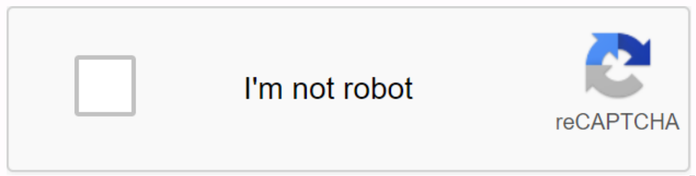

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Tamiya mini 4wd for sale

Rising Trigger for Tamiya and Expandable Parts Racing Mini 4WD Dash-3 Shooting Star with Dash! Yonkuro 5 lane track taken in 2014 Mini 4WD is a motorized toy car usually 1:32 scale equipped with 4WD. From 1986 to 2020, the term was popularized overwhelmingly (99%)[quote required] for a 1/30 (1:30) scaled, AA battery-packed plastic model race car without a remote control. This particular type of Mini 4WD uses horizontal side rollers to steer the vehicle along the vertical walls of the UN-italic track steering, which speeds from 14 to 65 km/H [quotation required] (9-40 mph) on the track. History in 1982, Tamiya, a Japanese manufacturer of plastic model kits, introduced Mini 4WD racing cars. The Mini 4WD racing car has a 1:32 scale build-it-yourself kit featuring four-wheel drive powered by an electric motor using a pair of AA batteries. A single electric motor reverses both axles. These sets snap and screw together without glue. [1] The first vehicles included a Ford Truck and a Chevrolet Truck. In 1986, Tamiya introduced the Racing Mini 4WD series as a motorized version of the plastic car model kits. Based on the company's 1/10 scale R/C buggy, these highly modifiable racing model kits are larger than 1/30 scale, although they are still traded on a 1/32 scale. [Summons required] In 1988, Tamiya Japan started the Japanese Mini 4WD National Championship with a 150-meter 5-lane wooden track. In February 1989, several American and Japanese companies presented their versions at the New York State Games. [2] At the end of 1989, the average Japanese boy had an 8-11 miniature 1:32 battery race car. [3] In November 1989, Jesse Ventura, a retired U.S. Navy seal, retired professional wrestler and former governor of Minnesota, USA, competed in a national television competition near Chicago, USA, provided by hasbro, mini 4WD, Record Breakers: World of Speed. [4] Record Breakers: World of Speed series was available in several versions. [5] In 1994, in a Sicilian town of Messina, a group of children began experimenting with street racing, which was called Dash! I'm Yonkuro. This category of competition has become a worldwide success by 2017 and is steadily increasing in recognition and participation. [6] In 1999, Tamiya Japan temporarily suspended the Japan Cup national championship for Mini 4WD drivers until 2012. By the 2000s, at least twenty-eight (28) other companies had ventured into the Mini 4WD market and famously included Tokyo Marui, Kyosho, The Academy, Circuit no Ōkami, Aoshima Bunka Kyozai, Matchbox (brand), Revell, Hot, Tonka, Hasbro and Bandai. [Summons required] in 2012, he will again hold Japan's national Mini 4WD championship in spring, summer and autumn, with a 5-lane wooden track. 170 to 225 meters. [7] By 2015, the Mini 4WD was popular in several countries, including the Philippines, Thailand, Singapore, Malaysia, Indonesia, South Korea, Canada, Germany, Italy, Russia, India, China and the United States. From 2012 to 2015, Tamiya America, based in Irvine, California, in the United States held the U.S. Mini 4WD Championship at Marukai Corporation USA Gardena, California using a 5-lane plastic track with a length of up to 283 feet. [reference required] in 2019, the Street Mini 4WD category was officially supported by tamiya italia's agent. On June 23, 2019, a mini 4WD competition event was held at the Glorietta Shopping Center in Manila, Philippines. The event, called the Tamiya Mini 4WD Asia Challenge, took place with more than 200 participants from 87 attending from outside the Philippines. [9] The winner of the championship won the World Cup in Japan in November of the same year. [10] Tamiya released a 1:32 mini 4WD car from the distinctive Jeepney, the Dyipne, to commemorate the event. [11] Originally published in the Philippines with a plan to be released globally in a month. [12] Longest Mini 4WD Track World Records According to the Guinness Book of World Records, 2019. [13] Date Meters Feet Track Country 2019 November 3, 191.58 10,471.06 3-track foam by Kimura Foundry Co., Ltd. at Amagi Dome in Izu, Shizuoka, Japan Race Types This section does not refer to any sources. Please help improve this section by providing quotes from trusted sources. Sourceless material can be attacked and removed. (September 2020) (Information on how and when to remove this template message) There are some racing types within the Mini 4WD racing series: Circuit Racing, Endurance Racing and Street Racing. Circuit Racing is a standard type of race where cars are placed on a 3 or 5 lane racetrack, made of plastic or wood. Circuit racing is divided into several classes with different restrictions regarding the types of cars and modifications that riders can use in the race. Endurance Race is similar to Circuit Racing, but instead of tilting the position of the riders who first cross the finish line, it determines the position by the amount of laps taken by the driver's car for a limited time. Just like Circuit Racing, it can be divided into several classes. The Street Racing category, inspired by the race featured in the Dash! Yonkuro manga, where cars run on the off-road track, where no fence was present. Racers must use the driver's stick to maneuver their cars in the race. Mini 4WD Design In a standard 4WD design, separate four wheels can rotate at different speeds using differentials. This is important for cornering to eliminate mandatory. In a Mini 4WD, this non-standard design and is only available with optional one-way wheel sets. Thus, the standard Mini 4WD uses a direct drive to all 4 wheels even around corners. The chassis is designed to keep the engine and batteries in different layouts. There are lateral motors at the back. There are lateral motors at the front. There are in-line engines in the middle. The rear and front position motors shall be positioned side by side at the front or rear of the engine position. The design of the engine in the middle position should place the batteries on both sides of the motor. The rear and front position motors use a propeller rod that stretches from the main engine gearbox and drives both the front and rear axles. The mid-position motor design drives the front and rear wheels through separate gearboxes, so you don't need such a propeller rod. The chassis is designed with front bumpers, optional side and rear bumpers that hold guide rollers in contact with the 58mm high walls of the track. The body is designed for hard plastic or soft, transparent polycarbonate, known by the trademarked names Lexan, for its special or limited editions, which attaches to the catch-type lock at the back of the car, distinguishes one model from another. Engines Three specifications are characteristic of all engines: Speed, torque and power consumption. [14] RPM is the speed and torque strength provided by the engine. Higher speeds mean higher maximum speeds, higher torque provides higher acceleration and allows the car to better withstand the difficulties of climbing slopes or running on bends. The engine is one of the important components of a mini 4WD racer need to make the car move, there are two types of engines: single-axle or double-axle engines. Gears The different types of gears have different gear ratios between the engine and the wheel and include (3,5:1), (3:7:1), (4:1), (4,2:1), (5:1) and Special (the ratio varies, but usually 6,4:1). The higher the ratio, the better the acceleration speed and torque; the lower the ratio, the better the maximum speed. [15] See also Bakusō Kyōdai Let's & Go! Popular anime/manga mini 4WD Tamiya Racer Mini Yonku: Japan Cup - Famicom video game Record Breakers: World of Speed References ^ Onorato, Paul (2019-05-31). Tamiya Mini 4WD phenomena. RC driver. (Accessed 2020-09-26). ^ New York Magazine ^ Harrington, Richard (1989-11-24). HOTTEST TOYS UNDER THE TREE. Washington Post. ISSN 0190-8286. (Accessed 2020-09-26). ^ TIME Magazine ^ New York Magazine ^ Street Mini 4WD ^ Tamiya Japan Cup Schedule ^ Street Mini 4WD official rules on the Tamiya Italia website ^ Martin, Lije (June 28, 2019). Tamiya holds Mini 4WD Asia Challenge in Manila. Topgear Philippines. (Accessed 2020-09-27). PH gears up for Tamiya Asia challenge (PH gears up for Tamiya Asia challenge) (A PH gears up for Tamiya Asia challenge) (A PH gears up for T CNN Fülöp-szigetek. 