AC MECHANICAL FUEL PUMPS

Manufacturers: AC-Delco Division of General Motors, Ltd., Dunstable, Beds.

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S INCE our first article on this subject was published, almost five years ago, there have been many amendments to pump specifications, changes in identity and alterations to repair procedure. It is for these reasons that we are publishing this revised version of our original article, and all the fresh data will be found in these pages together with a completely new list of fuel pump applications on cars and some commercial vehicles from post-war to the present date.

In order that readers may effect a comparison of data and repair schedules, this sheet is arranged in similar fashion to the previous article. Part numbers of pump are stamped on the pump engine flange, pipe union bars, or under the diaphragm flange. When ordering from vehicle application, reference to our chart on p. iii will give the appropriate type letters and

numbers for the unit required.

There are four basic varieties of pump in production, Y, T, U & W. All are of similar design, but vary in size and detail. The latter type W has been the subject of an earlier service supplement No. 250/C13, and will not be dealt with here. It is hoped to publish a revised version of service and repair techniques for this fuel/vacuum unit at a later date.

First-aid kits are available for all types of pump, and although a simple check of pump operation can be made, two pieces of special equipment are available from AC-Delco. The AC fuel pump analyser enables a positive check to be made with

U & F GROUP

the pump in position on the engine, while a test stand is supplied as the basis of a bench test rig.

Replacement pumps are available on an exchange basis from the Service Department of the manufacturers, through all AC service stations. Pumps are supplied in sealed protective transparent envelopes complete with unions, where these were supplied to the vehicle manufacturer, and engine pad gasket.

Construction

Basically the pump consists of two die castings, the body, which is mounted on the engine by two setscrews, and the upper casting. These are assembled by a ring of screws round their flanges which pass through a diaphragm trapped between the two units. The diaphragm is supported in the centre by metal protectors to which is attached a pull rod.

Two slots in the end of the pull rod engage in the forked end of a link, restraining a compression spring located by the diaphragm protector and the body. Oil sealing washers are sometimes fitted around the pull rod. The link is pivoted on a pin passing through the body and retained by spring rings (or staking). A more recent method of fixing is to slide the pin into the body within the cast channels. Two specially shaped retainers are then pressed into the channels from the flange face and staked, the whole assembly ensures that oil will not leak past the pin. Sharing the same pivot, and fitting between the side lugs of the link is the rocker arm. Washers on either side prevent side play. A small spring is trapped between the body and a projection on the rocker arm, which keeps the rocker arm in contact with the camshaft

In the underside of the upper casting fits the valve gear. On earlier Y and T type pumps the valve components are individually assembled, and there are two valve plates or seats; one being punched into the body, while the other forms part of the retainer. Inlet and outlet valves on later Y-type (e.g. YD) and on all U-type pumps, are formed as separate valve cage assemblies, complete with seats and springs, held in place by a retaining plate secured by two screws.

Some models have the top of the upper casting sealed by a metal cover, and synthetic gasket retained by a setscrew; a filter gauze fits below the cover. Other models have metal or glass bowls on the upper casting retained by a stirrup and clamp nut. On UE models the upper casting is quite different, being elongated, with the filter and bowl inverted at the side of the body; passages allow the fuel to follow the same course as for the normal model.

An addition on some models is a hand primer. This is a lever pivoted on a shaft passing through the body on which is formed a lug or cam contacting the link.

Operation

For every two engine revolutions the rocker arm, kept in contact with its eccentric by the small compression spring, will move through a limited arc. As it does so it will take the link with it.

To consider the operation, assume that the carburettor bowl is empty. As the rocker arm moves towards the body the link will move with it, and this will operate the pull rod downwards against the pressure of the spring. This flexes the diaphragm, creating a partial vacuum in the chamber above it. Air pressure in the fuel tank then forces fuel along the

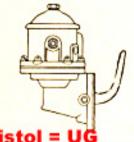
PUMP IDENTIFICATION

UE Standard type of pump for engines over 1,200 c.c.

c.c. Detachable valve assemblies and visible side filter.

