on pto end of crankshaft with a rawhide mallet to reseat ball bearing.

Some engines are equipped with a flywheel sleeve similar to the sleeve shown in Fig. TP2-17. Gold colored sleeves are used with solid-state ignitions while zinc colored sleeves are used with breaker-point ignitions. The sleeve must be discarded if it is sheared or damaged. Install sleeve so it is flush or just below inside surface of flywheel.

DISASSEMBLY. With engine removed from mower deck, unbolt and remove the cylinder shroud, cylinder head and crankcase covers. Remove connecting rod cap and push the rod and piston unit out through top of cylinder. To prevent damage to piston and rings, it may be necessary to remove the ridge from top of cylinder bore before removing piston and connecting rod assembly.

To remove the crankshaft, remove starter housing, flywheel and the bolts securing shroud base (bearing housing) to crankcase. Carefully heat magneto end plate in bearing area so crankshaft and bearing can be separated from end plate; do not use excessive heat.

CONNECTING ROD. A steel connecting rod equipped with needle roller bearings at the crankpin and at the piston pin ends is used on some models.

An aluminum connecting rod which rides directly on crankpin journal is used on some models. Piston pin rides directly in connecting rod bore.

On other models with an aluminum connecting rod, a steel insert (liner) is used on inside of connecting rod and needle bearing rollers are used at the crankpin end.

On models with aluminum bushing type connecting rod, clearance on crankpin should be 0.0011-0.0020 inch (0.028-0.051 mm). Crankpin journal diameter should be 0.6857-0.6865 inch (17.417-17.437 mm). Piston pin diameter is 0.3750-0.3751 inch (9.525-9.528 mm). Only standard size parts are available.

On models with aluminum connecting rod with steel liners and bearing needles at crankpin, standard journal diameter is 0.8442-0.8450 inch (21.443-21.463 mm). There are 74 bearing rollers and ends of liners must correctly engage when match marks on connecting rod and cap are aligned. Piston pin diameter is 0.4997-0.4999 inch (12.692-12.698 mm) and piston pin rides in a cartridge

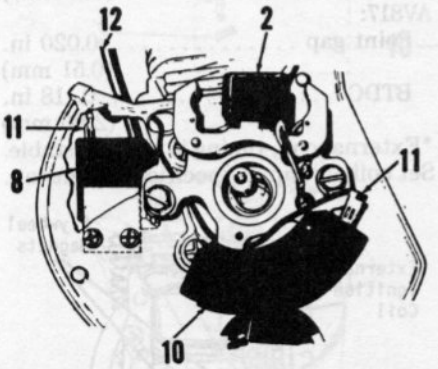


Fig. TP2-16—The solid-state ignition charging coil, triggering system and mounting plate (2 and 10) are available only as an assembly and cannot be serviced.

2. Charging coil
8. Pulse transformer
10. Trigger system
11. Low tension lead
12. High tension lead

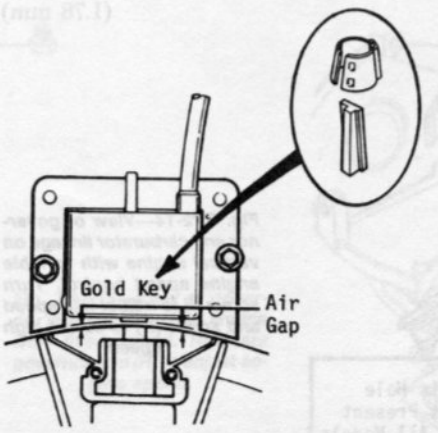


Fig. TP2-17—On solid-state ignition system, set coil lamination air gap at 0.0125 inch (0.32 mm) at locations shown. Ignition module will be marked (arrow) to indicate color of flywheel sleeve (S) or crankshaft key (K) that must be installed.

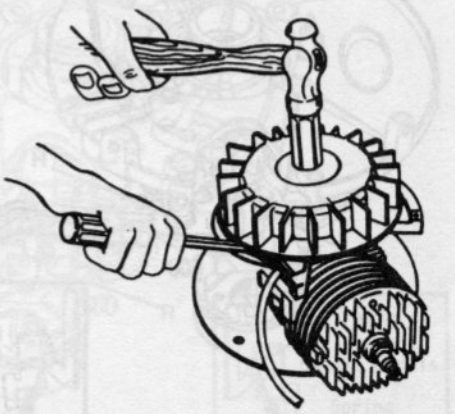


Fig. TP2-18—View showing use of a knock-off tool (nut) to separate flywheel from crankshaft end.