2019. június 14. Beolvasott Beolvasott ^ Arcadio, Ryan (2019-06-03). Tamiya creates jeepney Mini 4WD kit. INQUIRER.net. (Access:) 2020-09-27. ^ Japanese toy maker Tamiya Releases Special Edition, Jeepney-inspired model set. sg.news.yahoo.com. (Access: 2020-09-27. ^ Guinness World Record for Mini 4WD ^ Mini 4WD Engine Specs ^ Mini 4WD Gearing Specifications External links wikimedia commons media related mini 4WD. Asia Challenge 2019 (CNN Philippines Official YouTube Channel) Older yet good reference site with largest Mini 4WD Boxart Gallery & Historical Photos Mini4WD Online Track Editor Retrieved from 2Four by four redirects here. Other uses: Four to four (a misunderstood) and four-wheel drive (a misunderstood). The Jeep Wrangler is a 4WD vehicle with a short range or long-range four-wheel drive to select a transfer case. Four-wheel drive, also known as 4x4 (four x four) or 4WD, refers to the dual-axle vehicle drivetrain's ability to provide torque to all wheels simultaneously. It may be full-time or on-demand and usually connected through a transfer case, which provides an additional output drive shaft and, in many cases, additional gear. A four-wheel drive vehicle with torque delivered to two axles is called an all-wheel drive (AWD). However, four-wheel drive typically refers to the functions and functions of specific components and refers to the planned off-road application, which usually corresponds to the modern use of terminology. Definitions Four-wheel drive systems have been developed in many different markets and used on a number of different vehicle platforms. There is no generally accepted terminology set that describes different architectures and functions. [1] The terms used by different manufacturers often reflect marketing rather than technical aspects or significant technical differences between systems. [2] [3] SAE International Standard J1952 only recommends the term all-wheel drive with additional subdivisions for all types of AWD/4WD/4x4 systems on production vehicles. [4] 4×4 or 4×4 are often used for a class of vehicles. Syntactically, the first figure shows the total number of wheels (specifically, axle ends), and the second shows the number driven. So 4×2 means a four-wheeled vehicle that transmits the engine torque to the end of only two axles: the first two in the front wheel drive or the rear two in the rear-wheel drive. [5] Similarly, a 6×4 vehicle has three axles, two of which provide torque for two axle ends. If this vehicle is a truck with dual rear wheels with two rear axles, so in fact ten wheels, the configuration is still formulated as 6x4. The second during the U.S. army typically used 4 X 2 or 6 X 4 seats. [6] Center transfer case for sending performance performance the gearbox for rear axle (right) and front axle (left) for 4WD Four-wheel drive (4WD) applies to two-axle vehicles providing four-axle ends. In the North American market, the term usually refers to a system optimised for driving conditions in the field. [7] The term 4WD is typically used for vehicles equipped with a transfer case that switches between 2WD and 4WD modes manually or automatically. [8] AWD Main Article: The AWD (vehicle) All-Wheel Drive (AWD) has historically been synerging with four-wheel drive for four-wheeled vehicles and six-wheel drive on 6×6s and so on, which were used in this way at least as early as the 1920s. [9] [10] Today, in North America, the term is used for both heavy vehicles and light cars. When naming heavy vehicles, the term is increasingly used for permanent multi-wheel drive on powertrain systems 2×2, 4×4, 6×6 or 8×8, which contain the difference between the front and rear drive shafts. [11] This is often combined with some kind of anti-slip technology, which is increasingly hydraulically based and allows differentials to rotate at different speeds, but is still able to transfer torque from a wheel with poor grip to the right axle. Typical AWD systems work well on all surfaces, but are not designed for more extreme off-road use. [11] In light passenger vehicles, it is used to describe AWD systems, refers to a system that applies torque to all four wheels (permanent or on demand) and/or aims to improve road grip and performance (especially in harsh conditions) rather than off-road applications. [7] Some all-wheel-drive electric vehicles use one engine for each axle to solve this challenge, eliminating mechanical differentiation between the front and rear axles. An example is the dual-engine version of the Tesla Model S, which can control the distribution of torque electronically between the two engines on a millisecond scale. [12] The IWD Individual-wheel drive (IWD) is used to describe electric vehicles that drive each wheel with its own electric motor. This system essentially has characteristics that are usually attributable to four-wheel drive systems, such as the distribution of available torque to the wheels. However, because of its inherent characteristics of electric motors, torque can be negative, as shown by the Rimac Concept One and SLS AMG Electric. This can have dramatic effects, such as better treatment of tight corners. [13] The term IWD may refer to vehicles with as many wheels as they want. For example, rovers have six-wheeled IWD. For example, the Mars rovers are six-wheel IWD. SAE Recommended Practices For SAE International Standard J1952, the preferred term for all systems described above. The standard lists AWD systems in three categories. [4] Part-time AWD systems require driver intervention in the the secondary axle from the main driven axle and these systems have no medium difference (or similar structure). The definition notes that part-time systems may have a low range. Full-time AWD systems always drive the front and rear axles using an interaxle differential. The torque distribution of the difference may be fixed or variable depending on the type of mean difference. This system can be used on any surface at any speed. The definition does not address the inclusion or exclusion of short-range fishing gear. On-demand AWD systems drive the secondary axle with an active or passive coupling device or an independent drive drive system. The standard notes that in some cases the secondary propulsion system may also provide primary vehicle propulsion. An example is the hybrid AWD vehicle, where the primary axle is driven by an internal combustion engine and the secondary axle is driven by an electric motor. When the internal combustion engine is switched off, the secondary electric-powered axle is the only driven axle. On-demand systems primarily operate with only one driven axle until the second axle requires torque. At this point, a passive or active switch sends torque to the secondary axis. In addition to the above primary classifications, standard J1952 also results in secondary classifications resulting in a total of eight systems, Designated: Part-time nonsynchro Part-time synchro