Mounting stud holes arranged diagonally.

- FE As UE but mounting holes side by side.
- FH As UH but mounting holes side by side.



Bristol = UG

U Standard type of pump with metal filter cover.

Mounting stud holes arranged diagonally.

✓ Standard type of pump with glass filter bowl on top. Mounting stud holes arranged diagonally.

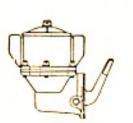
✓ The standard type of pump with glass filter bowl on the standard type of pump with glass filter bowl on the standard type of pump with glass filter bowl on the standard type of pump with glass filter bowl on the standard type of pump with glass filter bowl on the standard type of pump with glass filter bowl on the standard type of pump with glass filter bowl on the standard type of pump with glass filter bowl on top.

UF As U but stud holes side by side.

FG As UG but mounting holes side by side.

JH Standard type of pump without filter. Mounting stud holes arranged diagonally.

Y GROUP



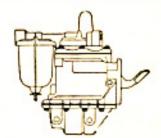
Small size pump for engines up to 1,200 c.c. Mounting stud holes side by side.

YD As type Y but later type with detachable valve assemblies.

YJ As YD but no filter.

YE As YJ but glass filter bowl at side.

W GROUP



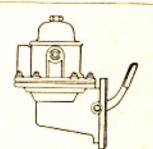
WE Combined fuel and vacuum pump.
Early type has detachable lower vacuum cover. Later double acting type has onepiece lower casting.

WH As WE but no filter.

WG As WE but filter bowl on top.

W Vacuum pump only

T GROUP



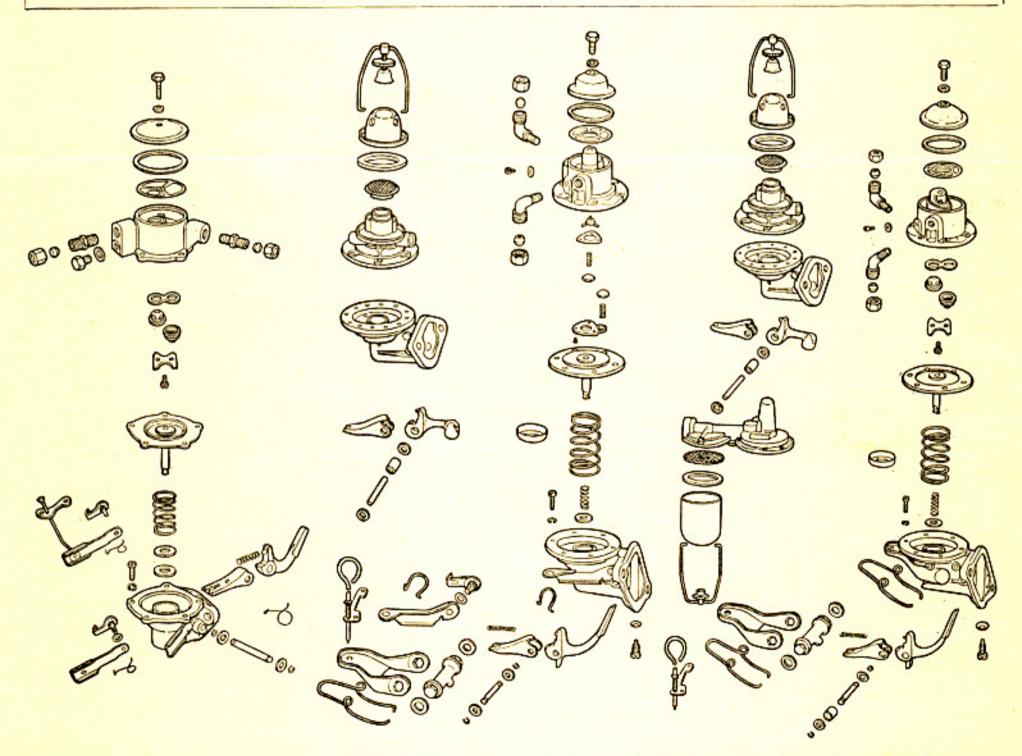
T Early type standard size with separate valves and springs. Mounting stud holes arranged diagonally.