Illustrations courtesy Tecumseh Products Co.

type needle bearing that is pressed into connecting rod piston pin bore.

All models with steel connecting rod are provided with loose needle rollers at crankpin end of connecting rod and a cartridge needle bearing at piston pin bore.

Standard crankpin journal diameter is 0.5611-0.5618 inch (12.252-12.270 mm) for Model AH440 and 0.5614-0.5621 inch (12.260-12.277 mm) for Models AH480 and AH490. Crankpin bearing for Models AH440, AH480 and AH490 may use one row of 30 needle rollers or 60 short needle rollers placed in two rows.

On early Model AH520, the crankpin journal diameter is 0.5611-0.5628 inch (12.252-12.270 mm) and 56 short (half length) needle rollers are placed in two rows. Later Model AH520 has a standard crankpin journal diameter of 0.6922-0.6927 inch (17.582-17.595 mm) and uses 31 needle roller bearings in the 0.8524 inch (21.650 mm) connecting rod bearing bore.

Two different types of crankshafts, bearing rollers and connecting rods are used on Models AH750 and AV750. Early models are equipped with 0.6240-0.6243 inch (15.850-15.857 mm) diameter crankpin journal and use 32 needle rollers in the 0.7566-0.7569 inch (19.218-19.225 mm) diameter connecting rod bearing bore. Later Model AV750 is equipped with 0.6259-0.6266 inch (15.898-15.916 mm) diameter crankpin journal and uses 33 needle rollers in the 0.7588-0.7592 inch (19.274-19.284 mm) diameter connecting rod bearing bore.

Model AH817 and AV817 have standard crankpin journal diameters of 0.6259-0.6266 inch (15.898-15.916 mm) and use 66 short (half length) needle rollers placed in the two rows in the 0.7588-0.7592 inch (19.274-19.284 mm) diameter connecting rod bearing bore.

Models AH600 and TVS600 have a standard crankpin journal diameter of 0.8113-0.8118 inch (20.607-20.620 mm) and use 30 roller bearings in the 1.0443-1.0448 inch (26.525-26.538 mm) diameter connecting rod bore.

On models with short (half length) needle rollers, bearing needles are placed in two rows around crankpin with flat ends together toward center of crankpin.

On all models equipped with needle bearing at crankpin, rollers should be renewed only as a set. Renew bearing set if any roller is damaged. If rollers are damaged, check condition of crankpin and connecting rod carefully and renew if bearing races are damaged. New rollers are serviced in a strip and can be installed by wrapping the strip around crankpin. After new needle rollers and connecting rod cap are installed, force lacquer thinner into needles to remove the beeswax, then lubricate bearing with SAE 30 oil.

On all models, make certain match marks on connecting rod and cap are aligned.

On vertical shaft models, make certain lubrication hole in side of connecting rod is toward top. Some AV520 and AV600 models are stamped with "V" or "1111" mark on piston as shown in Fig. TP2-19. On models so equipped, make certain mark stamped on top of piston is toward the right side as shown.

On models with aluminum connecting rod, tighten connecting rod cap retaining screws to 40-50 in.-lbs. (5-6 N·m) and lock with the tab washer.

On all models with a steel connecting rod, tighten the connecting rod cap retaining screws (self-locking) to 70-80 in.-lbs. (8-9 N·m).

PISTON, PINS AND RINGS. Piston and cylinder bore specifications are as follows:

Cylinder bore diameter:
Models AH440, AH480, AH490, AH520, AV520, AH600, AV600 and TVS600 . . . . . 2.093-2.094 in. (53.162-53.188 mm)
Models AH750 and AV750 . . . . . 2.375-2.376 in. (60.389-60.391 mm)
Models AH817 and AV817 . . . . . 2.437-2.438 in. (61.900-61.925 mm)

Piston-to-cylinder clearance (listed by type number):
638 thru 638-100,
642-01,A,
642-02,A thru G,
642-02E,F, 642-03,A,B,
642-04,A,B,C, 642-05,A,B,
642-06,A, 642-07,A,B,
642-07C, 642-08,
642-08A,B,C,
642-09 thru 642-14,
642-13 thru 14C,
642-15 thru 642-23,
642-24 thru 642-33,

