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CHAPTER 1. MODEL OVERVIEW AND TERMS USED

TECUMSEH/TRANSMISSIONS UNITS

GENERAL

Manufactured since 1945, Tecumseh/Peerless gear products are found in many products worldwide. Applications vary from industrial products to residential and commercial lawn and garden equipment.

This book is intended for use by properly trained technicians that have appropriate facilities and the proper tools. If you are not a Tecumseh trained technician, DO NOT attempt a repair. Consult an Authorized Tecumseh Servicing Dealer.

IDENTIFICATION OF MODELS

All units manufactured since 1964 have identification numbers located on an attached tag or are stamped into the case. This information is required to obtain parts or replacement units. We have included illustrations on page 9 of this book to assist you in locating them.

TRANSAXLES

The term transaxle is a combination transmission and differential in one case. Tecumseh transmissions and transaxles are manufactured in many different gear ratio combinations from one to seven forward speeds with one reverse.

600 Series The 600 series is a lightweight transaxle used in riding mowers or similar applications. The 600 series has a vertical input shaft at the top of the aluminum case. Variations in the series (which determine the specific model number such as 603, 603A, 609 etc.) include:

1. Shift lever shape.
2. Axle lengths.
3. Axle machining for wheel hub attachment.
4. Axle housing variations.
5. Size of the brake shaft.

There may be other slight differences, however, these are present as a result of product improvement which are not options to an O.E.M. (Original Equipment Manufacturer).

800 Series This unit has 3 to 6 speeds forward and 1 reverse. This transaxle features bronze oil impregnated bushings with needle bearings or ball bearings on the axles, input and output shafts.

820 Series With 2 to 6 speeds forward and 1 reverse, this transaxle is built for heavy duty applications including use with ground engaging attachments. Sleeved needle bearings are used in place of oil impregnated bushings on all shaft ends and ball bearings are standard on the axles. The 820 also features steel cut gears for maximum durability.

900 Series This unit is similar to the 800 series transaxle with the added feature of 2, 3, or 4 speeds forward and 1 reverse.

910 Series The 910 series transaxle offers a forward and reverse unit. The speed changes with the use of a variable-drive pulley arrangement.

915/940 Series This unit has 3 to 5 speeds forward and 1 reverse. Reverse is gear driven instead of chain driven and the case is contoured around the gears.

920 Series The 920 series offers 3 to 7 speeds forward and 1 reverse. The shifter/brake shaft is similar to the 800 series shifter/brake shaft.

930 Series This unit has 3 to 7 speeds forward and 1 reverse. The transaxle is very similar to the 920 series except the differential and shifter/brake shaft are different.

The MST Series The MST (Manual Shift Transaxle) is a sealed unit which uses 16 oz. (473 ml) of 80W90 gear lube (part #730229B). The MST series is available with up to 6 speeds forward and one reverse and has a contoured case and cover.

1200 Series The distinguishing feature of the 1200 series transaxle is that the axle support housings are pressed in from the inside of the case and cover. Therefore they are not readily removable until the unit is completely disassembled. The case is cast iron for rugged, longtime use.

2300 Series Generally similar to the 1200 series transaxle. The distinguishing features are a more massive case and a larger shift lever opening machined area. The obvious difference from the standpoint of application is that these units have four speeds forward and will be found on equipment that can be used with ground engagement operations.

NOTE: The 1200 and 2300 series transaxles are fairly similar in appearance, but do have recognizable characteristics. Both of these units have cast iron cases for rugged applications, although the 2300 series is the only unit that can be used with ground engaging applications.

HYDROSTATIC GEAR REDUCTION AND DIFFERENTIAL UNITS

GENERAL

These units do not have a transmission function characteristic of transaxles, but rather, are designed to reduce input speed to a suitable axle speed and torque range. The hydrostatic units which mate to these units perform the transmission function.

1300 Series This unit is the hydrostatic counterpart of the three-speed forward unit (1200). It has an aluminum casing and pressed-through axle support housings, which is characteristic of the 1200 series. The hydrostatic pump is made by Eaton® Manufacturing and is not serviced by Tecumseh Service Dealers.

