



# Servicing V-Belt Drives

Service Manual No. 9-50621

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**JI Case**  
A Tenneco Company



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## INTRODUCTION

Although the Case Compact Tractor is famous for its exclusive "Hydraulic Drive", many V-belts are used for attachment drives and for tractor traction drives on several models. Since V-belts play a large part in the overall service picture of the Case Outdoor Power Equipment business it is important that we understand the

proper installation, maintenance, and use of these belts on the various drives.

The information in this manual in no way replaces that found in Case Operator's Manuals, Parts Catalogs or Service Manuals, but is intended as a supplement to them.

### I. GENERAL BELT FACTS

- A. V-Belt Components and How They Work: Basically, a V-belt consists of four (4) distinct components: 1) Tensile member; 2) Top cushion; 3) Bottom cushion or compression section and 4) Cover or jacket.

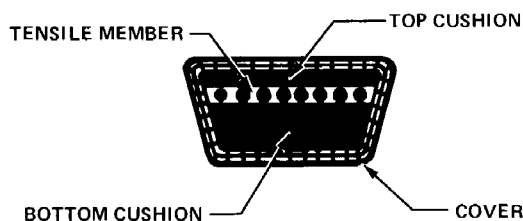


Figure 1. Construction of a Vee Belt.

The tensile member in a V-belt can be either a layer of cable cord or multiple layers of tire cord. The cable cord construction, which has one strand of cord spiraled around the belt, is usually used in the smaller belt sizes. These belts are normally used on smaller diameter sheaves, thus requiring greater flexibility which is provided by this construction. The larger belts usually utilize multiple layers of tire cord. These belts are normally used over larger diameter sheaves and must carry more horsepower but require less flexibility.

The top cushion section absorbs the stresses set up by the tensile member as the belt flexes around the sheaves. It also facilitates cord positioning and alignment.

The bottom cushion or compression section, supports the tensile member

and is the principle in the wedging action of a V-belt drive. In essence, the compression section transmits pressures and forces set up by the tensile member to the pulley groove sides.

The cover or jacket is usually a rubberized fabric material. The primary function of this section is to provide the V-belt with an oil and heat resistant "coat" with excellent wear characteristics.

- B. V-Belt Installation and Tensioning:

No matter how well a V-belt drive is designed, the belts must be properly installed and tensioned in order for the drive to operate properly. Improper installation and tensioning can result in premature belt failure.

1. Pulley Condition:

Check the condition of all pulleys, both old and new. Be sure the pulley has a smooth finish and does not have sharp edges or burrs. Rust in the groove is an abrasive and will rapidly deteriorate the belt cover. Check for groove uniformity. Excessively worn pulleys or improperly machined grooves can lead to early belt failure. If the grooves are worn to the point where the belt bottoms, slippage may result and the belt burn. A belt bottoming in the pulley groove is evidenced by the groove bottom being shiny and smooth. If the side-walls are "dished out", the bottom shoulder of the worn pulley groove ruins the belt prematurely by wearing off the bottom corners.

Grooves should be checked with a groove gauge or straight edge and feeler gauge. When wear reaches .025" the pulley is unacceptable for cord V-belts. If a problem exists, the groove angle should also be checked. The center line of the pulley should always bisect the groove angle.

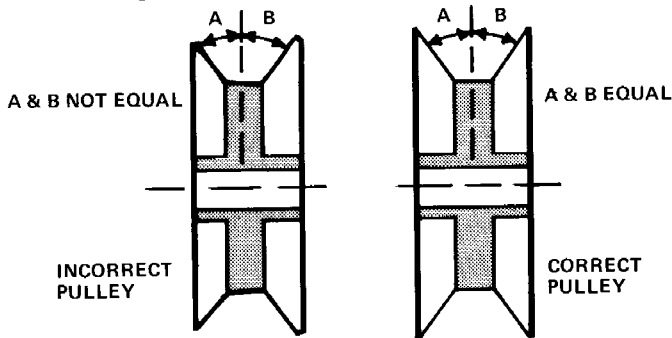


Figure 2. Defective Pulley Groove.

If a condition of wobbling or excessive belt vibration exists, a bent drive shaft, pulley out of round, or, in the case of a welded assembly, the pulley not welded to the shaft exactly on center (Example 7 & 8 HP PTO Jackshafts) could be problem areas. A worn bearing, spindle or idler (in idler pulleys containing bearings) could cause a similar problem and should be checked.

Belt vibration could also be caused by a pulley with its groove pushed in in one area. This would tend to narrow the groove and cause the belt to ride high in that spot only.

Spring loaded idler pulleys must be free to pivot under spring tension. Make sure the pivot point is properly lubricated and is not over tightened or binding. Also make sure the spring is not stretched out and is hooked in the proper location.

## 2. Pulley Alignment:

Pulley alignment should be checked by placing a straight edge or tight cord across the pulley faces so that it touches all four points of contact. Ordinarily, a misalignment of more than one-half of one degree (one-eighth inch in one foot) will adversely affect belt life. Improper pulley alignment produces uneven wear on one side of the belt, causes the belt to roll over in the pulley or throws all the load on one side of the belt, stretching or breaking the cords on that side. To check alignment after belt installation, remove the spark plug (direct engine drives) or disengage the PTO clutch and rotate the drive by hand through several revolutions. If the belt tracks hard

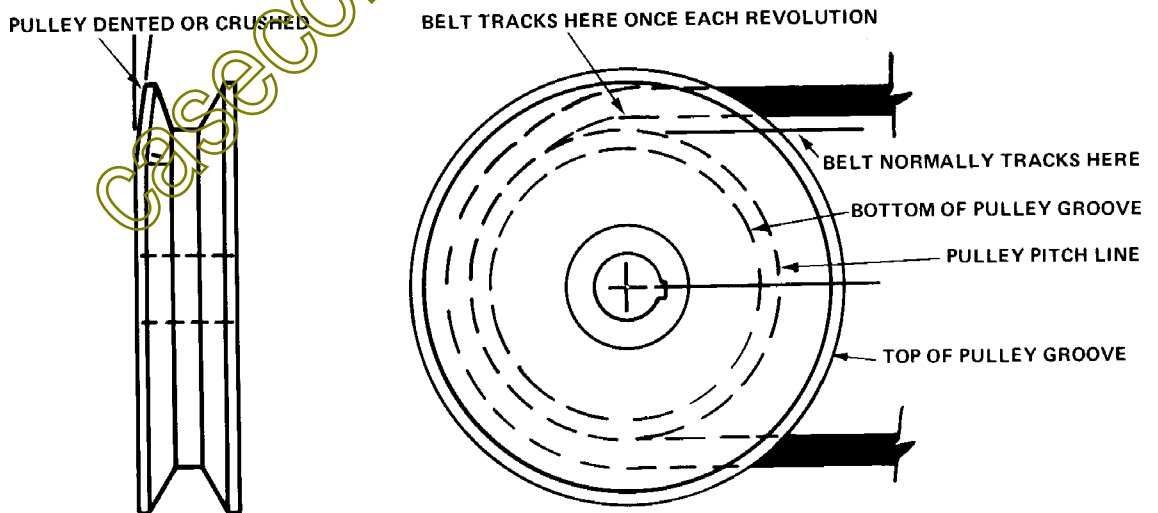


Figure 3. Effect of Dented or Crushed Pulley

against one side of a pulley or idler, corrective action should be taken.

Idlers may be shimmed with common washers to bring the belt to the center. Driving or driven pulleys may be loosened and moved on their shafts to achieve proper alignment. Occasionally a bracket could require repositioning by reforming or filing out slots to give more adjustment.

If a belt problem exists on an attachment that is not held rigidly to the tractor, check for excessive movement caused by wear in pivot or mounting points.