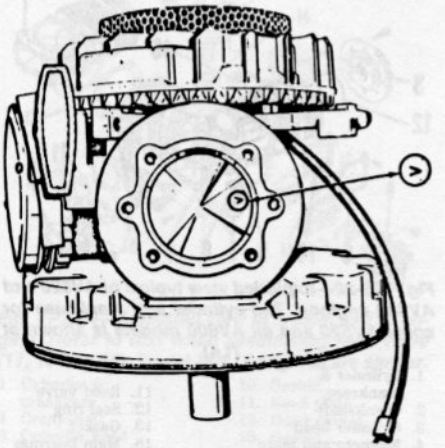


Fig. TP2-19—The "V" or "1111" mark stamped on top of piston must be toward side shown. Lubrication hole in side of connecting rod must be toward top on all vertical shaft models.

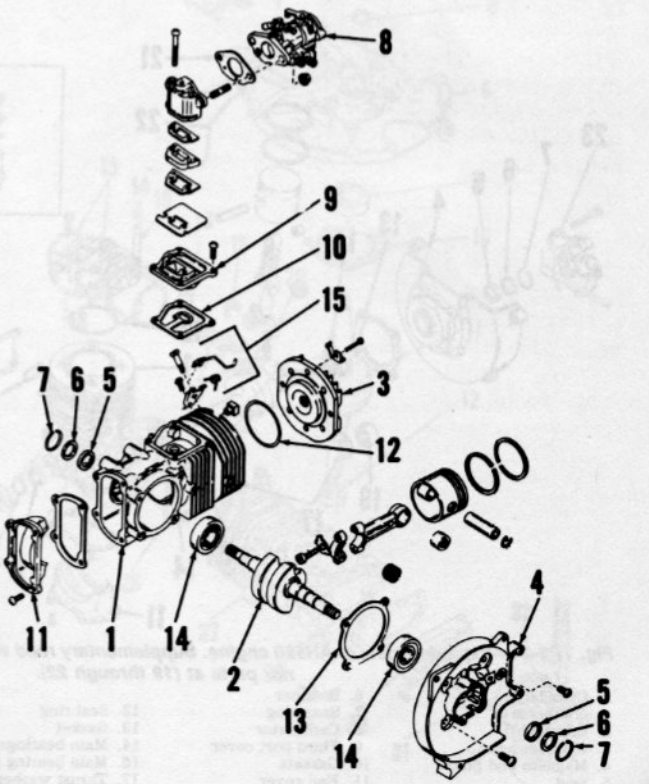


Fig. TP2-20—Exploded view typical of AH440 and AH490 models.

1. Cylinder & crankcase
2. Crankshaft
3. Cylinder head
4. Magneto end plate
5. Seal
6. Retainer
7. Snap ring
8. Carburetor
9. Third port cover
10. Gasket
11. End cover
12. Seal ring
13. Gasket
14. Main bearings (ball)
15. Compression release

Illustrations courtesy Tecumseh Products Co.

643-01,A, 643-03,A,
643-03B,C, 643-04,
643-05A, 643-05B,
643-13, 643-14,
643-14A,B,C, 643-15,
643-15A thru 643-32,
650, 660-11 thru 660-38,
670-01 thru 670-109,
1402, 1402B, 1425,
1430A, 1432,A,
1440,A,B,D, 1442,A,B,
1444,A, 1454,A, 1459,
1460,A,B,C,D,E,F,
1462, 1464,A,B,
1465, 1472,A,B,C,
1473,A,B, 1474,
1475 thru 1476,
1479, 1485,
1488,A,B,C,D,
1491, 1493,A, 1494,
1495A, 1496, 1497,
1501,A,B,C,D,E,F,G,
1503,A,B,C,D, 1508,
1510, 1512,A, 1513,
1519 thru 1521,
1522, 1523, 1524,
1528,A,B, 1530,A,B,
1536, 1537,
1538 thru 1541A,
1543 thru 1546,
1552, 1561, 1572,
1574 thru 1577,
1575, 1578,
1581 thru 1582A,
1583 thru 1599A . . . . . 0.005-0.007 in. (0.13-0.18 mm)

