MOTORCRAFT MODEL 2150 2-BARREL

CARBURETOR APPLICATION

FORD MOTOR CO.

Application	Ford Motor Co. Part No.①
3.8L (230") V6	
Federal	
Without A/C	E2BE-AAA, ABA, AHA
With A/C	E2BE-UA, VA, AGA; E2VE-CA
High Altitude	
Without A/C	E24E-DA, FA
With A/C	E24E-CA, EA
4.2L (255") V8	
Federal	
Without A/C	E2KE-BA; E2WE-FA
With A/C	E2KE-AA; E2WE-EA
High Altitude	
Without A/C	E2DE-KA, MA
With A/C	E2DE-JA, LA
5.0L (302") V8	
Federal	
Without A/C	E2ZE-BBA
With A/C	E2ZE-BAA
High Altitude	E25E-CA

① — Ford basic part number is 9510.

CARBURETOR IDENTIFICATION

Carburetor can be identified by a tag attached to the air horn. This tag contains number and design change codes in addition to the build date. Always refer to the tag number when ordering or replacing parts.

DESCRIPTION

Motorcraft 2150 carburetors consist of a float system and 5 fuel metering systems: choke system, acceleration system, main metering system and power enrichment system. In addition to these systems, some carburetors may be equipped with some or all of the following systems: altitude compensation, high speed pullover system, throttle positioners and/or variable high speed bleed system. The float system maintains a preset level of fuel in the fuel bowl. The fuel bowl is internally vented to the air cleaner on all models. Some models are also externally vented to the canister. Some carburetors have a filler block in the fuel bowl on the left side.

All electric choke systems with choke pulldown diaphragms are used with the 2150 carburetor. The electric choke used with V6 engines gets electrical power from the battery; the choke cap and oil pressure switch are connected in series. The electric choke used with V8 engines gets electrical power from the alternator stator; choke cap wire is connected directly to alternator stator terminal. The choke system used on V8 engines also uses thermactor hot air assist. Choke cap on both V6 and V8 systems include ceramic heater discs (2 on V6 engines and 1 on V8 engines). On V6 engines, the first disc is always energized when engine is running to unwrap the spring, which opens the choke plate at a calibrated rate. The second disc is energized when the temperature in engine compartment is 54-74°F (12-23°C) to further open the choke plate. On V8 engines, hot air from the manifold is applied to the choke housing to open the choke (serves same function as first disc on V6 engines). At temperatures of 54-74°F (12-23°C), a temperature sensing switch energizes the ceramic heater disc to open the choke further (same as second disc on V6 engines). *See Fig. 1.*

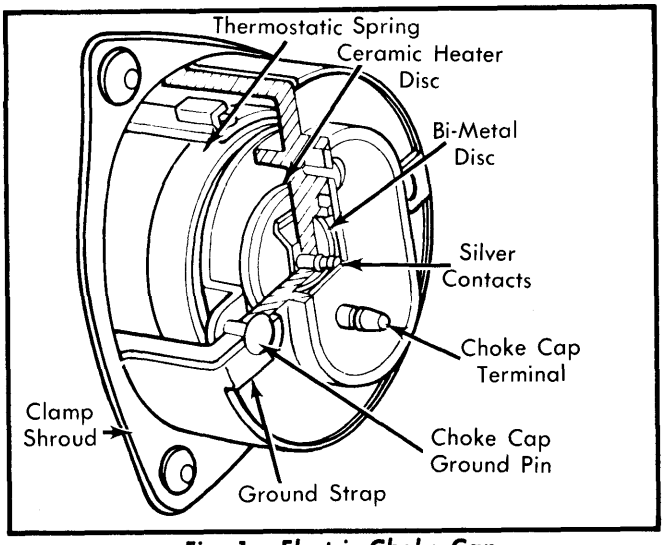

Fig. 1 Electric Choke Cap

Choke pulldown diaphragms are of 3 types: modulated choke pulldown, positive choke closure (PCC) and modulated positive choke closure (MPCC). The modulated choke pulldown assembly includes an additional spring which allows choke plate to move under certain cold engine starts. The positive choke closure also has an additionall spring, but it is on the outside of the pulldown link. This spring adds more force to hold choke plate closed during engine starts. The modulated positive choke closure is a combination of the other 2 pulldown assemblies. The positive choke closure is used during engine starts and the modulated choke control operates during engine warm-up. All choke pulldown assemblies use manifold vacuum to provide a leaner air/fuel mixture after engine starts. The choke is opened by a link connected to the pulldown diaphragm. *See Fig. 2.*