TG As type T but glass filter bowl on top.

F As type T but mounting holes side by side.

| THE RESIDENCE | |
|-------------------|------|
| FINDING | CHAN |
| | |

| FAULT | CAUSE | REMEDY | |
|--------------------------------|--|--|--|
| L'arving at High Speeds | Loose pipe unions. Broken or overcompressed filter gasket Worn parts | Tighten. Replace gasket. Recondition pump or exchange. | |
| Difficult Starting—2low | As above | As above. Replace. Refit. Stop leakage. | |
| Carburettor Flooding | Faulty carburettor neeedle valve Pump pressure incorrect | Clean or replace. Check with specification. In some cases it is permissible to fit one or two extra gaskets between pump and crankcasto check flooding—not so many as to affect volume of pump delivery for max. power. | |
| Excessive Wear on Moving Parts | Lack of lubrication and corrosion due to: blow-by, inefficient crankcase ventilation | Recondition engine. Improve breathing if possible. | |
| Noisy Operation | General engine noise | Check with pump removed. Replace. | |
| Gum deposits from Fuel | Vehicle standing unused | Clean out fuel system completely. | |
| Vapour Lock | Fuel pipe near exhaust system Pump overheating | Reposition or lag. Fit heat shield, improve ventilation if possible. | |
| Excessive Fuel Consumption | Ignition, carburation or mechanical fault | Excessive fuel consumption cannot be attributed to fuel pump except in rare cases of diaphragm puncturing or splitting and allowing fuel leakage to waste or into sump. | |



AC fuel pumps shown in "exploded" form. Left is the YD-type pump with alternative hand primers. Note that earlier pumps had separate diaphragm and rod, later ones have a riveted assembly with new type of body and oil seal (shown by YD cast on body). In the centre, is the T-type pump with special upper casting of TG-type shown on left, and special rocker arm and body of TF-type. Below: alternative hand primers are shown. On the right is the U-type pump with, to the left, a special upper casting of UG-type, special body and rocker of UF-type upper casting and filter bowl of UE-type and hand primer fittings.

