TABLE OF CONTENTS

DRIVE BELT

1999 APPLICATION CHART

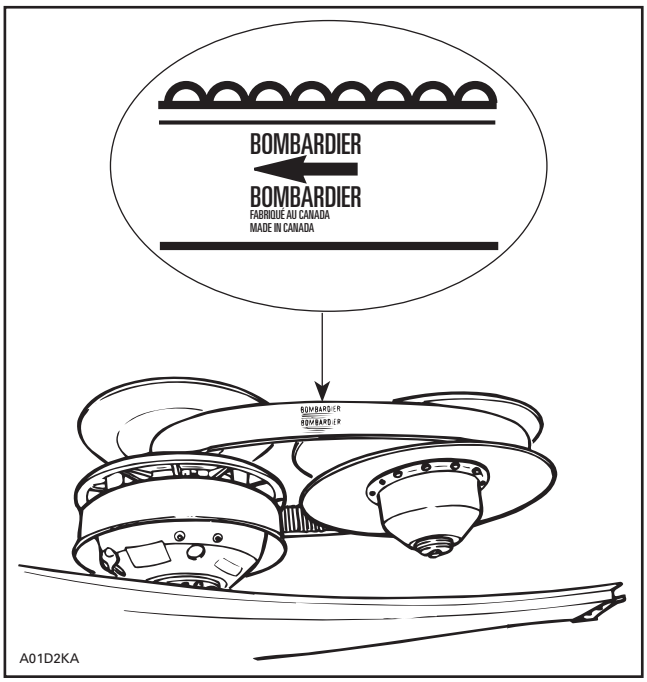
MODEL	PART NUMBER	WIDTH (NEW) ± 0.25 mm (.010 in)	MINIMUM WIDTH (WEAR LIMIT)
Tundra/R	414 827 600	33.30 mm (1.311 in)	30.00 mm (1.181 in)
S-Series	415 060 600	34.70 mm (1.366 in)	32.30 mm (1.272 in)

CLEANING

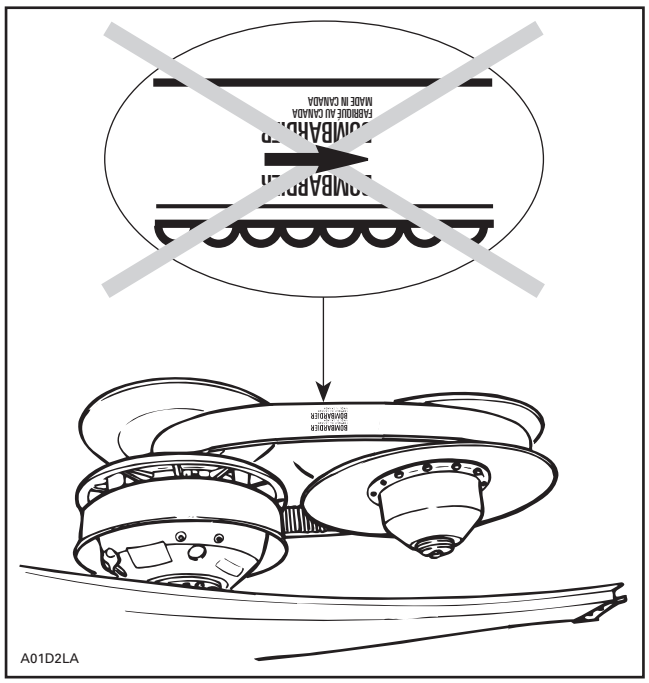
Use Bombardier Cleaner (P/N 293 110 001) to remove rubber residue from drive belt.

ROTATION DIRECTION

The maximum drive belt life span is obtained when the drive belt is installed as shown. This will ensure that correct direction of rotation is respected.



CORRECT



INCORRECT

NOTE: For used drive belt, mark and reinstall in the same position.

DRIVE BELT DEFLECTION MEASUREMENT

NOTE: The drive belt deflection measurement must be performed each time a new drive belt is installed.

NOTE: To obtain an accurate drive belt deflection measurement, it is suggested to allow a break-in period of 50 km (30 mi).

Before checking the belt deflection, ensure vehicle has the proper belt (Refer to the application chart).

Adjust pulley distance and alignment. Refer to PULLEY DISTANCE AND ALIGNMENT 05-05.

To obtain maximum vehicle performance, the belt tension must be adjusted according to specifications shown in the accompanying chart.

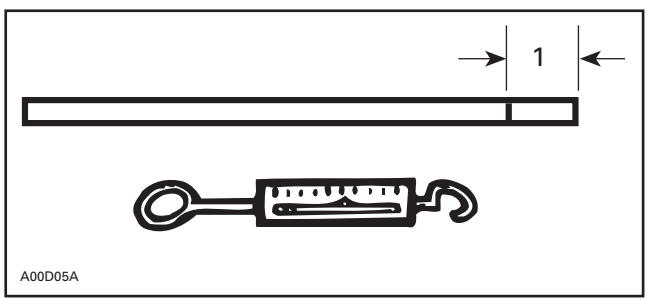
MODEL	DEFLECTION mm (in)	FORCE kg (lb)	HEIGHT† OVER DRIVEN PULLEY
Tundra/R	32 ± 5 (1-1/4 ± 13/64)	6.8 (15)	0 - 1.5 mm (0 - 1/16 in)
S-Series	32 ± 5 (1-1/4 ± 13/64)	11.3 (25)	0 - 1.5 mm (0 - 1/16 in)

†For reference only

To Check Tension

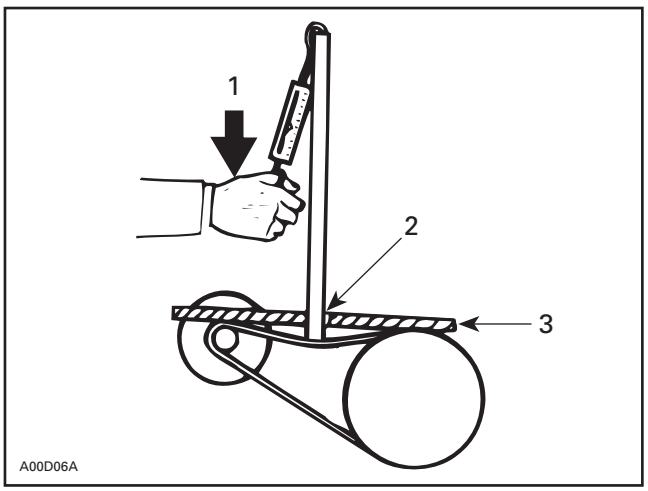
Position a reference rule on drive belt.

Wooden Stick and Spring Scale Method



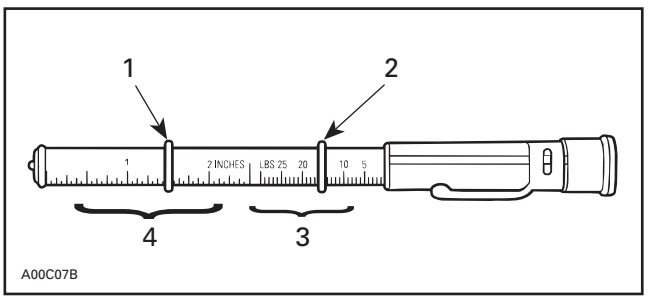
1. Mark specified deflection

Using spring scale and stick, apply specified force on drive belt halfway between pulleys as shown.



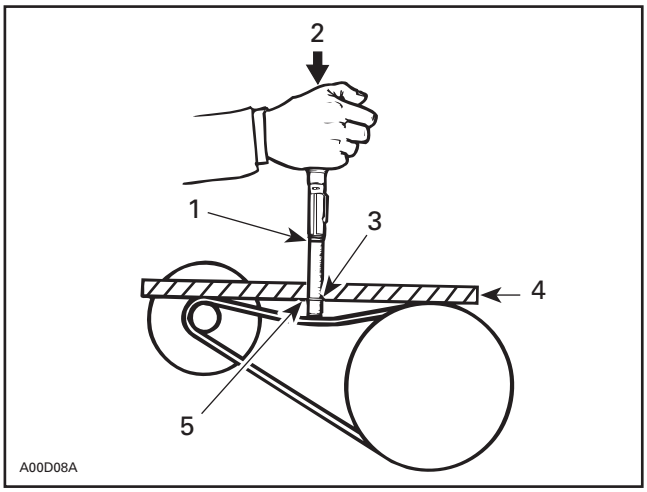
1. Force
2. Read deflection here
3. Reference rule

Or use the belt tension tester (P/N 414 348 200).



1. Lower O-ring
2. Upper O-ring
3. Force (read down)
4. Deflection (read up)

1. Slide lower O-ring of deflection scale to specified measure.
2. Slide upper O-ring to zero on the force scale.
3. Apply pressure until lower O-ring is flush with edge of rule and read force on the upper scale at top edge of O-ring.

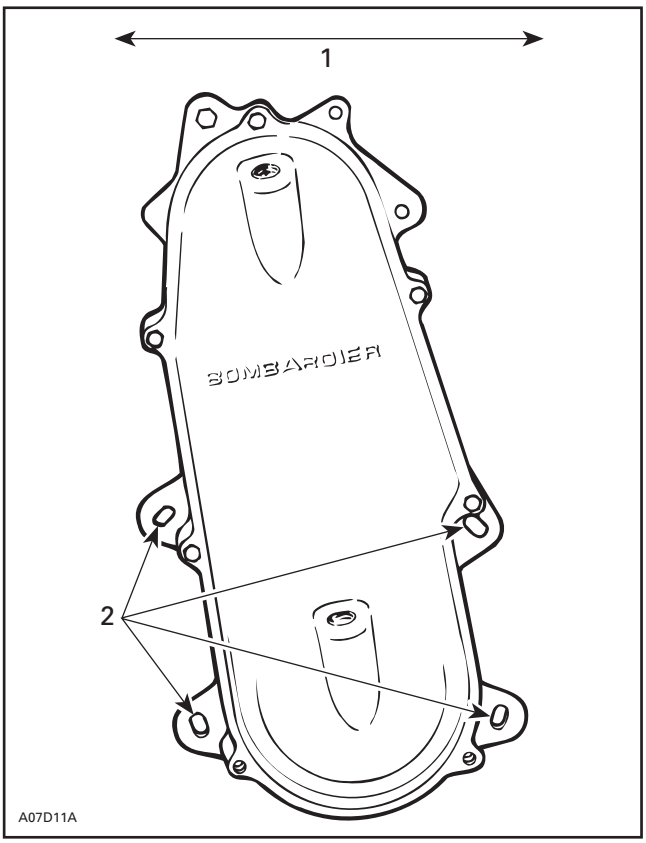


1. *Upper O-ring — force*
2. *Force applied*
3. *Lower O-ring — deflection*
4. *Reference rule*
5. *Deflection*

DEFLECTION ADJUSTMENT

Tundra/R

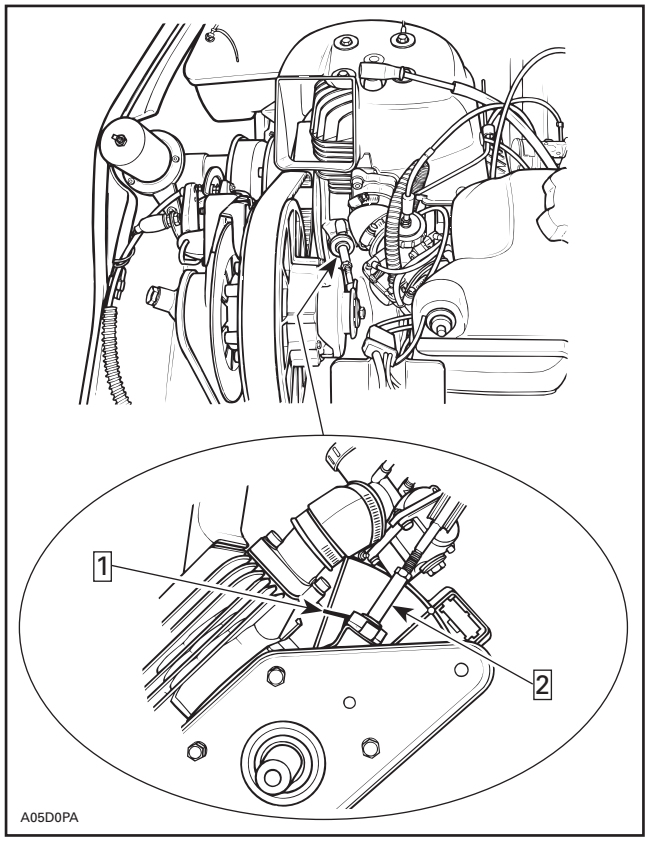
Drive belt deflection is adjusted by moving chaincase.



TYPICAL

1. *Movement*
2. *Retaining nuts*

To do so, loosen the 4 chaincase retaining nuts, unlock and raise driven pulley support.



TUNDRA II LT

Step 1 : Push and hold
Step 2 : Raise support

Adjust pulley distance according to specifications, refer to PULLEY DISTANCE AND ALIGNMENT 05-05 and measure drive belt deflection. Readjust pulley distance if required, then tighten the 4 nuts. Adjust driven pulley support and lock it to engine.

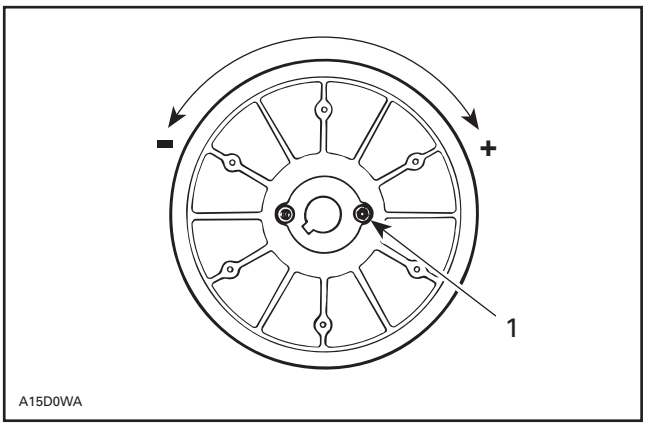
S-Series

Adjust pulley distance according to specification, refer to PULLEY DISTANCE AND ALIGNMENT 05-05, then adjust drive belt deflection using Allen screws, as shown.

To increase deflection: turn Allen screws clockwise.