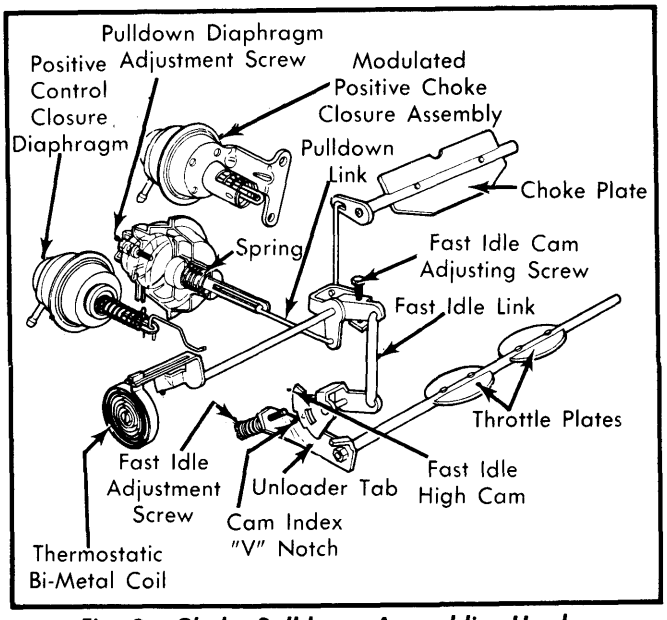

Fig. 2 Choke Pulldown Assemblies Used on Motorcraft Model 2150 Carburetors

The idle system provides the correct air/fuel mixture at curb idle speeds. The amount of mixture entering the engine is controlled by the tapered idle mixture adjusting screws. The adjusting screws extend into the curb idle discharge ports and

MOTORCRAFT MODEL 2150 2-BARREL (Cont.)

change the metering area of the ports. The adjusting screws are preset at the factory and 2-piece tamper-proof caps are installed to prevent adjustment of the idle mixture screw setting. The acceleration system is an external diaphragm type pump which provides additional fuel necessary to increase engine speed from idle to full throttle. As the idle system phases out, the acceleration system provides fuel until the main metering system can provide the necessary air/fuel mixture.

The main metering system provides the necessary air/fuel mixture for speeds above curb idle. The main metering system consists of a main venturi, booster venturi and main fuel discharge port in each bore. Fuel from the fuel bowl is drawn up through the main well bleeds by the vacuum created by air flowing through the venturi. Air is added to the fuel from the anti-siphon bleeds and high speed bleeds through holes in the main well tubes. This air/fuel mixture is discharged through the main discharge nozzles in the booster venturi and mixed with the air flowing through the main and booster venturis. The amount of air/fuel mixture admitted to the engine is controlled by throttle plate position. The enrichment system consists of an enrichment valve diaphragm which adds extra fuel to the air/fuel mixture during periods of increased load or high speed operation.

The altitude compensation system provides additional air (added between venturi booster and throttle plate) to lean the air/fuel mixture at higher altitudes. The high speed pullover system is an air bleed in the air horn with a calibrated hole which adds extra fuel for high speed operation. Various throttle positioners are used to increase idle speed during A/C operation and to permit slow return of throttle plates to idle position during deceleration.

The variable high speed bleed system provides a direct link between air/fuel mixture and throttle plate position. A cam on throttle shaft engages a lift rod as the throttle opens. The lift rod raises metering rods in the high speed bleed holes to decrease air flow through the high speed bleed holes. This allows better high speed operation and low speed response.

TESTING

ELECTRIC CHOKE

NOTE – *Some V6 engines may have the choke cap electrical lead connected to the alternator stator rather than through oil pressure switch to battery. Verify by tracing electrical connection.*

Choke Cap Continuity (Alternator Powered) – 1) Disconnect electrical lead from choke cap. With ignition off, connect test lamp between battery positive terminal and choke cap terminal. Using a jumper wire, connect one end to choke clamp shroud and other end to battery negative terminal.

2) Test lamp should glow. If not, connect jumper wire directly to choke cap ground pin; if lamp glows, correct poor connection between choke clamp shroud and choke cap ground pin. If lamp does not glow, replace choke cap.