Full-time fixed torque Full-time variable torque passive Full-time variable torque passive Full-time variable torque active On-demand synchro variable torque passive On-demand synchro variable-torque active On-demand independently driven variable torque active Design Differentials Main Article: Differential A Murciélago is an AWD that is the front via a viscous connector unit when the back slips. The HMMWV is a 4WD/AWD that powers each wheel evenly (continuously) through a manually lockable middle differential, with Torsen differentials both front and rear. The two wheels fixed to one axle (but at opposite axle ends) shall rotate at different speeds as the vehicle moves along a bend. This is because the wheel that is located on the inside of the curve should travel less distance than the opposite wheel for the same period of time. However, if both wheels are connected to the same axle drive shaft, they must always rotate at the same speed relative to each other. When you go on a curve, it either forces one wheel to slip if possible to balance the apparent distance covered or creates an uncomfortable and mechanically stressful wheel hop. In order to prevent this, the different speeds using mechanical or hydraulic differentials. This allows a drive shaft to drive two output axes independently, axles that go from differential to wheel at different speeds. The differential achieves this by force (in the form of torque) evenly, with the angular speed (turning speed) distributed so that the average of the two output axes is the same as the mean of the differential ring drive. If driven, each axle requires a differentiated divide power between the left and right sides. If the power is allocated to all four wheels, a third or middle differential can be used

to distribute the power between the front and rear axles. The described system handles it extremely well, as it can accommodate different movement forces and distribute performance evenly and evenly, making slippage unlikely. If it does slip, however, recovery is difficult. If the left front wheel of a four-wheel drive vehicle slips on an icy road spot, for example, the sliding wheel rotates faster than other wheels, as the lower adhesion is lower than the wheel. Because differential force applies equal torque to all half-axles, power is reduced for other wheels, even if they have good adhesion. This problem can occur in both 2WD and 4WD vehicles when a driven wheel is placed on a surface that rises with little adhesion or from the ground. The simplistic design is acceptable to work well with 2WD vehicles. This is much less acceptable for 4WD vehicles because 4WD vehicles have twice as many wheels with which they lose traction, increasing the likelihood that this could happen. 4WD vehicles are also more likely to drive on reduced adhesion surfaces. However, since torque is distributed between four wheels instead of two, each wheel receives about half the torque of a two-wheel drive vehicle, which reduces the possibility of wheel sliding. To prevent slipping, the control of some vehicles independently locks the middle, front and rear differentials. Limitation slip Main item: Limited slip differential (LSD) Many differentials do not limit the amount of engine power sent to the attached output axes. As a result, if the tyre loses traction in acceleration, or if the low traction position (e.g. driving on gravel or ice) or engine power overcomes the available traction, the non-sliding tyre receives little or no energy from the engine. In very low traction situations, this can prevent the movement of the vehicle. To combat this, several differential design may limit the degree of slippage (known as limited slip differences) or temporarily close the two output axes to ensure that the engine power achieves equal all driven wheels. The locking axles operate by temporarily locking the differential output axles, so that all wheels turn at the same speed and provide torque in case of slippage. usually used in the middle differential, which distributes the power between the front and rear axles. While the powertrain, which turns all wheels equally, would usually fight the driver and cause treatment problems, this is not a concern wheels slide. The two most common factory-installed locking differentials use either a computer-controlled multi-disc clutch or viscous coupling unit to connect the axles, while other differentials more commonly used on off-road vehicles usually use manually operated locking devices. In the multi-board clutch, the vehicle's computer detects slippage and closes the axles, causing a small boost when activated, which can interfere with the driver or cause additional traction loss. In the differences between viscous switches, the shear load of the high axle speed differences solidates the dilatant fluid in the differential, which connects the two axes. This design suffers from fluid degradation with age and exponential lock behavior. [summons required] Some designs use a small rotational difference as a gear to speed up torque transmission. The third approach to restricting slippage is applied by a Torsen differential, which allows the output shafts to receive different torques. This design does not provide traction when one wheel rotates freely, where there is no torque, but provides excellent handling in less extreme situations. [summons required] A typical Torsen II differential provides up to twice as much torque on the high traction side before exceeding traction on the low traction side. In the field of passenger cars, electronic traction control is a relatively recent innovation. It typically uses the vehicle's braking system to slow down the rotating wheel. This forced deceleration mimics the function of a limited-slip differential and, by more aggressively using the brakes to ensure that the wheels are steered at the same speed, a locking differential can also emulate. For this technique, wheel sensors usually need to detect when the wheel slips and is activated only when wheel slippage is detected. Therefore, there is typically no mechanism to actively prevent wheel slippage (i.e. it is not possible to fix the differential before wheel slip); rather, the system is designed specifically to allow for wheel slip support and then attempts to send torque to the wheels with the best adhesion. If preventing all-wheel slippage is required, this is a restrictive design. Modes The architecture of the AWD/4WD system can be described by showing the possible modes. [1] A single vehicle can operate in several modes depending on the driver's choice. The different modes are: Selector: 2H for two-wheel drive, 4H for long-range 4WD, 4L for short-range 4WD, and N for neutral two-wheel drive (mode - In this mode, only one axle (typically the rear axle) is driven. The drive on the other axle is not The operating torque split ratio is 0:100. Four-wheel drive mode - Here, depending on the type of torque transmission of the axles, three submodes (below) can be defined. Part-time mode - Front and rear axle drives rigidly rigidly in the relocation case. Since the drivetrain does not allow for a speed difference between the axles and may cause the drivetrain to be reeled in, this mode is only recommended for part-time use on road or loose surfaces where the drivetrain is unlikely to be reeled in. Depending on the road conditions and the weight above the axles, even full torque can be avoided on both axles. Full-time mode – Both axles are always folded, but the inter-axle differential allows the axles to turn at different speeds as needed. This allows you to drive the vehicle full-time, regardless of the road surface, without fear of