2400, 2500 & 2600 Series This series of hydrostatically driven reduction gear and differential units can be used in ground engaging operations such as plowing. The hydrostatic pump is manufactured by Sundstrand® Corp.

TRANSMISSIONS

Transmissions manufactured by Tecumseh consist of a shifting mechanism to take a constant input shaft speed and reduce it to the desired output speed. Transmissions need a belt drive or chain drive/differential assembly to deliver power to the wheels.

700 Series This unit can be 2, 3, 4, 5 & 6 speeds forward and 1 reverse. The brake system can be mounted on either side of the unit.

700 "H" Series This unit is built with almost all interchangeable parts within its two cases except with an "H" shift pattern. This unit has 3 or 4 speeds forward and 1 reverse.

DIFFERENTIALS

The 100 series is a self-contained differential/axle unit. It features hardened or non-hardened axle shafts of various lengths and is machined with many variations for hub attachment. The case is cast aluminum and the differential gears are sintered metal (powdered metal) or cut steel. The differential pin is held in place by the four retaining cap screws. Oil Lite bushings reduce friction during differential operation. The drive sprocket is part of the unit which, depending upon the application, can be of several diameters in size thus having a different number of gear teeth. This sprocket is often supplied by the O.E.M.

ANGLE DRIVES

These units are used primarily to change the direction of drive at the point where the working equipment attaches. They can be assembled for right or left hand rotation so that they can be used in various combinations for synchronous operation.

Right Angle Drives These units consist of input shafts, output shafts, and the beveled gearing necessary to change the direction of power at right angles. If the bevel gear (drive gear) on the input shaft is turned around and moved to the other side of the case (opposite end of the shaft), the output shaft will rotate in the opposite direction.

A cover identifies each unit as being either a left hand (LH) or a right hand (RH) right angle drive. The cases and bearings are identical in both drives.

"T" Drives The "T" drive is essentially the same as the right angle drive except that the input shaft extends out the other side of the case to transmit power in the same line to additional right angle drives or other equipment.

Shafts, Couplings, Pulleys, etc. These items are part of complete units and are used to connect angle drives, and other attachments. The serrated couplings match the serrations on the shafts of the angle drives and connecting shafts.

TERMS USED

AXLE - The shaft which connects the wheel or hub to the differential unit and transmits force back to the wheels.

AXLE HOUSING (or AXLE SUPPORT) - An extension of the case and cover to support the outer ends of the axles. Because the housing is visible, it is often the best means of distinguishing the series in question.

BEARING BLOCK (Strip) - Used to support the ring gear of the differential.

BEVEL (on a gear) This is a chamfer or roundness of the meshing side of the gear teeth to permit easy shifting. For instance, with "H" shift pattern transaxles, this is about the only allowance that can be made to make shifting easier. Input power should be stopped before shifting to keep these spur gears from developing wear.

BEVEL GEAR - A gear with teeth ground on a diagonal so that when it meshes with a second bevel gear, power is transmitted at an angle. If the angle is 90°, the gear is known as a MITER GEAR.

BEVEL PINION - The smaller of two meshed bevel gears in a gear train.

BRAKESHAFT/SHIFTER BRAKESHAFT) - The shaft on a unit (Transaxles or Transmission) to which a braking system may be attached. It is usually larger in diameter than the input shaft due to its function of taking shock loads experienced in braking.

CASE - That bottom half of the gear box which contains the shift lever , axle and brake shaft openings. The other half is the COVER. Unit reassembly is normally done into the case with variations listed by individual model.

CHAMFER - In gear products, chamfers provide two main functions. The first is to reduce gear wear at the leading contact point as two gears mate. The second purpose is to act as a ramp for shifter key compression through the shift washer prior to gear engagement. The chamfer in the washer is either stamped or machined in.

COUNTERSHAFT - A splined shaft which hold spur gears that are in constant mesh with shift gears and transfer input power to the shift gears.