3) Leave test lamp connected and remove jumper wire. Test lamp should glow. If not, locate and repair open in ground circuit. Reconnect electrical lead to choke cap.

4) Connect test lamp between choke cap shroud and battery negative terminal. Start engine. Test lamp should glow. If not, locate and repair open circuit between choke cap and alternator stator terminal. If no open circuit is found, check alternator output and service as required. Stop engine and remove test equipment.

Choke Cap Continuity (Battery Powered) – 1) Turn ignition off. Disconnect electrical connection from oil pressure switch and install jumper wire in electrical harness. Connect test lamp between battery negative terminal and choke cap terminal.

2) Turn ignition on but do not start engine. Test lamp should glow. If not, locate and repair open circuit (fuse, fuse link, electrical connector, etc.). Turn ignition off.

3) Remove jumper wire and reconnect electrical connection to oil pressure switch. Turn ignition on but do not start engine. Test lamp should not glow. If lamp glows, replace oil pressure switch.

4) With test lamp still connected, start engine. Test lamp should glow. If not, replace oil pressure switch.

Choke Cap Resistance – 1) Using a heat source (100 watt bulb), hold close to face of choke cap for 3-5 minutes to heat cap to temperature above internal switching point.

2) Using an ohmmeter set on 30 ohm (maximum) scale, connect ohmmeter between choke cap terminal and choke cap shroud. Ensure metal-to-metal contact is obtained. Ohm reading should be under 30 ohms, but not 0. If not to specifications, repeat test. If reading is still not to specifications, replace choke cap.

3) Using a choke tester, cool choke cap by directing cold air towards oval-shaped insulator (not case) around cap terminal. Ohm reading should slowly increase and then a sudden increase (under 10 ohms) should occur.

4) Stop cooling. The sudden increase (of under 10 ohms) should occur within 10 minutes after cooling began. If resistance change does not occur within 10 minutes, replace choke cap. If resistance does change, warm insulator in same manner as described in step **3)**.

5) The ohm reading should vary gradually and then a sudden decrease should occur within 10 minutes that warming began. If decrease does not occur within 10 minutes, replace choke cap. If resistance does change, choke cap is working properly.

ADJUSTMENT

HOT (SLOW) IDLE RPM

See appropriate article in TUNE-UP SERVICE PROCEDURES.

IDLE MIXTURE

See appropriate article in TUNE-UP SERVICE PROCEDURES.

COLD (FAST) IDLE RPM

See appropriate article in TUNE-UP SERVICE PROCEDURES.

ACCELERATOR PUMP STROKE

NOTE – *Accelerator pump stroke has been preset at factory for each particular engine application. Additional holes are only provided for different engine applications.*

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1) On adjustment limiting carburetors, support area below pump housing roll pin to prevent damage to pump housing. Using blunt-tipped punch and small hammer, remove roll pin attaching pump link to pump housing.

2) Lift pump link and rod up and over carburetor until keyed end of rod is aligned with keyed hole in pump overtravel lever. Remove and reposition rod in specified hole and reassemble pump link and rod assembly.

NOTE – *Adjustment limiting carburetors are identified by a new plastic tamper-proof retaining clip instead of metal retaining clip.*

3) On all other carburetors, pry up on tab portion of metal retaining clip using small screwdriver and disengage rod assembly from overtravel lever.

4) Position clip in specified hole of overtravel lever and insert rod assembly through hole in clip and overtravel lever. Snap end of clip over rod assembly. See *Fig. 3*.

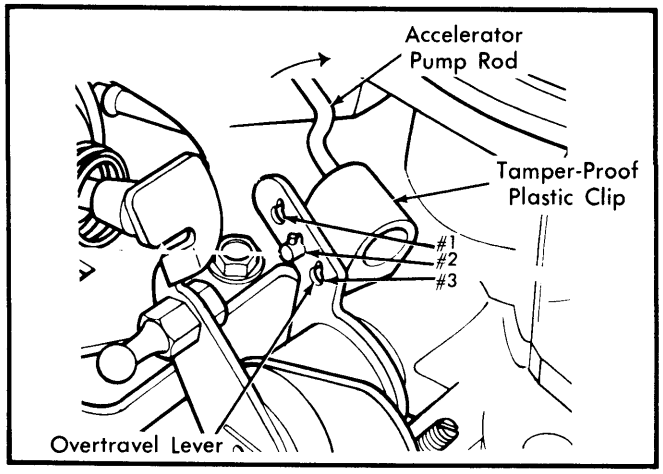

Fig. 3 Accelerator Pump Stroke Adjustment

FLOAT LEVEL (DRY SETTING)

NOTE – *Dry float setting is preliminary adjustment only. Final adjustment (wet setting) must be made after carburetor is installed on vehicle.*

With air horn removed, depress float tab to seat fuel inlet needle. Measure distance from top of main body (gasket removed) to float, at point 1/8" from free end of toe. If adjustment is necessary, bend float tab.