639 thru 639-13A,
642-35, 643-32A,
643-33, 643-34,
653-01 thru 653-05,
661-01 thru 661-29,
1620 . . . . . 0.0055-0.0075 in. (0.140-0.190 mm)

640-02 thru 640-06B,
1550A, 1557 thru 1560,
1562 thru 1571 . . . . . 0.0063-0.0083 in. (0.160-0.211 mm)

640-07 thru 640-21A 0.0058-0.0078 in. (0.147-0.198 mm)

640-23 . . . . . 0.0053-0.0073 in. (0.135-0.185 mm)

641 thru 641-14,
1400 . . . . . 0.0047-0.0067 in. (0.119-0.170 mm)

643-35,A,B,
653-07 thru 653-10,
660-39,A, 660-40,
661-30 thru 661-45,
662-02, 1618, 1619,
1622 thru 1623A . . . . 0.0045-0.006 in. (0.114-0.152 mm)

1401 thru 1401F, 1401J
1448 thru 1450,
1450A,B,C,D,E, 1466,A,
1471,A,B, 1482,A,
1483, 1484,A,B,C,D,
1486, 1489 thru 1490B,
1498, 1499, 1500,
1506, 1507, 1509,
1511, 1515 thru 1516C,
1517, 1517, 1518,
1525A, 1527, 1529,A,B,
1531, 1535B, 1542,
1547, 1549, 1551
1553, 1554,A, 1555,
1556, 1573,
1600 thru 1617 . . . . . 0.0045-0.0065 in. (0.114-0.165 mm)

1401G,H, 1450F,
1506B, 1534A . . . . . 0.004-0.006 in. (0.10-0.15 mm)
1624 thru 1642 . . . . . 0.0043-0.0058 in. (0.109-0.147 mm)

Piston ring end gap (listed by type number):
638 thru 638-100,
641 thru 641-14,
650, 1400, 1486,
1518 . . . . . 0.006-0.014 in. (0.15-0.36 mm)
639 thru 639-13A . . . . . 0.005-0.013 in. (0.13-0.33 mm)

1471,A,B,
1484,A,B,C,D,
1489 thru 1490B
1498, 1500, 1509,
1511, 1515 thru 1516C,
1517, 1517, 1527,
1529,A,B, 1531,
1535B, 1542, 1547,
1549, 1554,A,
1573 . . . . . 0.006-0.011 in. (0.15-0.30 mm)
Other type numbers in preceding list for piston clearance . . . . . 0.007-0.016 in. (0.18-0.41 mm)

Piston and rings that are 0.010 inch (0.25 mm) oversize are available for

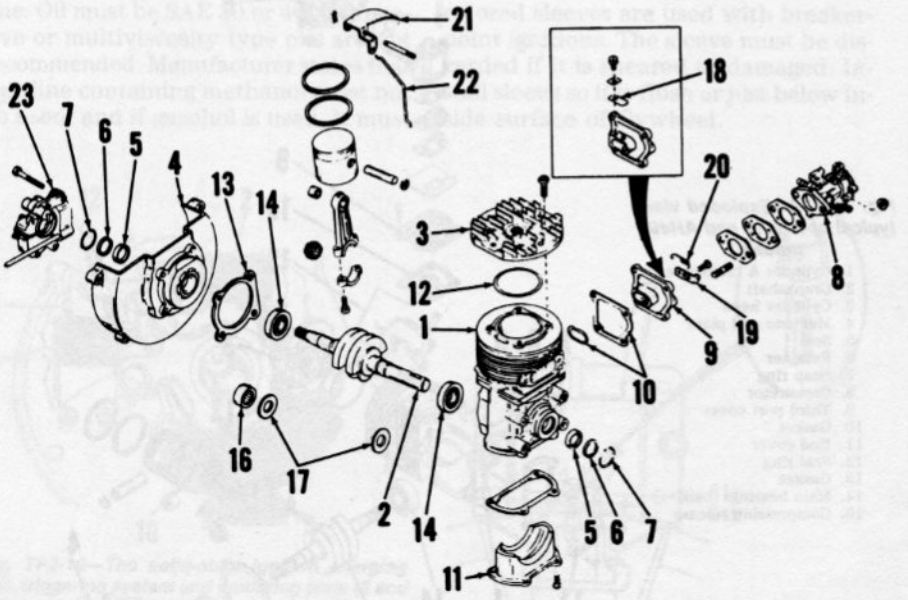


Fig. TP2-21—Exploded view of AH520 engine. Supplementary reed valve is shown at (18) and governor parts at (19 through 22).

