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Comprehensive Service and Repair Instructions

INTRODUCTION AND OVERVIEW

This official service manual provides detailed information for the Volkswagen Type 3 Fastback (also referred to as Type 3 Sedan) and Squareback models manufactured between 1968 and 1973. The manual covers vehicles introduced from August of the preceding year for each model year. It is designed to assist owners and technicians with maintenance, repair, and troubleshooting procedures.

Service to VW owners is of top priority to the Volkswagen organization and has always included the continuing development and introduction of new expanded services. In line with this purpose, Volkswagen of America, Inc. has introduced this Volkswagen Official Service Manual.

For VW owners with mechanical skills and for automotive repair shops, this Manual gives VW-approved specifications and procedures. In addition, a VW owner who has no intention of working on his car will find that reading and owning this Manual will enable him or her to discuss repairs intelligently with a professional mechanic.

The aim throughout has been simplicity, clarity, and completeness with step-by-step procedures and accurate specifications.

If you are a professional mechanic already working on imported cars, you may have some VW special tools that are shown in some of the illustrations in this Manual. If you have previously worked only on American-manufactured cars, you will not have to replace your expensive micrometers, vernier calipers, and other precision tools because specifications are given both in millimeters and in inches, except when special VW metric tools are indispensable (such measurements are given only in millimeters).

Volkswagens are constantly being improved and sometimes such changes—both in parts and specifications—are made applicable to older VWs. Thus, a replacement part to be used on an older VW may not be the same as the part used in the original installation. Such changes are noted in this Manual.

This Type 3 Manual covers the Fastback and Squareback of Model Years 1968, 1969, 1970, 1971, 1972, and 1973. Here is a sample of the kind of up-to-date information you will find in this Volkswagen Official Service Manual:

- Troubleshooting, repairing, and rebuilding the clutch
- Testing and repairing the fuel injection system
- Troubleshooting, adjusting, and rebuilding the automatic transmission
- Rebuilding disc and drum brakes
- Rebuilding the front axle and the steering gearbox
- Troubleshooting, replacing, or repairing every component of the electrical system—with full-color wiring diagrams for every model and year
- Tune-up specifications for all models up through the latest 1973 cars—including those with exhaust gas recirculation
- Adjusting and repairing the sliding steel sunroof
- Spark advance curves for all distributors
- Complete engine repairing and rebuilding data
- Official Volkswagen tolerances, wear limits, settings, and torque specifications for every part of your car.

**Volkswagen of America,
Inc.**

Image: Front cover of the Volkswagen Type 3 Official Service Manual, displaying the title and covered model years.

The manual's content is structured to provide clear, step-by-step instructions for various service operations. It emphasizes clarity and completeness, ensuring that individuals with mechanical skills can effectively perform repairs and maintenance. For specialized tasks, the manual may reference the need for specific Volkswagen special tools, which are illustrated within its pages.



Volkswagen

**Official
Service Manual**

**Fastback and Squareback
1968, 1969, 1970, 1971, 1972, 1973**



\$9.95

Image: Back cover of the service manual, listing key topics such as engine, clutch, fuel system, brakes, suspension, electrical system, and tune-up specifications.

USING THE SERVICE MANUAL

This manual is organized into chapters covering different vehicle systems. To effectively use this manual, locate the relevant section for the task you intend to perform. Each procedure is described with accompanying illustrations and diagrams to guide you through the process. It is recommended to read through the entire procedure before beginning any work.

- **Identification:** Verify the specific model year and vehicle type to ensure you are following the correct instructions, as minor changes may exist between years.
- **Safety First:** Always observe safety precautions, including using appropriate tools, wearing protective gear, and ensuring the vehicle is securely supported.
- **Tool Requirements:** Note any special tools or equipment mentioned for a procedure. While some tasks can be done with general tools, specialized tools are often designed for precision and safety.

MAINTENANCE PROCEDURES

The manual details routine maintenance tasks essential for the longevity and performance of your Volkswagen Type 3. These procedures include, but are not limited to:

- Engine oil and filter changes.
- Ignition system inspection and adjustment.
- Brake system inspection and service.
- Lubrication points and fluid level checks.
- Tire rotation and pressure checks.

1. Flywheel
2. Intake air distributor
3. Crankshaft
4. Camshaft
5. Fan housing
6. Crankshaft pulley
7. Oil strainer
8. Camshaft
9. Oil pump
10. Fan
11. Injector

Engine Mounting

ts and two studs join the engine and transmission. The VW Beetle, Type 3 vehicles also have a clutch at the rear of the engine.