CAUTION – *Do not allow float tab to contact needle while making float adjustment as Viton needle tip may be damaged.* See *Fig. 4*.

FLOAT LEVEL (WET SETTING)

1) Warm engine to normal operating temperature. Ensure vehicle is on flat, level surface. Stop engine. Remove air cleaner and air horn attaching screws. Leave air horn in position on carburetor. Start engine.

2) Allow engine to idle for a few minutes to stabilize fuel level. With engine idling, remove air horn and gasket.

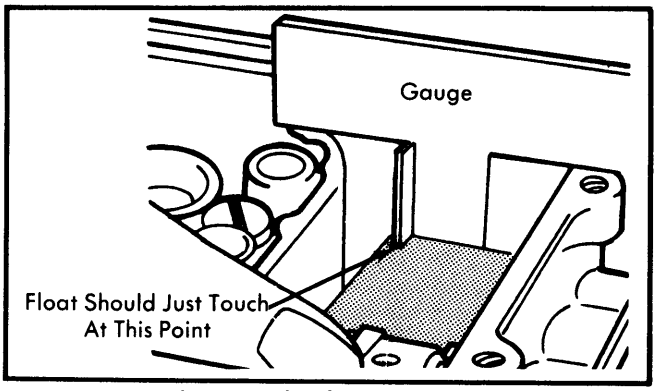

Fig. 4 Float Level Adjustment (Dry Setting)

3) Using "T" scale, measure distance from machined surface of main body to level of fuel in fuel bowl. Make measurement at least 1/4" away from sides of bowl for accurate readings. See *Fig. 5*.

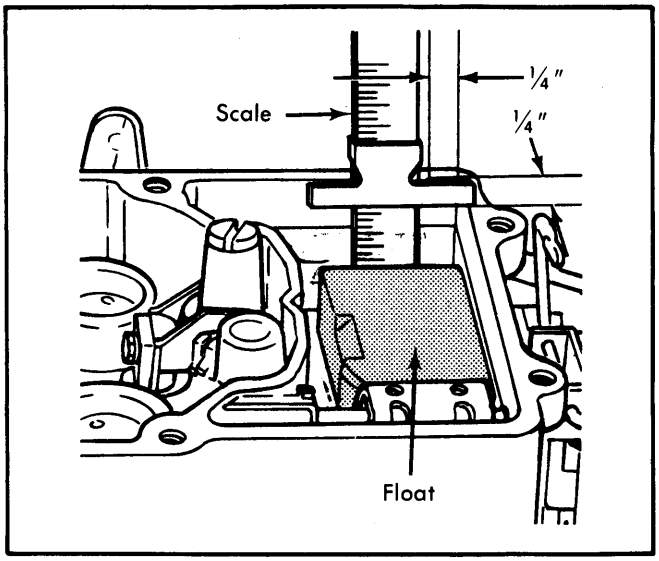

Fig. 5 Float Level Adjustment (Wet Setting)

4) If level is not within specifications, adjustment is needed. Stop engine before adjusting to avoid fire danger from fuel spray. Bend float tab (contacting inlet valve) up to raise fuel level and down to lower level.

5) After each adjustment, install air horn with 2 screws, start engine and idle long enough for fuel level to adjust to new adjustment. Stop engine, recheck fuel level.

6) When correct level is obtained, install new air horn gasket; replace air horn (install I.D. tag). Be sure plastic dust seal on choke rod is positioned properly and does not bind rod.

CHOKE VALVE PULLDOWN (INITIAL CHOKE VALVE CLEARANCE)

1) Remove vacuum line from choke pulldown motor. Apply external vacuum source to pulldown motor. If motor does not activate, replace pulldown motor. If motor activates, apply vacuum source to hose. If vacuum holds, clean vacuum hose.