Where serpentine drives (those that twist around corners) are used, the idlers should be aligned so the entry angle is as small as possible (usually not more than 5°).

Assuring correct alignment will greatly lengthen the service life of the belt.

### 3. Belt Installation

Today's V-belts stretch as little as 1% and force should never be used in installing them. Cord damage is a virtual certainty if a belt is forced on a drive with a pry bar or by cranking. If a belt fails during its first few hours of operation, you can be almost 100% sure that it was damaged during installation.

On most drives, a pulley can be moved to obtain the slack necessary to install a belt. Sometimes it is necessary to remove a pulley from its shaft to install a belt. It's worth the trouble. For example, turning the adjusting crank on J40, J44, and J46 mowers as far clockwise as possible will loosen the belt for easy replacement. On other applications, (such as mower deck belts) stretching the

spring loaded idler with a wrench or bar will provide adequate slack for removal or installation of the belt.

**NOTE** Specific installation instructions for each model of tractor and attachment are found in each operator's manual.

After installing the belt, rotate the drive by hand several times to insure that the belt is tracking properly. Refer to the "Pulley Alignment" section of this manual for more detail.

In serpentine drives always try to utilize the natural curve of the belt for ease of installation. Make sure the belt is strung in the proper manner as per the operator's manual or attachment decal. Installing the belt improperly will result in either reverse rotation or damage to the drive system.

Make sure after each installation that all belt keepers are properly installed. They should be positioned at right angles to the belt and 1/16" to 1/8" from the belt.

### 4. V-Belt Tensioning

Proper tension is a prime fundamental in the proper operation of any V-belt drive. If tension is too slack, belt slippage is likely. There is also the possibility of a belt's slipping and then "grabbing" when the load comes on abruptly. The resulting shock load is known as belt whip. It often is strong enough to snap a belt. Prolonged slip results in excessive cover wear, burn spots and overheating -- all of them damaging.

Following the initial tension adjustment, the belt should be checked and readjusted if necessary after a 20 minute run-in period and again after an hour. During this run-in process,

the belt tension may decrease for the two following reasons:

1. The initial stretch is taken out of the belt.
2. The soft rubber surface of the outer envelope is abraded away and the belt is seated at a slightly lower position in the sheave, permitting the belt to run slack.

Unless new belts are retensioned, there is likely to be considerable slipping, burning or other irreparable damage.

Drives employing spring loaded idlers with no other provision for adjustment would tension themselves automatically. A periodic check should be made to insure that the proper tension is being maintained by the spring loaded idler. The idler must be free to pivot and the spring be hooked properly and not stretched out to provide the proper tensioning. On drives using manual tensioning devices, refer to the operator's manual for specific instructions.

A rule of thumb for proper tensioning A-section V-belts is: 1/64" of deflection per inch of span with 4 pounds of thumb pressure. Therefore, an eight inch span should have 1/8" deflection with 4 pounds of thumb pressure.

If the unit is stored for a long period of time, the tension on the belt should be relieved to prevent it from taking a "set". A belt that has taken a "set" will result in a rough, unsatisfactory drive.

#### 5. V-Belt Use:

Proper use of V-belts will extend their service life greatly. A new belt

should be run in under no load for a period of 30 minutes to assure that it will track properly. It should then be retensioned and placed into service. The tension should then be checked periodically as specified in the V-belt tensioning section of this manual and in the Operator's Manual.

The PTO clutch should never be engaged with the mower or snowblower under load. It should always be engaged slowly and smoothly - "avoid jerks". Always clear the area to be worked of debris to prevent the attachment and belt from damage due to shock loading or entanglement. Do not overload the belt by going through heavy grass or snow at excessive ground speeds. Overload may also be caused by stiff or frozen bearings (example - mower spindle bearings) and may be detected by rotating the unit by hand. Be sure to stop the engine, disconnect the spark plug wire and disengage the PTO clutch for safety.

Avoid "slipping the clutch" on belt drive tractors by using a lower gear or taking a half swath of grass or snow.

#### 6. V-Belt Storage:

V-belts should be stored in a cool dry environment with no direct sunlight. On shelves, in piles, the piles should be small enough to avoid excess weight on the bottom belts. Do not pile other items on top of the belts. If hung on pegs, care should be taken to prevent the belts from taking a "set" from the peg. That is, the pegs should be round or crescent shaped and large enough in cross section to provide a gentle curve to the belt.

## II. V-BELT PERFORMANCE ANALYSIS CHART

Visible Problem	Probable Underlying Cause	Recommended Solution
<p>Belt turnover on misaligned and twisted drives</p>	<p>Excessive misalignment</p> <p>Flat or V-idler improperly located</p> <p>Excessive vibration and belt whip</p> <p>Sheave finish</p> <p>Damaged V-belt tensile member</p> <p>Defective belt</p>	<p>Correct misalignment.</p> <p>Locate idler such that misalignment is reduced.</p> <p>Check pulley for eccentricity and side wobble.</p> <p>Avoid heavily painted, treated or oily and greasy surfaces.</p> <p>Replace with new belt.</p> <p>Replace with new belt.</p>
<p>Belt squeal</p>	<p>Insufficient tension, excessive overload or start-up load</p>	<p>Increase tension only if squeal is objectionable and additional tension will not cause premature failure due to excessive tension. Reduce overload or excessive start-up loads.</p>
<p>Tensile break</p>	<p>Shock or extreme overload</p> <p>Belt not strong enough to handle normal shock loads encountered</p> <p>Damaged tensile member (at installation or during operating from foreign material, structural interference or mechanical failure)</p> <p>Too aggressive engagement of drive</p> <p>Excessive tension</p> <p>Excessive misalignment (resulting in broken edge cords)</p> <p>Defective belt</p>	<p>Operate machine properly.</p> <p>Be sure to use only genuine Case replacement belts.</p> <p>Install new belt. Inspect condition of pulleys, idlers, belt guides and possible structural interference.</p> <p>Engage drives gradually.</p> <p>Reduce tension (check spring force if spring loaded idler is used). Check belt length.</p> <p>Correct misalignment.</p> <p>Replace with new belt.</p>

Visible Problem	Probably Underlying Cause	Recommended Solution
Excessive stretch	<p>Excessive tension</p> <p>Insufficient tensile strength</p> <p>Insufficient take up</p> <p>Excessive heat due to belt slippage</p> <p>Improper belt used</p> <p>Worn or damaged pulleys</p>	<p>Reduce tension.</p> <p>Use correct J I Case replacement belt.</p> <p>Adjust take up. Check spring loaded idler free pivot and spring tension.</p> <p>Increase tension if belt is slipping.</p> <p>Use genuine Case replacement belts only.</p> <p>Check for proper groove dimension, replace with new pulleys.</p>
Excessive Vibration	<p>Bent, worn or out-of-tolerance pulleys</p> <p>Excessive shaft or engine deflection (ie, iso-mounted engines)</p> <p>Insufficient tension</p> <p>Pulsating loads</p> <p>Excessive ride or center-to-center variation of V-belt</p>	<p>Replace with new pulleys.</p> <p>Restrict engine shaft motion. Replace isolation mounts.</p> <p>Increase tension.</p> <p>Check spring loaded idler for proper tension. Attempt to even out load.</p> <p>Replace with new belt.</p>
Excessive Envelope Wear	<p>Rough finish on pulleys</p> <p>Worn pulleys</p> <p>Excessive misalignment</p> <p>Foreign material in drive (ie, dirt, sand, oil, gas, grease)</p> <p>Structural or belt guide interference</p>	<p>Replace rusted or pitted pulleys.</p> <p>Replace with new pulleys.</p> <p>Correct misalignment.</p> <p>Make sure guards or shields are in place to reduce foreign material access to drive.</p> <p>Remove obstruction.</p>
Cracks in cushion section of belt	<p>Excessive heat (causing hardening of the rubber in the cushion section)</p> <p>Damaged belts (during installation, packaging or storage)</p>	<p>Eliminate heat build-up source such as slippage. Use only genuine J I Case replacement belts.</p> <p>Provide proper installation instructions to customers. Eliminate sharp reverse bends that could occur in belt shelving or storage practices.</p>