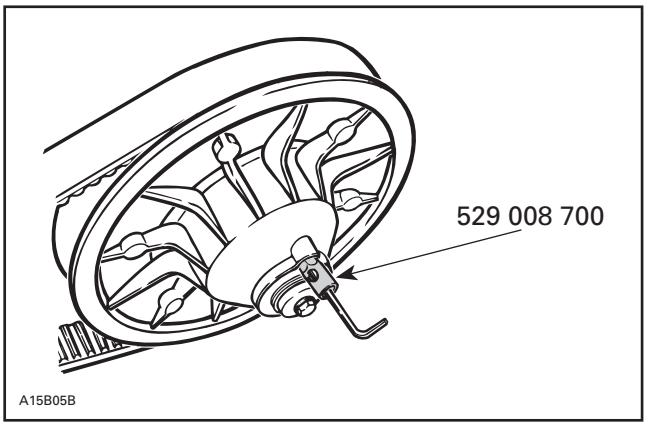
To decrease deflection: turn Allen screws counterclockwise.

NOTE: Turn Allen screws 1/4 turn at a time, then rotate driven pulley to allow drive belt to settle in pulley. Check deflection, repeat as required.



1. Allen screw with jam nut

Allen screws should be restrained while tightening jam nut to prevent throwing adjustment out. Use drive belt tension adjuster (P/N 529 008 700).



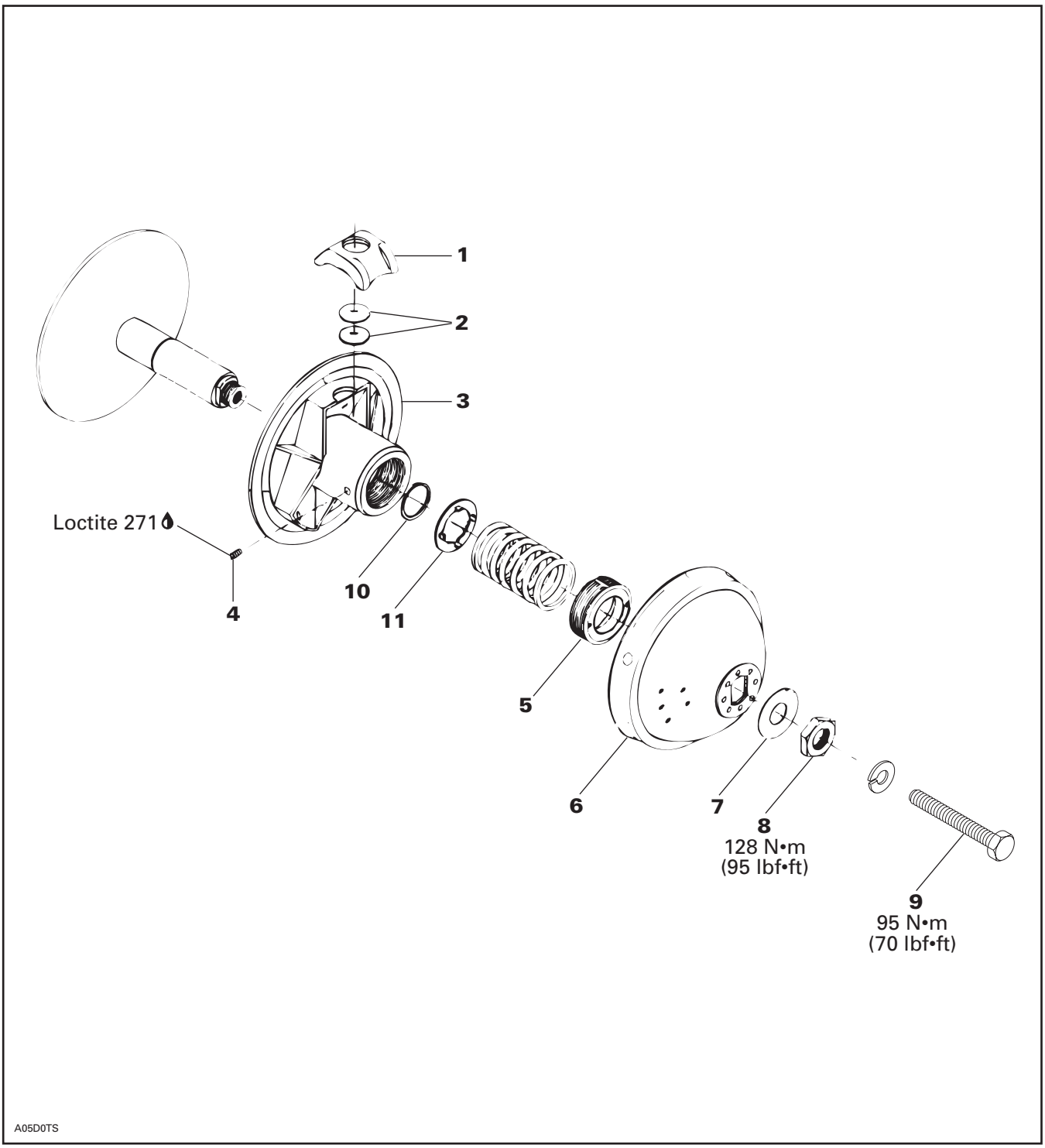
Restrain Allen screws with the wrench and tighten nut with the socket using socket handle provided in tool box.

DRIVE PULLEY

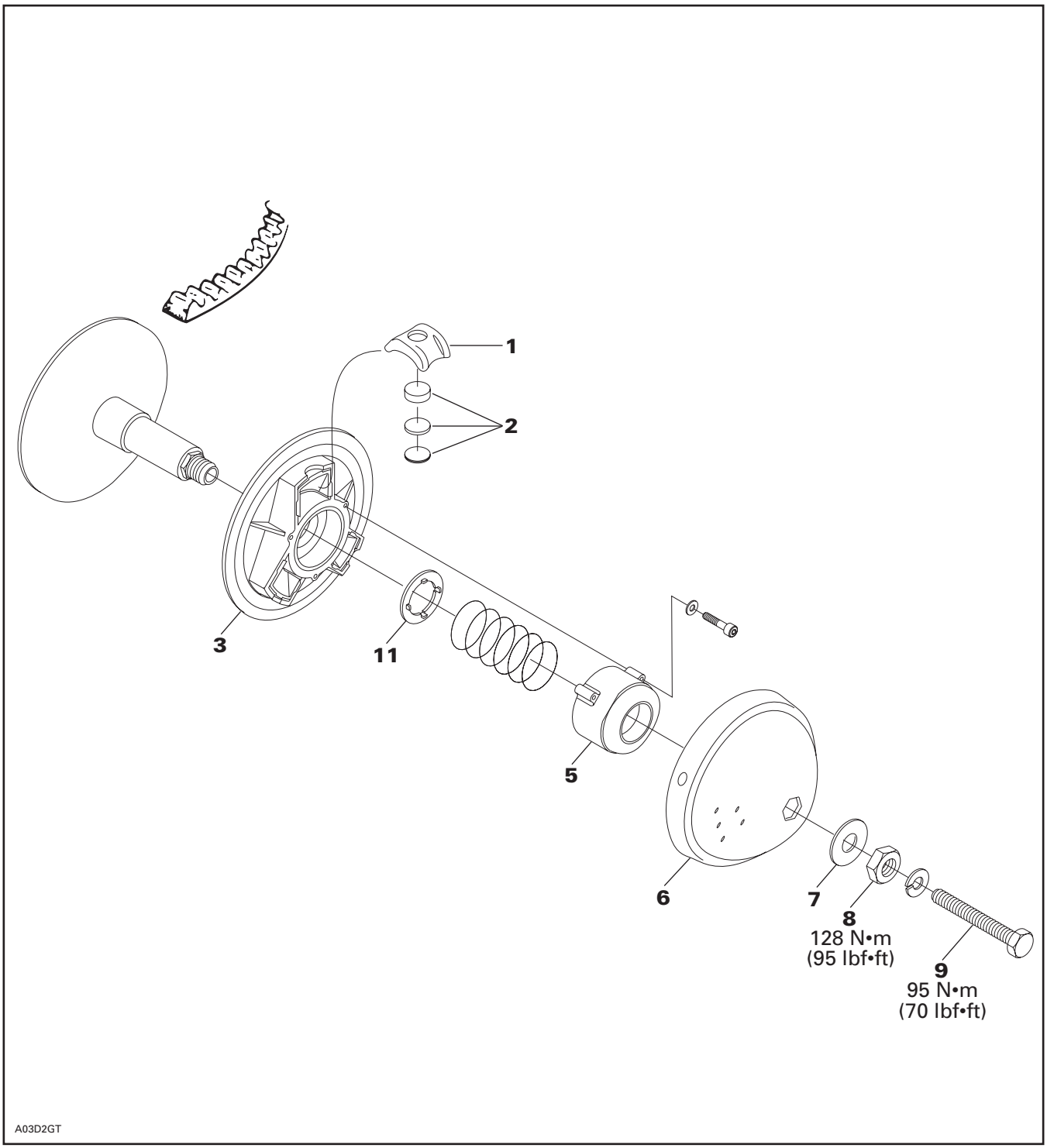
BOMBARDIER LITE

NOTE: This is a lubrication free drive pulley.

Tundra/R



377 Engine S-Series



GENERAL

Some drive pulley components (return spring, calibration disk) can be changed to improve vehicle performance in high altitude regions. The *High Altitude Technical Data booklet* (P/N 484 300 003 and 484 054 500 for binder) gives information about calibration according to altitude.

▼ CAUTION

Such modifications should only be performed by experience mechanics since they can greatly affect vehicle performance.

◆ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

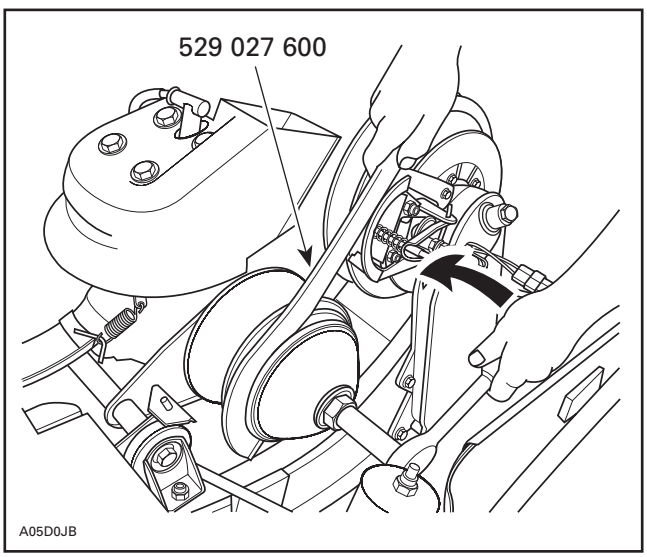
NOTE: If disassembling drive pulley, first straighten tab washer no. 7 then untighten nut no. 8.

◆ WARNING

Never use an impact wrench to remove or install the drive pulley.

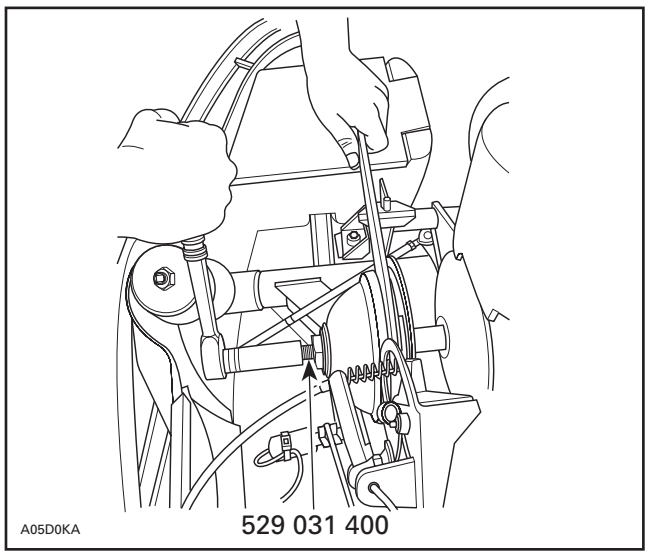
Use holder (P/N 529 027 600).

Remove retaining screw no. 9.



TYPICAL

Insert drive pulley puller (P/N 529 031 400) then remove drive pulley.

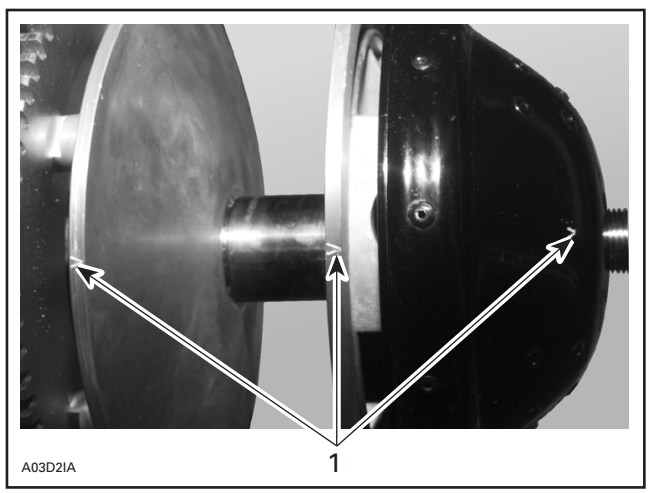


TYPICAL

DISASSEMBLY

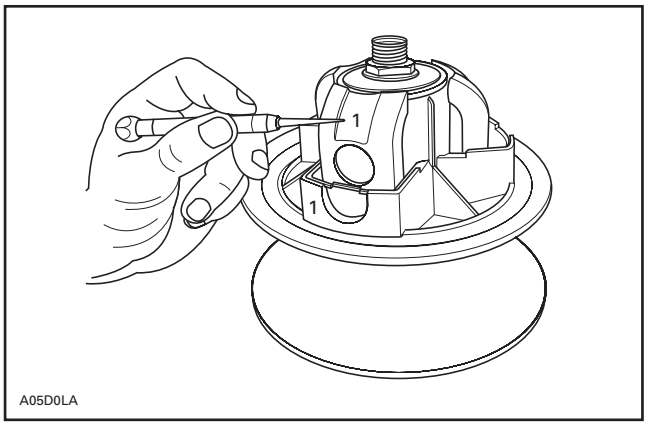
Unscrew nut. Remove tab washer.

Check for alignment marks for proper indexing at reassembly.



1. Alignment marks

Identify blocks no. 1 and their respective positive positions for reassembly.



1. Identify

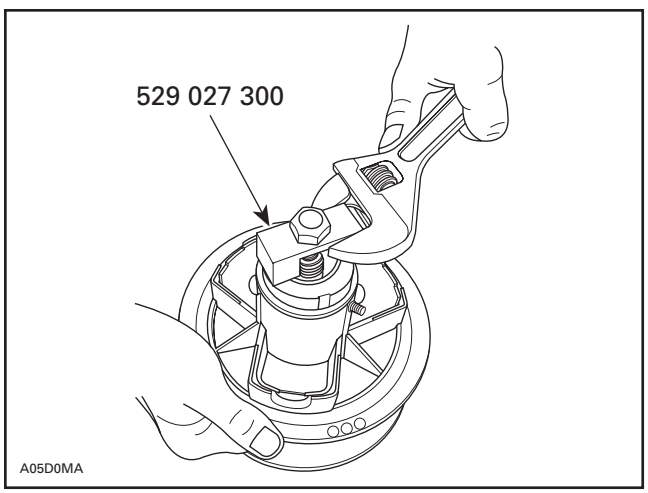
2, Cap, Washer and Disk

These are calibration parts. Refer to TECHNICAL DATA 10.

