

260 / 289 Cobra Borg Warner T10 Identification, Gear Ratios & Tooth Counts

Several Borg Warner T10s were produced for use in Ford vehicles, with different main case and tail housing configurations depending on the vehicle application and bell housing bolt patterns. Most do not fit a 260/289 Cobra because the shifter location is wrong or the transmission is too short. The main case and tail housing for a 1960-64 Galaxie/Mercury, with an overall assembled case length of 27 3/8 inches including the 1/2 inch spacer between the cases, is correct for a 260/289 Cobra. A lighter, aluminum version of this transmission was used in the 1963-64 lightweight 427 Galaxies, 64 Fairlane Thunderbolts, 289 competition Cobras and later street 289 Cobras. The T10's from the 406 and 427 Ford cars are close ratio units as are some from the 390 cars and Hi Po 289 Fairlanes, but there are differences in the gears as explained further below. GM and other T10 case applications are not discussed here because the bolt patterns, lengths and shifter locations are incorrect for Ford applications.

Ford used two different bolt patterns to mount the bellhousing to the small block V-8s. A 5 bolt pattern was used on the 221s, 260s and 1963-64 289s and a 6 bolt pattern was used on 1965-68 289s, 302s and 351s. The 5 bolt bell housings use a narrow bolt mounting pattern to attach the transmission to the bellhousing and 6 bolt bell housings use a mounting pattern about an inch wider on each side to attach the transmission to the bellhousing. Ford also used two sizes of 6 bolt bell housings, one for the 157/160 tooth flywheels and one with the starter moved outboard for the larger diameter, 164 tooth flywheel.

A 5 bolt bellhousing has a smaller index hole for the transmission front bearing retainer than a 6 bolt bellhousing does, so retainers that fit into a 5 bolt bellhousing do not fit snugly into a 6 bolt bellhousing and a retainer for a 6 bolt unit will not fit into a 5 bolt unit unless it is turned down on a lathe. The bearing retainer indexes the transmission mainshaft and engine crankshaft centerlines to each other by fitting snugly into the hole in the back of the bell housing. When you have the transmission out, it is a good time to check the bellhousing runout with a dial indicator to ensure the centerline of the hole in the back of the bellhousing lines up with the crankshaft centerline. The maximum per Ford specs is .015 and misalignment can be corrected by using offset dowel pins in the back of the engine block instead of the stock, straight ones. Misalignment can result in premature pilot or front bearing failure or a catastrophic clutch failure. Anyone who saw the 289 Cobra explode it's clutch at Milan Dragway during SAAC V knows what is meant by a "catastrophic" clutch failure.

Ford T10s used two iron main case configurations and both main cases are 9 1/2 inches long. The early, narrow transmission mounting bolt pattern T10 B-1 case was used from 1960-64 with 221/260/289 engines that had 5 bolt blocks and the later T10 H-1 case with a dual mounting bolt pattern entered service in late 1964 for use with the 289 and later engines with a 6 bolt block. A late T10 H-1 main case will fit a 5 bolt engine bell housing because it has both set of mounting holes, the early (narrow) and late (wide) pattern, but the narrow pattern T10 B-1 main case does not bolt to a stock 6 bolt Ford bell housing because none of the mounting holes line up. Two light weight, aluminum main cases were used in high performance applications. Lightweight 427 Galaxie/Thunderbolt/289 Cobras used a narrow pattern T10 L-1 aluminum main case and the 1965-66 Shelby GT 350 used a dual bolt pattern, T10 M-1 aluminum main case. The 260 and 289 Cobras originally came with 5 bolt bellhousing engines and used the narrow transmission mounting bolt pattern except for a handful of late production factory automatic Cobras that were equipped with 6 bolt engines. The correct iron main case for a 260/early 289 Cobra has casting number T10 B-1 in raised letters on the passenger side and the correct aluminum main case for a mid production- on 289 Cobra has casting number T10 L-1 in raised letters on the passenger side.

Ford T10s used 6 different tail housings with various shifter locations and 3 different lengths. The Galaxie/260/289Cobra tailhousing measures 17 3/8 inches front to rear and the casting number is in raised letters on the passenger side. It is T10 B-7 for the iron tailhousing and T10 L-7 for the aluminum tailhousing. The shifter mounts to the tailhousing with 3 bolts in an "L" pattern with the vertical part of the "L" toward the front of the tail housing. The center of the top front bolt hole for the shifter mount is 4 1/4 inches from the front of the tail housing. The shifter assembly is a 1963-64 Galaxie/Fairlane T10 unit with a shorter handle. A Mustang, Falcon or Comet T10 tailhousing is 3 inches shorter than a Cobra one and the shifter is not in the right location. The 1964 Fairlane T10 tail housing has the correct shifter location but, except for the Thunderbolts, it is 1 inch shorter, making the Cobra driveshaft to short.