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NOTE – *Choke cap is retained with tamper-proof screws. To remove choke cap, remove fast idle cam retainer. Center punch choke cap retaining screw heads. Using a ¼" drill bit, drill screw heads deep enough to remove choke cap retainer. Using a sharp, flat chisel, remove cap by inserting chisel between choke cap gasket layers and prying loose (gasket is epoxyed). Using small pliers, remove remaining portion of screws. Remove epoxy and gasket material from mating surfaces.*

2) Remove choke cap as previously described. Install 3 screws to retain choke cap in position. Install fast idle cam retainer. Rotate thermostatic housing counterclockwise to lightly close choke plate and turn an additional 90°.

3) Apply external vacuum source to activate pulldown motor or manually force diaphragm to retracted position. Using a drill bit or pin gauge, measure clearance between lower edge of choke plate and air horn wall. To adjust, rotate adjusting screw until correct clearance is obtained. Perform Fast Idle Cam Index adjustment.

NOTE – *If access to adjusting screw is covered with steel plug, remove plug as follows: File a groove ⅛" deep and ¼" away from rear edge of pulldown motor. Using sharp tipped tool, pry plug out. If adjusting screw is held in position with Loctite, heat with soldering gun to loosen Loctite and rotate screw until free. After adjustment, retain screw with Loctite, install plug and retain with epoxy.*

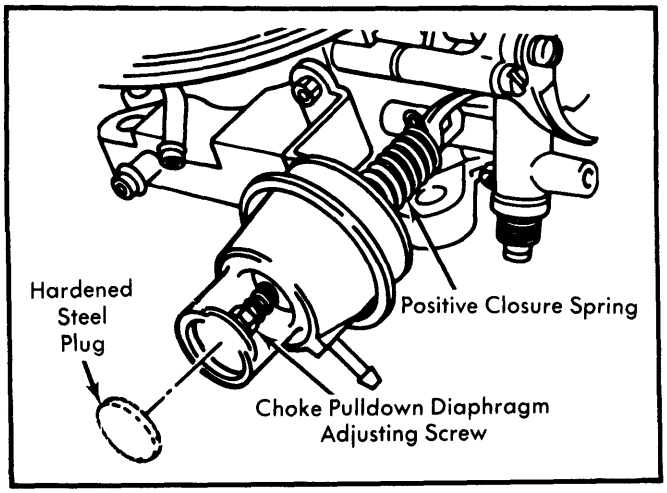

Fig. 6 Choke Pulldown Adjustment (Initial Choke Valve Clearance)

FAST IDLE CAM INDEX

NOTE – *Fast idle cam index must be checked after any choke pulldown adjustment.*

1) With thermostatic housing in rich position (step **2)** in Choke Valve Pulldown adjustment procedure), open throttle to set fast idle cam. Apply external vacuum source to pulldown diaphragm. Open throttle and watch fast idle cam. Fast idle cam should drop to kickdown step and fast idle screw should be opposite cam "V" notch.

2) To adjust, turn fast idle cam lever adjustment screw. See *Fig. 7*. Reconnect vacuum hose and perform Automatic Choke adjustment to reset thermostatic housing to specification.

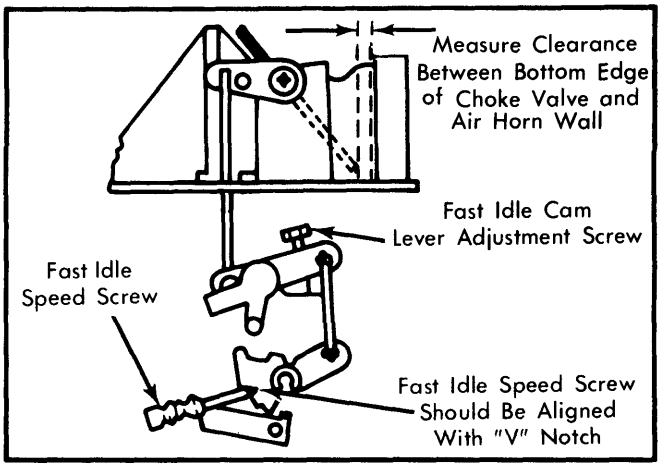

Fig. 7 Adjusting Fast Idle Cam Index

CHOKE UNLOADER

1) Hold throttle wide open. Using specified drill bit or pin gauge, measure clearance between lower edge of choke plate and air horn wall.