Tundra/R

Unscrew set screw **no. 4** then use spring cover tool (P/N 529 027 300) to unscrew spring cover **no. 5**.

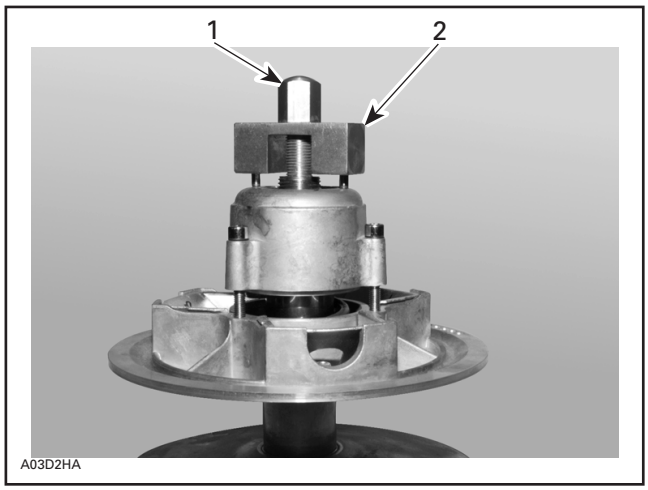
Mount tool in a vise for cover hand-unscrewing.



Remove washer **no. 10** then circlip **no. 11**.

377 Engine S-Series

Install spring cover tool (P/N 529 027 300) with puller (P/N 529 031 400) on spring cover.



1. Puller tool
2. Spring cover tool

Screw puller (hand tight) to hold spring cover and remove screws holding spring cover.

Slowly unscrew puller to release spring pressure.

Remove spring cover **no. 5**, spring and washer **no. 11**.

CLEANING

All Models

Clean pulley faces and shaft with fine steel wool and clean dry cloth. Clean sliding half bushing with clean dry cloth.

INSPECTION

Check sliding half for excessive lateral play and fixed half shaft for scratches. Replace as required.

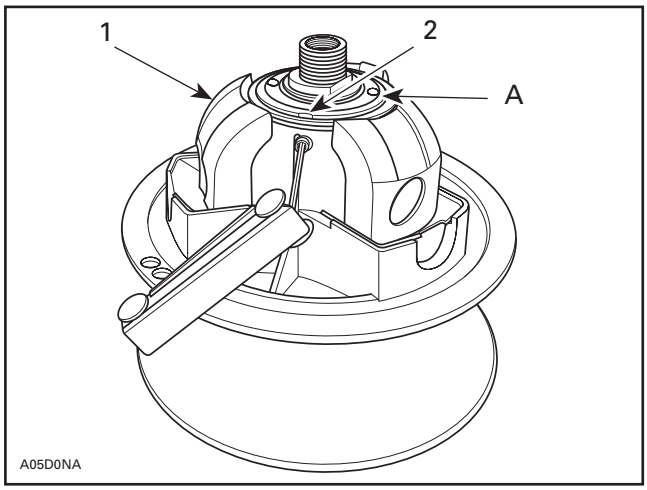
ASSEMBLY

Install circlip **no. 11** then washer **no. 10**.

Make sure to install blocks at their original position and with their curved end toward governor cup. See following illustration.

Tundra/R

Screw spring cover to 2 to 3 mm (1/16 to 1/8 in) down below sliding half end. Apply Loctite 271 on screw threads. Install set screw aligned with spring cover slot.



1. Curved end
2. Spring cover slot
A. 2 to 3 mm (1/16 to 1/8 in)

All Models

Tighten nut no. 8 to 128 N•m (95 lbf•ft).

INSTALLATION

Torque screw to 90 to 100 N•m (66 to 74 lbf•ft).

Install drive belt and belt guard.

Raise and block the rear of the vehicle and support it with a mechanical stand.

◆ WARNING

Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake, repeat 5 times.

Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

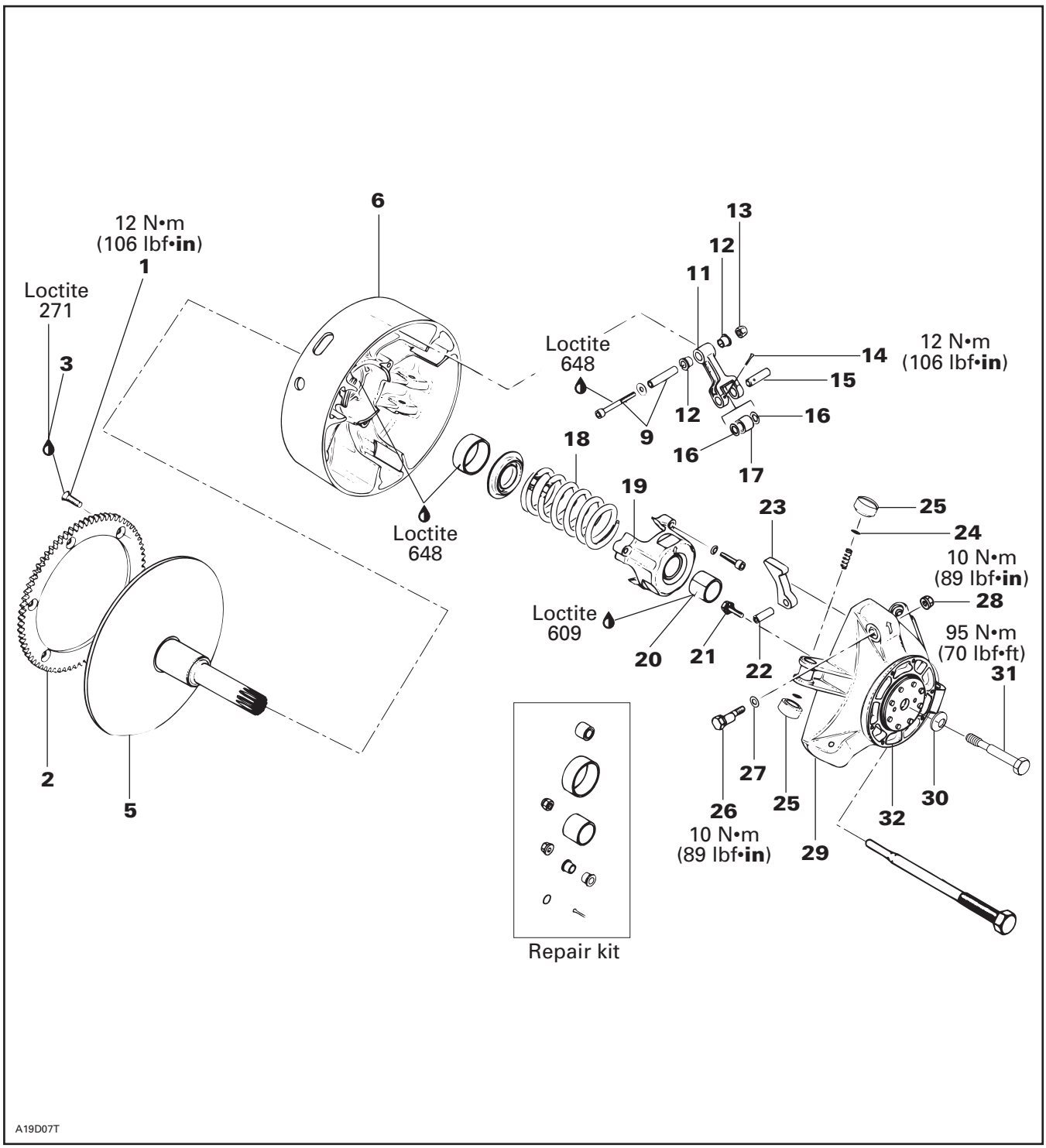
◆ WARNING

After 10 hours of operation the transmission system of the vehicle must be inspected to ensure the retaining screw is properly torqued.

TRA

All Models

NOTE: This is a lubrication free drive pulley.



GENERAL

Some drive pulley components (return spring, ramp) can be changed to improve vehicle performance in high altitude regions. The *High Altitude Technical Data Booklet* (P/N 484 300 003 and 484 054 500 for binder) gives information about calibration according to altitude.

▼ CAUTION

Such modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance. Verify spring specifications before installation. Do not only refer to the spring color code.

NOTE: TRA drive pulley stands for Total Range Adjustable drive pulley.

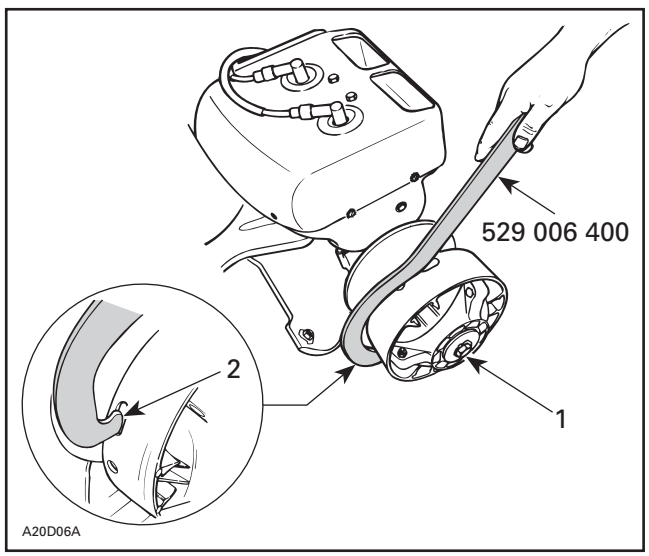
◆ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Subcomponent installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

30,31, Conical Spring Washer and Screw

Use holder (P/N 529 006 400).



TYPICAL

1. *Retaining screw*
2. *Insert in any slot*

NOTE: Sliding half can be removed while fixed half remains on crankshaft.

◆ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

Remove retaining screw.

To remove drive pulley ass'y and/or fixed half from engine, use puller (P/N 529 007 900).

▼ CAUTION

These pulleys have metric threads. Do not use imperial threads puller. Always tighten puller by hand to ensure that the drive pulley have the same type of threads (metric vs imperial) prior to fully tighten.

To Remove Drive Pulley Ass'y:

Retain drive pulley with holder.

Install puller in pulley shaft then tighten.

DISASSEMBLY

1,2, Screw and Ring Gear

▼ CAUTION

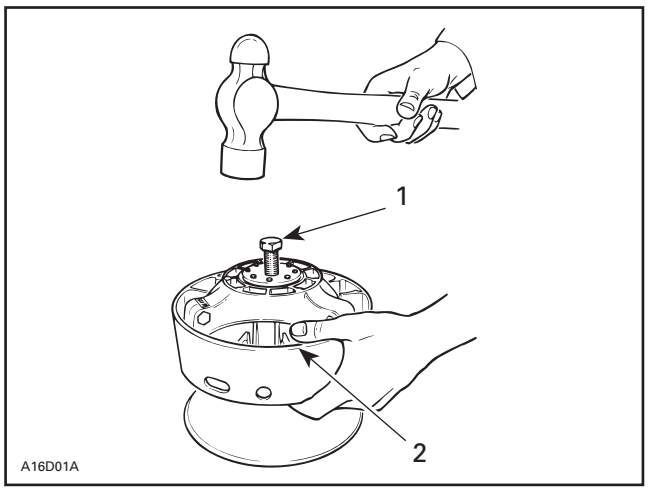
Retaining screws must be heated before disassembly.

5,6, Fixed and Sliding Half

▼ CAUTION

Do not tap on governor cup.

Screw puller into fixed half shaft about 13 mm (1/2 in). Raise drive pulley and hold it by the sliding half while knocking on puller head to disengage fixed half.



1. Puller
2. Holding sliding half

NOTE: No components marking is required before disassembling this drive pulley since it has factory mark and arrows as indexing reference.

25,29, Slider Shoe and Governor Cup

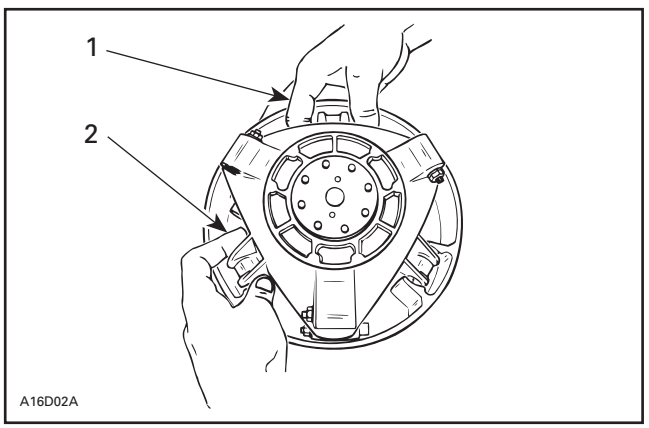
Carefully lift governor cup until slider shoes come at their highest position into guides.

Hold a slider shoe set then carefully lift its housing and remove them. Proceed the same way for other housings lifting 1 at a time.

32, Cushion Drive

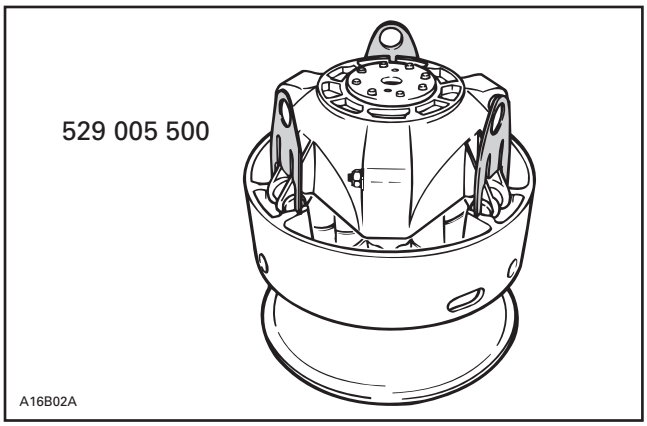
▼ CAUTION

Do not disassemble cushion drive. Governor cup and cushion drive are factory balanced as an assembly.



1. Hold slider shoes
2. Lift one housing at a time

NOTE: To ease disassembly, forks (P/N 529 005 500) should be used to hold slider shoes prior to removing governor cup.