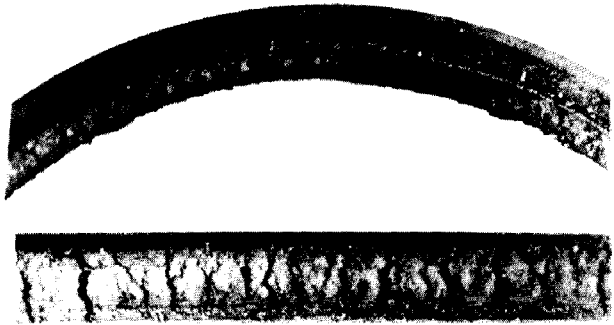


Visible Problem	Probable Underlying Cause	Recommended Solution
Belts too long or too short at installation	<p>Drive improperly set up on machine</p> <p>Insufficient take-up or installation allowance</p> <p>Wrong size belts (ordered or shipped)</p>	<p>Check for proper location and size of all pulleys and idlers.</p> <p>Check for full movement of take-up idler and/or take-up mechanism.</p> <p>Check this manual for proper dimensions, install correct belt size.</p>
Improper engagement or disengagement of clutched belts	<p>Wrong size belts (ordered or shipped)</p> <p>Incorrect pulley groove angle.</p> <p>Sheave finish</p>	<p>Check this manual for proper dimensions. Check belts for proper length.</p> <p>Check pulley groove angle.</p> <p>Keep sheave grooves clean and free of excess paint, oil and grease.</p>
Spin burns	<p>Locked pulley (ie, frozen bearing)</p> <p>Insufficient tension for peak load conditions</p>	<p>Keep pulleys free turning through proper maintenance and operation.</p> <p>Increase tension sufficient to eliminate slippage</p>
Delamination of belt components	<p>Excessive heat</p> <p>Excessive oil, gas or lubricant exposure</p> <p>Mechanical defects; ie, burrs or sharp edges on pulleys, structural interference, damaged guides or guards</p> <p>Defective belt materials</p>	<p>Reduce belt slippage.</p> <p>Protect belt from contamination.</p> <p>Check all pulleys for smoothness, remove or correct obstructions or defects.</p> <p>Install new belt.</p>

### III. FAILED BELT ANALYSIS

#### WEATHERING

This shows the typical condition of many belts that have been in service at least one year. The sides and bottom have numerous small cracks. These cracks are only in the cover. This condition is known as "weathering". It is caused by the elements, rain, sun, and dust. Of course, small sheaves aggravate the situation. Another name for this condition is "crazing".



#### EFFECT OF SMALL SHEAVE DIAMETERS

Here is a belt that has been run on small sheaves. It shows deep bottom cracks about every three inches. Further evidence that it was run on small sheaves is shown by the cover being worn off the lower half of the sidewall of the belt. In many cases, the angle of the belt is not compatible with the angle of the extremely small sheave and, therefore, excessive wear will occur on the lower part of the belt. The belt also shows that an excessive amount of dust has collected in the bottom of the belt. A belt running in a dusty atmosphere will show excessive cover wear.



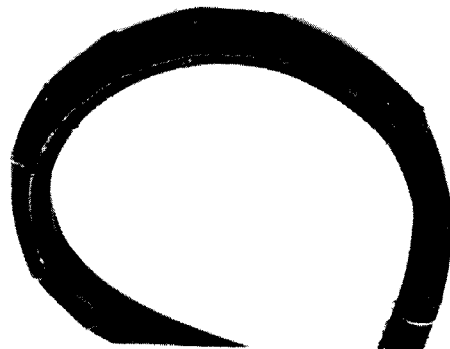
#### SPIN-BURN

This picture shows the results of a "spin burn". The cover is burned off and the rubber cushion and tensile member are exposed. This has been caused by the driven sheave becoming "frozen" or "locked" and the driver sheave continuing to turn. The driver sheave in this case was small as evidenced by the length of the burn.



#### EXCESSIVE TENSION - SMALL SHEAVES

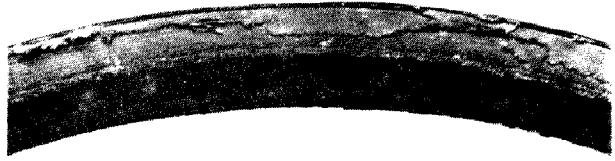
This is a Double "V" belt and shows the results of excessive tension over small sheaves. Deep bottom cracks extend into the cushion. The cover and cushion both have split open.



## FAILED BELT ANALYSIS

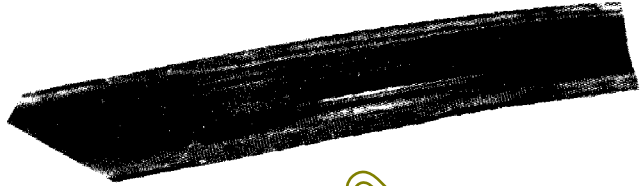
### ROUGH SHEAVES

This belt has the cover worn off in spots and what cover is left is rough and jagged. The cause of this is a rough spot or rust on the sheave. A very similar condition to this can be obtained by a belt that is not quite tight enough during heavy loads and the belt will slip and catch rapidly. This action actually tears off the cover.



### BELT GUARD INTERFERENCE

This is a belt where its top has been rubbing on the guard. The top of this belt has one-eighth inch deep grooves cut into it.



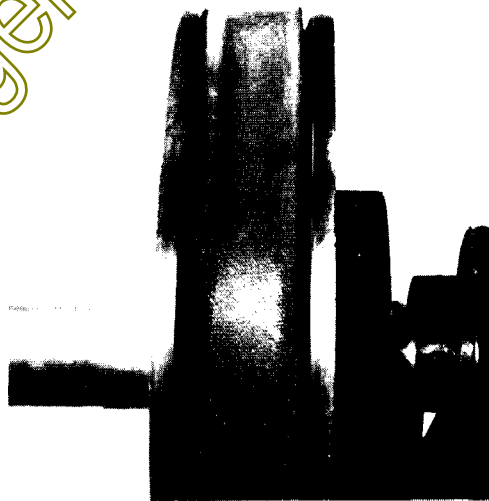
### TENSILE BREAK

Here is a belt that has a "tensile break". It has been caused either by a high shock load or a foreign object getting between the bottom of the sheave and the bottom of the belt. This also could be caused, particularly on smaller belts, by prying the belt over the sheave during installation and thus damaging the load-carrying member. In this case the belt usually will not completely break until it has been in service for a few hours.



### POOR INSTALLATION

This is a case where the belt has been damaged during installation. The load carrying member has been broken on one side during the installation. Externally, the belt is still intact. The only evidence of damage is the one spot where one side of the belt rides high in the sheave. If this belt were left to run, it would either turn over in the sheave or jump off the sheave. Sometimes a similar belt condition may arise from a foreign object getting in between the belt and the pulley.



### SHOCK LOADS

Here is another case where the load carrying member has been broken. The external evidence is shown only when the belt is under tension, then it "necks down". This is caused by a shock load or damage during installation.



## FAILED BELT ANALYSIS

### DUST AND DIRT

This belt shows excessive cover wear due to rough sheaves and excessive dust. It should have been taken off sooner. A belt with the cover worn off will soon fail by separating at the load carrying member or by the top coming off.



### FOREIGN MATERIAL

Here is a belt that has picked up numerous particles of relatively large pieces of gravel. These are imbedded in the side of the belt. These particles not only wear the side of the belt but they also cut grooves in the side of the sheave very rapidly. Cogging has nothing to do with the retaining of these particles.