1. Cylinder & crankcase
2. Crankshaft
3. Cylinder head
4. Magneto end plate
5. Seal
6. Retainer
7. Snap ring
8. Carburetor
9. Third port cover
10. Gaskets
11. End cover
12. Seal ring
13. Gasket
14. Main bearings (ball)
16. Main bearing (roller)
17. Thrust washers
18. Reed valve
19. Spring bracket
20. Governor spring
21. Air vane
22. Carburetor link
23. Magneto

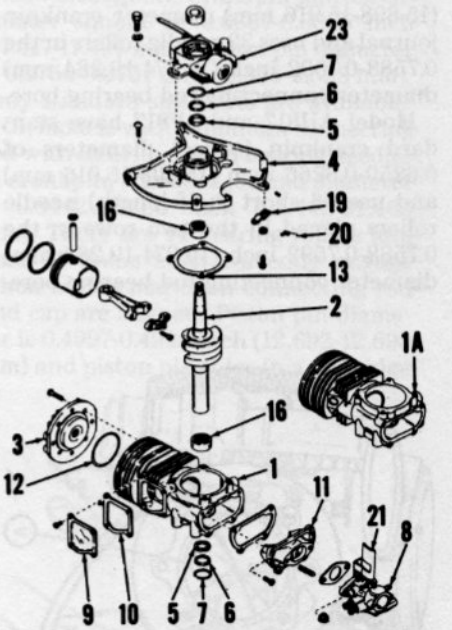


Fig. TP2-22—Exploded view typical of AV520 and AV600 engines. The cylinder and crankcase for some AV520 and all AV600 models is shown at (1A).

1. Cylinder & crankcase
2. Crankshaft
3. Cylinder head
4. Magneto end plate
5. Seal
6. Retainer
7. Snap ring
8. Carburetor
9. Cover
10. Gasket
11. Reed valve
12. Seal ring
13. Gasket
16. Main bearings (roller)
19. Spring bracket
20. Governor spring
21. Air vane (on carburetor)
23. Magneto

Illustrations courtesy Tecumseh Products Co.

TVS600 engines and some other later engines. Check parts availability before machining or discarding cylinder. The piston pin should be a press fit in heated piston on models with needle bearing in connecting rod pin bore. On models without needle bearing, the piston pin should be a palm push fit in piston and thumb push fit in rod.

Refer to CONNECTING ROD section for standard piston pin diameters.

When assembling piston and connecting rod on vertical crankshaft models, lubrication hole in side of connecting rod must be toward top of engine. On Models AV520 and AV600 equipped with offset piston, make certain that "V" mark or "1111" mark stamped on top of piston is toward the right side as shown in Fig. TP2-19.

Use the old cylinder head sealing ring and a ring compressor to compress piston rings when sliding piston into cylinder.

NOTE: Make certain rings do not catch in recess at top of cylinder.

Always renew the cylinder head metal sealing ring. The cylinder head retaining screws should be tightened to 90-100 in.-lbs. (10-11 N·m). Refer to CONNECTING ROD section for installation of the connecting rod.