19, Spring Cover Ass'y

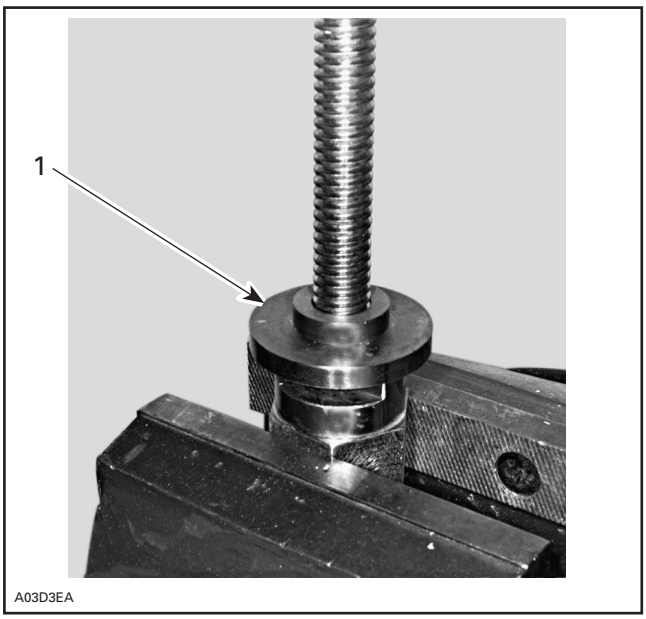
It is pushed by spring pressure.

◆ WARNING

Spring is very strong. Never attempt to remove spring cover without the recommended tools.

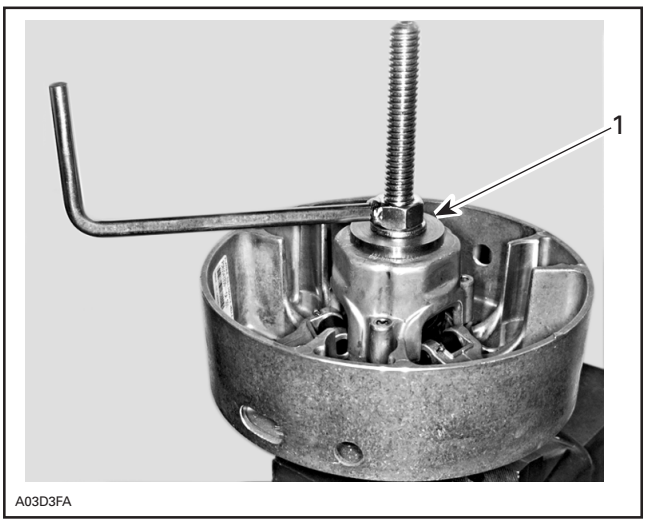
Use spring compressor (P/N 529 035 524).

Install support guide.



1. Support guide

Install sliding half then a second support guide. These support guides will prevent bushing damages.



1. Support guide

Remove 3 Allen screws retaining spring cover then unscrew compressor.

CLEANING

5,6, Fixed and Sliding Half

Clean pulley faces and shaft with fine steel wool and dry cloth.

5, Fixed Half and Crankshaft End

Parts must be at room temperature before cleaning.

Using a paper towel with cleaning solvent, clean crankshaft tapered end and the taper inside the fixed half of the drive pulley, crankshaft threads and retaining screw threads.

◆ WARNING

This procedure must be performed in a well ventilated area.

▼ CAUTION

Avoid contact between cleaner and crankshaft seal because damage may occur.

Remove all harden oil deposits that have baked on crankshaft and pulley tapered surfaces with coarse or medium steel wool and/or sand paper no. 600.

▼ CAUTION

Do not use any other type of abrasive.

Reclean mounting surfaces with paper towel and cleaning solvent.

Wipe off the mounting surfaces with a clean, dry paper towel.

▼ CAUTION

Mounting surfaces must be free of any oil, cleaner or towel residue.

4,20, Bushing

Only use petrol base cleaner when cleaning bushings.

▼ CAUTION

Do not use acetone to clean bushing.

INSPECTION

Drive pulley should be inspected annually.

16,17, Thrust Washer and Roller

Check roller for roundness of external diameter. Check thrust washer for thickness wear. Replace as required.

▼ CAUTION

Ensure rollers are in good condition. Replace as required.

9,12, Fitting Bolt Ass'y and Flanged Bushing

Check for wear, replace as required. When installing old style flanged bushing (made of black plastic), use a size "O" (letter) drill bit to ream inside diameter.

24,25, O-Ring and Slider Shoe

Check if O-rings are cracked, cut or crushed. Replace as required.

Check slider shoes for wear. Replace if groove is not apparent on top.

5,29, Fixed Half and Governor Cup

Inspect splines and free play between both parts. Maximum free-play is 0.5 mm (.020 in) measured at calibration screw radius. Replace if required.

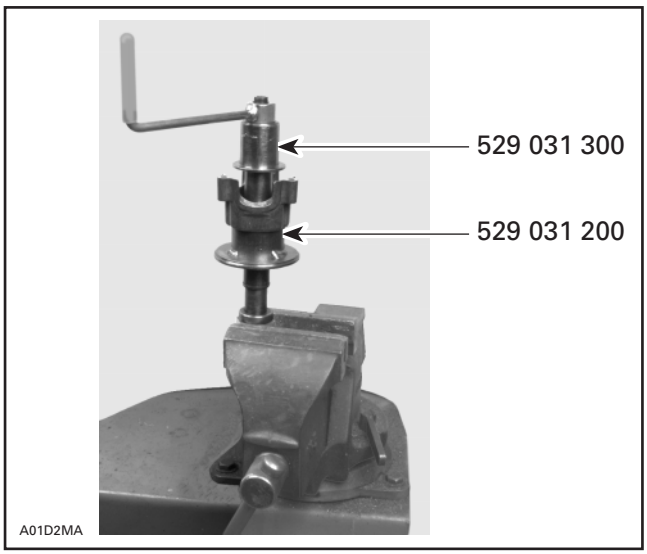
20, Spring Cover Bushing

Visually inspect coating. Replace if worn.

Under normal use there is no need to replace this bushing.

Mount compressor (P/N 529 035 524) in a vise.

Use tools (P/N 529 031 300 and 529 031 200) to remove old bushing.



▼ CAUTION

Bushing must be bonded with retaining compound.

Apply retaining compound outside of bushing then press it down to counterbore from sliding half side.

▼ CAUTION

Insert bushing from sliding half side (inner) of spring cover.

ASSEMBLY

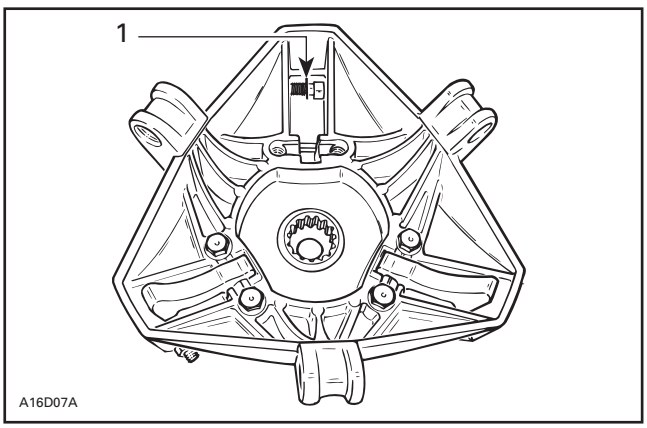
NOTE: This drive pulley is lubrication free. **Do not lubricate** any component.

1,2,3, Screw, Ring Gear and Loctite 271

Apply Loctite 271 (P/N 413 702 900) on threads and under head then torque to 15 N•m (133 lbf•**in**).

26,27,28, Calibration Screw, Washer and Locking Nut

When installing calibration screw, make sure to install washer as shown.



1. Washer

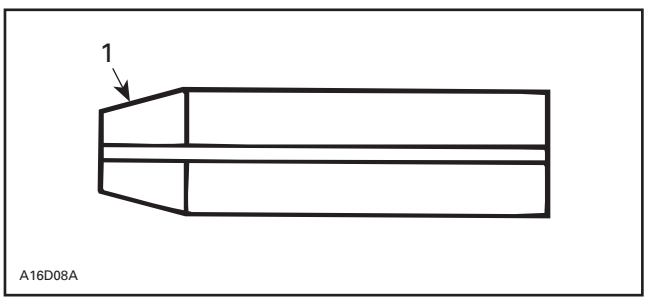
Torque locking nut to 10 N•m (89 lbf•**in**).

15, Pin

Always use the same type of pin as originally installed when servicing. Different types have different weights for calibration purpose. Refer to TECHNICAL DATA 10.

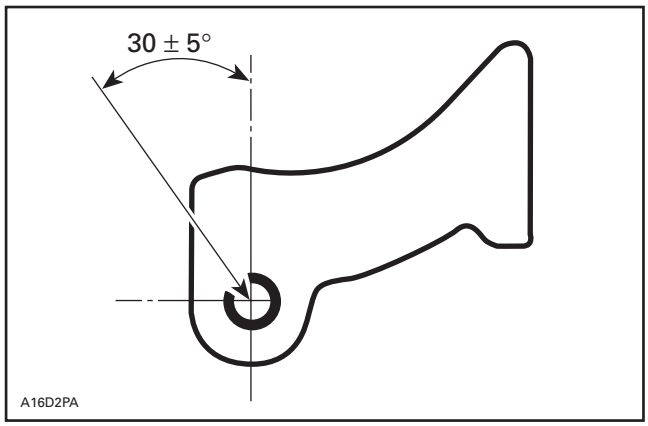
21,22,23, Ramp, Dowel Tube and Screw

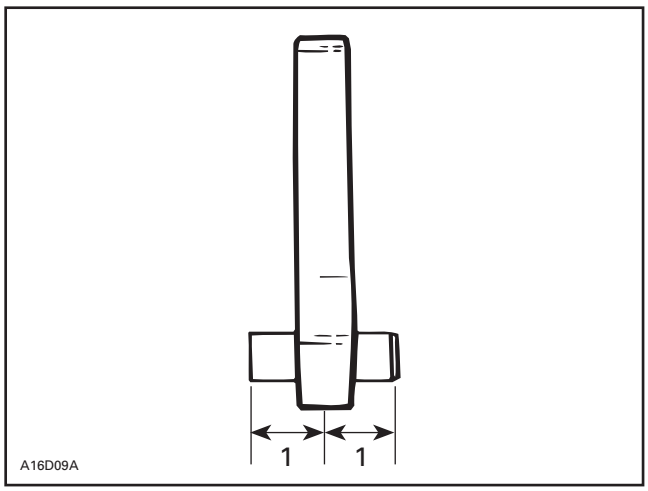
Insert dowel tube from chamfered side. Make sure ramp is centered on dowel tube.



1. Chamfered side

Position dowel tube split at the illustrated angle.





1. Equal distance

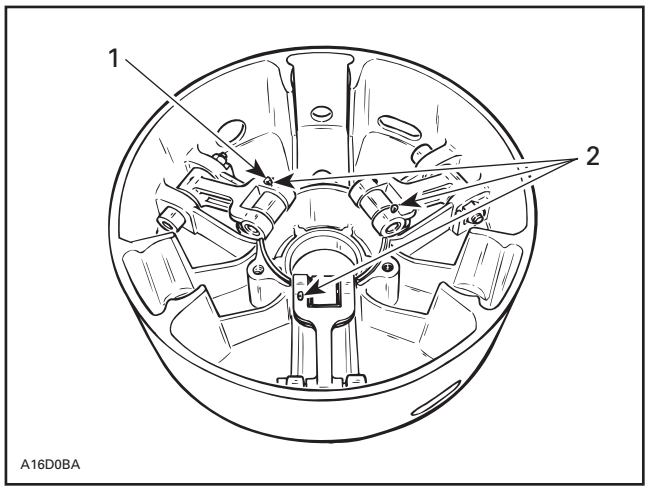
Torque screws to 10 N•m (89 lbf•**in**).

9,11,13,14, Screw, Lever Ass'y, Nut and Cotter Pin

Always install lever assemblies so that cotter pins are at the shown side. Besides install cotter pin head on top when lever is sat at bottom of sliding half. Bend cotter pin ends to sit perfectly against lever.

◆ WARNING

Whenever replacing centrifugal levers, always replace all 3 at the same time. Otherwise, drive pulley misbalancing will occur because of levers difference.



1. Head on top
2. All on the same side

▼ CAUTION

Lever assemblies must be installed so that cotter pins are on the same side.

Torque nuts to 12 N•m (106 lbf•**in**).

▼ CAUTION

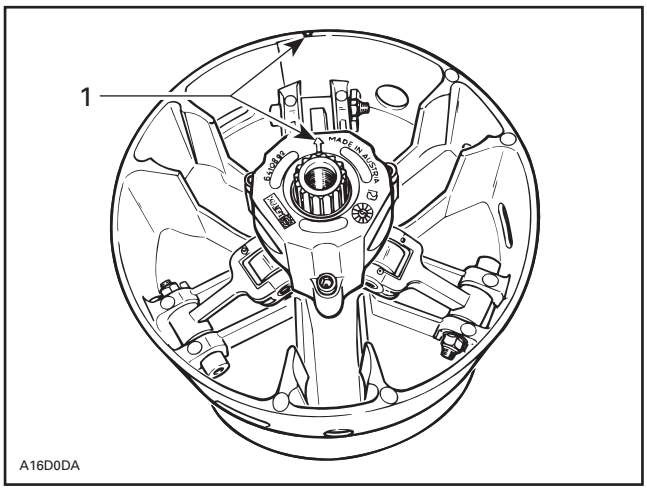
Lever ass'y and rollers must move easily after installation.

5,6,18,19, Fixed Half, Sliding Half, Spring, Spring Cover and Screw

To install spring cover, use spring compressor (P/N 529 035 524).

Assemble fixed and sliding halves. Note that fixed halves have different cone angle. Match cone angle with crankshaft.

Lift sliding half against spring cover and align spring cover arrow with sliding half mark.

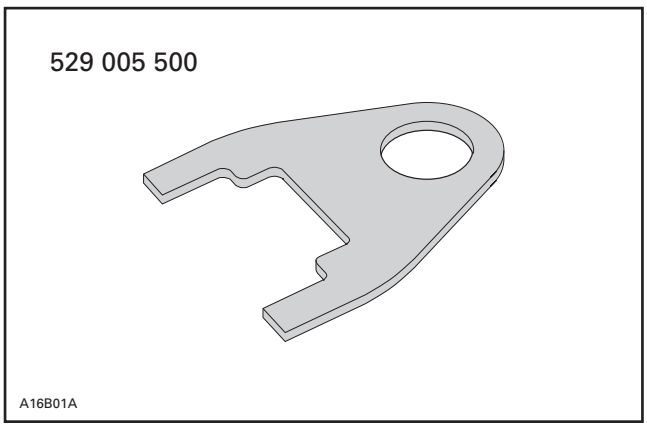


1. Align

Install and torque screws to 10 N•m (89 lbf•**in**).