Borg Warner identifies the various gear ratios sets with a letter designation and the first gear set to use that particular combination of ratios has that letter designation assigned to the cluster gear because the cluster alone is unique to each gear set. For example, T10B-8 is the part number assigned to the first Ford T10 cluster gear and it denotes the "B" ratio set. Often times only one gear on the cluster itself is changed to make up a new set of gear ratios. Other individual gears receive the same letter designation assigned to the first cluster gear it is used with

even though the gear itself may also be used with different cluster gears in several other gear sets. For example, T10B-16 is the part number for the input shaft used with the "B" gear set, but it also fits the J, L and M gear sets. There are Borg Warner part numbers for each gear along with OEM part numbers for any gears used in an OEM application and sometimes there is more than one OEM number if more than one car manufacturer used that particular gear. Borg Warner numbers are relatively simple to follow as the only change in the gear part number is the letter designation itself, which is replaced with a ___ in the example below:

- T10__ - 8 Cluster gear
- T10__ - 16 Input shaft (4th gear)
- T10__ - 11 3rd gear
- T10__ - 31 2nd gear
- T10__ - 12 1st gear

Since many of the individual gears are used in several gear sets, the best way to identify which gear set is in a particular transmission is to count the teeth on the cluster gear. All of the Ford close ratio input shafts are 26 tooth and interchange between the Ford close ratio sets but the input shaft on the GM "K" input, which was used in some 289 Cobras, has a different tooth count and it will not fit the Ford cluster gears. The close ratio Ford B and L inputs are a bit shorter and measure 8 1/2 inches in length because they are for use with the 390, 406 and 427 engines. They can be used with a 289 by using the factory Ford extended pilot bearing used in early Broncos or by adding 3/8 inch to the pilot tip, which extends it to the small block length of 8 7/8 inches like the small block J and M close ratio inputs. All of the first gears will interchange in the Ford T10 sets except the 66 Mustang "Q" wide ratio first. Tooth counts for the "Q" ratio are provided here for gear identification, but that gear set will not fit a Cobra because it uses it's own mainshaft with a different diameter on the tip that fits into the rear of the input shaft and a "Q" mainshaft is not available in the Cobra length.

Ford T10 Close Ratio Gear & Tooth Counts:

B* close ratio (1962)	L ** & J*** close ratio	M close ratio ****	K close ratio (GM)*****
1 -- 36	1 -- 36	1 -- 36	1 -- 36
2 -- 32	2 -- 30	2 -- 29	2 -- 30
3 -- 29	3 -- 29	3 -- 27	3 -- 29
4 -- 26	4 -- 26	4 -- 26	4 -- 27 (Pontiac)
cluster 29-23-20-17	cluster 29-23-19-17	cluster 29-25-20-17	cluster 28-23-19-17

* B gear sets are not nickel alloy and were used in 1960 - 62 Fords and early 260/289 Cobras.

** L gear sets are nickel alloy and were used in 406/427 powered Ford cars and some 289 Cobras.

*** J gear sets are not nickel alloy and were used in 1963 - 64 390 Galaxies, Hi Po 289 Fairlanes and possibly some 260/early 289 Cobras. L and J gears are the same ratios so the gears will interchange.

**** M gear sets, also called the "Sebring" gears, were first available in late 1963 and were used in 1964 427 Galaxies & Mercurys, later production 289 Cobras and 1965 - 66 Shelby GT 350s.

***** The K close ratio gear set is a nickel alloy gear set originally used in some 1957- 63 GM high performance cars and some early to mid production 289 Cobras. The K input is the same length as the small block Ford input but a Chevrolet clutch disc is used because of the larger 1 1/8" GM input shaft diameter and a 389 Pontiac pilot bushing is used because the GM input tip is smaller than the Ford input tip. 1st, 2nd and 3rd gears are the same ones used in the L ratio gear set, but the ratios change because the L and K inputs have different tooth counts. The GM "C" ratio is the same ratio as the K set but it is not nickel alloy and it was not used in Cobras.

H wide ratio (Falcon/Fairlane/Comet/65 Mustang)	Q wide ratio (66 Mustang only)
1 -- 36	1 -- 34
2 -- 30	2 -- 27
3 -- 28	3 -- 24
4 -- 24	4 -- 20
cluster 31-24-19-17	cluster 28-21-18-18

T10 Gear Ratios:

	B	J & L	M	K (GM)	H (wide ratio)
1st	2.36	2.36	2.36	2.20	2.73
2nd	1.78	1.76	1.62	1.64	2.04
3rd	1.41	1.41	1.20	1.31	1.50
4th	1.00	1.00	1.00	1.00	1.00
Rev	2.42	2.42	2.42	2.26	2.80

If one wants a more robust transmission for racing a 260/289 Cobra, a 64 Galaxie toploader will bolt right in but you will also need the Toploader shift linkage because all of the rods and shift arm lengths are different from a T10 shifter. One has to be careful here also, as the Ford Toploader also used two main case configurations with the narrow bolt pattern (early) being used on 5 bolt bellhousing engines and wide bolt pattern (late) used on 6 bolt bellhousing engines. Toploader tail housings also came in three lengths but used many more tailhousing configurations for different shifter locations. David Kee's web site has an excellent Toploader tailhousing ID chart at <http://www.4speedtoploaders.com/idchart1.htm>