### MORE FOREIGN OBJECTS

A foreign object got between the belt and the sheave thus throwing the belt off the sheave. In so doing, the cover was cut by the rim of the rotating sheave. In most cases, the load-carrying member is also damaged during this type of accident.



### EFFECT OF OIL

This belt has been exposed to an excessive amount of oil. The belt is swollen and soft. As a result of being soft, the bottom corners have begun to wear. Also, the seams have started to "open up".



#### IV. V-BELT WARRANTY GUIDANCE

When a V-belt fails during the warranty period, the customer is very apt to request a free replacement under warranty. You must realize, however, that a belt is a wear item much like tires and engine oil. The severity of use will determine the life-span of the belt. If the belt is worn out, then warranty can not be granted.

A belt is also subject to abuse, such as, improper tensioning, misalignment or shock-

loading (a more detailed list of abuse is contained in the Failed Belt Analysis Chart in this manual). Belts failing due to abuse are not eligible for warranty. Instead, try to educate the customer as to the proper usage so that he will receive longer life from the replacement belt he purchases.

On the other hand, if a belt has failed as a result of poor material and/or workmanship, warranty credit may be allowed.

#### V. RECENT MODEL CASE TRACTOR V-BELT SYSTEMS

A. Model 107 Traction Drive Belt System: The Model 107 traction drive system is composed of two belts as indicated in the diagram below. The engine belt is automatically tensioned by a spring loaded idler and propels a double vee pulley which in turn drives the traction belt. The traction belt drives the transmission input pulley. It is tensioned and declutched by the idler pulley and keeper shown in inset A.

To replace the drive belts, the following procedure should be used:

a. Using a pliers, disconnect the Idler Spring from the tractor frame.

b. Loosen the two wire type Belt Keepers at the engine pulleys.

c. With the Attachment Drive Lever in the "Off" position, disconnect the attachment drive belt from the Lower Engine Pulley. (Attachment Drive Belt will be discussed later in this manual).

d. Turn the front wheels as far as possible to the right to obtain maximum belt clearance at the steering gear.

e. Remove the original belt first from the Upper and Lower Engine Pulleys, then Idler Pulley and last from the Double Vee Pulley.

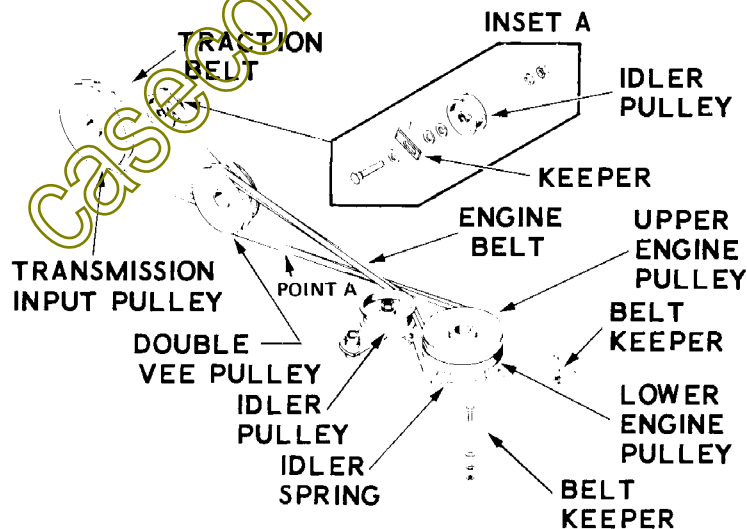


Figure 4. Model 107 Traction Belt Drive System.

**NOTE** If the Traction Belt requires replacement, it must be installed when the engine belt is removed.

- f. With the front wheels turned as far as possible to the "right", install the new belt first on the Double Vee Pulley, then the Idler Pulley and last on Lower and Upper Engine Pulleys as shown in Figure 4. Make certain the belt is properly installed as illustrated with the flat "back" side against the idler pulley and the "V" side in the Vee Pulleys. If the belt is accidentally looped the wrong way, reverse rotation of the transaxle will occur resulting in 3 speeds reverse and one speed forward.

### Traction Belt

**NOTE** The engine belt must be removed before replacing the traction belt. Refer to engine belt instructions above.

- a. With the engine belt removed, depress and lock the Clutch and Brake Pedal.
- b. Loosen the Keeper on the traction belt Idler Pulley.
- c. Remove the traction belt first from the Double "Vee" Pulley and then from the Transmission Input Pulley.
- d. Install the new belt first on the Transmission Input Pulley and then onto the outer groove of the Double "Vee" Pulley. Make certain that the top strand of the belt is above the Idler Pulley.

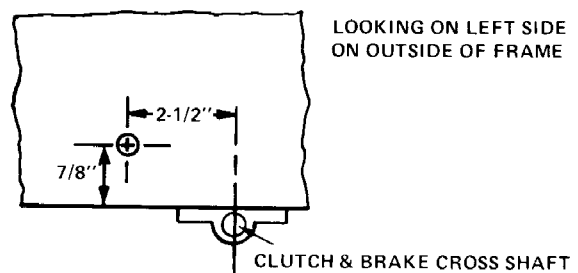
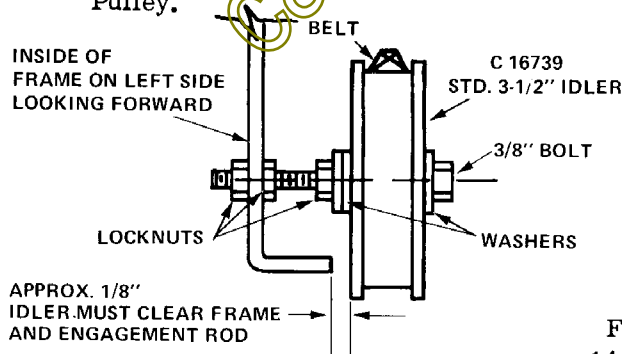


Figure 5.

- e. Position the keeper, with tension on the traction belt, 1/16" away from and parallel to the belt. Difficulty in declutching the traction belt will result if the keeper is not positioned properly. If the keeper is not parallel, it will bind with the belt causing friction, heat, and a burned spot on the keeper. If a burned spot is present, the keeper should be repositioned to prevent further interference.

The amount of belt take-up in this drive system may be fine tuned by adjusting the jackshaft bracket securing the double vee pulley. If a new traction belt is installed, and "appears" to be too short to declutch properly, the bracket may be adjusted rearward. If, after some wear, full travel of the clutching idler pulley will not tighten the belt, the jackshaft bracket may be moved forward. If a belt problem exists, all belt installation and alignment guidelines described in the beginning of this manual should be followed. In addition, tractors prior to S/N 9646800 should have modification kit number C 16767 installed. Two additional areas for engine belt life improvement are:

1. Replacing the C 16739 idler pulley with an extra wide flanged idler, part number C 20465.
2. Apply the C 16739 to point A (Figure 4) to reduce belt vibration. This idler should be positioned on the frame rail so it just touches the backside of the engine belt. (Figure 5.)

**B. Model 117-118 Traction Drive Belt System**

The Model 117 and 118 traction drive belt system consists of one vee belt as indicated in the diagram below. The belt is automatically tensioned by a spring loaded clutching idler and drives the Eaton Marshall hydrostatic transmission input pulley.

Model 117 prior to S/N 9646800 did not have a clutching mechanism as pictured. Instead, a simple spring loaded idler was utilized.