COUPLING - A sleeve to connect two serrated or splined shafts in the same axial plane. Used in right angle drive systems, 700 series, output shafts or in a hydrostatic drive connecting the pump and motor to the gear drive of a transaxle.

COVER - The top half of a horizontally parting gear box such as 700,800,900 and MST models. The cover normally contains the input shaft, bearing(s) and the input bevel gear. The shaft may change location in the cover based on the OEMs mounting position.

DIFFERENTIAL GEAR BOLTS - Through bolts holding the differential parts together. The heads of these bolts must be opposite the output shaft gear (except in the 2400 series). This is an early check to see that the unit is being assembled correctly.

DOWEL PIN - An alignment pin used to align the case and cover and other parts in a transmission or transaxle. The dowel pins should be installed to hold the parts in alignment before tightening the retaining screws. Failure to install dowel pins first will usually lead to a unit that binds after assembly.

DUO-TRAK™ DIFFERENTIAL (Trademark -Illinois Tool Works) - A type of differential which increases torque to the tractive wheel to keep it turning. However in situations where differentiation is necessary (as in turning), the unit acts much like a regular differential.

EQUIPMENT - The complete assembled product (riding mower, tractor etc.) which uses of the drives listed in this manual.

HEAD ASSEMBLY - A complete unit containing all parts of one right angle or "T" drive assembly of a right angle drive system. The head assembly is permanently lubricated and sealed.

IDENTIFICATION NUMBER - See **MODEL NUMBER**

IDLER - A gear used in a gear train to transfer motion or direction. The gear rotates independently of the shaft upon which it is located.

INPUT OR INPUT SHAFT - The part of a unit which is always connected to the drive. Its rotational speed is dependent on the driving mechanism. The input shaft brings power to the unit.

LIMITED SLIP DIFFERENTIAL - See **DUO-TRAK™ DIFFERENTIAL**.

MITER GEAR - One of a pair of interchangeable bevel gears with axles at right angles. Since all bevel gears are miter gears, the terms can be the same.

MODEL NUMBER - The identifying number of a unit which will permit selection of the proper parts to repair that unit.

NEUTRAL SPACER - A single or split collar between forward and reverse gears that the shift keys engage into when the unit is in neutral.

OIL SEAL, SINGLE LIP/DOUBLE LIP - An oil seal with one or two sealing surfaces to prevent entrance of foreign matter and leakage of lubricant.

OIL SEAL, (SQUARE CUT O-RING)- A seal with two external and two internal sealing surfaces. Used in the shifter housing.

OUTPUT, OR OUTPUT SHAFT - On a transaxle, the shaft that contains the output pinion which is in direct mesh with and drives the differential. The output shaft on a transmission contains the sprocket for driving the axles. The output shaft is driven by the large **OUTPUT GEAR**.

OUTPUT SHAFT GEAR - The importance of defining this gear is to point out that it must be opposite the differential bull gear (except the 2400 series).

GEAR REDUCTION AND DIFFERENTIAL UNIT - A unit that reduces a high R.P.M. input speed to a suitable axle speed without the use of a transmission. Since there is a single gear train, there is a single input speed to output speed ratio, however, axle speeds are infinite, depending upon input speed.

REVERSE IDLER (915 Series) - The gear located between the reverse gear of the countershaft and the reverse gear of the shifter/brake shaft that allows the drive to operate in the opposite direction.

REVERSE IDLER - A gear added to the gear train so when in mesh, the direction of all gears driven after it is reversed. Its number of teeth also affects the reverse gear ratio. The center gear of the three gear cluster is always in mesh with the **REVERSE IDLER**, and the large shifter gear always shifts into it.

RIGHT ANGLE DRIVE / HEAD ASSEMBLY. The major operating parts are a pair of miter gears. The assembly consists of other right angle or "T" drive head assemblies and connecting hardware.

SEAL - A material which prevents lubricant from leaking past a rotating shaft. It can be a rubber or square cut "O"-ring, a sealing-type ball bearing, or most commonly, a rubber sealing surface encased in a metal form.

