SOFTWARE & TECH

Jeep Manual Transmission Identification

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Introduction: Why Identifying Your Jeep's Manual Transmission Matters

For Jeep enthusiasts, the manual transmission represents more than just a means of shifting gears. It is a connection to the vehicle's rugged heritage, a symbol of driver engagement, and for many, the only authentic way to pilot a proper off-road machine. Whether you are restoring a classic CJ-7, building a rock-crawling Wrangler TJ, or trying to diagnose a troublesome gearbox in your Cherokee XJ, knowing exactly which manual transmission is bolted to your engine is absolutely critical. **Jeep manual transmission identification** is not just a hobbyist exercise; it is a practical necessity for ordering the correct replacement parts, selecting the right rebuild kit, or planning a performance upgrade. Misidentifying your transmission can lead to wasted money, improper fitment, and even mechanical failure when you need your rig to perform most reliably.

Over the decades, Jeep has sourced transmissions from a variety of manufacturers, including BorgWarner, New Process, Aisin, Peugeot, and Tremec, as well as developing their own internal designs. Each of these gearboxes has distinct characteristics, strengths, weaknesses, and telltale signs that allow for accurate identification. In this comprehensive guide, we will walk you through the most common manual transmissions found in Jeeps from the 1960s through the modern era. You will learn how to identify them by case shape, bellhousing pattern, shift tower location, number of bolts, and other visual cues. By the end of this article, you will be equipped to confidently determine exactly what is underneath your Jeep, whether you are a seasoned mechanic or a weekend warrior just getting started with your project.

The Most Common Jeep Manual Transmissions: A Quick Overview

Before diving into specific identification methods, it is helpful to understand the major players in the Jeep manual transmission family. Different Jeep models and years came with different gearboxes, and knowing which transmissions were available for your particular platform can narrow down the possibilities significantly.

T-90 and T-150: The Classic Three-Speeds

The BorgWarner T-90 was the stalwart three-speed manual found in early Jeep CJs, Willys wagons, and trucks from the 1940s through the early 1970s. It is a rugged, simple unit with a cast iron case and a distinctive shift pattern. Later, the T-150 replaced the T-90 in some applications, offering a similar design but with updated internal components. These transmissions are common in vintage restorations and are relatively easy to identify by their side-mounted shift levers and small, compact size.

T-18 and T-176: The Heavy-Duty Four-Speeds

The BorgWarner T-18 is legendary among Jeep enthusiasts for its incredible strength and granny-low first gear. It was used in CJs, full-size Jeeps, and early J-Series trucks through the late 1970s and early 1980s. The T-176 is a similar but slightly refined version found in CJ-7s, CJ-8s, and early Wrangler YJs. Both are cast iron, heavy, and almost indestructible. Identifying these gearboxes often involves counting the bolts on the top cover and observing the shape of the shift tower.

AX-5 and AX-15: The Modern Five-Speeds

As Jeep moved into the 1980s and 1990s, the Aisin-Warner AX-5 and AX-15 five-speed transmissions became the

standard for Wranglers, Cherokees, and Comanches. The AX-5 is a lighter-duty unit often paired with four-cylinder engines, while the AX-15 is a much stronger gearbox found behind six-cylinder powerplants. These transmissions are aluminum-cased and have a distinctive, rectangular shift tower. They are among the most common Jeep manual transmissions, and accurate identification is essential because internal parts are not interchangeable between the two.

NV3550 and NSG-370: The Late-Model Gearboxes

Beginning in the late 1990s and continuing into the 2000s, Jeep adopted the New Venture NV3550 and later the Chrysler NSG-370. The NV3550 is a five-speed found in TJ Wranglers and some XJ Cherokees, known for its smooth shifting and aluminum case. The NSG-370 is a six-speed unit that appeared in later TJs and early JK Wranglers. These transmissions require specific identification because their bellhousing patterns and input shaft lengths differ from earlier models.

Visual Identification Methods: Examining the Transmission Case

The most reliable method for identifying a manual transmission without removing it from the vehicle is careful visual inspection. You do not need to be a professional mechanic to identify key features. Grab a flashlight, put on some safety glasses, and get under your Jeep. Here are the critical areas to examine.

Case Material and Shape

One of the first things to note is whether the transmission case is made of cast iron or aluminum. Cast iron cases are heavy, prone to rust, and generally indicate an older or heavy-duty transmission. Aluminum cases are lighter, more modern, and typically found in the AX-5, AX-15, NV3550, and NSG-370 units. The shape of the case matters too. For example, the T-18 has a distinctive, almost rectangular bulge on the driver's side. The AX-15 has a smooth, flowing contour, while the NSG-370 is more angular and compact.

Shift Tower Configuration

The shift tower is the raised section on top of the transmission where the shifter mechanism sits. Count the number of bolts holding the shift tower or top cover to the case. The T-18 typically has a top cover held by six or seven bolts. The T-176 has a top cover with six bolts. The AX-15 has a distinctive rectangular shift tower that is bolted down with four bolts on its perimeter. The NV3550 has a similar tower but with a different shape. Observing the position of the shift tower relative to the case can also help. On some transmissions, it sits far forward; on others, it is more centrally located.