To replace the drive belt, the following procedure should be used:

- a. Remove the battery and loosen the belt keeper located above the Vee Clutch Idler (Figure 6).
- b. Loosen the belt keepers at the engine pulley.
- c. With the Attachment Drive Lever in "Off" position, disconnect the attachment drive belt from the lower engine pulley. (Attachment drive belts will be discussed later in this manual).
- d. Loosen the keeper on the idler attached to the frame and depress and latch the combination clutch brake pedal.
- e. Remove the original belt first from the clutch idlers, then upper and lower engine pulleys, frame idler and last from the hydrostatic input pulley.
- f. Install the new belt first over the fan and onto the hydrostatic input pulley, then onto the upper engine pulley and last onto the Vee and Flat Clutch idlers as shown in Figure 6. Make certain the belt is properly installed as illustrated with the flat side against the flat idlers and the "V" side in the Vee idlers. If the belt is accidentally looped the wrong way, reverse rotation of the hydrostatic transmission will occur resulting in forward motion when the travel lever is put in reverse, and reverse motion when the travel lever is put in forward.
- g. Install the attachment drive belt on the lower engine pulley.

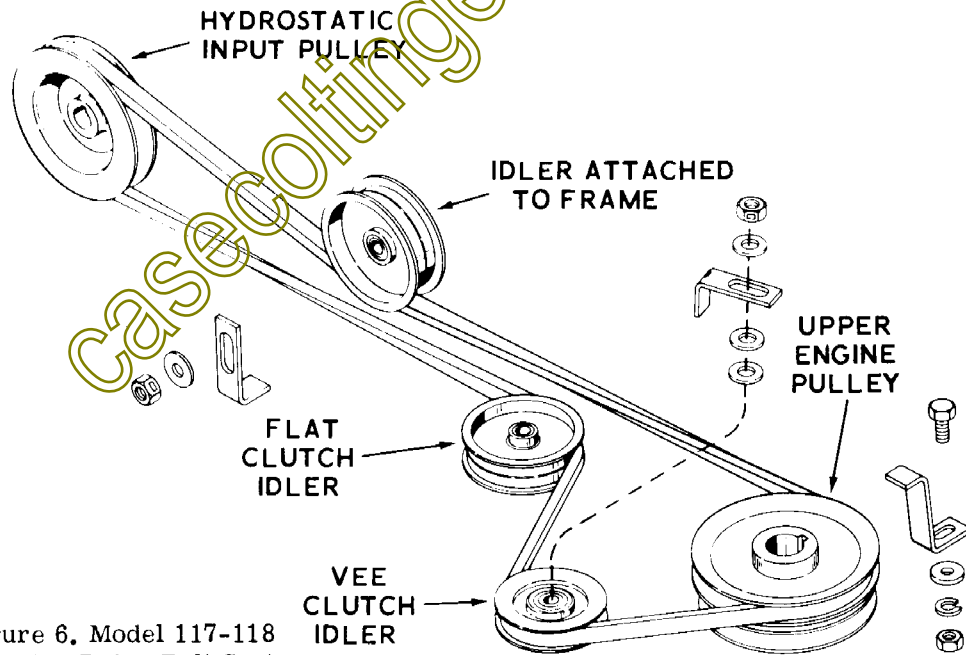


Figure 6. Model 117-118 Traction Drive Belt System.

- h. Release the clutch - brake pedal to tension the belt and reset and tighten all keepers parallel with and 1/16" away from the belt.

**NOTE** The vee clutch idler belt keeper (P/N C 17164) must be positioned exactly midway between the points at which the drive belt enters and leaves the vee idler with the clutch released (ie. belt under tension.)

If a belt problem exists, all belt installation and alignment guidelines described in the beginning of this manual should be followed. In addition, tractors prior to S/N 9646800 should have modification kit P/N C 16763 installed.

- C. Model 108 Traction Drive Belt System: The Model 108 traction drive belt system consists of one vee belt as indicated in the diagram below. The belt is automatically tensioned by a spring loaded clutching idler and drives the Peerless Transaxle input pulley.

To replace the traction drive belt, the following procedure should be used.

- a. Engage and lock the brake.

- b. Remove two wire belt keepers at engine pulley, two flat keepers at transmission pulley, and loosen flat keeper at V-idler pulley.

- c. Remove belt from transmission pulley.

- d. Remove belt from idlers and engine pulley.

- e. Install belt on lower engine pulley.

- f. Place belt around idler pulleys making sure Vee idler rides on inside of belt and flat idler rides on the back side.

- g. Install belt on transmission drive pulley.

- h. Release brake, install two wire belt keepers at engine pulley and two flat keepers at transmission pulley. Adjust all keepers to 1/16" from belt. Make sure the flat keeper on the Vee idler is positioned half way between the points where the belt enters and leaves the pulley.

If a belt problem exists, all belt installation and alignment guidelines described in the beginning of this manual should be followed.

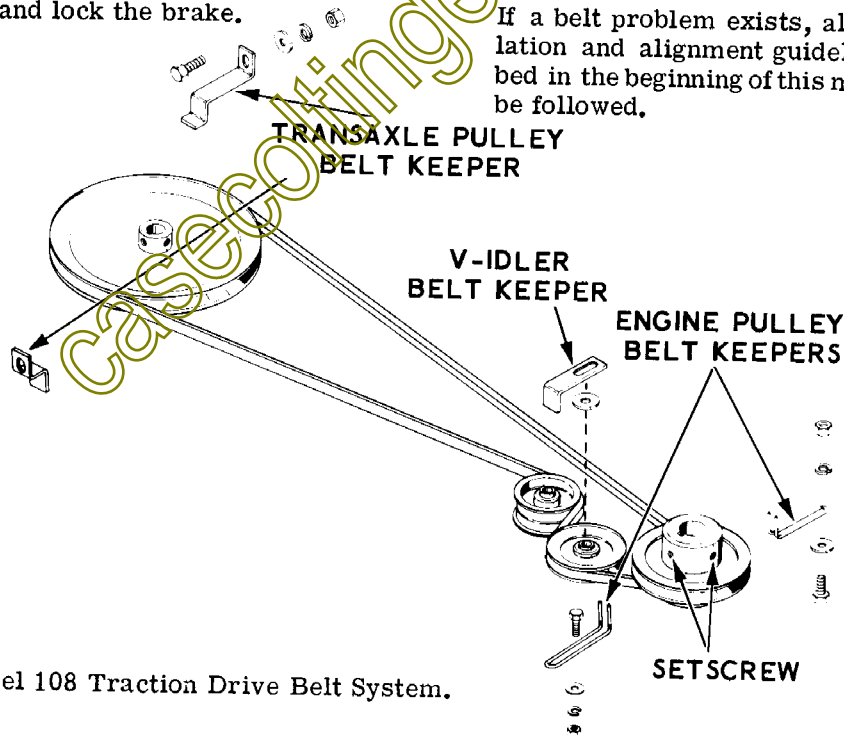


Figure 7. Model 108 Traction Drive Belt System.



D. Model 107-117 Attachment Drive Belt System:

The Model 107 and 117 attachment drive system consists of a vee belt driven by the lower engine pulley and driving the upper attachment drive pulley of the spring loaded, hinged, jackshaft assembly. The belt is declutched by pivoting the hinged jackshaft assembly back and is tensioned by a compression type coil spring which requires manual adjustment.

To replace the attachment drive belt, the following procedure should be used:

- a. Move the attachment drive lever to the "OFF" position.
- b. Loosen the two belt keepers.
- c. Remove the old belt, install the new belt.
- d. Place the Attachment Drive Lever in the "ON" position to tension the belt and reset two keepers parallel with and 1/16" away from the belt. Place the Attachment Drive Lever in the "OFF" position.