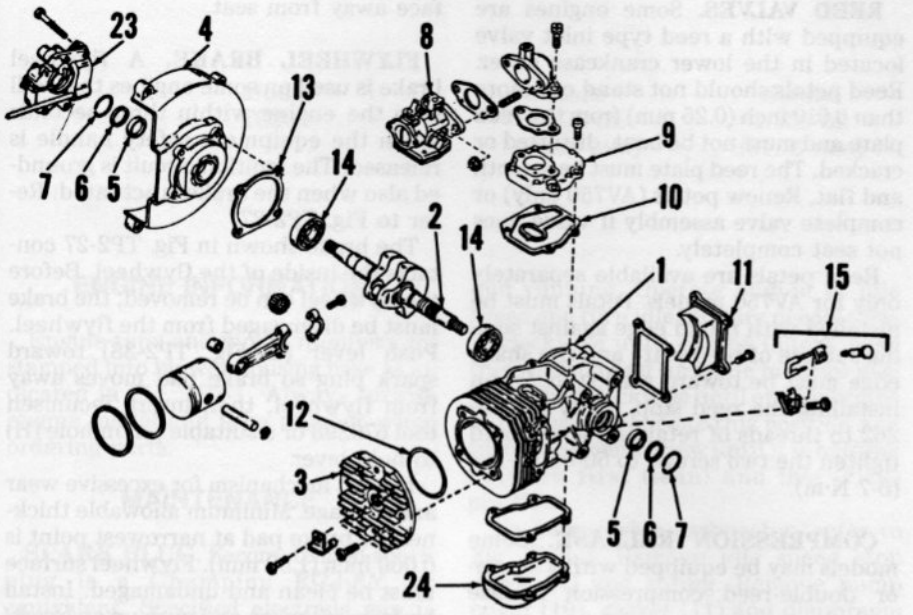


Fig. TP2-23—Exploded view of AH750 engine. Compression release is shown at (15). Model AH817 engines are similar.

1. Cylinder & crankcase
2. Crankshaft
3. Cylinder head
4. Magneto end plate
5. Seal
6. Retainer
7. Snap ring
8. Carburetor
9. Third port cover
10. Gasket
11. End cover
12. Seal ring
13. Gasket
14. Main bearings (ball)
15. Compression release
23. Magneto
24. Transfer port cover

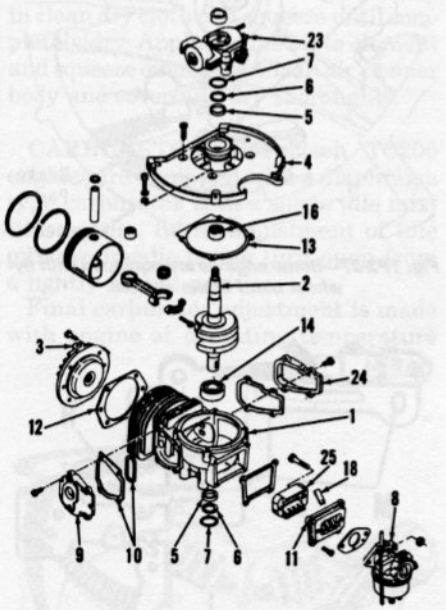
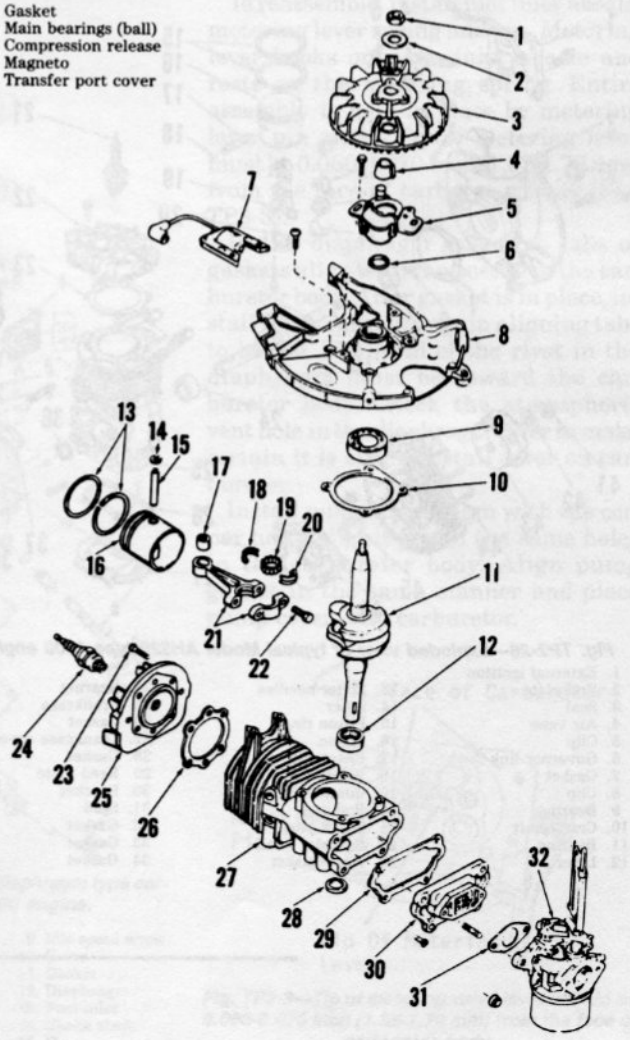


Fig. TP2-24—Exploded view of typical AV750 engine. Refer to text when assembling reed valve (11, 18 and 25). Model AV817 engines are similar.