6,25,29, Sliding Half, Slider Shoe and Governor Cup

To install governor cup, use following tool:

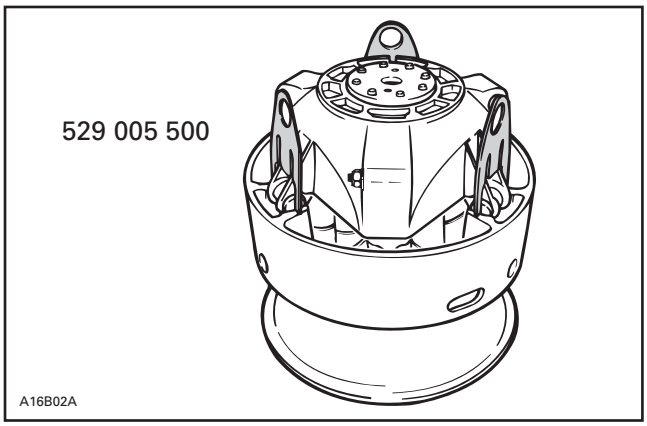


Insert spring and slider shoes into governor cup so that groove in each slider shoe is vertical to properly slide in guides.

▼ CAUTION

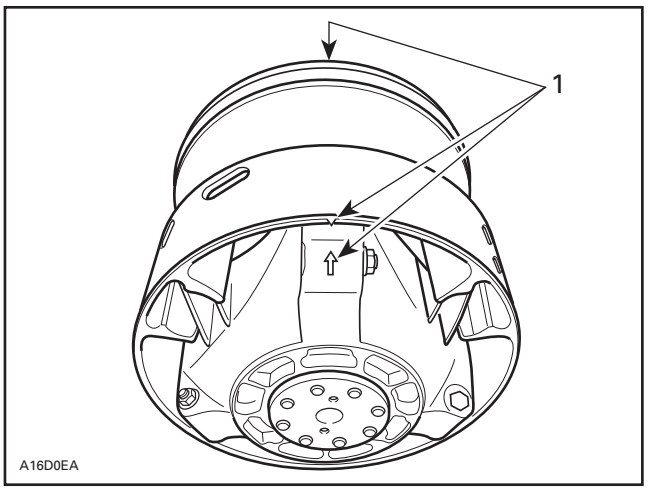
Make sure O-rings are installed on slider shoes and their grooves are positioned vertically.

Install fork (P/N 529 005 500) into slider shoe grooves to maintain them for governor cup installation. Proceed on 3 set of slider shoes.



Make sure to align governor cup arrow with sliding half and fixed half mark.

NOTE: If fixed half has no mark, align governor cup mark with segment no. 1 of inner half. Segments are identified on engine side.



1. Align

Carefully slide governor cup into sliding half. Align mark of governor cup with mark of fixed half.

Remove forks and push governor cup so that its splines engage with fixed half shaft splines.

▼ CAUTION

Make sure splines of both parts are fully engaged.

INSTALLATION

◆ WARNING

Do not apply anti-seize or any lubricant on crankshaft and drive pulley tapers.

◆ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

Clean mounting surfaces as described in CLEANING above.

Drive Pulley Ass'y

The installation procedure must be strictly adhered to as follows.

Lock crankshaft in position as explained in removal procedure.

Install drive pulley on crankshaft extension.

Install conical washer with its concave side towards drive pulley then install screw.

◆ WARNING

Never substitute lock washer and/or screw with jobber ones. Always use Bombardier genuine parts for this particular case.

Torque screw to 90 to 100 N•m (66 to 74 lbf•ft).

Install drive belt and belt guard.

Raise and block the rear of the vehicle and support it with a mechanical stand.

◆ WARNING

Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake, repeat 5 times.

Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

◆ WARNING

After 10 hours of operation the transmission system of the vehicle must be inspected to ensure the retaining screw is properly torqued.

DRIVE PULLEY ADJUSTMENT

The drive pulley is factory calibrated to transmit maximum engine power at a predefined RPM. Factors such as ambient temperature, altitude or surface condition may vary this critical engine RPM thus affecting snowmobile efficiency.

This adjustable drive pulley allows setting maximum engine RPM in the vehicle to maintain maximum power.

Calibration screws should be adjusted so that actual maximum engine RPM in vehicle matches with the maximum horsepower RPM given in TECHNICAL DATA 10.

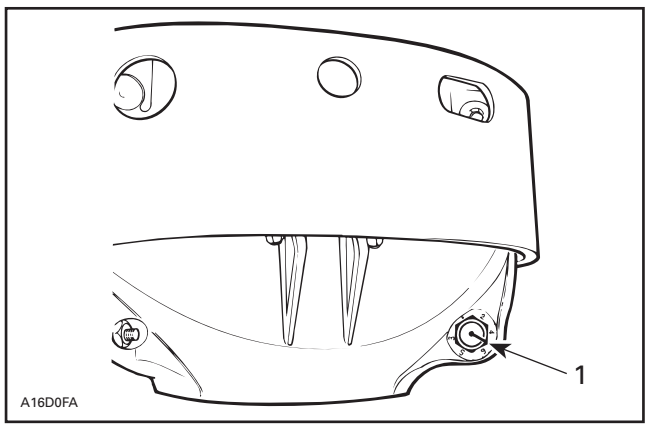
NOTE: Use precision digital tachometer for engine RPM adjustment.

NOTE: The adjustment has an effect on high RPM only.

To adjust, modify ramp end position by turning calibration screws.

26,28,29, Calibration Screw, Locking Nut and Governor Cup

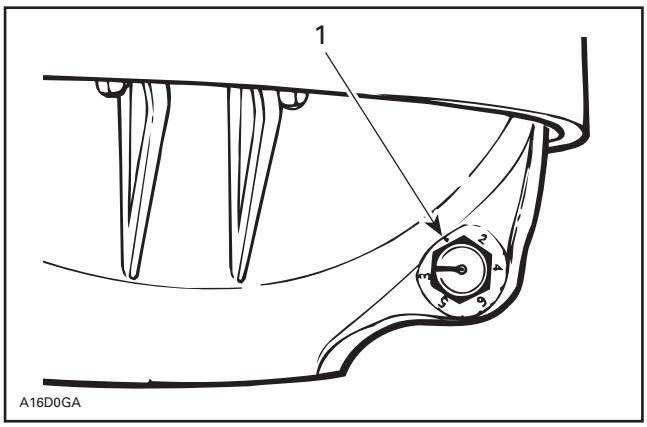
Calibration screw has a notch on top of its head.



1. Notch

Governor cup has 6 positions numbered 2 to 6. Note that in position 1 the number is substituted by a dot (due to its location on casting).

See TECHNICAL DATA 10 for original setting.



1. Position 1 (not numbered)

Each number modifies maximum engine RPM by about 200 RPM.

Lower numbers decrease engine RPM in steps of 200 RPM and higher numbers increase it in steps of 200 RPM.

Example:

Calibration screw is set at position 4 and is changed to position 6. So maximum engine RPM is increased of 400 RPM.

To Adjust:

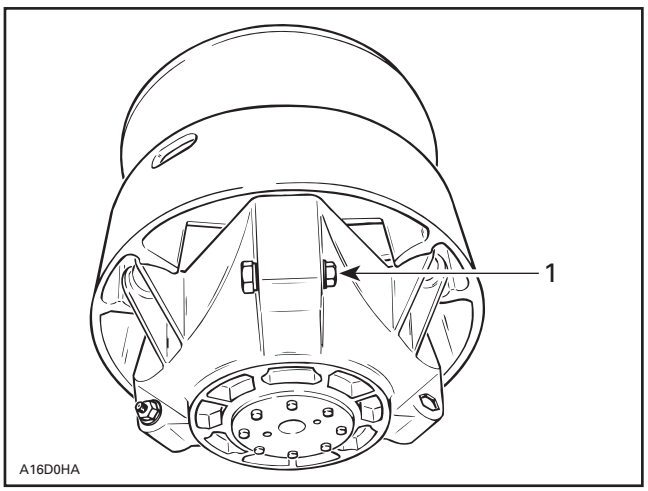
Just loosen locking nut enough to pull calibration screw **partially** out and adjust to desired position. Do not completely remove the locking nut. Torque locking nuts to 10 N•m (89 lbf•**in**).

▼ CAUTION

Do not completely remove calibration screw or its inside washer will fall off.

▼ CAUTION

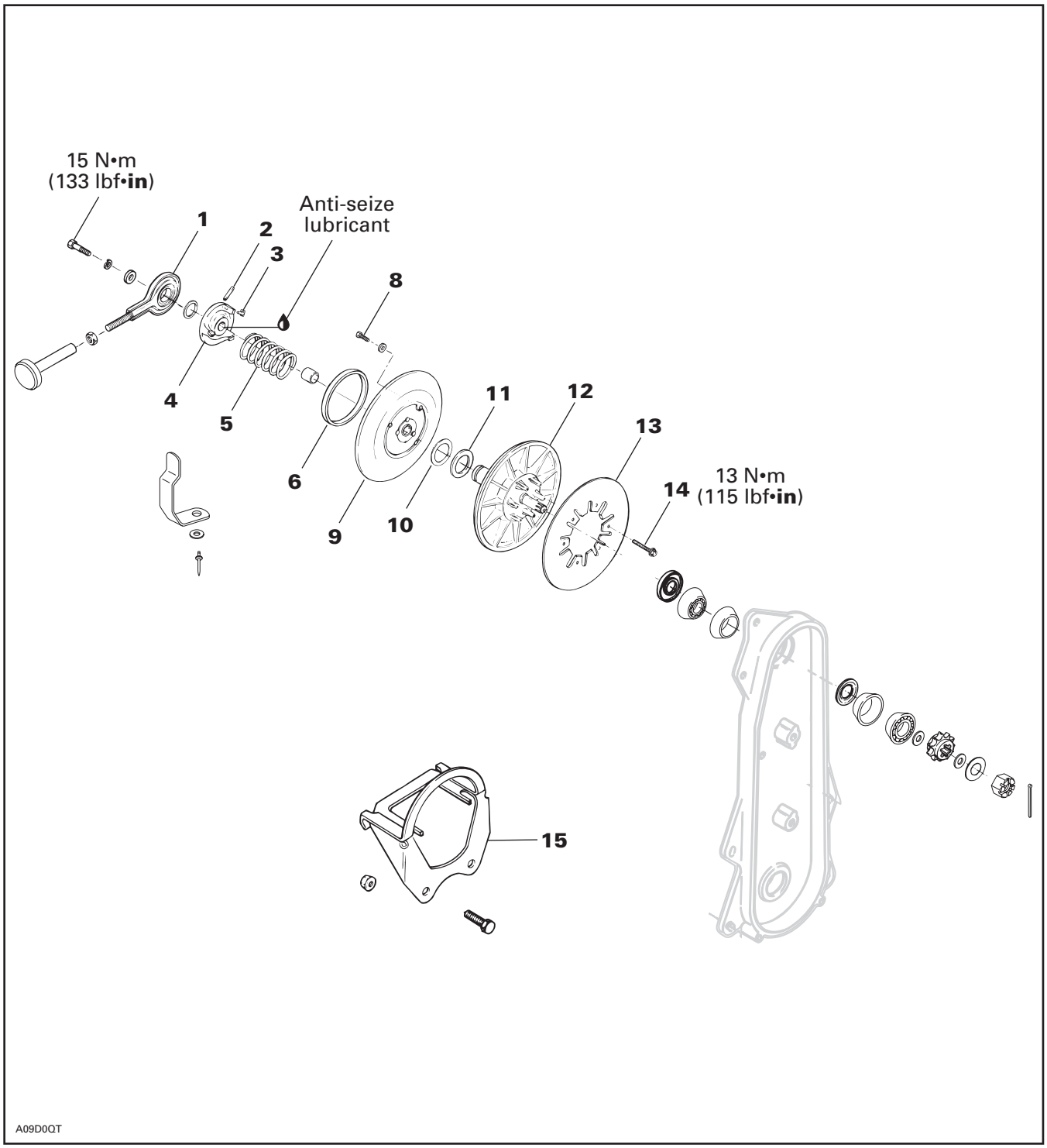
Always adjust all 3 calibration screws and make sure they are all set at the same number.



1. Position 1 (not numbered)

DRIVEN PULLEY

Tundra



NOTE: Driven pulley components (support, cam, shoes, etc.) can be serviced without removing the whole driven pulley from chaincase. Refer to the following procedures but neither remove brake caliper nor open chaincase for those cases.

REMOVAL

To remove driven pulley from chaincase, follow this procedure.

Remove guard and drive belt from vehicle.

Remove brake support **no. 15** from chaincase with brake ass'y.

Free countershaft support **no. 1** from support clamp.

Chaincase

Open chaincase and drain oil. Unlock and remove upper sprocket.

The following is required to have enough space to remove driven pulley from chaincase:

Loosen upper retaining screws of steering column.

Disconnect carburetor boots from intake manifold and air intake silencer.

Disconnect impulse hose from engine.

Disconnect oil injection supply line at injection pump and plug line to prevent draining.

Remove screws retaining rear engine support to chassis.

Tip engine forward just enough to allow driven pulley removal from chaincase. Block in this position.

NOTE: In some cases, chaincase retaining screws might have to be slackened to allow pivoting of chaincase. In this case, note position of alignment shims. Besides, air intake silencer and oil injection reservoir might have to be slightly moved to get enough space to pull driven pulley.

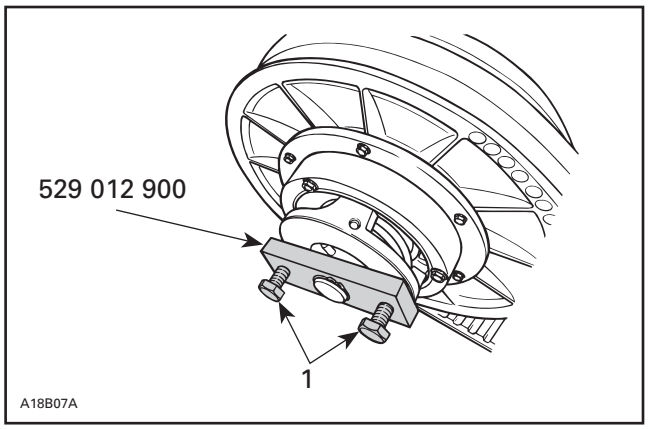
Remove bearing cone.

Knock driven pulley shaft with a plastic hammer and pull driven pulley out.

DISASSEMBLY

Remove support **no. 1** using a suitable puller.