reeling in the drive line. The standard beret gear with gear differences splits the torque 50:50. Planetary differentials provide asymmetric torque distribution as necessary. The system, which operates permanently in full-time mode, is sometimes referred to as all-the-time 4WD, all-wheel drive or AWD. If the interaxle differential is excluded, the mode is placed in part-time mode. On-demand mode - In this mode, the transmission case works primarily in 2WD mode. Torque shall be moved to the secondary axle as necessary by modulating the transfer clutch from open to rigidly coupled, avoiding drive shaft drive. Torque modulation can be achieved by active electronic/hydraulic control systems or passive devices based on wheel slip or wheel torque, as described in the section on traction control systems. In addition to these basic modes, some implementations may combine these modes. The system can have a clutch throughout the middle differential, for example, which can modulate the front axle torque in a full-time mode with a 30:70 torque split in the middle differential with a 0:100 torque split in 2WD mode. History The 1893 Diplock Steam Locomotive was the world's first 4WD land vehicle. The Lohner-Porsche Mixte Hybrid was the world's first hybrid vehicle and the first four-wheel drive without a steam engine. The 1903 Spyker 60-HP was the world's first 4WD to be directly powered by an internal combustion engine and the first 4WD racing car. In the late 1800s, in 1893, before the founding of the modern Uk automotive industry, English engineer Bramah Joseph Diplock patented a four-wheel drive system[14] on a steam-powered traction engine, including four-wheel steering and three differentials that were later built. The development also included bramah pedrail's wheel system, one of the first four-wheel drive cars to deliberately travel on challenging road surfaces. This stemmed from Bramagh's previous idea of developing an engine that would reduce road damage Ferdinand Porsche designed and built a four-wheel drive electric vehicle for the k. u. k. Hofwagenfabrik Ludwig Lohner & Co. in Vienna in 1899 and was presented to the public in the 1900s and 1900s Exhibition in Paris. The vehicle was a hybrid car that used an electric brain motor on all wheels, powered by batteries charged by a gasoline-powered generator. [15] It was clumsily heavy, and due to its unusual status, the so-called Lohner-Porsche did not often receive the first four-wheel drive car. In the 1900s and 1920s, the Jeffery/Nash Quads was the first four-wheel drive vehicle to be produced in five-figure numbers (1913–1928). The world's first four-wheel-drive car was directly powered by an internal combustion engine, and the first was a front engine, a four-wheel drive layout that was the Dutch Spyker 60 H.P. commissioned for the Paris-Madrid race in 1903, it was unveiled that year by brothers Jacobus and Hendrik-Jan Spijker in Amsterdam. [17] [18] The two-seater sports car had a permanent four-wheel drive and was the first car equipped with a six-cylinder engine and four-wheel braking. Later used as a mountaineering racer, it is now an exhibition at the Louwman Museum (the former Nationaal Automobiel Museum) in The Hague, The Netherlands. [19] In 1905, he was a four-wheel drive version of the Twyford Company in Brookville, Pennsylvania; Around 1906, six were produced; one still exists and is published annually. [20] The Reynolds-Alberta Museum has a four-wheel drive vehicle, the Michigan, from 1905, in an unrecovered storage unit. The first four-wheel drive vehicles, which went into mass production, were built by the American Four Wheel Drive Auto Company (FWD), founded in 1908,[21] (not to be confused with the term FWD as an abbreviation for front-wheel drive). Along with the 2-ton Nash Quad (see below), the 3-ton FWD Model B became the standard military four-wheel drive truck for the U.S. Army in World War I. Some 16,000 FWD Model B trucks were built by the British and US armies during World War I - about half of them FWD and other licensed manufacturers. Only about 20% of the trucks built were four-wheel drive, but the 4x4s were more often on the front lines. [22] [23] Between 1913 and 1919, about 11,500 Jeffery /Nash Quad trucks were manufactured for similar use. The Quad not only came with four-wheel drive and four-wheel brakes, but also featured four-wheel steering. [23] The Quad was one of the first successful four-wheel drive vehicles ever produced and continued for 15 years, with a total of 41,674 produced until 1928. [24] Daimler-Benz also has four-wheel drive. After Daimler Motoren Gesellschaft built a four-wheeled vehicle, the Dernburg-Wagen, in 1907, which was also equipped with four-wheel steering and used by the German colonial civil servant Bernhard Dernburg in Namibia; Mercedes and BMW introduced some rather sophisticated four-wheel drive, following the G1, G4 and G4 in 1926. Mercedes and developed this 1937. 1930s The 1936-1944 Kurogane Type 95 reconnaissance car (Japan) The 1938-1945 GAZ-61 four-wheel drive Phaeton (Russia) 1940 GAZ-64 jeep-like car (Russia) The American Marmon-Herrington Company was founded in 1931 to serve a growing market for moderately priced four-wheeled vehicles. Marmon-Herrington specializes in converting Ford trucks into four-wheel drive and embarked on a successful start by acquiring contracts for military and commercial aircraft refueling trucks, 4×4 chassis to tow light weapons, and in order to get to the Iraqi Pipeline Company, what the largest trucks were built at the time. [25] The early Marmon-Herringtons were an exception to the rule – four-wheel drive cars and trucks developed in the 1930s were built mainly for governments, with (future) warfare applications in mind. Dodge developed the first four-wheel drive truck in 1934 - a military 11/2 ton designated K-39-X-4 (U.S.), of which 796 units were built by the U.S. Military in multiple configurations. [26] Timken delivered front axles and transfer cases, adding to the militarization of a civilian truck. The Timken permeable case was the first part-time design,[27] which allowed the driver to switch on or out of the four-wheel drive using the lever in the cab. [28] [29] Despite the limited military budget of the 1930s, the '34 truck was well liked that a more modern 11/2 ton truck was developed and 1,700 RF-40-X-4(U.S.) trucks were manufactured in 1938, and 292 TF-40-X-4(U.S.) in 1939. [30] Starting in 1936, Japan's Tokyu Kurogane Kogyo built about 4,700 four-wheel drive roadsters, known as the Kurogane Type 95 reconnaissance car, used by the Japanese imperial army from 1937 to 1944 during the Second Sine-Japanese War. Three different body styles were produced - a two-door roadster, a two-door pickup truck, and a four-door phaeton, all equipped with a shuttle case that involved front wheels, powered by a 1.3-liter, two-cylinder, air-cooled OHV V-twin engine. [31] The 1937 Mercedes-Benz G5 and BMW 325 were equipped with 4×4 full-time four-wheel drive, four-wheel steering, three locking differentials and a fully independent suspension. These were manufactured because the government demanded a four-wheel drive passenger vehicle. The modern G-series/Wolf like the G500 and G55 AMG still feature some attributes, except for a completely independent suspension, as it could compromise the free analogy. The Unimog is also the result of Mercedes 4x4 technology. The first Russian-made four-wheel drive vehicle, also partly for civilian use, was the GAZ-61, which was developed in the Soviet Union in 1938. Civil use may be a little inappropriate Like most, if not all, were used by the Soviet government and the military (the command cars), but