VEHICLE APPLICATION

| Vehicle | Original Equipment Part No. | Factory Exchange Part No. | Vehicle | Original Equipment Part No. | Factory Exchange Part No. |
|---|--|--|--|---|---|
| ALVIS 1951-54 3 litre Saloon—first 400 ditto —later 1953-57 3 litre Sports ARMSTRONG SIDDELEY 1946-48 2-3 litre 1949-54 2-3 litre | 1524710UF 1524743UE 1524743UE 1524488T 1524488U | 1524710 1524743 1524743 1524488 1524488 | HUMBER 1945-49 Hawk (R.H.D.) 1950-54 Hawk, All 1955-60 Hawk 1945-48 Snipe 1949-52 Super Snipe, Pullman and Imperial 1953-57 ditto, Mark IV (O.H.V.) | 1524282T 1524615U 7950030VE 1524257T 1524257T 1524950VE | 1524543 1524615 7950030 7950240 7950240 1524950 |
| 1952-60 Sapphire 234, 236, 246 and Star Sapphire AUSTIN 1945-47 8 and 10 h.p | 856965T 1524502T 1524467T 1524467U 7950189YD | 856965 1524467 1524467 1524467 7950189 | 1959-60 Super Snipe | 7950367VU 1524212U 1524713U 1524577U | 7950367 1524212 1524709 1524709 |
| 1955-60 A.40, A.50 and A.55 Cambridge 1955-58 A.90, 1955-60 A.95 and A.105 1948-50 Sheerline and Princess to Chassis No. 4792 1955-60 Sheerline and Princess AUSTIN TRUCKS AND COACHES | 7950058UF 7950144U 1524607U 1524711U | 7950058 7950417 1524467 1524711 | 1946-52 Model CK3 to Engine 2C219 1946-52 Model CK3 after Engine 2C219 1948-50 Bantam 1950-55 Bantam comm. Chassis 69A; 14 seater, J and BK Tractors | 1524257T 1524304T 1524282T 1524615U | 7950240 7950246 1524543 |
| † ton 4 x 4 Champ | 1524582U 7950410U 7950058UF 1524467U 1524711U | 1524467 7950410 7950058 1524467 1524711 | 1957-58 ditto (O.H.V.) | 7950030UE 1524921UE 1524274U 1524750FE | 7950030 1524921 1524274 1524750 |
| 1949-59 2, 3 and 5 ton—Petrol 1949-59—others (from Eng. No. 362094)— Petrol BEDFORD 1952-53 CA Van. to Ch. No. CA. 19142 | 856965U 7950244U 1524771Y | 856965 856965 7950193 | 1955 Sprite | 7950292U 1524467U 7950058UF | 7950292 1524467 7950058 |
| 1953-57 CA Van, prior to Ch. No. 78000 1957-58 CA Van Comm. Ch. No. 78000 1953-56 (May) TA Series 1956-57 A2, A3, from Engine 86487 1956-57 A4, A5 from Engine 100,000 1957-58 TC/TD Series Comm. Chassis No. 1001 | 7950050FG 7950319FG 7950084WE 7950312FE | 7950050 7950319 7950084 7950312 | 1947-50 4/4, Series I, Standard Engine 1951-58 Plus Four (Vanguard) 1953-58 Plus Four (TR2/3) 1956-58 4/4 Series II—Ford Engine MORRIS COMMERCIAL | 1524236Y 1524717UE 7950108UE 7950302YD | 7950206 1524717 7950108 7950302 |
| 214 cu. in Petrol Engine | 7950312FE 7950082FE 7950312FE 7950312FE | 7950312 7950082 | PV 15 cwt., LC 25 cwt J2 Minibus, Light-Pick-up & Van (from Ch. No. 16901) 30 cwt., 2, 3 and 5 ton and EVC NV Series, Petrol LD1 1 ton LD2 30 cwt.—Petrol 3 ton and 5 ton—Petrol—Series III | 7950058UF 1524527UG 1524527UG 1524467U 7950282U | 7950058 1524884 1524884 1524467 7950282 |
| 1947 24 litre | 7950411UG 1524147U 7950364U 7950098Y | 7950411 7950364 7950364 7950187 | RENAULT 1952-55 760 c.c. and Dauphine (Rear Engine) 1956-58 760 c.c. and Dauphine (Rear Engine) 1947-50 8 and 12 h.p | 7950197YD | 7950197 7950197 1524709 |
| 1954-55 Model 2 CV (Home) 1956-58 ditto COMMER 1945-48 15/25 cwt 1949-52 Mark IV Express Delivery | 7950187YD 1524282T 1524352Y | 7950187 7950187 1524543 7950200 | 1947-48 6 h.p | 1524548UG 1524137U 7950169U | 1524548 1524137 7950169 |