2) To adjust, bend metal tang on fast idle speed lever attached to throttle shaft. See *Fig. 8*. Make sure tang does not touch edge of cam to avoid wide open throttle sticking condition. Rotate throttle lever several times to check for any binding during unloader operation.

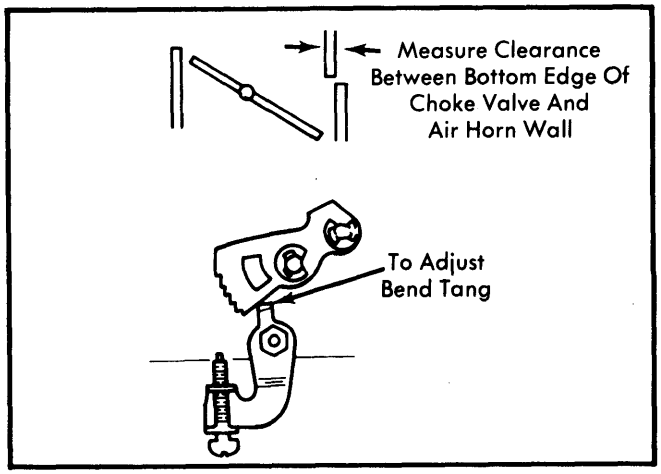

Fig. 8 Choke Unloader Adjustment

AUTOMATIC CHOKE

1) Remove choke cap as previously described. Apply ½" bead of epoxy sealer to each side of choke cover gasket, next to the 3 screw bosses. Install gasket and choke cap with new break-away screws.

2) Rotate cover assembly in "Rich" or "Lean" direction to align reference mark on choke cover with specified mark on housing. Tighten break-away screws until head of screw breaks off.

NOTE – *Ensure bi-metal spring tab is engaged in slotted choke shaft lever.*

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OVERHAUL

DISASSEMBLY

Air Horn – **1)** Remove air cleaner anchor screw and automatic choke control rod retainer. Remove air horn attaching screws, lock washers, carburetor I.D. tag, then remove air horn and gasket. Remove choke control rod by loosening screw securing choke shaft lever to choke shaft. Remove rod from air horn and slide plastic dust seal out of air horn.

2) If necessary to remove choke plate, remove choke plate screw staking marks. Remove choke plate screws. Slide choke plate out of shaft from top of air horn. Remove burrs from choke plate screw holes on choke shaft. Slide choke shaft out of air horn.

3) If equipped with altitude compensator, the by-pass choke plate is removed in same way as main choke plate. To remove shaft, remove link retainer and slide shaft out of air horn.

Main Body – **1)** Remove choke pulldown diaphragm retaining screws. Remove diaphragm link circlip and pulldown diaphragm. Remove fast idle cam retainer. Remove choke cap as previously described. Remove choke housing retaining screws, choke housing and gasket. Remove fast idle cam and rod from fast idle cam lever.

2) Remove choke lever retaining screw and washer. Disconnect choke control rod from choke lever. Remove choke lever and fast idle cam lever from choke housing.

3) Pry float shaft retainer from fuel inlet seat with a screwdriver. Remove float, float shaft retainer and fuel inlet needle assembly. Remove retainer and float shaft from float lever. Remove filler block from fuel bowl (if equipped).

4) Remove fuel inlet needle, seat, filter screen and main jets. Remove booster venturi screw (accelerator pump discharge), booster venturi, metering rod assembly and gasket. Remove filter screen from booster venturi screw. Turn main body upside down and catch accelerator pump weight and ball.

5) To disassemble metering rod assembly, remove lift spring retaining clip and spring. Do not remove metering rod hanger from lift rod. On adjustment limiting carburetors, remove roll pin attaching accelerator pump link to pump housing with punch and small hammer. Remove pump link and rod assembly.

6) On all other carburetors, remove accelerator pump operating rod from overtravel lever and retainer by pressing ends of retainer together, while at the same time, pressing rod away from retainer until free. Remove rod and retainer.

7) Remove accelerator pump cover screws. Remove bowl vent bell crank and bracket, accelerator pump cover, diaphragm assembly and spring. If necessary to remove Elastomer valve, grasp firmly and pull out. Remove enrichment valve cover and gasket. Using box wrench or 8-point socket, remove enrichment valve. Discard gasket.