SEAL RETAINER - Found on some models of transaxles and on right angle drives.

SHIFT COLLAR - A round collar which retains shift keys onto the shifter/brake shaft. The shifter assembly pin (or pins) slide into the groove on the collar to move the shift keys.

SHIFT GEARS - The gears on the shifter/brake shaft that are in constant mesh with the spur gears of the counter shaft. The shift gear is engaged by the shift keys and it's size determines the speed of output by the axles.

SHIFT KEY - One of either two or four metal spring steel keys, which are held in the keyways of the shifter/brake shaft by a shift collar. The shift keys are used to slide through the shift gears and engage the desired gear or speed.

SHIFT KEYWAY - One of either two or four slots in the shifter/brake shaft for the shift keys to slide through for gear selection.

SHIFT WASHER - The shift washer provides a ramp to gradually compress the shift key prior to engagement with the gear. We have used two types in production; the newer style has the chamfer stamped into the washer. Earlier production washer's had the chamfer machined in.

SHIFTER ASSEMBLY - Consists of a shift rod, shift fan, shift arms and shift pin or pins.

SHIFT LEVER - The lever by which the operator manually changes the shifter gears to vary reduction speed ratios in the transmission. The configuration of the lever is variable and is often the only reason for a unit being given a new model number.

SHIFTER FORK - A mechanical arm which is connected to the shifter rod to position the shifter gear at an exact spot axially along the shifter shaft.

SHIFTER GEAR, LARGE (600/2300) - This gear transmits 1st gear, reverse gear (and 2nd gear in 4-speed units) ratio force to the output shaft. It is beveled on both sides.

SHIFTER GEAR, SMALL (600/2300) - This gear transmits 2nd and 3rd (3rd and 4th in a 4-speed unit) gear ratio force to the output shaft. It can have two different beveled tooth diameters or it can have a beveled spline to engage 3rd (or 4th) gear through an additional splined shaft.

SHIFTER HOUSING (600/2300's) - This housing contains the shift lever and must be re-installed in the proper position to function correctly. If the housing does not already have guide marks, scribe the shifter housing and transmission case before removal.

SHIFTER ROD - One of two similar smooth rods of equal length with grooves which match the fork positioning with meshed positions of the shifter gears and those of the three gear cluster. Each rod has a snap ring to act as a fork stop, but can also be used to determine how the fork is assembled to it.

SHIFTER SHAFT - A splined shaft which meshes with the internal splines of the shifter gears, to transmit force to the output shaft gear. On in-line transmissions and transaxles the shaft has machined channels to accommodate the shift keys.

SHIFTER STOP (600/2300's) - A stamped metal plate which separates the shifter forks. The stop has a notch cut in it which corresponds to the neutral position on the shifter forks and rod. The shifter lever must return the engaged fork back to neutral before it can actuate the other fork.

SPROCKET - A geared wheel designed to turn a chain drive. Sprocket diameters vary and are available in different sizes for changing output ratios.

SPUR GEAR - A gear having the shaft bore and teeth in a parallel plane.

"T" DRIVE - A right angle drive with an input shaft extending thru the case to transmit power axially in a second direction to the right angle output. On "T" drives with dissimilar input and output ends, care must be taken to insure that the parts do not run in reverse when reassembled.

THREE GEAR CLUSTER (2300) - A three gear assembly in mesh with the input shaft. The gears are of different sizes to change gear ratios when meshing with the two shifter gears.

THRUSTER RACE - A thrust washer in which the outer edge is cupped to fit the outer diameter of a thrust bearing. This fit positions the thrust race concentric with the axle diameter. It further acts as a thrust washer.

THRUST WASHER - A flat polished surface separating metals of different hardness. It also acts as a spacer between shafts and the case and cover.

TRANSMISSION - A system of varying sized gears in a case, some of which can be moved along a shaft to vary the gear ratio in a unit. The net effect is to change speeds to the rear wheel according to the type of work being done.

UNIT - A general term for Tecumseh/Peerless Transmission products.