| 1953-55 Mark V to VIIA Express Delivery 1956-59 Mark VIII Express Delivery 1960 \$\frac{1}{2}\$ ton FC (Petrol) 1956-57 Cob Light Van 1945-51 15/25 cwt 1945-51 Superpoise, others 1952-55 \$\frac{1}{2}\$ and \$1\frac{1}{2}\$ ton Superpoise, Mark III 1956-59 ditto (O.H.V.) | 1524615U | 7950190 7950071 7950071 7950190 1524543 7950240 1524615 7950030 | 1946-47 10 and 12 h.p | 1524234T 1524235T 7950517FE 7950285FE 7950414FE 7950446FE 7950445FE | 7950223 7950223 7950517 7950445 7950446 7950446 7950445 |
| 1952-59 Superpoise Mark III and IV, others 1948-52 5 and 7 ton Forward Control Mark I 1953-58 ditto, Mark II, III and IV 1959-60 Cob Series I | 1524724UE 1524556UG 1524921UE 7950174UG | 1524724 1524556 1524921 7950174 | 1955-56 Hunter and Roadster (Home) 1957-60 " Gazelle " STANDARD Atlas 10/12 cwt. Van and Pick-up | 7950111FG 7950327FG 7950191YD | 7950424 7950327 7950191 |
| DAIMLER | 1524703U 1524750FE 1524558*T | 7950292 1524750 7950254 | 1945-48 8 h.p. (R.H.D.) | 1524236Y 1524006T 1524215T 1524551U 1524602U | 7950206 7950251 7950251 1524551 1524602 |
| 1952 Trucks, Kew built engine 1953-59 Trucks, Kew built engine FORD CARS 1945-53 Anglia and Prefect (Home) 1954-55 Popular (Home) 1956-57 Popular (Home) | 1524278Y 7950204YD | 1524963 1524963 7950204 7950204 | 1950-60 Vanguard, later and 1958-59 Ensign 1953-55 8 and 10 h.p 1956-59 8, 10 h.p. and Pennant 1954-55 Vanguard—Diesel 1956-57 Vanguard—Diesel 1958-60 Vignale Vanguard | 1524717UE 1524952Y 7950191YD 7950101Y 7950186YD 1524717UE | 1524717 7950191 7950191 7950186 7950186 1524717 |
| 1954-55 New Anglia and Prefect, All 1956-59 Anglia, Prefect, Escort, Squire, All 1959-60 New Anglia 1959-60 New Popular 1959-60 New Prefect 1951-52 Consul, to Engine 63026, Zephyr to Engine 18125 | 7950032Y 7950302†YD 7950466FE 7950302†YD 7950468WG | 7950183 7950302 7950466 7950302 750468 7950083 | SUNBEAM-TALBOT | 1524487U 1524553UG 7950030UE 7950174UG 7950536UG | 7950240 1524443 7950030 7950174 7950536 |
| 1952-56 Consul, Zephyr, Zodiac (Mark Hater) 1956-60 ditto, Mark II 1948-51 Pilot FORD (THAMES) TRUCKS AND VANS 1945-56 V-8 Engines | 1524760WE 7950218WH 1524376UF 1524376UF 1524745FG | 7950083 7950218 1524376 1524376 | TRIUMPH 1946-48 Model 1800 1949-50 Model 2000 to Chassis No. TDB. 1947 1951-55 Renown | 1524550U 1524602U 1524717UE 1524712Y 7950108UE | 1524551 1524602 1524717 7950196 7950108 |
| 1953-54 5 and 7 cwt. Van | 7950032Y 7950302†YD 1524278Y 7950276WG | 7950183 7950302 7950204 7950276 7950301 | VAUXHALL 1946-51 10 and 12 h.p. and LIX Wyvern 1946-48 14 h.p 1951-52 Wyvern EIX (except square engine) | 7950191YD 1524164Y 1524483UG 1524732Y | 7950191 7950195 1524483 7950195 |
| 1958-59 10/12 and 15 cwt. Vans HILLMAN 1945-49 (May) Minx 1949-52 Minx commencing Chassis No. 1,000,001 1953-55 Minx (S.V.) and 1955-57 Husky 1955-56 (April) Minx (O.H.V.) Engine, Mark VIII | 1524020T 1524352Y 1524959Y 7950071UG | 7950224 7950200 7950190 7950071 | 1952-53 Wyvern EIX (square engine) to Chassis No. EX 44295 | 1524771Y 7950050FG 1524483UG 1524731UE 1524773UE | 7950193 7950050 1524483 1524731 1524773 |
| 1956 (May)- 60 New Minx Series I, II, III and IIIA 1958-60 Husky Series I and II | 7950174UG 7950190YD | 7950174 7950190 | 1957-60 Victor Series I and II, Velox/Cresta Models | 7950319FG | 7950319 |