NOTE – *If tip of Elastomer valve broke off, make sure it is removed from fuel bowl. Elastomer valve must be replaced whenever it is removed.*

8) To remove idle mixture screw limiter caps, support area under cap. Using a punch, lightly tap tang on cap and tap cap forward. Remove caps, idle mixture screws, springs and plugs. If required, remove nut and washer securing fast idle adjusting lever to throttle shaft and remove lever.

9) If required, remove idle screw and spring from fast idle adjusting lever. Remove throttle positioner (if equipped). If required to remove throttle plates, mark each plate with its corresponding bore for reassembly reference. File off staked portion of throttle plate screws and remove throttle plates. Remove any burrs on throttle shaft. Slide throttle shaft out of main body; catching the mechanical high speed cam (located between throttle plates).

10) On altitude compensated carburetors, remove 4 attaching screws and remove aneroid and valve assembly with gasket from main body. Remove 3 aneroid-to-valve screws. Separate aneroid, gasket and valve.

CLEANING & INSPECTION

- Use a regular carburetor cleaning solution. Soak components long enough to thoroughly clean all surfaces and passages of foreign matter.
- Do not soak any components containing rubber, leather or plastic.
- Remove any residue after cleaning by rinsing components in a suitable solvent.
- Blow out all passages with dry compressed air.

REASSEMBLY

NOTE – *Use new gaskets and seals. Make sure that new gaskets fit correctly and that all holes and slots are punched through and correctly located. Replace Elastomer valve if removed from main body.*

To reassemble carburetor, reverse disassembly procedure and note the following:

1) When installing new Elastomer check valve (if removed), lubricate tip of new valve and insert tip into center hole of accelerator pump cavity. Use needle nose pliers inserted in fuel bowl and pull valve in until it is fully seated. Cut off excess valve tip at retaining shoulder and remove tip from fuel bowl.

2) When installing idle mixture needles and springs, turn screws in with fingers until lightly seated. Then back screws off seated position 1½ turns for an initial adjustment. Do not install idle limiter caps until final adjustments have been made.

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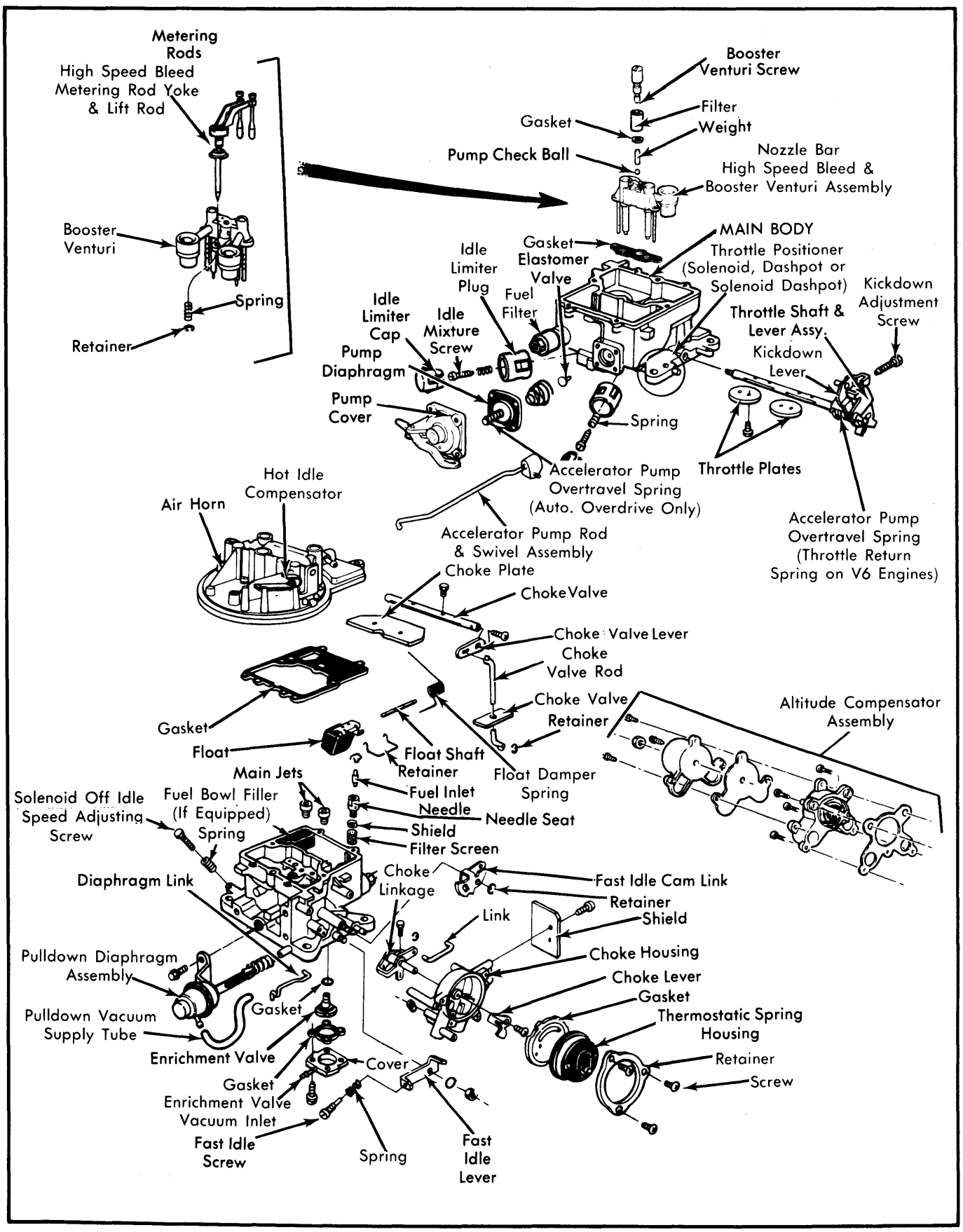