Install cam pusher (P/N 529 012 900), reinstall circlip. Tighten cam pusher screws alternately then remove roll pin.



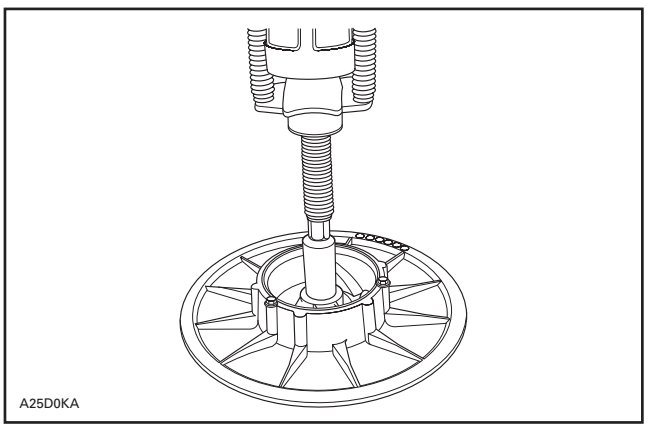
1. Tighten alternately

Loosen cam pusher screws, remove circlip then cam pusher. Remove cam.

Note spring original setting (adjusting hole in sliding half).

6,9, Sliding Half Bushing and Bushing

To disassemble a worn bushing (small), use a press and a suitable pusher.



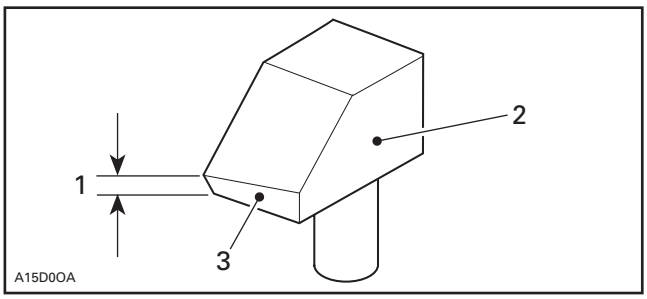
TYPICAL

Remove 3 screws and washers and pry large bushing out.

INSPECTION

3, Slider Shoe

Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope base is worn to 1 mm (.039 in) or less.

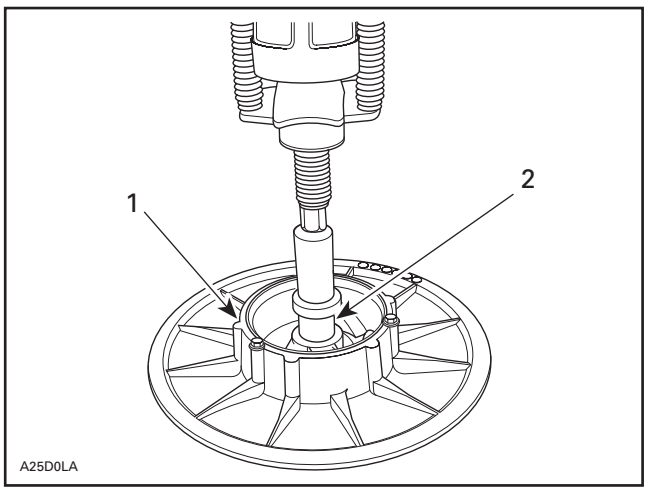


1. Measure thickness of slope base here
2. Sliding pulley side
3. Slope base

ASSEMBLY

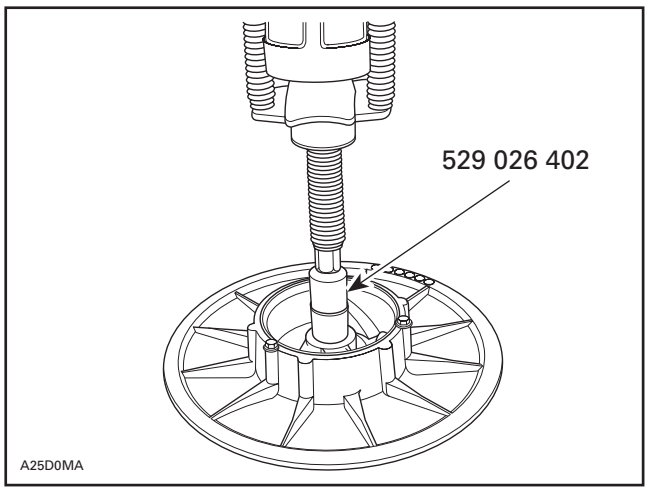
6, Sliding Half Bushing

Clean mounting surfaces with Loctite Safety Solvent. Using a press and a suitable pusher, install bushing as illustrated.



1. Install bushing from this side of sliding half
2. Bushing

After bushing installation, try fixed half shaft inside bushing. If it is too tight, use burnishing bar (P/N 529 026 402) then retry. If it is still too tight, use burnishing bar with oil on it.



8,9, Screw and Bushing

Align notches with screw positions and press down. Torque screws to 5 N•m (44 lbf•**in**).

3, Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on cam.

12, Fixed Half Shaft

Thoroughly clean the fixed half shaft. Remove rust with no. 320 grit sand paper.

Apply a light film of anti-seize lubricant (P/N 413 701 000) on the shaft. Always wipe off surplus.

NOTE: Activate the sliding half several times to distribute lubricant over full length of shaft. Be careful that lubricant does not get on inner halves of pulley.

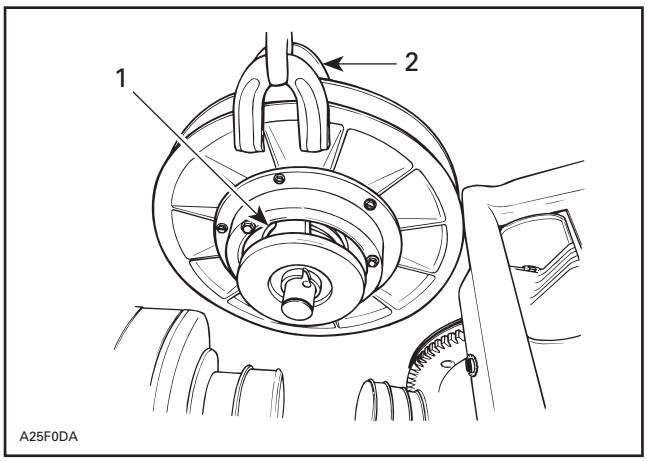
13,14, Brake Disc and Screw

Install brake disc on fixed half and torque screws to 13 N•m (115 lbf•**in**).

Assemble driven pulley components by reversing the disassembly procedure.

2,4,5, Roll Pin, Outer Cam and Spring

One of its ramps facing upwards, hold sliding half with welding clamps. Install spring into sliding half at its original setting (previously noted adjusting hole). Insert other spring end in outer cam and turn clockwise until a slider shoe corresponds with the ramp facing upwards. Push cam all the way in then install roll pin coated with anti-seize lubricant (P/N 413 701 000).



TYPICAL

1. *A ramp facing upwards*
2. *Welding clamp*

INSTALLATION

Driven Pulley and Chaincase

Install a new upper chaincase oil seal and a new chaincase cover seal.

Reinstall the driven pulley on vehicle by reversing the removal procedure.

NOTE: If chaincase screws have been loosened, chaincase can be reinstalled to its initial position by securing driven pulley support before tightening chaincase retaining screws. Make sure to install alignment shims as noted at removal.

▼ CAUTION

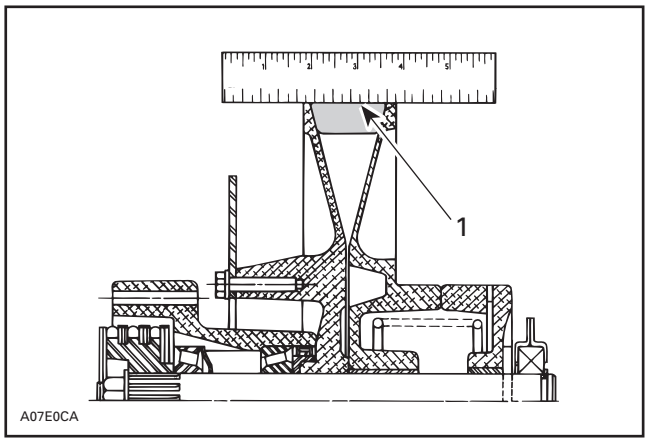
Bleed oil injection pump on models that have had their injection oil supply line removed. Refer to INJECTION OIL SYSTEM 04-06.

ADJUSTMENT

10,11, Shim

NOTE: The following adjustment must be performed with a new drive belt.

For best performance, particularly at starting, top of drive belt should be flush with top of driven pulley halves.



TYPICAL

1. *Belt flush with the top of the pulley halves*

Shim(s) no. 10 and no. 11 provide belt height adjustment between pulley halves. Adding shims will lower the belt in driven pulley, while removing shims will raise the belt. Adjust properly.

5, Spring

General

It is usual to experience spring setting during breaking period of a new spring. The factory spring preload is slightly higher (about 1 kg (2 lb)) to compensate for spring setting. Specifications in TECHNICAL DATA 10 are applicable after break-in period (about 10 hours of use).

Spring Torsional Pre-Load

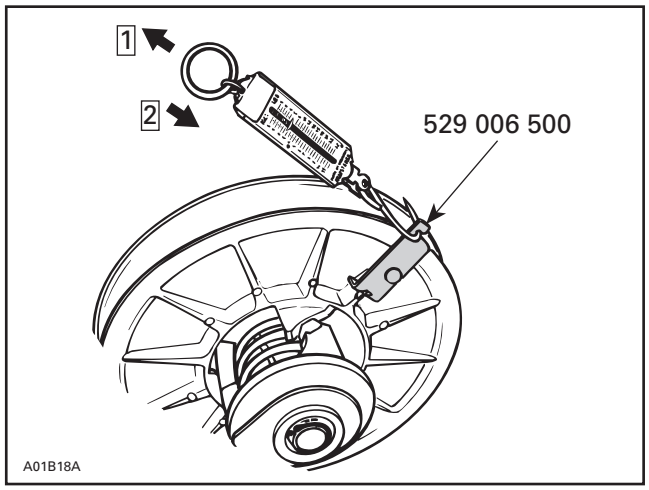
To check spring pre-load adjustment, use spring scale hook (P/N 529 006 500) and a spring scale.

Install the hook on the sliding half, making sure the spring scale is perpendicular to the pulley axle.

Take a measurement when opening driven pulley and another one when driven pulley begins to close after a rotation of 10 mm (3/8 in). Spring pre-load is the average measurement between these 2.

$$\frac{1^{st}\text{ measurement (when opening)} + 2^{nd}\text{ measurement (when closing)}}{2} = \text{Spring pre-load}$$

$$\text{Example: } \frac{3.8\text{ kg (8.4 lb) (when opening)} + 3.4\text{ kg (7.5 lb) (when closing)}}{2} = \text{3.6 kg (8 lb) Actual spring pre-load}$$

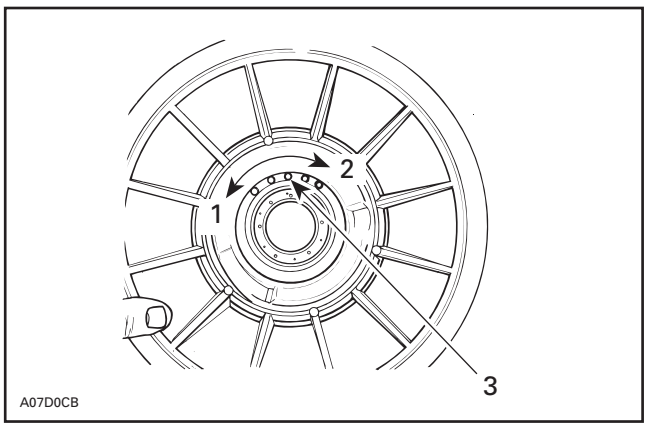


TYPICAL

Step 1 : 1st measurement
Step 2 : 2nd measurement

Spring pre-load should be as TECHNICAL DATA section 10.

To adjust spring pre-load relocate spring end in sliding pulley, moving it clockwise to decrease the pre-load and counterclockwise to increase it.



1. *Decrease*
2. *Adjusting holes*
3. *Increase*

NOTE: Always recheck torsional pre-load after adjusting.

Chaincase

Check oil level and refill as required. Refer to CHAINCASE 05-07.

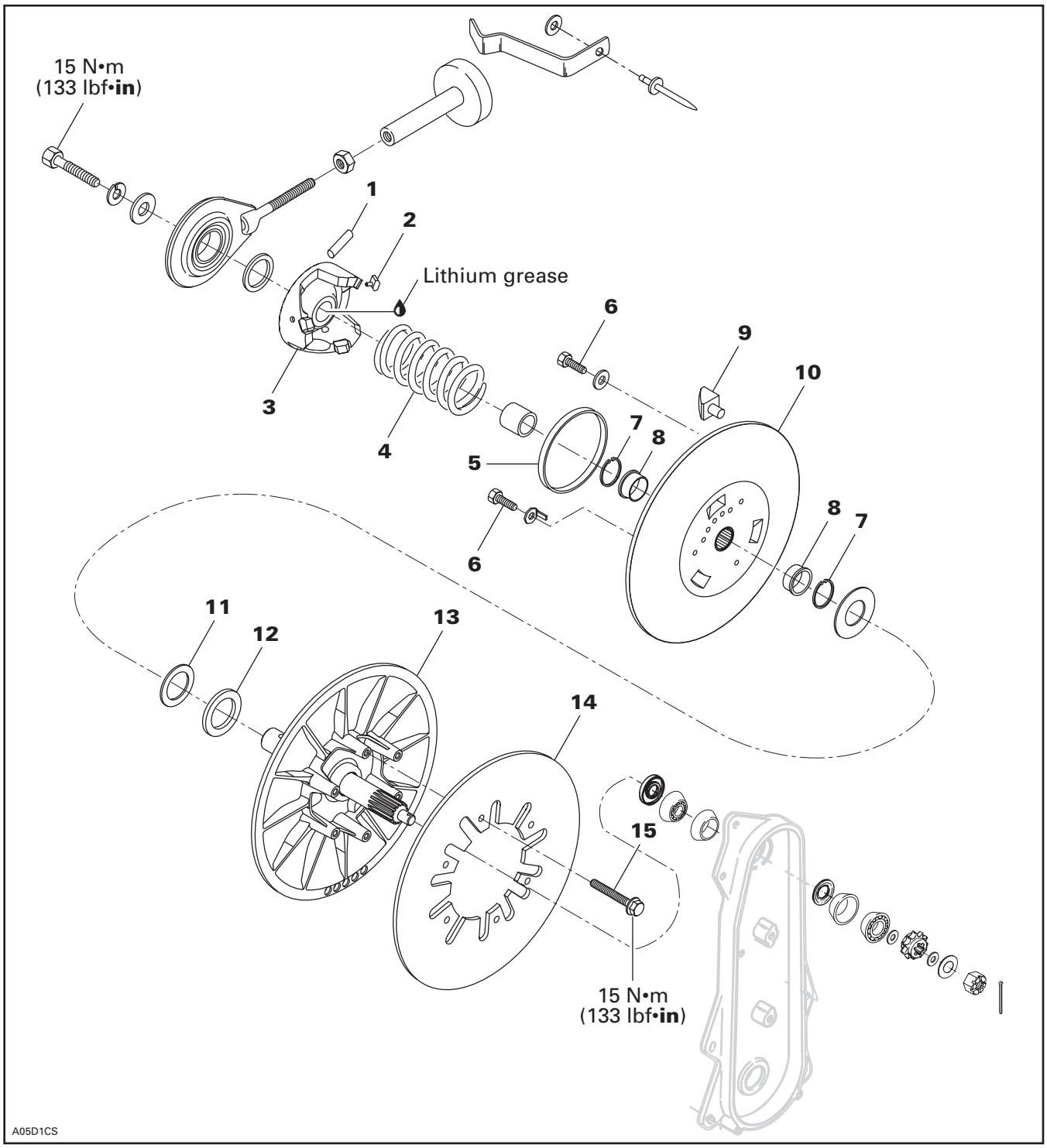
Pulley Alignment and Drive Belt Deflection

Refer to PULLEY DISTANCE AND ALIGNMENT 05-05 and DRIVE BELT 05-02 to perform adjustments.