pipe line into the filter chamber, through the filter and open inlet valve into the pump chamber.

Further movement of the eccentric will allow the small spring to return the rocker arm, and the link will be held in contact with it by the action of the large spring. This will press the diaphragm upwards; the inlet valve is now forced on to its seat and the outlet valve opens, the fuel flowing out into the outlet pipe. A pocket of air trapped in a chamber above the outlet port acts as a cushion to damp out pulsations which could give rise to an irregular supply.

This sequence of events will be repeated until the carburettor bowl is filled, when the needle closes and shuts off flow from the outlet pipe. When this happens fuel is trapped in the pump chamber, keeping the diaphragm flexed in its lowest position. This holds the link out of contact with the rocker arm, which will keep "idling" as long as the engine runs. Immediately fuel is used, the needle valve opens, allowing fuel to flow from the pump chamber, and the diaphragm to rise. Thus with the next cycle of operation the rocker arm will contact the link again. The hand primer operates the link in much the same way.

In this way the pump automatically adjusts its output to the requirements of the engine, and delivery pressure is dependent only on the diaphragm compression spring.

Testing

Simple test is to remove feed pipe where it enters carburettor bowl and turn engine by hand. For each two turns of engine, spurt of petrol (about ½ egg-cupful) should be delivered. Petrol should be clean and free from air bubbles.

Fuel Pump Analyser.—Designed for testing pump in position on engine. Consists of container with pressure gauge and valve connected by flexible hose to Teepiece fitted in outlet union and fuel outlet pipe by adaptors.

Test No. 1.-Hold analyser so that bottom of container is level with carburettor bowl. Run engine at speed equal to 30-35 m.p.h. in top gear. Open analyser valve and note time taken to fill measure up to mark, watching for air bubbles. Correct time is shown in table.

Test No. 2.—Close valve. Allow engine to run at slowest possible speed and read pressures. Correct pressures shown in table.

Fuel Pump Test Stand. Fitted on bench with two holes drilled to take feed and delivery pipes. These should project into suitable tank or reservoir about 3ft below, inlet pipe almost touching bottom. Clean paraffin is recommended as test

Pump is attached to stand by bolts and wing nuts in series of fixing holes to accommodate different sizes. Adaptors for connecting hoses to unions provided.

Three or four strokes of pump arm should prime pump, 10 to 12 should start pump delivering. Watch sight glass for air bubbles.

Pressure Test. Close cock below sight glass and work pump. Pressure of 4-6lb/ sq in should be reached and maintained. If pressure falls check unions. If these are sealing correctly pump is worn and needs repair or replacement. Note that test stand does not check linkage efficiency and checks for wear should be made visually.

Maintenance

After 800 miles with new vehicle, 2,500 miles thereafter, filter needs cleaning. Remove bowl and empty sediment. Wash filter gauze in petrol or blow clear with compressed air. When replacing filter check that gasket and fibre washer under setscrew, if fitted, are in good condition. Periodically check tightness of connections, look for leaks.

Dismantling

Disconnect unions and remove two nuts or setscrews retaining pump.

Clean exterior of pump and mark flanges of body and upper casting with file-cut for correct reassembly. Remove screws round flange and separate flanges. Turn diaphragm assembly through 90 deg and remove. Remove screws retaining valves, valve discs, springs, etc., and note their correct positioning. Remove filter cover and gauze. Remove circlip retaining pivot pin and push out, releasing rocker arm, spring and link with washers. With the "drop in" pin construction the rocker arm should be secured in a vice and the casting should then be given a sharp rap with a mallet to free the rocker arm assembly.

Re-assembling

Wash valve cages or discs in paraffin, this aids seating. Assemble valves and retainer into correct position-the inlet valve spring projects into pump chamber and outlet valve spring into air dome, and tighten screws.

Place filter gauze on top of casting, fit synthetic gasket and filter cover assembly,

fibre washer and setscrew.

Assemble link, packing washers, rocker arm, and spring in body. Insert pivot pin and fit spring rings. Rod .240in dia used as pilot for pin will aid assembly. Rocker pin retainers used with drop in pin assemblies should be replaced with service retainers having a lower shoulder to permit casting materials to be staked over. Where fitted, thread oil seal washer spring and oil seal washer on to pull rod and turn washer through 90 deg. to retain. Place diaphragm spring and diaphragm assembly in position.