Crankcase

Two-piece crankcase is cast of lightweight alloy. The halves are precisely machined that the halves fit together with a gasket. If either half becomes defective, both halves are replaced to assure an exact fit.

Crankshaft Bearings and Seal

The crankshaft rotates in four main bearings, only one (No. 2) is of the split shell type. The No. 1 bearing is flanged to take the crankshaft end thrust. A clutch end of the crankshaft and a slinger at the front prevent oil leakage.

Valve Train

The camshaft is gear-driven off the crankshaft and runs on three split shell bearings. A Woodruff key positions the camshaft gear while the camshaft gear is riveted to the camshaft. Solid lifters, pushrods, and adjustable rocker arms complete the valve-operating linkage.

Cylinder Heads

Each pair of cylinders is covered by a deeply finned aluminum alloy cylinder head. Valve guides and valve stems are pressed in and can be replaced only with special tools. No cylinder head gasket is used. Howlers are fitted at both ends of each pushrod.

Connecting Rods

Connecting rods are steel forgings. Split-shell bearings are used at the crankshaft end and lead-bronze bushings at the piston pin end.

Pistons and Cylinders

The pistons are secured by push-fit pins. The cylinders are detachable and, with the pistons, are fully interchangeable with one another. The fins of the iron cylinder exteriors aid in cooling.

Flywheel and Drive Plate

The flywheel used on cars with manual transmission is bolted to the crankshaft by four steel dowels and a gland nut also serves as a pilot bearing for the transmission input shaft. On cars with automatic transmission, the drive plate, with the torque converter bolted onto it, replaces the flywheel.

Cooling System

A fan on the end of the crankshaft forces cooling air over the finned cylinders and cylinder heads. Some air is diverted to pick up heat from the heat exchangers. This warm air is used to heat the car interior. A thermostat operates the flaps controlling engine cooling air volume. These do not influence heater output in any way.

Positive Crankcase Ventilation

A closed PCV (positive crankcase ventilation) system keeps crankcase vapors from polluting the air. Fresh air from the air cleaner enters the crankcase through two hoses leading to the rocker arm boxes on the cylinder heads. Each hose has a flame arrester that prevents backfires from reaching the crankcase. The crankcase vapors are drawn into the intake air distributor, then into the cylinders where they are burned. A PCV valve in the hose regulates the air flow.

Exhaust Gas Recirculation

The 1972 models with automatic transmission sold in California and all 1973 models with automatic transmission have an exhaust gas recirculation system that draws off a portion of the exhaust gases and pipes them into the intake air distributor. The recycled exhaust gas limits flame peaks in the combustion process, thus reducing emission of a major air pollutant, oxides of nitrogen.

Ignition System

The ignition system consists of an ignition coil, a distributor with breaker points and condenser, spark plugs, low and high voltage wiring, and the ignition switch. When the ignition switch is turned on, battery current flows through a coil of thick electrical wire, creating a magnetic field. When the breaker points open, battery current is switched off and the field collapses. This sends magnetic lines of force sweeping through a longer coil of fine wire. Because there are more coils of fine wire than of thick wire, the voltage is stepped up from the battery's 12 volts to as much as 20,000 volts.

The high voltage flows from the coil to the center terminal of the distributor cap and through it into the rotor. The rotor then sends the voltage through the outer distributor cap terminals to each of the four spark plug wires, according to the engine's firing order. A condenser inside the distributor acts as an electrical shock absorber, preventing battery current from arcing across the points and burning them. The condenser also works to aid the sudden collapse of the coil's magnetic field.

Lubrication System

A gear-type oil pump, driven by the camshaft, draws oil from the bottom of the crankcase sump and forces the oil through an oil cooler into the engine oil passages.



Image: An internal page from the manual, titled "ENGINE 5", providing detailed descriptions of engine components such as the crankcase, valve train, and ignition system.

Each maintenance task is broken down into sequential steps, often accompanied by diagrams or exploded views to clarify component locations and assembly order. This ensures accurate execution of service procedures.

TROUBLESHOOTING AND REPAIR

The manual provides comprehensive troubleshooting guides to diagnose common issues. It covers various systems, including the engine, transmission, brakes, and electrical components. For example, the manual includes:

- Engine performance diagnostics.
- Fuel system testing and adjustment.
- Brake system fault isolation.
- Electrical system wiring diagrams for all model years.
- Steering and suspension component inspection.