▼ CAUTION

Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

Tundra R


15 N•m
(133 lbf•in)
1
2
Lithium grease
3
4
5
6
6
7
8
9
10
8
7
11
12
13
14
15
15 N•m
(133 lbf•in)
A05D1CS

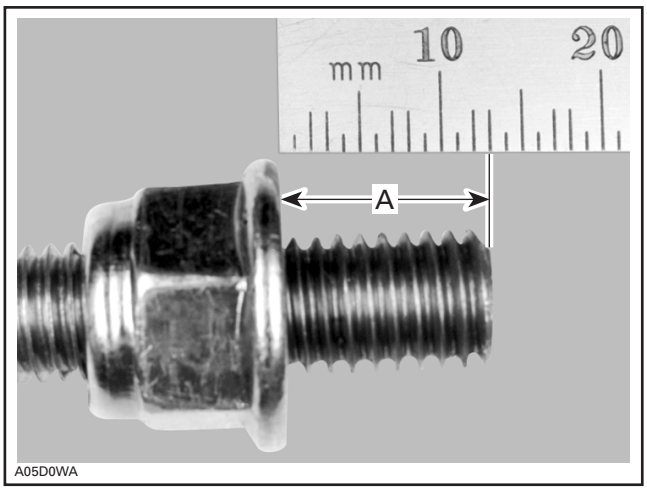
REMOVAL

Follow removal procedure for Tundra driven pulley at beginning of this subsection.

DISASSEMBLY

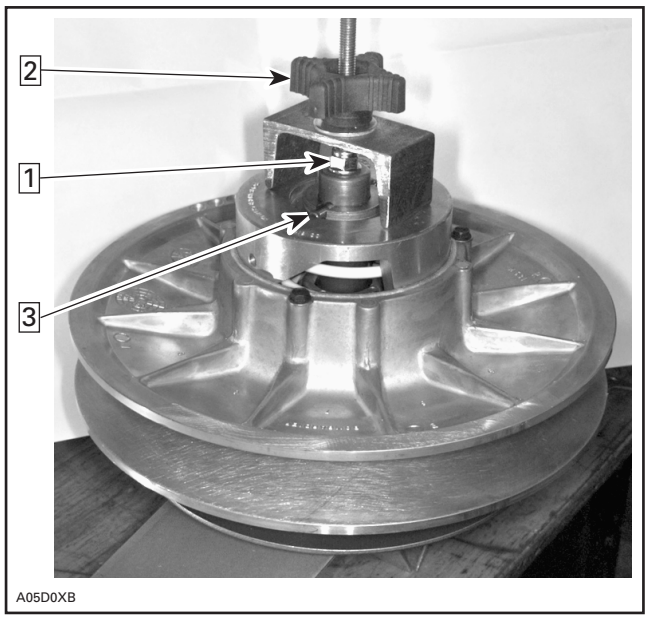
To disassemble driven pulley, driven pulley spring compressor (P/N 529 035 300) must be used. See following procedure.

Position stop nut 13 mm (1/2 in) from threaded rod end, as shown in the next photo.



A. 13 mm (1/2 in)

Install driven pulley spring compressor (P/N 529 035 300). Fully tighten the 13 mm (1/2 in) exposed threads in driven pulley. Tighten stop nut. Tighten tool knob to compress spring then remove roll pin no. 2.

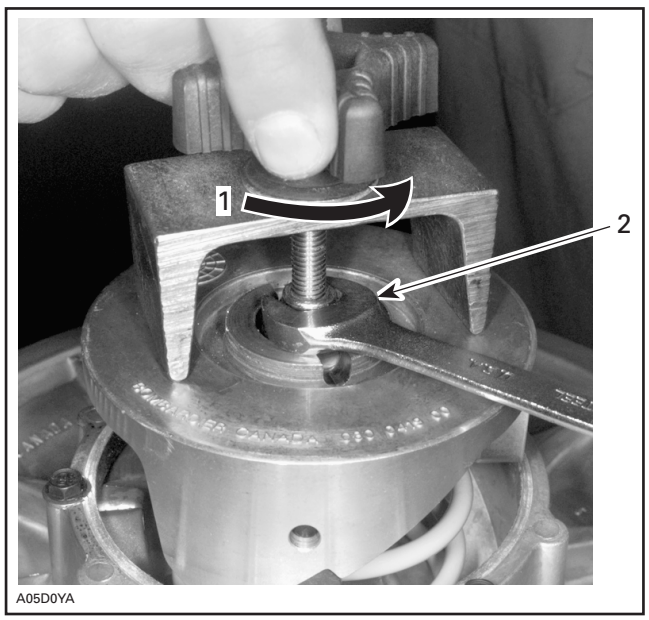


Step 1 : Tighten stop nut
Step 2 : Tighten knob to compress spring
Step 3 : Remove roll pin

Once roll pin has been removed, loosen knob until spring pressure is completely released.

◆ WARNING

To avoid injuries always hold stop nut with a key when loosening knob, as shown in the next photo.

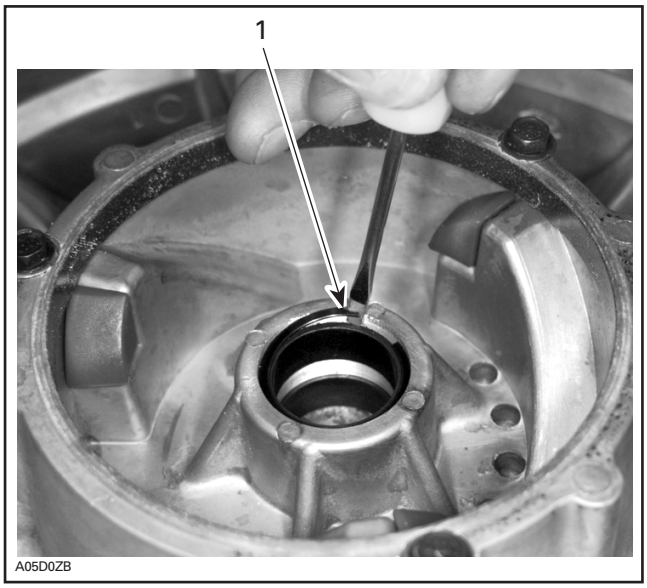


1. *When loosening knob*
2. *Hold stop nut with a key*

Remove tool and cam **no. 3**. Remove spring **no. 4** and sliding half **no. 10**.

8, Sliding Half Small Bushing

To remove a worn bushing **no. 8**, use a screwdriver and pull out circlip **no. 7**.



1. Remove circlip

Reverse pulley half **no. 10** then remove bushing using a punch, as shown in the next photo.

▼ CAUTION

Small bushings will be damaged at removal. Always replace with new ones.

5, Large Bushing

Remove 3 screws **no. 6** with washers and pry bushing **no. 5** out.

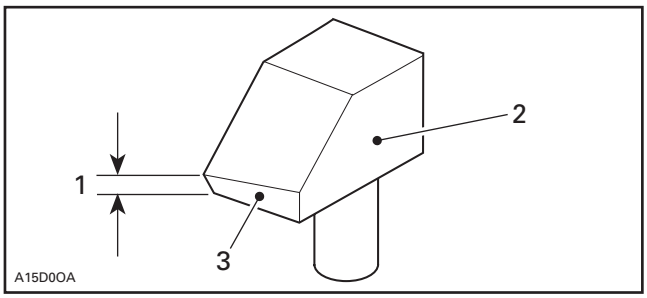
INSPECTION

2,9, Slider Shoe

Black slider shoe = forward

Red slider shoe = reverse

Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope base is worn to 1 mm (.039 in) or less.



1. Measure thickness of slope base here
2. Sliding pulley side
3. Slop base

ASSEMBLY

Assemble driven pulley components by reversing the disassembly procedure except for the following:

8, Bushing

Clean mounting surfaces with Loctite Safety Solvent. Using a press and pusher (P/N 420 876 512), install bushing as shown in the next photo.

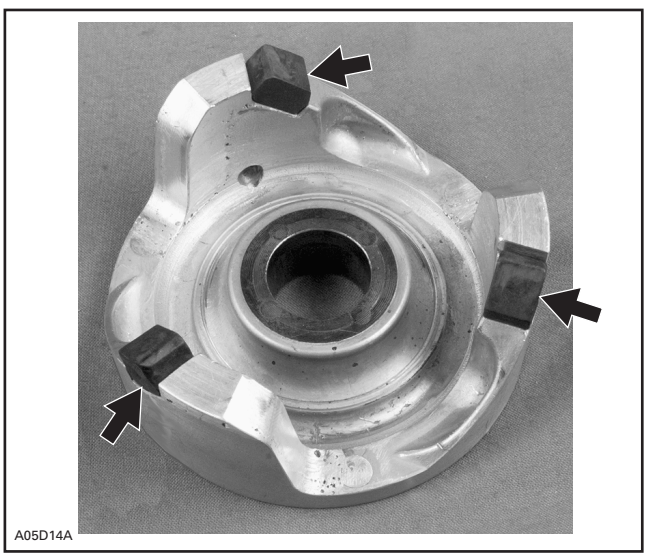
▼ CAUTION

To avoid bushings damage, use extreme caution when inserting new bushings.

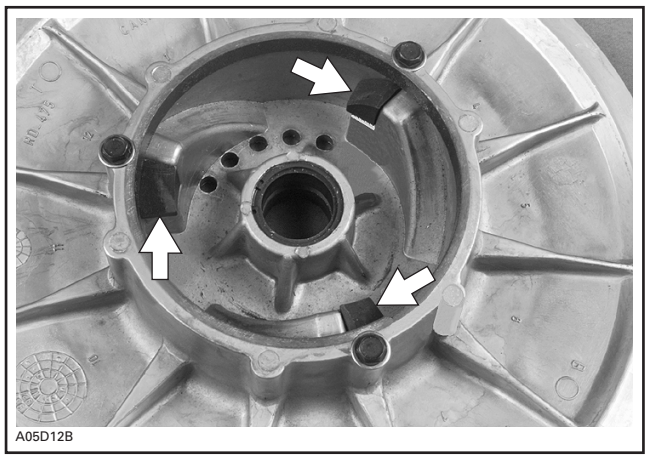
2,9, Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

Install slider shoes as per following photo. Red slider shoes are being used for reverse and black ones for forward.



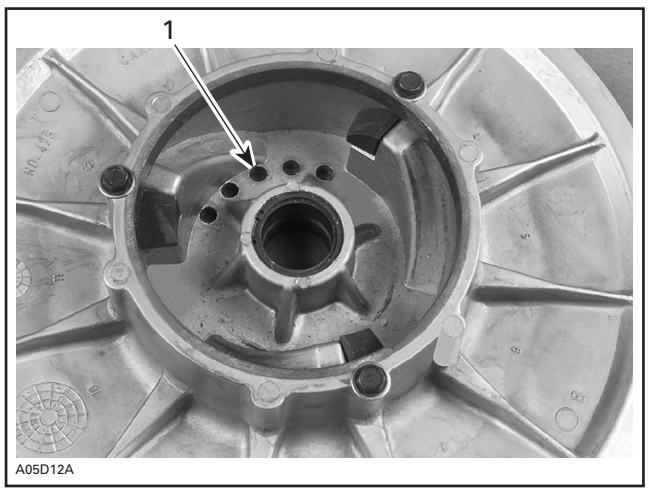
BLACK SLIDER SHOES ON CAM



RED SLIDER SHOES ON PULLEY HALF

2,4,5, Roller Pin, Outer Cam and Spring

Insert spring in adjusting hole no. 3 into sliding half, as illustrated.



1. Adjusting hole no. 3

Insert other spring end in cam. Mount driven pulley spring compressor (P/N 529 035 300) as in disassembly procedure.

Push cam all the way in then install roll pin coated with anti-seize lubricant (P/N 413 701 000).

13,14,15, Fixed Pulley Half, Brake Disc and Screw

Install brake disc on fixed pulley half and torque screws to 15 N•m (115 lbf•**in**).

INSTALLATION

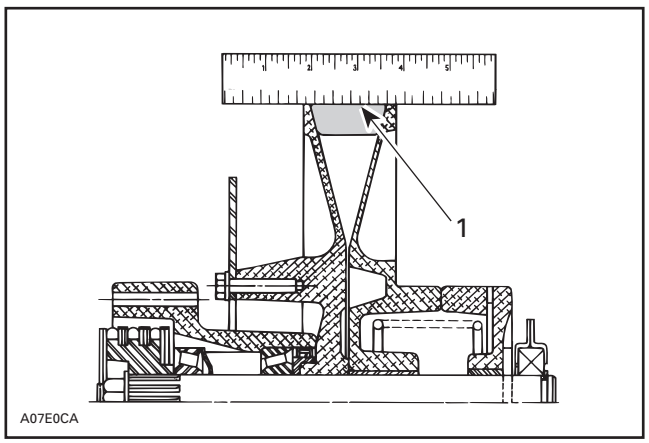
Follow installation procedure for Tundra driven pulley at beginning of this subsection.

ADJUSTMENT

11,12, Shim

NOTE: The following adjustment must be performed with a new drive belt.

For best performance, particularly at starting, top of drive belt should be flush with top of driven pulley halves.