Correct adjustment and tension for this belt and control linkage are obtained as follows:

- a. Turn the jam nut as far as possible on the adjusting rod.
- b. Turn the adjusting rod as far as possible into the sleeve and lock the jam nut against the sleeve. No more than one thread should be showing on the adjusting rod in front of the jam nut. If the adjusting rod has "Bottomed" against the push rod, turn the sleeve sufficiently off the push rod to obtain full thread engagement on the adjusting rod.
- c. Place the attachment drive lever in the "ON" position to tension the belt and check the position of both keepers at the lower engine pulley. The keepers should be parallel to and located 1/16" away from the belt. Leave attachment drive lever "ON" when performing Step d. below.
- d. With a mower or snow blower on the tractor and the belt connected to the lower attachment drive pulley, turn the adjusting rod until end of the roll pin "A" is directly in line with the inside edge of the handle "B".

If a belt problem is experienced, all belt installation and alignment guidelines described in the beginning of this manual should be reviewed and followed. Also, the specific adjustment instructions, above, should be carried out.

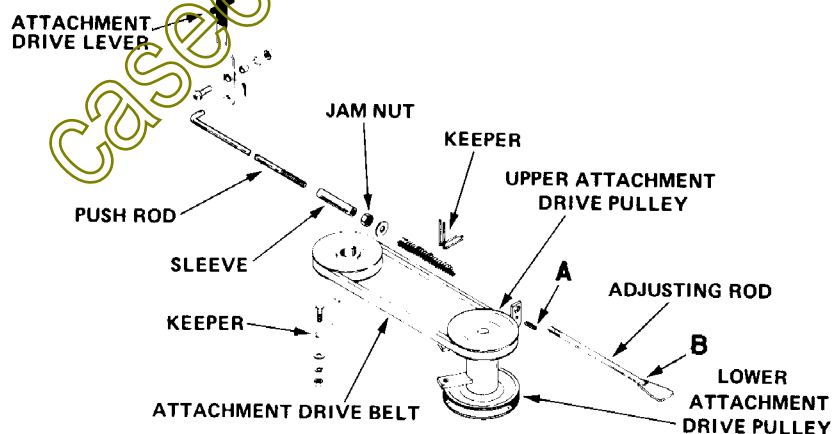


Figure 8. Model 107-117 Attachment Drive Belt System.

**E. Model 108-118 Attachment Drive Belt System**

The Model 108 and 118 attachment drive system consists of a vee belt, engine pulley, attachment drive jackshaft pulley, and spring loaded clutching idler as shown in the illustration below.

The attachment drive belt is driven by the upper engine pulley in the case of the 108 and by the lower engine pulley on the 118. It is automatically tensioned by the spring loaded clutching idler.

To replace the attachment drive belt, the following procedure should be used.

- a. Place the attachment drive lever in the "OFF" position.
- b. Remove the C 20189 Belt Keeper (IF wire keepers are still present, the C 20189 keeper should be installed).
- c. Remove the old drive belt (on model 108, the traction drive belt must be removed from the lower engine pulley) and install the new one.

d. Position the belt so the clutching idler is riding on the back side of the belt.

- e. Place the attachment drive lever in "ON" position. Mount the belt keeper parallel to the tractor frame with approximately 1/16" horizontal clearance from the attachment drive pulley on the engine and with the long angle forward. Shim between the tractor frame and the keeper bracket, with flat washers, if required, to obtain relative vertical alignment with the attachment drive pulley on the engine.

The C 20189 belt keeper has two mounting slots. The forward slot is for 118, and the rearward slot is for 108 application.

If a belt problem is experienced, all belt installation and alignment guidelines described in the beginning of this manual should be reviewed and followed.

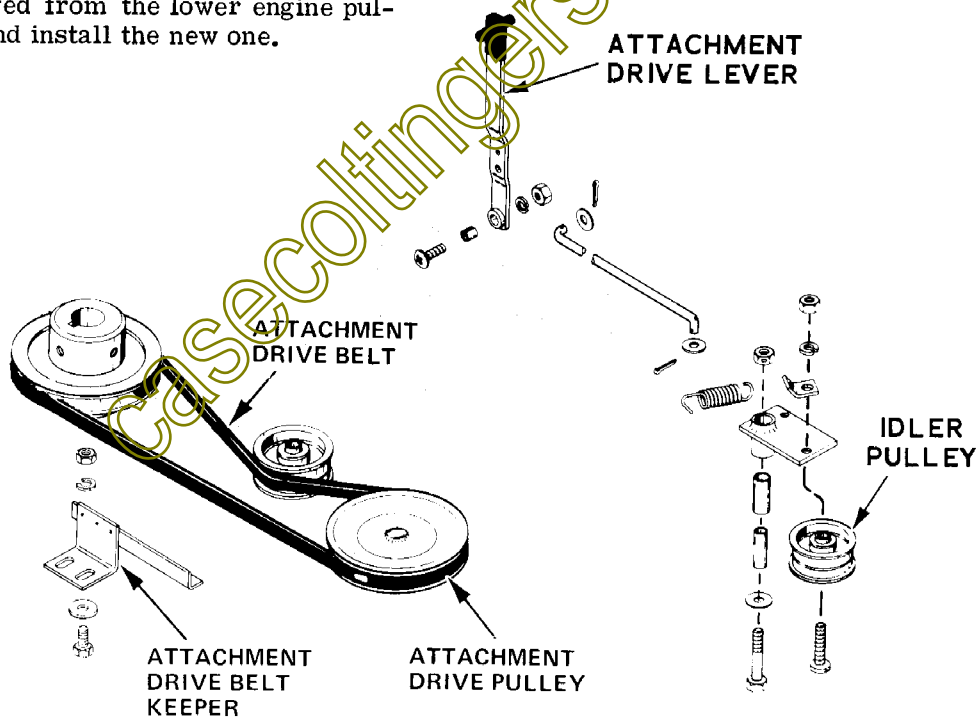


Figure 9. Model 108-118 Attachment Drive Belt System.

F. Model 210 Traction Drive Belt System  
 The Model 210 traction drive system consists of two V-belts as shown in the illustration below. The engine belt runs from the engine drive pulley, through the mule idler system to the rear jackshaft pulley. This belt is automatically tensioned by a spring loaded backside idler. The traction belt runs from the jackshaft pulley to the transaxle input pulley. It is tensioned and declutched by the backside idler (working on vee side of belt) idler pulley.

The following procedure should be used when replacing the drive belts.

1. Replacing the engine drive belt:

- a. Remove the engine belt guard.
- b. Loosen the four flangette mounting bolts on the jackshaft bearings.
- c. Allow the jackshaft to move downward and out so the belt may be fed between the frame rail and pulley.

d. Secure the four flangette mounting bolts.

e. Position the top strand of the belt under the backside idler of the mule idler assembly. The keeper must be positioned exactly midway between the points at which the drive belt enters and leaves the backside idler and 1/16" from the belt.

f. Place the bottom strand of the drive belt in the vee idler pulley.

g. Bring the drive belt up and over the engine drive pulley.

h. Make sure the belt tension idler is tracking properly on the backside of the drive belt.

i. Replace the engine belt guard.

2. Replacing the traction belt:

a. Remove the traction belt guard.