the GAZ-61-73 version is the first four-wheel-drive vehicle with a normal closed sedan body. The components of the chassis will be vehicles such as the 1940 GAZ-64 and the 1943 GAZ-67, as well as the postwar GAZ-69, and the properly civilian GAZ-M-72, are based on the rear-wheel drive GAZ-20 Victory, and were built from 1955 to 1958. Soviet civilian life did not allow the proliferation of civilian products such as jeeps in North America, but in the 1960s the technology of Soviet 4×4 vehicles remained on par with British, German and American models, even in some ways going beyond it, and for military purposes, as it actively evolved, manufactured and used. World War II – a jump in AWD proliferation from 1940 to 1945 willys American Jeep Until go-anywhere vehicles were needed by the military large-scale, four-wheel drive and all-wheel drive vehicles were not found their place. The World War II Jeep, originally from the American Bantam, but produced by the masses Willys and Ford, became the best known four-wheel drive vehicle in the world during the war. [32] The U.S. Dodge WC series and chevrolet G506 4x4 variants were also produced by hundreds of thousands, as well as Canadian military model trucks, of which the 4x4s were by far the most common in various powertrain configurations. All in all, North America built about 1 1 • 2 million 4x4 vehicles during the war,[33][34][35] certain critical components, such transfer cases, and in particular the availability of fixed-speed joints, affected development. Although not much was used on commercial vehicles,[nb 1] all four-wheel drive vehicles were needed; and three times the number of driven axles, which means that more gears would be dwindling for all differentials. From the spring of 1942, Ford, Dodge and Chevrolet joined the production of these in quantities more than 100-by-100 in the 1939 1039. [36] Although Russia had operated in the American jeep in 1940, a year earlier, a year earlier, Russia had its own jeep-like vehicles, which were provided by the Western Allies. In 1943, a more advanced version was launched: the GAZ-67. In contrast, the closest equivalent of the axle powers is the jeep, the VW Kübelwagen, of which only about 50,000 were built, although equipped with portal gear brains, only rear-wheel drive. 1945-1960s The 1945 Willys CJ-2A Jeep The first generation Dodge Power Wagon Willys introduced the CJ-2A in 1945, the first fully produced four-wheel drive vehicle to be sold on the general market. Due to the success of the world-leading Jeep, its massive utire has set a pattern for a number of four-wheel drive vehicles. [37] By the 1946 model year, the Dodge had also started production of civilian 4WD Power Wagons. Both the Willys and Dodge were developed directly by their World War II predecessors. It is also boxed to and the land rover appeared at the Amsterdam Motor Show in 1948. Originally designed as a stop-gap product for the struggling Rover car company, despite chronic underfunding, it did much better than their cars. Inspired by Willys MB - the ubiquitous World War II jeep - that often runs off-road on the farm belonging to chief engineer Maurice Wilks, Land Rover developed the more sophisticated but still off-road capable luxury 4WD Range Rover of the 1970s. With the acquisition of the Jeep name in 1950, Willys cornered the brand. His successor, the Kaiser Jeep, introduced the revolutionary 4WD wagon Wagoneer in 1963. Not only was it technically innovative, with an independent front suspension and the first automatic transmission connected to a 4WD, but also equipped and ready as a regular passenger car. [38] It was actually the analyt of the modern SUV. Manufactured between 1966 and 1969, the luxury Rambler or Buick V8 Super Wagoneer raised the bar even higher. Jensen used the Formula Ferguson (FF) full-time all-wheel drive system for the Jensen FF 318, manufactured between 1966 and 1971, making it the first time the 4WD had been used in a gg sports car. [39] While most 4WD systems evenly shared torque, Jensen drove the torque up about 40% at the front, 60% at the rear, and the front and rear gears in different proportions. In the 1970s and 1990s, American Motors (AMC) acquired the Kaiser Jeep Division in 1970 and quickly upgraded and expanded the entire line of off-road 4WD vehicles. With added technical, the high-end full-size Grand Wagoneer continues to compete with traditional luxury cars. [40] It was partly hand-built and remained relatively unchanged in production until 1991, even after the acquisition of Chrysler AMC. Subaru introduced the category-expanding Leone in 1972, a cheap compact station wagon with a lightweight, part-time four-wheel drive system that can't be involved in dry pavements. In September, AMC introduced the Quadra Trac full-time AWD for the 1973 Jeep Cherokee and Wagoneer model year. [41] Due to the full-time AWD, which freed the driver from the lock centers and had to manually choose between the 2WD and 4WD modes, he dominated all other products in the FIA rally race. Gene Henderson and Ken Pogue won the Press-on-Regardless Rally FIA championship in 1972 in a Jeep equipped with a Quadra Trac. [42] In 1969 Jensen FF, the world's first 4WD production GT sports car the 1987 AWD AMC Eagle wagon, the most popular model in line for the 1981 AMC Eagle AWD convertible American Motors unveiled the innovative Eagle in the 1980 model year. [43] These were the first American mass-produced cars to use the full-front motorized four-wheel drive system. [44] The AMC Eagle was used as a sedan, coupe and permanent automatic wagon with passenger models. The new Eagles Eagles Jeep technology is an existing and proven AMC passenger car platform. They are introducing a brand new product category sports utility or crossover SUV. AMC's Eagles came with comfort and high-level appointments expected from regular passenger models and used the off-road technology for an extra margin for safety and traction. [45] Eagle's thick viscous liquid middle differential provided a quiet and steady energy transfer proportionally to the axis with the highest adhesion. It's a real full-time system that only works in four-wheel drive without undue wear on the suspension or drive. In the transfer case, no low range was used. It became the precursor to the plans that followed the other manufacturers. [46] At the time, the car press tested the Eagles' grip and described it as better than subaru's and that it was able to beat many so-called off-road vehicles. Four Wheeler magazine concluded that the AMC Eagle was the beginning of a new generation of cars. [47] The Eagles were popular (especially in the snow belt), had traction capacity and came in at a number of equipment levels, including sports and luxury decorations. In 1981, two additional models, the subcompact SX/4 and Kammback, were added. For greater fuel economy, a manual transmission and front axle separation function were also available. In 1981 and 1982, a custom convertible was added to the line. The Eagle's monocoque body was confirmed for conversion and had a steel targa bar with a removable fiberglass roof. [48] The Eagle station wagon remained in production for a year after Chrysler acquired AMC in 1987. Total AMC Eagle production is nearly 200,000 vehicles. In 1980, Audi also introduced the all-wheel drive car, the Audi Quattro, which runs on the road. Audi chassis engineer Jörg Bensinger noticed in winter tests in Finland that the vehicle used by the West German army, Volkswagen Iltis, could beat any high-performance Audi. He suggested I develop a four-wheel drive car, which will also be used to improve Audi's conservative image. The Audi quattro