1. Cylinder & crankcase
2. Crankshaft
3. Cylinder head
4. Magneto end plate
5. Seal
6. Retainer
7. Snap ring
8. Carburetor
9. Cover
10. Gasket
11. Reed plate
12. Head gasket
13. Gasket
14. Main bearing (ball)
16. Main bearing (roller)
18. Reed valve petal (8)
23. Magneto
24. Transfer port cover
25. Reed petal stop

Fig. TP2-25—Exploded view of typical Model TVS600 type 661 engine.

1. Flywheel nut
2. Washer
3. Flywheel
4. Flywheel sleeve
5. Magneto
6. Seal
7. Coil
8. End plate
9. Bearing (ball)
10. Gasket
11. Crankshaft
12. Bearing (roller)
13. Piston rings
14. Clip
15. Piston pin
16. Piston
17. Bearing
18. Liner
19. Roller bearings
20. Liner
21. Connecting rod
22. Rod bolt
23. Head bolt
24. Spark plug
25. Cylinder head
26. Head gasket
27. Cylinder
28. Seal
29. Gasket
30. Reed valve
31. Gasket
32. Carburetor



CRANKSHAFT AND CRANKCASE. The crankshaft can be removed after the piston, connecting rod, flywheel and magneto end bearing plate are removed.

Crankshaft main bearings may be either ball type or cartridge needle roller. If ball type main bearings are used, it should be necessary to bump the crankshaft out of the bearing inner races. Ball bearing may be retained on crankshaft with a retainer ring. If a retainer ring is not used, apply Loctite 609 into grooves on crankshaft where ball bearing contacts shaft. Ball and roller bearing outer races should be a tight fit in bearing bores. If new ball bearings are to be installed, heat the crankcase when removing or installing bearings.

On all models, bearings should be installed with printed face on race toward center of engine.

If the crankshaft is equipped with thrust washers at ends, make certain they are installed when assembling.

Crankshaft end play should be 0.003-0.016 inch (0.08-0.41 mm) for Models AV520 and AV600 equipped with two needle roller main bearings. Crankshaft end play for all other models is zero.

Crankshaft seals are installed so lip is toward inside of engine.

REED VALVES. Some engines are equipped with a reed type inlet valve located in the lower crankcase cover. Reed petals should not stand out more than 0.010 inch (0.25 mm) from the reed plate and must not be bent, distorted or cracked. The reed plate must be smooth and flat. Renew petals (AV750 only) or complete valve assembly if valve does not seat completely.

Reed petals are available separately only for AV750 models. Petals must be installed with round edge against sealing surface of reed plate and the sharp edge must be toward reed stop. When installing the reed stop, apply Loctite 262 to threads of retaining screws and tighten the two screws to 50-60 in.-lbs. (6-7 N·m).

COMPRESSION RELEASE. Some models may be equipped with a single- or double-reed compression release valve attached to the cylinder. Single-reed type is serviced as a unit assembly only. Individual reeds are available for double-reed type. Colored side of reed must face seat, while rough edge should face away from seat.

FLYWHEEL BRAKE. A flywheel brake is used on some engines that will stop the engine within three seconds when the equipment safety handle is released. The ignition circuit is grounded also when the brake is actuated. Refer to Fig. TP2-27.

The brake shown in Fig. TP2-27 contacts the inside of the flywheel. Before the flywheel can be removed, the brake must be disengaged from the flywheel. Push lever (L—Fig. TP2-28) toward spark plug so brake pad moves away from flywheel, then insert Tecumseh tool 670298 or a suitable pin in hole (H) to hold lever.

Inspect mechanism for excessive wear and damage. Minimum allowable thickness of brake pad at narrowest point is 0.060 inch (1.52 mm). Flywheel surface must be clean and undamaged. Install brake mechanism and push up on bracket so bracket mounting screws are at bottom of slotted holes (M) in bracket. Tighten mounting screws to 90 in.-lbs. (10.2 N·m).