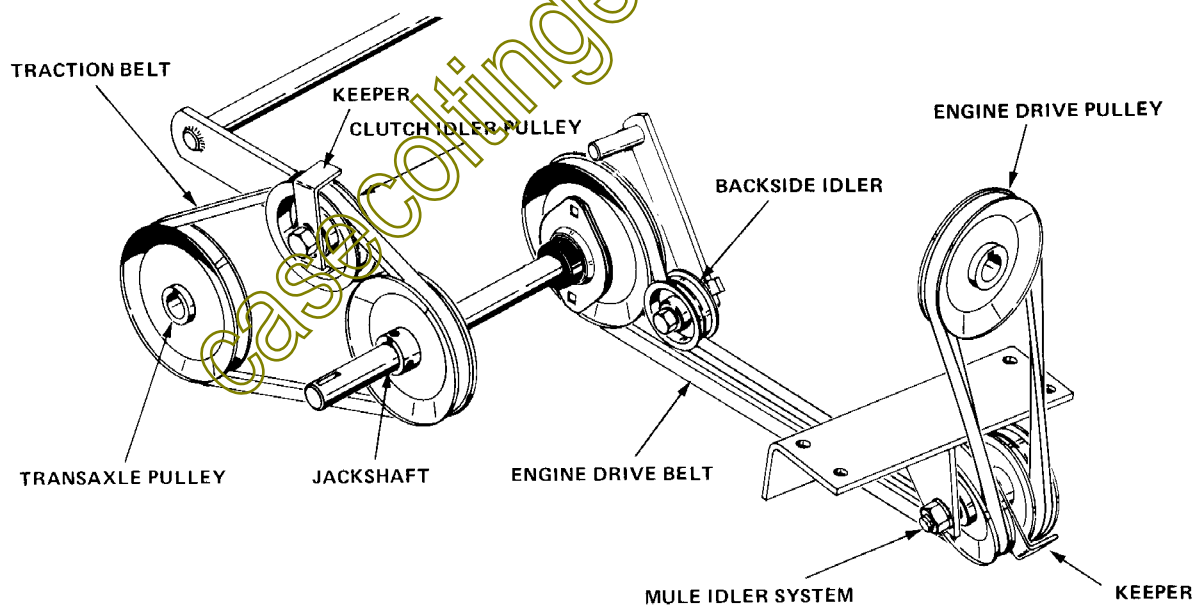


Figure 10. Model 210 Traction Drive Belt System.

- b. Loosen the belt keepers on idler and drive pulleys.
- c. Install belt between the keeper and the clutching idler pulley.
- d. Depress the clutch-brake pedal and slip the belt over the drive and driven pulleys.
- e. Adjust the idler keeper so it is positioned on top of the pulley with the clutch brake pedal depressed and 1/16" from the belt when the pedal is released. Torque the keeper bolt to 20 to 25 foot pounds.
- f. Adjust the driving pulley belt keeper so it is 1/16" from the belt.

g. Adjust the clutch-brake assembly as described in the operator's manual.

h. Replace the traction belt guard.

If a belt problem exists, all belt installation and alignment guidelines described in the beginning of this manual should be followed. In addition, some early units had a misformed C 18974 mule idler bracket. This bracket may be replaced or reformed if found to wear the belt prematurely.

Occasionally, with a new engine drive belt, the C 18969 belt tension idler arm could strike the underside of the operator's platform. This condition will disappear as the belt takes its initial stretch and is not considered a problem area.

## VI. HOW TO MEASURE A V-BELT

The same V-belt can show many different lengths, depending upon how it is measured. For this reason it is necessary to standardize conditions to prevent confusion.

To measure a belt on a portable belt checker, such as the Good Year Insta Find Measuring Gauge, the following procedure should be followed:

1. Place belt in grooves and pull the movable end toward you.
2. Equalize belt tension on both sides of gauge.

3. Apply light thumb pressure to the movable end - just enough to pull the belt parallel to the gauge bar on both sides. Do not apply excessive force!

4. Read the 4L line for A-section belts and the 5L line for B-section belts. On the Good Year Gauge, omitting the last zero will give a direct total effective outside length in inches.

The nominal top width for a 4L or A section belt is 1/2 inch. For a 5L or B section belt is 21/32 inch. For a 3V or 3L it is 3/8 inch.

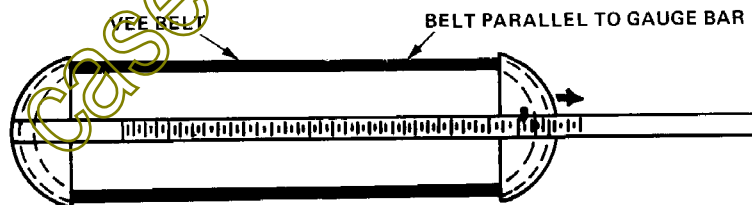


Figure 11. Belt Measuring Gauge.

## VII. LIST OF CONTRIBUTORS

Eaton Trouble Saver Guide for V-Belt Drives  
Eaton Corporation  
Kenosha, Wisconsin 53140

Durkee Atwood Maintenance Manual  
Durkee-Atwood Co.  
Minneapolis, Minnesota 55413

## VIII. BELT SIZE CHART

### CASE BELT DRIVEN TRACTOR BELT INDEX

Tractor Model	Transmission Drive Belt		Clutching Belt		PTO Belt	
	Case Part No.	Actual Size	Case Part No.	Actual Size	Case Part No.	Actual Size
120	C 10389	76.125 +.25 -0  3V cross section	N/A	N/A	C 10507	3V cross section 30"
107	C 15370	62.50" +.36 -0  A cross section	C 15753  C 17413 after S/N 96468801	32.50 +.25 A cross section  31.86±.25 A cross section	C 15552	A cross section 33"±.25
117	C 17251 (with Mod Kit C 16763)  C 17412 after S/N 96468801	77"±.50 -0  A cross section  80.375 ±.37 A cross section	N/A	N/A	C 15552 All	A cross section 33"±.25
108	C 18634	86.50 ±.36  A cross section	N/A	N/A	C 19171	A cross section 32.88 ±.18
118	C 18468	81.88  ±.36 A cross section	N/A	N/A	C 19171	A cross section 32.88 ±.18
210	C 18918	68.38 ±.375 A cross section	C 18919	31±.375 A cross section	N/A	N/A

CASE MOWER BELT INDEX

Tractor Model	Mower Model	Drive Belt		Deck Belt	
		Case Part No.	Size	Case Part No.	Size
Colt 7 and Colt 9	C-38	C 12491	A cross section 57"	C 12493	A cross section 41"
	C-44	C 12492	A cross section 58"	C 12494	A cross section 41.75"
Colt Deluxe	C-38	C 11948	B cross section 56.9" +.4 -.7	C 11944	A cross section 68" +.4 -.7
Colt Super Case 130	C-44	C 11949	A cross section 59.2"	C 11945	A cross section 82" +.4 -.7
Colt Rancher Case 180	C-44R	C 11988 C 11384 (with Mod C 11633)	B cross section 56.31" +.20 -.35	C 11945	A cross section 82" +.4 -.7
Colt Super H	C-44H	C 11988	B cross section 56.31" +.20 -.35	C 11945	A cross section 82" +.4 -.7
Colt 2110 Colt 2310 Case 120 Case 150	38"	C 14980	3V cross section 60.50" to 61.00"	C 10769	3V cross section 71"
Colt 2110 Colt 2310 Case 120 Case 150	44"	C 14980	3V cross section 60.50" to 61.00"	C 10919	3V cross section 75" +.125 -.375
Case 190	44"	C 14983	3V cross section 69.88" to 70.25"	C 10919	3V cross section 75" +.125 -.375
Colt 2510	44"	C 14981	3V cross section 65.50" to 66.00"	C 19019	3V cross section 75" +.125 -.375
Colt 2712	44"	C 14894	3V cross section 68.88" to 69.25"	C 10919	3V cross section 75" +.125 -.375