system has become a feature of production cars. In 1987, Toyota developed a car that was raced in rally campaigns. [49] A limited number of road-going FIA Homologation Special Vehicle Celica GT-Four (North American Toyota Celica All-Trac Turbo) was produced. The All-Trac system was later available on the series-produced Toyota Camry, Toyota Corolla and Toyota Previa. Some of the earliest mid-engine four-wheel drive cars were a variety of road-legal rally cars made from Group B homologation, such as the Ford RS200, made from 1984 to 1986. in 1989, niche maker Panther Westwinds created a mid-engine four-wheel drive, the Panther Solo 2. from 2000 in the United States, as of the end of 2013, 32% of AWD vehicles were new light vehicle sales have increased by 5% since 2008. [50] This is largely due to the popularity of the crossover. [50] Most crossovers offer popular technology, despite increasing the price of the vehicle and fuel consumption. [51] Automakers flooded consumers by advertising the AWD as a safety element, although the AWD's advantage over the FWD is in acceleration, braking, or steering. [52] Tests have shown that although the AWD provides better acceleration in winter conditions, it does not help braking. [53] In 2008, Nissan introduced the GT-R, which features a rear axle. The AWD system requires two drive shafts, one crankshaft from the engine to the axle to the differential, and a second drive shaft from the axle to the front wheels. [54] Uses Road Racing Spyker is the first four-wheel drive racing car, the Spyker 60 HP, built in 1903 and used in racing. [55] In 1932, Bugatti created a total of three four-wheel drive drivers, the Type 53, but the cars were notorious for poor handling. Miller produced the first 4WD car to qualify for the Indianapolis 500, the 1938 Miller Gulf Special. Ferguson Research Ltd. built the first motorized P99 Formula One car to win the non-world championship race with Stirling Moss in 1961. In 1968, the Lotus team raced on the Indy 500 and three years later in Formula One in lotus 56, which had both turbine engines and 4WD, as well as the 1969 4WD-Lotus 63 with the standard 3-litre Ford Cosworth engine. Matra also raced on a similar MS84, and McLaren entered the M9A for the British Grand Prix, while engine manufacturers Ford-Cosworth produced its own version, which was tested but never raced. All these F1 cars were considered worse than their RWD counterparts, as the emergence of aerodynamic downforce meant that proper grip could be achieved in a lighter and mechanically more efficient way, and the idea was discontinued, although Lotus tried several times. In 1989, Nissan and Audi succeeded in all-wheel drive with the release of the Nissan Skyline GT-R. So successful was the car that it dominated the Japanese circuit in the early years of production, followed by bigger and impressive wins in Australia, before weight penalties finally imposed a de facto ban on the car. The most controversial was the 1990 Macau Grand Prix, where the car drove from start to finish. Audi's dominance in the Trans-Am series in 1988 was equally controversial as it led to a weight penalty in the middle of the season and led to a rule review banning all AWD cars; In 1998, his dominance in Super Touring eventually led to a ban on the FIA in the AWD system. New 2011 24-hour Le Mans regulations can revive AWD/4WD for road racing, although such systems can only be the new hybrid-powered Le Mans prototypes. [56] An example is the Audi R18 e-tron quattro (winner In 2012, the first hybrid/4WD won The Le Mans, with an electric engine on the front axle and a petrol engine at the rear. [57] In heavy goods vehicles Medium and heavy-duty trucks have recently adopted 4×4 powertrains; 4×4 medium trucks became common after Ford began selling Ford Super Duty trucks. These trucks shared a lot of components between light and medium load capacity, reducing production costs. The Dana 60 front axle is used on both medium and light Super Duty trucks. Furthermore, the Big Three share/shared parts between companies, reducing costs. The Dana S 110 is currently used for rear drive, Ford and Ram medium power trucks. The Dana 110 was also used on General Motors 4×4s××. For the 2005-2009 model years, General Motors has × 4,000 copies for the 4005×2009 model years. GM 4×4 Medium Duty Trucks Heavy Duty International Workstar Ford Medium Duty 4×4 PowerTrain Construction Equipment The Case Excavator Loader 4WD Volvo introduced the Model 646 four-wheel drive backhoe loader in 1977. [58] Case Corporation followed suit in the United States in 1987. [summons required] Terminology From an engineering point of view, four-wheel drive means a vehicle with a power of four wheels distributed over at least two axles. The term 4×4 (pronounced 4-4) was used in the 1940s to describe North American four-wheel drive vehicles,[59] the first number indicating the number of wheel ends ending on the vehicle and the second indicating the number of wheels driven. Trucks with double tyres and two driven agaes on the rear axle are marked as 4×4, despite having six wheels as paired rear wheels act as a single wheel for traction and classification purposes. Vehicles with 3 driven axles, true 6×6 ×, fall into category 6×6, regardless of how many wheels they have. Examples are these two rear axles, a front axle of the six-wheeled Pinzgauer, which is popular with defense forces around the world, and 10-wheel GMC CCKW made famous by the U.S. military in World War II. A four-wheeler is a related term that refers to off-road vehicles and should not be confused with four-wheel drive. The four cases referring to the vehicle are four wheels, not necessarily all driven. Unusual systems inspired by the perceived need for a simple, inexpensive off-road oil in North Africa, French engine manufacturer Citroën developed the 2CV Sahara in 1958. Unlike other 4×4 vehicles, which use a conventional transfer case to drive the front and rear axles, the Sahara had two engines, each driven independently of each other, with the rear engine facing backwards. The two throttles, clutches and gearbox mechanisms can be connected, the two 12-le (9 kW) 425 cc (26 cu in) motors can run together or split up and powered exclusively by both engines. In combination with two fuel tanks and two batteries (which can be created to run or both engines), the redundancy of two separate drive trains meant that they were able to recover from civilization even after significant mechanical failures. Only about 700 of these cars were built, and only 27 are known to exist today. This took advantage of the mini power pack layout, with a transverse engine and gearbox in engine oil. Simply installing the rear of a second engine/gearbox unit can produce a rudimentary 4×4 system. Early prototypes had separate gearbox and clutch systems for each engine. Subsequent versions sent by the British Army for evaluation had more user-friendly interconnected systems. In 1965, A.J.M. Chadwick patented a 4WD system, the GB 1113068, which used hemispherical wheels for an SUV. Twenty years later, B.T.E. Warne, patented, GB 2172558, is an improvement on Chadwick's design that does not use differential fittings. The driven wheels maintain constant adhesion by using nearly spherical wheels, which have the power to tilt and turn each wheel. Furthermore, all driven wheels are steered, and pairing the wheels is not necessary, vehicles with an odd number of wheels are possible without affecting the integrity of the system. Gradual deceleration may be possible by dynamically changing the actual front-rear wheel diameter ratios. Suzuki Motors introduced the Suzuki Escudo Pikes Peak Edition