...necessarily, remove the distributor cap and rotor and adjust the dwell. This is done by loosening the contact mounting screw and moving the fixed contact to one side or the other with a screwdriver to change the point gap.

NOTE —
As the dwell angle decreases the dwell angle, increasing the gap increases it. The engine should be run with the starter and the dwell checked on the dwell meter during adjustment. Make a final check with the engine running.

Tighten the fixed contact mounting screw in the distributor rotor and cap.

of the timing.

Dwell angle is just another way of expressing point gap. It is also possible to adjust the points with a feeler gauge. However, two things must be considered: accurate feeler gauge adjustments are not possible if there is metal buildup on one of the points. The feeler gauge must be completely clean. Experience shows that the points are often contaminated with oil remaining on the feeler gauge from valve or other measuring work. If this oil is transferred to the breaker point contacts, they will soon be burning and deposits.

Using feeler gauge:

Remove the distributor cap and rotor.

Turn the crankshaft by hand, using either the generator or the starter, until the breaker point contact is on a high point on the cam (points are closed).

When doing a complete tune-up, adjust the dwell while the spark plugs are out. This makes it easier to turn the engine to the timing position.

Use a .016-mm (.016-in.) feeler gauge in the point gap to determine whether the points are gapped correctly. They should be close together, or too far apart.

The correct range is 0.40 to 0.50 mm (.016 to .019 in.).

Loosen the fixed contact mounting screw. Move the fixed contact one way or the other with the tip of a screwdriver to obtain the correct point gap.

5. Tighten the fixed contact mounting screw, then recheck the gap. Replace the distributor rotor and cap.
6. Adjust the timing.

Adjusting Timing

The ignition timing must be adjusted following installation or adjustment of the breaker points or after the distributor has been removed and reinstalled on the engine. A change of only 0.10 mm (.004 in.) in the breaker point gap will alter ignition timing about 3°.



To adjust timing:

1. Following the instrument manufacturer's instructions, install a tachometer and stroboscopic timing light.
2. Disconnect and plug the vacuum hose(s) to the distributor.
3. Run the engine at 850 rpm \pm 50 rpm. The oil temperature must be 30° to 70°C (86° to 158°F).
4. Aim the timing light at the timing marks on the fan through the opening provided in the fan housing. The timing marks should fall relative to the pointer as shown in **Table e**.

NOTE —

Coat the timing marks on the fan with white paint if they are not clearly visible.

Table e. Ignition Timing

Model	Ignition Setting	Marking
1968 to 1971	0° before TDC	
1972 to 1973	5° before TDC	

NOTE —

On 1972 engines with double vacuum advance the throttle valve must be completely closed before setting the ignition timing. To check, set the idle (with vacuum hoses on) to 850 rpm \pm 50 rpm by turning the bypass air screw on the fuel injection intake air distributor housing. Then disconnect the green (retard) hose from the distributor. The timing mark should move 15 to 18 mm ($1\frac{1}{32}$ to $2\frac{3}{32}$ in.) to the left. If it does not, the throttle valve is not closed completely and must be adjusted.

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Image: An internal page from the manual, titled "ENGINE 63", featuring a table for ignition timing adjustments for different model years, along with explanatory notes.

Detailed repair procedures are outlined for components such as the engine, clutch, manual and automatic transmissions, front axle, rear axle, and steering gear. The manual also includes information on adjusting and repairing the independent rear suspension (IRS) and spark advance curves for distributors.

SPECIFICATIONS

This manual includes critical specifications necessary for proper service and repair. These specifications ensure that components are installed and adjusted to factory standards.

Specification	Value
Publication Date	June 1, 1973
Language	English
Print Length	424 pages
ISBN-10	083760057X
ISBN-13	978-0837600574
Item Weight	2.2 pounds
Dimensions	8.5 x 1 x 11 inches

The manual also includes official Volkswagen tolerances, wear limits, settings, and torque specifications for various components, ensuring repairs meet manufacturer standards.

ADDITIONAL RESOURCES AND SUPPORT

As this is a historical service manual, direct product support or warranty information from the original publisher for this specific edition is not applicable. For current information regarding Volkswagen vehicles or general automotive repair, consult contemporary resources or certified automotive professionals.

This manual serves as a foundational reference for the specified Volkswagen Type 3 models. For parts availability or updated repair techniques, consider consulting specialized Volkswagen enthusiast communities or parts suppliers.