Fig. 9 Exploded View of Motorcraft Model 2150 Carburetor Assembly

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CARBURETOR ADJUSTMENT SPECIFICATIONS

Application	Float Level		Accel. Pump Setting	Choke Pull-Down Setting	Fast Idle Cam Setting①	Choke Unloader Setting	Auto. Choke Setting
	Dry Setting	Wet Setting					
Ford Motor Co.							
E2BE-UA	7/16"	13/16"	#2	.110"	"V" Notch	.250"	"V" Notch
E2BE-VA	7/16"	13/16"	#2	.113"	"V" Notch	.250"	"V" Notch
E2BE-AAA	7/16"	13/16"	#2	.110"	"V" Notch	.250"	"V" Notch
E2BE-ABA	7/16"	13/16"	#2	.113"	"V" Notch	.250"	"V" Notch
E2BE-AGA	7/16"	13/16"	#2	.113"	"V" Notch	.250"	"V" Notch
E2BE-AHA	7/16"	13/16"	#2	.113"	"V" Notch	.250"	"V" Notch
E2DE-JA	7/16"	13/16"	#2	.137"	"V" Notch	.250"	"V" Notch
E2DE-KA	7/16"	13/16"	#2	.137"	"V" Notch	.250"	"V" Notch
E2DE-LA	7/16"	13/16"	#2	.137"	"V" Notch	.250"	"V" Notch
E2DE-MA	7/16"	13/16"	#2	.137"	"V" Notch	.250"	"V" Notch
E2KE-AA	7/16"	13/16"	#2	.140"	"V" Notch	.250"	"V" Notch
E2KE-BA	7/16"	13/16"	#2	.140"	"V" Notch	.250"	"V" Notch
E2VE-CA	7/16"	13/16"	#2	.113"	"V" Notch	.250"	"V" Notch
E2WE-EA	7/16"	13/16"	#2	.137"	"V" Notch	.250"	"V" Notch
E2WE-FA	7/16"	13/16"	#2	.137"	"V" Notch	.250"	"V" Notch
E2ZE-BAA	13/32"	25/32"	#2	.172"	"V" Notch	.250"	"V" Notch
E2ZE-BBA	13/32"	25/32"	#2	.172"	"V" Notch	.250"	"V" Notch
E24E-CA	7/16"	13/16"	#2	.110"	"V" Notch	.250"	"V" Notch
E24E-DA	7/16"	13/16"	#2	.110"	"V" Notch	.250"	"V" Notch
E24E-EA	7/16"	13/16"	#2	.110"	"V" Notch	.250"	"V" Notch
E24E-FA	7/16"	13/16"	#2	.110"	"V" Notch	.250"	"V" Notch
E25E-CA	7/16"	13/16"	#2	.137"	"V" Notch	.250"	"V" Notch

① – "V" Notch is equal to kickdown setting. See adjustment procedure.