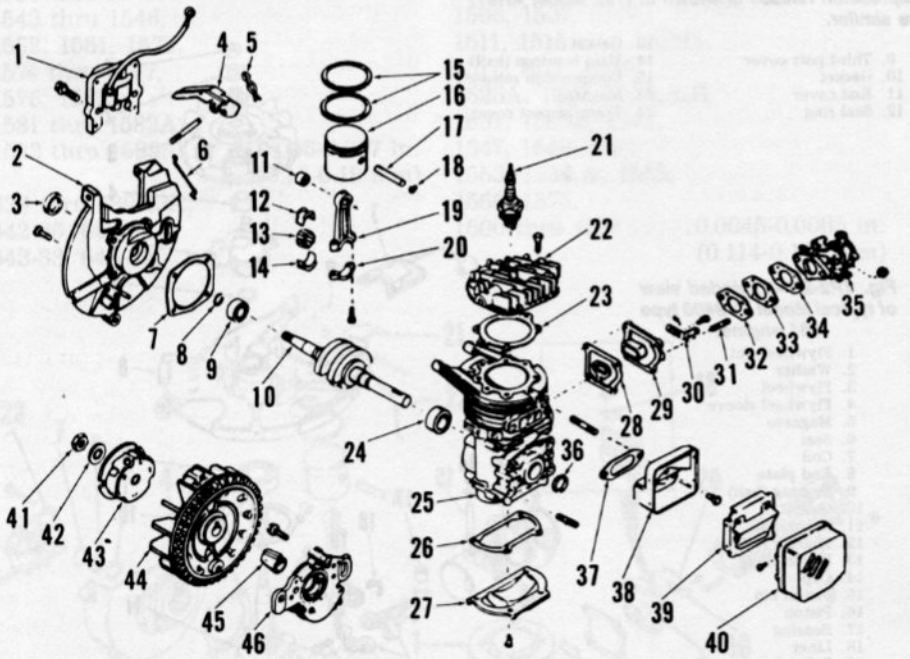


Fig. TP2-26—Exploded view of typical Model AH520 type 1600 engine. Model AH600 is similar.

1. External ignition
2. End plate
3. Seal
4. Air vane
5. Clip
6. Governor link
7. Gasket
8. Clip
9. Bearing
10. Crankshaft
11. Bearing
12. Liner
13. Roller needles
14. Liner
15. Piston rings
16. Piston
17. Piston pin
18. Retainer
19. Connecting rod
20. Rod cap
21. Spark plug
22. Cylinder head
23. Head gasket
24. Bearing
25. Crankcase
26. Gasket
27. Crankcase cover
28. Gasket
29. Reed plate
30. Bracket
31. Stud
32. Gasket
33. Gasket
34. Gasket
35. Carburetor
36. Seal
37. Gasket
38. Muffler base
39. Baffle
40. Cover
41. Nut
42. Washer
43. Starter cup
44. Flywheel
45. Flywheel sleeve
46. Magneto

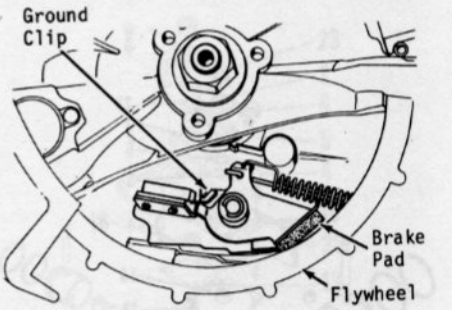


Fig. TP2-27—Some engines are equipped with flywheel band brake system.

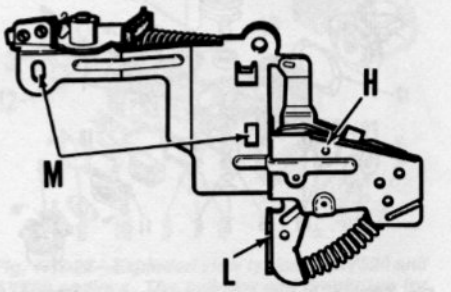


Fig. TP2-28—Push against lever (L) and insert a pin through holes (H) to hold brake pad away from flywheel.

Illustrations courtesy Tecumseh Products Co.