Turn until smallest tab on edge of diaphragm is at 11 o'clock. Press downwards on diaphragm, turning assembly to left so that slots in pull rod engage forked end of link. Finally turn one quarter turn to left to seat pull rod in its working position in "link," at same time aligning holes in diaphragm with those in body. Tab should now be at 8 o'clock.

Push rocker arm towards pump until diaphragm is level with body flange. Place upper casting in position shown by marks made earlier. Replace cover, screws and lockwashers, tightening until screwheads touch lockwashers. Push rocker arm towards pump as far as possible, hold in this position and finally tighten cover screws diagonally and securely. Edges of diaphragm should now be flush with clamping edges.

| | | REP | LACEMEN | T OF OBSOLETE PUMPS |
|----------------------|---|-------------------------|---------|--|
| Obsolete Part No. | Series | Superseding Part No. | Series | Remarks |
| 856543 | В | 1524483 | UG | |
| 856565 | В | 1524488 | UG | |
| 856641 | A | 856965 | U | |
| 356687 | В | 1524212 | U | |
| 856725 | В | 856965 | Ÿ | |
| 856728) | B B B M | 856964) | T | On Austin Little 7 h.p. |
| 856728 | M S | 856965 | Ü | On Austin 10 h.p. |
| 856753 | В | 7950171 | T | Pack includes pump 1524020 with engine push-rod. |
| 856841 | В | 856964 | T | The same beautiful and the same basis to a. |
| 856864 | В | 1524483 | UG | |
| 856860 | В | 856965 | U | |
| 856865 | В | 856965 | Ŭ | |
| 856881 | В | 856965 | Ü | |
| 856888 | В | 7950172 | Ü | Pack includes pump 1524550 with Jin engine packing plate |
| 856981 | В | 856965 | U | the state of the state of the sugar packing plate |
| 856982 | . В | 856965 | Ü | |
| 1524074 | В | 1524551 | Ü | |
| 1524081 | 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | 1524551 | Ū | |
| 1524131 | В | 1524495 | UG | |
| 1524133 | В | 1524493 | UG | |
| 1524231 | В | 1524493 | UG | |
| 1524239 | В | 7950253 | Ü | |

| | | | | | 1 | | | |
|--|---|--|---|---|--|--|--|--|
| Pump Type Y, YD, YJ and YE* All others* | | Diaphragm Diameter (between hole centres) Approx. 2\frac{1}{4} 2\frac{1}{4} | | Test No. 1 (secs) | Test No. 2 (lb/sq in) 11-21 11-21 | | | |
| | | | | 90 60 | | | | |
| • 1 | except as bel | ow. | | | | | | |
| | | | Ma | in Exceptions | | | | |
| Pump Type | Part No. | Test No. 1 (secs) | Test No. 2 (lb/sq in) | Vehicle Applications | | | | |
| UE UE YD YD WE YD WE | 1524724 1524773 1524921 7950073 7950182 7950186 7950081 7950193 7950218 | 60 60 60 90 90 90 60 | 2 1- 3 1 2 1- 3 1 2 1- 3 1 6 -10 6 -10 4 - 7 2 1- 3 1 2 1- 3 1 2 1- 3 1 2 1- 3 1 | Commer Superpoise Mk. III and IV, 1952-59. Bedford "8" to 1952. Wyvern and Cresta, 1952-57. Commer 5 and 7 ton F.C. Mk. II-IV, 1953-58; Gamecocand Loadmaster, 1952-58. Ferguson Tractor and F.E.35 (diesel). Karrier Bantam Mk. V (diesel). Standard Vanguard, 1954-57 (diesel.) Ford Consul, Zephyr and Zodiac, 1951-56. Bedford CA Van and Wyvern, 1952-53. Ford Consul, Zephyr and Zodiac Mk. II. | | | | |

FUEL PUMP ANALYSER TEST DATA