CASE MOWER BELT INDEX

Tractor Model	Mower Model	Drive Belt		Deck Belt	
		Case Part No.	Size	Case Part No.	Size
Case 155 C1967-8)	E-38	C 14982	3V cross section 66.00" to 66.50"	C 12627	3V cross section 67.88" to 68.25"
	E-44	C 14982	3V cross section 66.00" to 66.50"	C 10919	3V cross section 75" +.125 -.375
Case 195 C 1967-8)	E-44R	C 14894	3V cross section 68.88" to 69.25"	C 10919	3V cross section 75" +.125 -.375
T-90 (1967-8)	E-44T	C 14894	3V cross section 68.88" to 69.25"	C 10919	3V cross section 75" +.125 -.375
Case 220 and Case 222 (1969)	F-40	C 14893	3V cross section 66.50" to 67.00"	C 12627	3V cross section 67.88" to 68.25"
	F-42	C 14893	3V cross section 66.50" to 67.00"	C 10919	3V cross section 75" +.125 -.375
Case 442	F-44	C 14894	3V cross section 68.88" to 69.25"	C 10919	3V cross section 75" +.125 -.375
Case 444 (1969)	F-46	C 14985	4V cross section 69.0" ±.25	C 14965	A cross section 80.125" ±.50
Case 220  Case 222 (1970)	G-40	C 15944	A cross section 65.75" ±.375	C 16093	A cross section 69.00" ±.50
	G-44	C 16088	A cross section 67.25" ±.50	C 16094	A cross section 76.25" ±.375
	G-46	C 16088	A cross section 67.25" ±.50	C 14965	A cross section 80.125" ±.50
Case 442	G-44	C 15943	4V cross section 70.25" ±.375	C 16094	A cross section 76.25" ±.375
Case 444 (1970)	G-46	C 15943	4V cross section 70.25" ±.375	C 14965	A cross section 80.125" ±.50

**CASE MOWER BELT INDEX**

Tractor Model	Mower Model	Drive Belt		Deck Belt	
		Case Part No.	Size	Case Part No.	Size
Case 107 Case 117 (1970)	G-41	C 15411	A cross section 91.80" ±.50	N/A	N/A
Case 220	H-40	C 17050	A cross section 64.2" ±.44	C 16093	A cross section 69.0" ±.50
Case 222 (1971-72)	H-44	C17050	A cross section 64.2" ±.44	C 16094	A cross section 76.25" ±.375
	H-46	C 17050	A cross section 64.2" ±.44	C 14965	A cross section 80.125" ±.50
Case 442	H-40	C 17052	A cross section 69.94" ±.42	C 16093	A cross section 69.0" ±.50
Case 444 (1971-72)	H-44	C 17052	A cross section 69.94" ±.42	C 16094	A cross section 76.25" ±.375
	H-46	C 17052	A cross section 69.94" ±.42	C 14965	A cross section 80.125" ±.50
Case 107 Case 117 (1971-71)	H-41	C 17083	Double A Hex 94.25" ±.50	N/A	N/A
Case 210 Case 220 Case 222 Case 224  (1973)	J-40	C 18708	A cross section 65.20" ±.44	C 16093	A cross section 69.0" ±.50
	J-44	C 18708	A cross section 65.20" ±.44	C 16094	A section 76.25" ±.375
	J-46	C 18708	A cross section 65.20" ±.44	C 14965	A cross section 80.125" ±.50
Case 444 Case 446 (1973)	J-40	C 18709	A cross section 70.94" ±.42	C 16093	A cross section 69.0" ±.50



CASE MOWER BELT INDEX

Tractor Model	Mower Model	Drive Belt		Deck Belt	
		Case Part No.	Size	Case Part No.	Size
Case 210 Case 220 Case 222 Case 224 (1973)  (continues)	J-44	C 18708	A cross section 65.20" ±.44	C 16094	A cross section 76.25" ±.38
	J-46	C 18708	A cross section 65.20" ±.44	C 14965	A cross section 80.125" ±.50
Case 444  Case 446 (1973)	J-40	C 18709	A cross section 70.94" ±.42	C 16093	A cross section 69.0" ±.50
	J-44	C 18709	A cross section 70.94" ±.42	C 16094	A cross section 76.25" ±.38
	J-46	C 18709	A cross section 70.94" ±.42	C 14965	A cross section 80.125" ±.50
Case 644  (1972-73)	J-44	C 17050	A cross section 64.2" ±.44	C 16094	A cross section 76.25" ±.38
	J-46	C 17050	A cross section 64.2" ±.44	C 14965	A cross section 80.125" ±.50
Case 646  (1972-73)	J-44	C 13184	A cross section 72.5" ±.36	C 16094	A cross section 76.25" ±.38
	J-46	C 13184	A cross section 72.5" ±.36	C 14965	A cross section 80.125" ±.50
Case 108  Case 118 (1973)	J-41	C 17083	Double A Hex 94.25" ±.50	N/A	N/A

CASE SNOW CASTER BELT INDEX

Tractor Model	Snow Caster Model	Primary Drive Belt		Secondary Drive Belt	
		Case Part No.	Size	Case Part No.	Size
Colt Deluxe Colt Super	CT-36S	C 11124	5L390	C 11116	5L460
Case 130	C-36S	C 11124	5L390	C 11116	5L460
	C-36 & CT-36 (Lambert)	C 10509	3V cross section 32.125"	C 10510	3V cross section 45"
Colt Rancher Colt Super H	CT-48S	C 11124	5L390	C 11116	5L460
Case 180	C-48S	C 11124	5L390	C 11116	5L460
	C-36R & CT-36R (Lambert)	C 10509	3V cross section 32.125"	C 10511	3V cross section 50"
Colt 2110 Colt 2310	SB36	C 11514	3V cross section 40"	C 11116	5L460
Case 120 Case 150	C36S	C 11514	3V cross section 40"	C 11116	5L460
Colt 2510 Colt 2712	SB48	C 11514	3V cross section 40"	C 11116	5L460
Case 190	D48S	C 11514	3V cross section 40"	C 11116	5L460

CASE SNOW CASTER BELT INDEX

Tractor Model	Snow Caster Model	Primary Drive Belt		Secondary Drive Belt	
		Case Part No.	Size	Case Part No.	Size
Case 155 (1967-68)	E-36S	C 11789	3V cross section 41" ±.50	-----	-----
	E-80	C 14771	3V cross section 42.5" ±.50	-----	-----
Case 195 (1967-68)	E-36S	C 11789	3V cross section 41" ±.50	-----	-----
	E-84	C 14771	3V cross section 42.5" ±.50	-----	-----
Case 220 Case 222 (1969)	F-80	C 14116	A cross section 40.83"	-----	-----
Case 442 Case 444 (1969)	F-84	C 14116	A cross section 40.83"	-----	-----
Case 220 Case 222 (1970)	G-80	C 14116	A cross section 40.83"	-----	-----
Case 442 Case 444 (1970)	G-84	C 14116	A cross section 40.83"	-----	-----
Case 107 Case 117 (1970)	G-81	C 15337	A cross section 84.25" ±.375	-----	-----
Case 220 Case 222 (1971-72)	H-80	C 16498	A cross section 75.5" +.37-.25	-----	-----
	H-84	C 16498	75.5" +.37-.25	-----	-----

CASE SNOW CASTER BELT INDEX

Tractor Model	Snow Caster Model	Primary Drive Belt		Secondary Drive Belt	
		Case Part No.	Size	Case Part No.	Size
Case 442 Case 444 (1961-72)	H-84	C 16499	A cross section 80.625" +.37	-----	-----
Case 107 Case 117 (1971-71)	G-81	C 15337	A cross section 84.25" +.375	-----	-----
Case 221 Case 220 Case 222 Case 224 (1973)	J-80 & J-84	C 18706	A cross section 76.50" +.37 -.25	-----	-----
Case 444 Case 446 (1973)	J-80 & J-84	C 18707	A cross section 81.615" +.37	-----	-----
Case 108 Case 118 (1973)	J-81	C 18707	A cross section 81.625" +.37	-----	-----

BELT DRIVE TILLER

Tractor Model	Tiller Model	Primary Drive Belt		Secondary Drive Belt	
		Case Part No.	Size	Case Part No.	Size
Case 210 (1973)	J-72	C 19161	A cross section 70.88" +.375 -.125	C 19162	B cross section 41.50" +.375