in 1996. The previous Suzuki versions were twin-engined; From 1996, the engine was a two-turbo 2.0-L V6, mated with a sequential six-speed manual transmission. Nissan Motors has developed a system called the E-4WD, which is designed for cars that are usually front-wheel drive; however, the rear wheels are operated by electric motors. This system was introduced in some versions of the Nissan Cube and Tiida. (This is similar to the system used on the ford escape hybrid awd. [61]) The Chrysler Jeep Division debuted at the 2005 North American International Auto Show in Detroit with the twin-engine 670 hp Jeep Hurricane concept. This vehicle has a unique crab crawl capability that allows you to rotate 360° in place. This can be achieved by driving the left wheels as a pair and the right wheels as a pair, as opposed to driving the front and rear pairs. The central gearbox allows one side to drive in the opposite direction to the other. It also has dual Hemi V8s. Some hybrid vehicles, such as the Lexus RX400h, provide an awd system through a pair of electric motors, one with the front wheels and the other with the rear. The Lexus RX400h (and Toyota-branded harrier hybrid) AWD model version, the front wheels are wheels directly from the petrol engine of the vehicle and through the electric motors, while the rear wheels come only from the second electric motor. The power transfer is automatically handled by internal electronics based on traction conditions and need, making it an all-wheel drive system. The 4RM system used in the Ferrari FF in 2011 is unique in that it has a rear transaxle secondary front transaxle connected directly to the engine. The car primarily acts as a rear-wheel drive vehicle. Clutches on the front axle axle enter when the rear wheels slip. The drive for the front wheels is transmitted by two continuously variable clutch packages, which can slide to give the required wheel speed. The first transaxle is three stages, two forwards and backwards. The two forward gears of the front gearbox are the same as the lower four forward gears of the rear gearbox. It's not used in higher gears. The connection between the gearbox and each front wheel is made through independent haldex-type clutches without differentials. Due to the difference in ratios, the clutches slide continuously and transmit 20% of the engine torque at the earliest. [62] Built-in systems Center differential with Alfa Romeo 164 Q4 mechanical lock (central viscous connector, epic unit and Torsen rear differential) Alfa Romeo 155 Q4 (central epiculated unit, Ferguson viscous connector and Torsen rear differential) AMC Eagle (central viscous connector) Audi - Quattro Coupé, 80, 90, 100 & 200 (lock center and rear differential) - until 1987 Audi Q7 -double gear 50/50 with lockup clutch pack BMW 3 and 5 series in the 1980s - planetary center differential with a 37-63 (front-back) torque and viscous lock (also rear differential, but no front differential) Chevrolet Rounded Line K Fleetside, K Stepside, K Blazer, and K Suburban - permanent four-wheel drive (1973-1979) two-speed New Process 203 transfer case, middle differential 50:50 torque split and lock. The Eaton automatic differential lock was optional for the rear hipodida differential. Ford - Escort (RS 2000 16v 4×4 models and RS Cosworth), Sierra Cosworth, Sierra Sierra and Granada 4×4 models, Dodge Power Wagon - permanent four-wheel drive (1974-1979) two-speed New Process 203 transfer case, medium difference 50:50 torque split and lock. Ford Expedition (1997-present) and Expedition EL/Max (2007-present) - automatic ControlTrac four-wheel drive two-speed dual-range BorgWarner transfer case and intelligent locking center multi-disc differential Ford Explorer (1995-2010) - automatic ControlTrac four-wheel drive two-speed BorgWarner transfer case and smart locking center multi-disc differential Ford - for a permanent four-wheel drive (1974-1979) two-speed New Process 203 transfer, with a mean difference of 50:50 with an emphasic split and GMC Rounded-line K Wideside, K Fenderside, K Jimmy, and K Suburban - permanent four-wheel drive (1973-1979) two-speed New Process 203 transfer case, center planetary differential 50:50 torque and lock. The Eaton automatic differential lock was optional for the rear hipodida differential. H1 & Humvee NVG 242HD AMG open middle differential, closed middle differential, Neutral, low-range closed. Also Torsen1 differential on the front and rear axles, the H1 moved to Torsen2 when ABS was placed. H1 Alpha had an optional end differential instead of the torsens Hummer H2, H3 40/60 planetary lock Jeep Grand Cherokee, Commander (except models equipped with Quadra-Trac I) Jeep Liberty, Jeep Cherokee (XJ), Dodge Durango (Select-Trac) - NV 242 transfer case- rear drive, open middle differential, closed middle differential, neutral, low-range Jeep borg Warner QuadraTrac: slip center differential, 50/50 closed center differential. The low range can be used in closed or open mode, allowing for low range on the pavement. Land Rover Defender (and SERIES III V8 models) Land Rover Discovery/LR3 Land Rover Freelander Lada Niva (VAZ-2121) - full-time 4WD using open middle differential. Case with high/low range and manual central diff lock. It can be selected in low-range, closed, or unlocked mode, allowing you to use it on the sidewalk. Lexus RX300 -viscous connector via otherwise open center differential. Lincoln Navigator (1998-2006) - automatic ControlTrac four-wheel drive dual-range BorgWarner transfer case and smart lock center multi-disc differential Navigator and Navigator L (2007-present) uses single-speed single-range transfer case, no reduction gear Mercedes-Benz Unimog (locking center and rear up to 10 short-range gears). Mercedes-Benz G-Class (lock center and cabinets for both front and rear axles) Mercedes-Benz GL-Class - 4Matic all-wheel-drive system Mitsubishi Pajero (aka Montero or Shogun) Porsche Cayenne - 38/62 planetary with lockup clutch package Range Rover Classic 1970-1995 all full-time 4WD or plate LSD, hand lock or Ferguson viscous center differential. Range Rover 2nd Gen. 1994-2002 full-time 4WD Ferguson viscous mid-differential Suzuki Grand Vitara/Escudo (2005 and later models, except for the XL-7) -full-time 4WD using limited-slip middle differential, off-road 4WD optional mid-differential lock and low-range and low-range transmission case 4 modes (4hr, 4h lock, 4l n), traction control and electronic stability control Subaru - manual transmissions come in 50/50 viscous type of medium differential; performance models include planetary differential with a regulated closure; automatic transmission models have an electronically controlled variable transmission clutch. Toyota Land Cruiser Toyota Sequoia (Multi-mode) Volkswagen Touareg -double cog 50/50 with lockup lockup Package Torsen Centre Differential Alfa Romeo Q4s - a (Torsen T-3): 156 Crosswagon and Sportwagon 159 Brera, Spider Audis in quattro - various iterations of Torsen, the T-3 starting with the 2007 B7 RS4 80, 90 & Coupé (Typ 89) 100 & 200 A4, S4, RS4 A5 & S5 A6, S6, RS6 A8, S8 Q5, Q7 Bentley Continental GT, Bentley Continental Flying Spur (2005) initially Torsen T-2, current van T-3 Chevrolet Trailblazer SS Torsen T-3 Lexus GX470, Toyota Land Cruiser Prado 120 Torsen T -3 Range Rover 3rd Gen. 2002-2009 Toyota 4Runner (limited V8 model & 2010 Limited V6 model) Torsen T-3 lock Toyota FJ Cruiser (manual models only) Torsen T-3 lock Toyota Hilux Surf Torsen T-3 a lock Toyota Land Cruiser 200/2008/V8 Torsen T-3 lock Toyota Sequoia (only 2005-07 Models) Volkswagen passenger cars 4motion : Volkswagen Passat Torsen T-2 (B5.5 model, not latest B6 model with