Bellhousing Pattern and Bolt Count

The number of bolts connecting the transmission to the engine bellhousing is another strong clue. Older Jeeps often used a three- or four-bolt pattern, while later models standardized on a six-bolt pattern for many transmissions. However, bolt patterns can vary based on the engine and transmission combination. For instance, an AX-15 behind a 4.0-liter inline-six will have a different pattern than an AX-5 behind a 2.5-liter four-cylinder. Measure the distance between bolts and note their arrangement. You can often find diagrams online that match your specific pattern.

Top Cover and Side Plate Details

Many manual transmissions have removable side plates or inspection covers. The shape, size, and number of bolts on these covers can be a giveaway. The T-90 has a distinct side plate with a specific bolt pattern. The AX-5 and AX-15 have smooth side castings without large removable plates. Look for casting numbers and date codes stamped into the case itself. These numbers can be cross-referenced with online databases or factory service

manuals for a definitive identification.

Identification by Vehicle Model and Year

While visual cues are essential, knowing what transmission was originally equipped in your specific Jeep model and year range can save you a tremendous amount of time. Jeep generally stuck with specific transmissions for specific engine and chassis combinations.

CJ-5, CJ-7, and CJ-8 Scrambler

These classic models used a variety of three- and four-speed manuals. From 1972 to 1975, the T-150 three-speed and T-18 four-speed were common. From 1976 to 1981, the T-150 and T-176 appeared. In 1982 through 1986, the T-176 and the SR-4 (a lightweight four-speed) were used. The SR-4 is notoriously weak and can be identified by its aluminum case and unique shift tower. The T-176 is cast iron and far more robust.

Wrangler YJ (1987-1995)

The YJ Wrangler marked a shift to more modern transmissions. Early YJs with the 2.5-liter four-cylinder used the AX-5 five-speed, while 4.2-liter six-cylinder models used the BA-10/5 (a Peugeot-designed unit) until 1989. The BA-10/5 is known for reliability issues and is identifiable by its aluminum case and squared-off shift tower. From 1989 to 1995, the AX-15 became the standard five-speed for six-cylinder YJs. The AX-15 is much stronger and highly sought after.

Wrangler TJ (1997-2006)

The TJ generation initially used the AX-15 and NV3550 five-speeds, depending on the year and engine. Early TJs used the AX-15, while from 1999 onward, the NV3550 took over. In 2005 and 2006, the six-speed NSG-370 was introduced behind the 4.0-liter engine. The NSG-370 is unique because it uses a hydraulic clutch and has a different bellhousing bolt pattern than the NV3550. Identifying these accurately is important because clutch kits and flywheels differ.

Wrangler JK (2007-2018)

The JK generation used the NSG-370 six-speed from 2007 through 2011, then switched to the Aisin AY-6 six-speed for 2012 and later models. The AY-6 is a different design and has its own identification features, including a distinct shift tower and bellhousing. The shift feel is also noticeably different.

Cherokee XJ and Comanche MJ (1984-2001)

These unibody Jeeps used the Aisin-Warner AX-4 (four-speed) and AX-5 (five-speed) for four-cylinder and early six-cylinder models, and the AX-15 for later 4.0-liter models. The AX-4 and AX-5 look similar from the outside, but the AX-4 has a four-speed shift pattern. The AX-15 is larger and has a reinforced case. A simple visual check of the number of shift rails visible on the top cover can distinguish a four-speed from a five-speed, but you can also just shift through the gears carefully.

Ford vs. Jeep Bellhousing Patterns

One recurring point of confusion, especially in the classic Jeep world, is the difference between Ford and Jeep bellhousing patterns. Many Jeep transmissions, including the T-18 and T-176, were also used in Ford trucks. The bolt pattern on the bellhousing is often different. A Ford-pattern T-18 will have a wide bolt spacing, while a Jeep-pattern T-18 may have a different arrangement. If you have a transmission that you believe is from a Jeep but cannot find a direct match, it may be worth measuring the bellhousing bolt pattern and comparing it to Ford

specifications. Swapping bellhousings is possible, but you must ensure correct alignment and input shaft length.

Serial Numbers, Date Codes, and Stamped Identifiers

Nearly every manual transmission has identification numbers stamped into the case. These can be on a flat pad on the driver's side, near the bellhousing flange, or on the top cover. Cleaning the area with a wire brush and degreaser can reveal a stamped code. For example, AX-15 transmissions often have a tag attached to the side with the model number and a date code. T-18 transmissions have a casting number on the side of the main case. NV3550 units have a laser-etched barcode and model number. Taking a clear photo of these numbers and searching online forums or dedicated identification sites can yield a definitive answer. Keep in mind that date codes may follow a format like "98 04 12" for April 12, 1998.

Internal Differences: Input Shaft Length and Spline Count

If you have the transmission removed from the vehicle, you can take critical measurements. The input shaft length, diameter, and spline count are definitive identifiers. For example, the AX-5 and AX-15 input shafts look similar but have different lengths and spline counts. The AX-15 input shaft has 14 splines and is longer than the AX-5 input shaft, which has 21 splines in some versions. The NV3550 input shaft is also distinct. Measuring the input shaft with calipers and counting the splines will give you

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