transverse engine) Volkswagen Phaeton Torsen T-2 Non-lock center differentialBMW 3-and X5 between 2001 and xDrive - planetary center differential constant 38-62 (front-back) torque split # Escalade, STS AWD, SRX AWD (The first two generations had a viscous clutch in the middle differential) #Chrysler 300C AWD #Dodge Ramcharger 1974-1981 - NP203 FullTime 4WD Transfer Case Dodge Magnum, Charger AWD #GMC Yukon Denali, XL Denali, Sierra Denali #Mercedes 4MATIC Cars, Class R, and ML Class (note some ML's with low range) #Plymouth Trail Duster 1974-1981 - NP203 FullTime 4WD Transfer Case Toyota Highlander # Toyota Sienna AWD (-2010 only) # The above systems ending # function selectively use the anti-spin system (via ABS) to brake a sliding wheel. Multi-clutch systems Acura RL, RDX (SH-AWD) Right and left axis axis Acura MDX SH-AWD & VTM4 Ford Explorer - Ford full-time shift-on-the-fly Intelligent 4WD system (I-4WD) with 2011 Explorer field management system and RSC (Roll Stability Control), HDC (Hill Descent Control) and HAA (Hill Ascent Assist). [63] Honda Ridgeline Honda Pilot Infiniti FX (ATTESA E-TS) Mercedes-Benz 1. automatic clutch transfer event conducting 4WD on demand) Mitsubishi GTO MR/3000GT VR-4 Mitsubishi Lancer Evolution Series S-AWC 2010 Mitsubishi Outlander GT S-AWC Mitsubishi Outlander (2003-2006) independent front and rear axle connector, and Active Center differential. Nissan GT-R (ATTESA E-TS) Nissan Skyline GT-R (ATTESA E-TS and ATTESA E-TS-PRO) front axle connector, rear differential lock Nissan Skyline GTS4 (ATTESA E-TS) Nissan A31 Cefiro SE4 (ATTESA E-TS) Porsche 959 PSK front axle connector, rear differential lock Saab 9-3, Saab 9-5, Saab 9-4X (Saab XWD). Multi-disc clutch connector Audi A3 quattro, Audi S3, Audi TT quattro, Audi R8 (the Haldex Traction) BMW xDrive: latest 3 Series, latest 5 Series, X3, latest X5 Chevrolet Equinox (GMPCA) Chrysler Pacifica (BorgWarner ITM3e) (on 2007 model) Dodge Nitro (Quadra-Trac 1) Dodge Caliber Ford: Escape, Freestyle, Edge, Fusion, Five Hundred (Freestyle, FiveHundred Haldex Traction based) (Escape Control Trac II, based) Honda CR-V, HR-V, Element Hyundai Santa Fe, Hyundai Tucson Borg-Warner ITM 3e magnetic multi-plate clutch coupling Hyundai Veracruz IMJ magnetic multi-plate clutch coupling Infiniti: G35x, M35x Jeep Compass (Freedom Drive) Jeep Grand Cherokee and SRT8 NVG 249, 247 Land Rover Freelander 2/LR2 (also Haldex Traction)[65] Lamborghini: AWD variants VT series (viscous traction) Lincoln: MKS, MKZ Mazdaspeed6 (a power takeoff unit linked to clutch pack with torque sensitive rear differential) Mazda: Tribute, CX-7, CX-9 (tribute Control Trac II, based) Mercury: Milan, Montego, Mariner (Montego Haldex Traction-based) Mitsubishi Outlander (current generation) Nissan Murano automatic with manual lockup switch Porsche 911 AWD variants (a version of BorgWarner ITM3e) — excluding the 964-series Porsche 911 Carrera 4 31/69 planetary center differential Pontiac Torrent (GMPCA) Subaru low powered automatic transmission models Subaru Legacy, Outback, Impreza, Forester, Tribeca automatic transmission models: mechanical front drive, clutch coupled rear axle. Suzuki: SX4, XL7, Aerio, Swift / Cultus based Subaru Justy. (viscous clutch) Toyota RAV4 - From 2005 (third generation only) Toyota Sienna AWD (2011 and later) Volkswagen Golf 4motion, Volkswagen Jetta 4motion, Volkswagen Tiguan 4motion, Volkswagen Passat (B6) 4motion (initially viscous connector, later Haldex Traction) Volvo: S40, S60, S80, V50, V70, XC70, XC90 (Visco system until 2003, followed by all Haldex Traction-based) Note: the above function is like 2WD when multidisk clutch does not work (except for Subaru models) and as the 4WD highrange is a part-time 4WD system when the clutch is turned on (usually the computer bar some allow manual control). Some in this category have different degrees of control over the torque distribution of the front and rear by putting some clutches into a multi-disc clutch connector to engage and slide in different quantities. An example of such a system is the BorgWarner i-Trac (TM) system. Note: the Haldex Traction-based car list was created from the list on haldex traction's corporate website: Haldex Cars. A version of the BorgWarner ITM3e system was used in 2006 and porsche 911TT's. The Borg-Warner ITM 3e is also used in 2006-now Hyundai Santa Fe and Hyundai Tucson. For Hyundais, the ITM 3e acts as a full-time AWD 95:5 normal torque split. In extreme conditions, the system can be locked 50:50 with the 4WD LOCK button. Part-time These are vehicles that do not have a middle difference. Since there is no middle difference, which would allow for the front and rear rear a small amount of tyre slippage must occur in the bends. When used on smooth surfaces, it's not a problem, but when you turn on the dry sidewalk, the tires grip, then forced to slide, then grip again, and so on until the turn is complete. This causes the vehicle to exhibit a jumping sensation. Using a switched-on part-time 4WD system on a hard surface is not recommended as damage to the drive-line eventually occurs. Chevrolet Rounded-line K Fleetside, K Stepside, K Blazer, and K Suburban - conventional four-wheel drive (1973-1987) or shift-on-the-move four-wheel drive (1981-1987) for two-speed New Process 205 or 208 transfers. 0:100 torque divided in Two High. 50:50 torque split lock four high and four low. The Eaton automatic differential lock was optional for the rear hipodida differential. Note: Rounded-line K pickups and utilities have been temporarily renamed V for the 1987 Chevrolet Tahoe, Trailblazer (LT1 and LT3 models only), Tracker, Suburban, Silverado, Avalanche, Colorado, S-10 series, K5 Blazer Dodge Power Wagon (ram version front and rear differential locks) Dodge Ram, Dakota Dodge Nitro (Quadra-Trac 2) Ford F Series Ford Explorer (1991-1994) & Sport Trac Ford Ranger Geo Tracker GMC Rounded LinesK Wideside, K Fenderside, K Jimmy, and k suburban - traditional four-wheel drive (1973-1987) or shift-on-the-move four-wheel drive (1981-1987) for a two-speed New Process 205 or 208 transfer. 0:100 torque divided in Two High. 50:50 torque split lock four high and four low. The Eaton automatic differential lock was optional for the rear hipodida differential. Note: Rounded-line K pickups and utilities have been temporarily renamed V for the 1987 GMC Envoy, Yukon, Sierra, Jimmy, Sonoma Infiniti QX56 (All-mode 4WD) Automatically turns on 4WD with slip Isuzu i-series, Isuzu Wizard Jeep Cherokee (Quadra-Trac 2) Jeep Cherokee (XJ), Jeep Comanche, Jeep Grand Cherokee (ZJ), Jeep Liberty (Command-Trac) Jeep Wrangler (Rubicon model lock front and rear differential) Kia Sorento (some 2002-2009 models 2WD/4HI/4LO - mostly LX) Land Rover series I, II & III (except v8 models) Lincoln Mark LT Mazda B-Series Mercedes-Benz G-Class Mitsubishi Raider Nissan Patrol Nissan Terrano II Nissan Armada, Pathfinder (All-mode 4WD) Auto-engages 4 WD slip Nissan Titan , Xterra, Frontier (rear cabinet option) Subaru Loyale, GL / DL, BRAT Front / 4wd/ 4wd lo, Justy 4WD Suzuki Sidekick (pre-2005 models and XL-7), Jimny, Vitara Toyota Hilux Toyota Tacoma (rear lock differential optional) Toyota Tundra TRD Toyota FJ Cruiser (automatic transmission models) (also closing rear differential) Toyota 4Runner (only SR5 and pre 2010 Limited V6 models, 2010 Trail edition V6 (also closing rear differential for the 2010 V6) See also 4WS Dune Kneading Four-Wheel Drive Formula 1 Limited Skid Differential Off-road Vehicle Rock Sliding Sport Utility Vehicle Utility Vehicle case Footnotes ^ Front-wheel drive vehicles have not yet become common place at the time

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