TYPICAL

1. Belt flush with the top of the pulley halves

Shim(s) no. 11 and no. 12 provide belt height adjustment between pulley halves. Adding shims will lower the belt in driven pulley, while removing shims will raise the belt. Adjust properly.

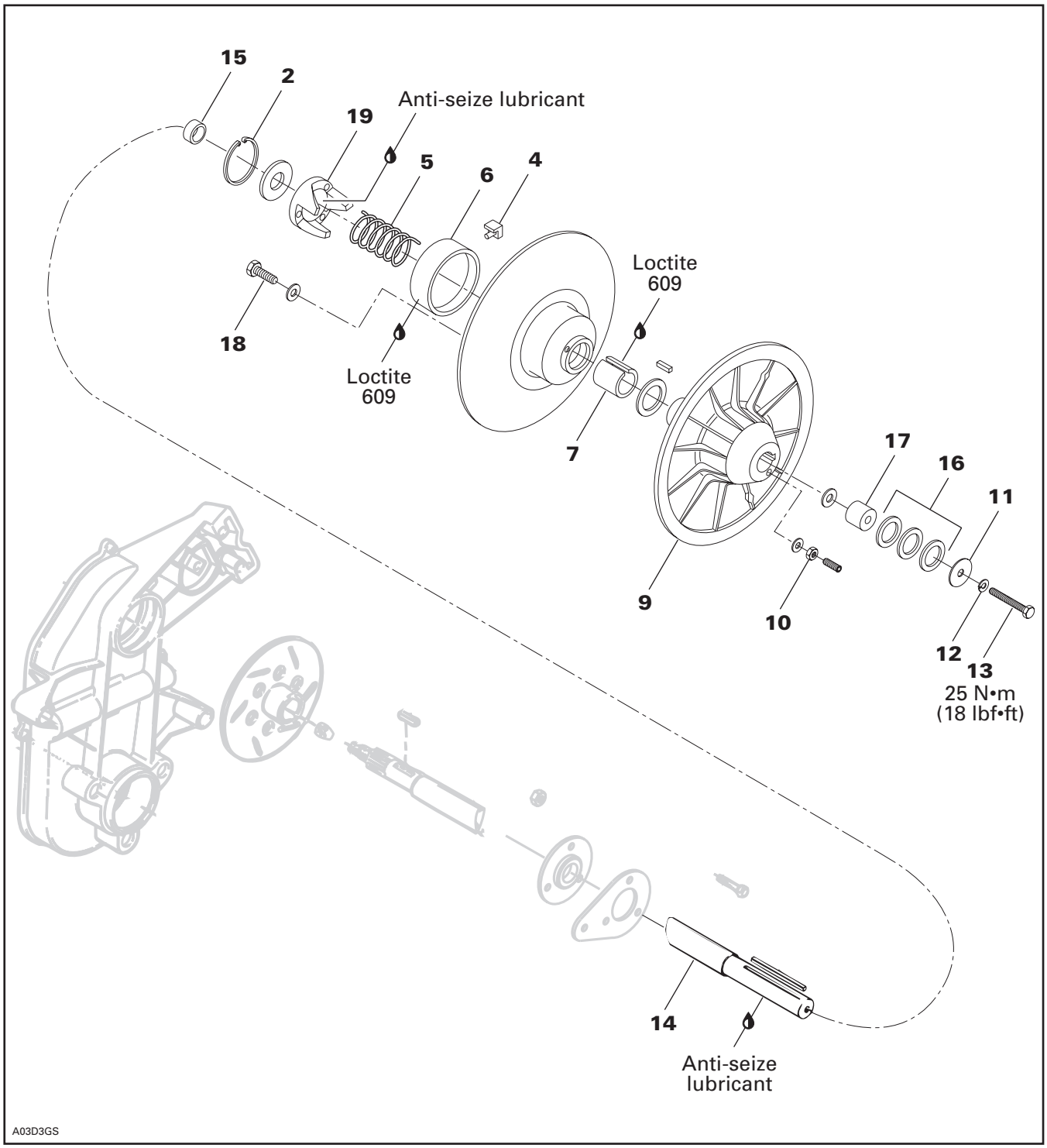
Pulley Alignment and Drive Belt Deflection

Refer to PULLEY DISTANCE AND ALIGNMENT 05-05 and DRIVE BELT 05-02 to perform adjustments.

▼ CAUTION

Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

Formula S/SL


15
2
19
Anti-seize lubricant
5
6
4
18
Loctite
609
Loctite
609
7
17
16
11
9
10
12
13
25 N•m
(18 lbf•ft)
14
Anti-seize
lubricant
A03D3GS

REMOVAL

Remove belt guard and drive belt from vehicle.

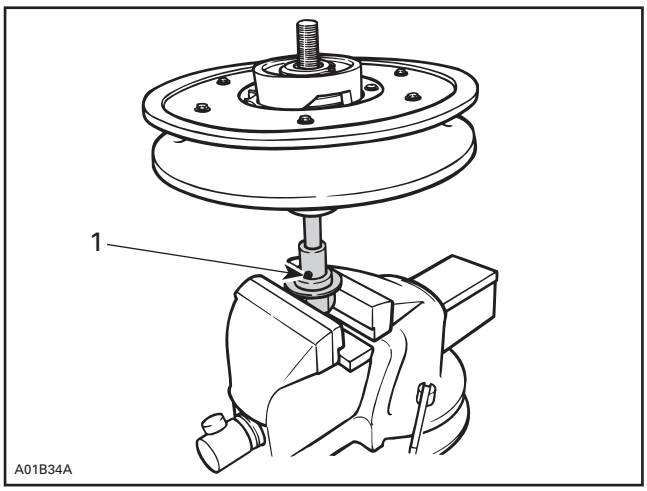
Remove the cap screw **no. 13**, lock washer **no. 12**, washer **no. 11**, extension **no. 17** and shims **no. 16** then pull the driven pulley from the countershaft.

14, Countershaft

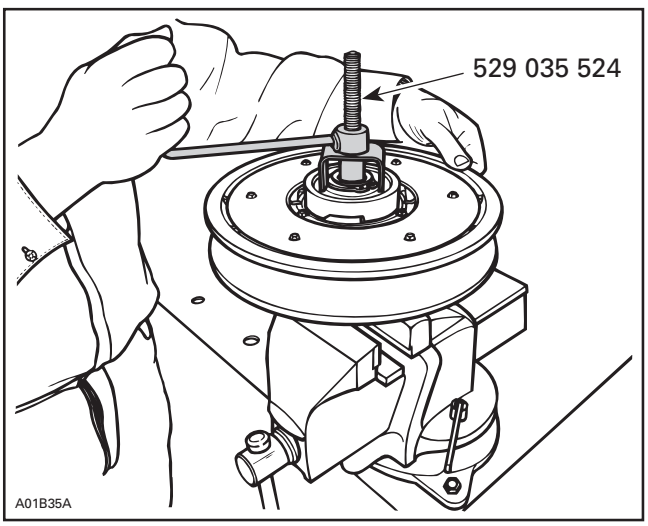
Should countershaft **no. 14** removal be required, refer to BRAKE 05-06 then look for **Countershaft and Brake Disc Removal**.

DISASSEMBLY

Use spring compressor (P/N 529 035 524).



TYPICAL
1. Insert this pin in keyway



TYPICAL

Remove snap ring **no. 2** to disassemble the outer cam and the 2 pulley halves.

◆ WARNING

Driven pulley cam is spring loaded, use above mentioned tool.

CLEANING

6,7, Large Bushing and Small Bushing

During break-in period (about 10 hours of use), teflon from bushing moves to cam or shaft surface. A teflon over teflon running condition occurs, leading to low friction. So it is normal to see gray teflon deposit on cam or shaft. Do not remove that deposit, it is not dust.

When a dust deposit has to be removed from the cam or the shaft, use dry cloth to avoid removing transferred teflon.

Pulley Half Cleaning

Use cleaning solvent.

INSPECTION

6,7, Bushings

Check for cracks, scratch and for free movement when assembled to fixed half.

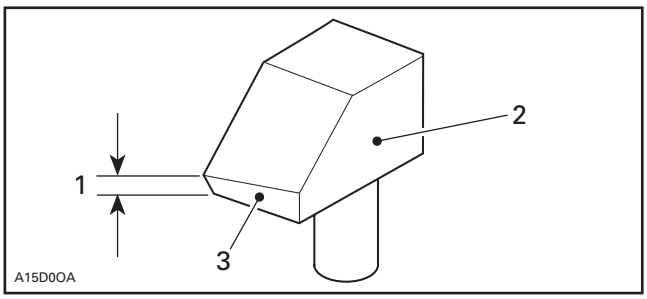
Using a dial bore gauge measure bushing diameter. Measuring point must be at least 5 mm (1/4 in) from bushing edge.

Replace bushing(s) if worn more than specified.

DRIVEN PULLEY BUSHING WEAR LIMIT mm (in)	
Small bushing	38.30 (1.508)
Large bushing	89.15 (3.510)

4, Slider Shoe

Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope base is worn to 1 mm (.039 in) or less.



1. Measure thickness of slope base here
2. Sliding pulley side
3. Slope base

Bushing Replacement

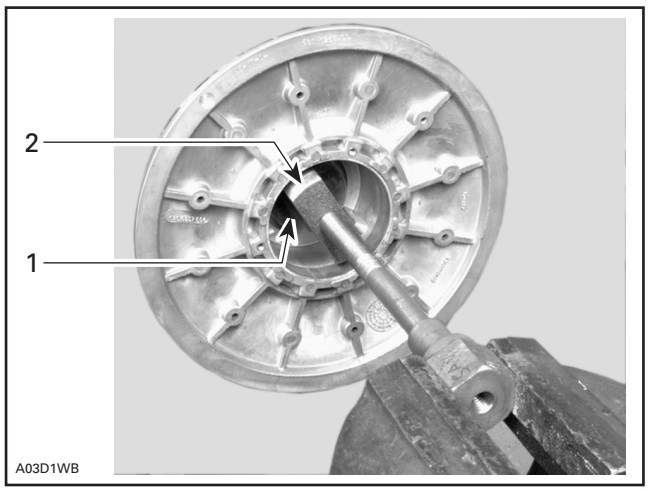
Large Bushing

Remove Allen screws if applicable. Heat to break Loctite bond.

Remove all 3 slider shoes.

Install support plate included in tool (P/N 529 031 100) inside sliding half.

Place extractor included in tool (P/N 529 031 100) below bushing.



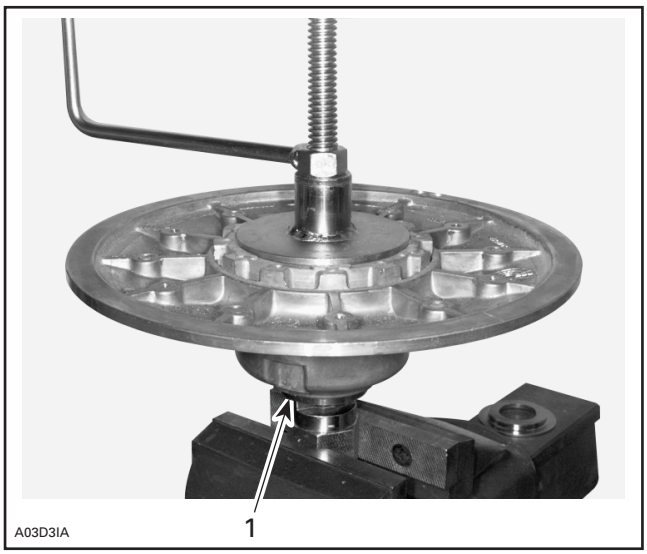
1. Support plate
2. Extractor

Mount screw head of puller (P/N 529 018 600) in a vise.

Turn pulley half by hand to extract old bushing.

Before bushing installation, file sliding half bore to remove burrs from crimping areas.

Coat bushing outside diameter with Loctite 609 (P/N 413 703 100). Place new bushing on sliding half and slightly tap to engage squarely the bushing in the sliding. Use tools (P/N 529 031 200) and new puller (P/N 529 035 524) with one of its shouldered washer to install bushing.



1. Shouldered washer

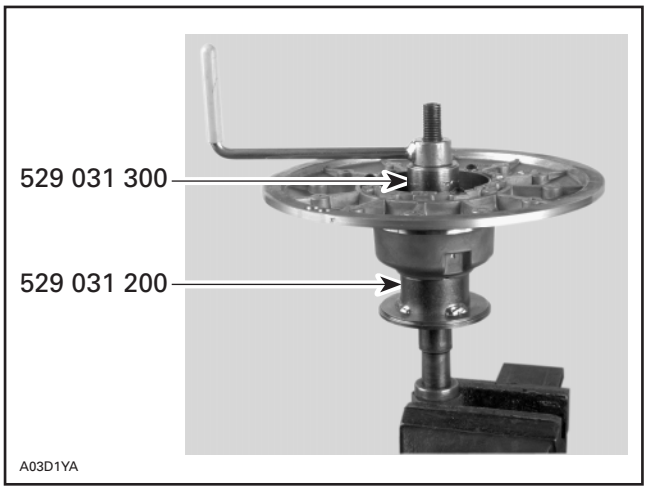
Small Bushing

NOTE: Following procedure can be done with a press using the same tools.

Install puller in a vise.

Heat bushing area.

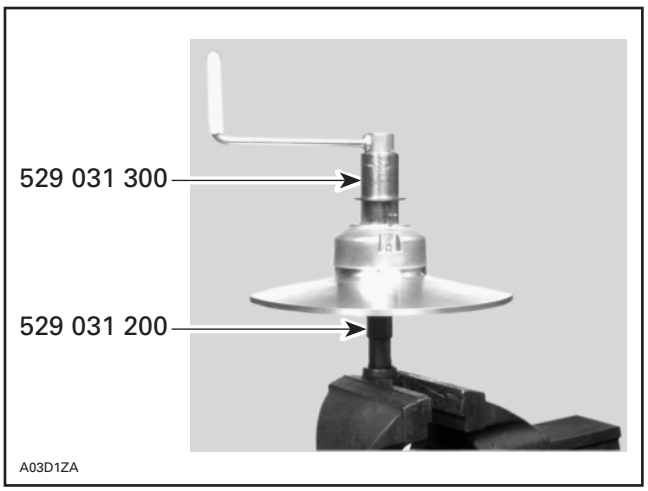
Turn puller handle and sliding half at once to extract the bushing.



IMPORTANT: Large bushing retaining screws and washers must be removed before small bushing installation.

Coat bushing outside diameter with Loctite 609 (P/N 413 703 100).

Install bushing as following photo.



ASSEMBLY

4, Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

Assemble driven pulley components by reversing the disassembly procedure.

19, Cam

Coat cam interior with anti-seize lubricant.

INSTALLATION

14, Countershaft

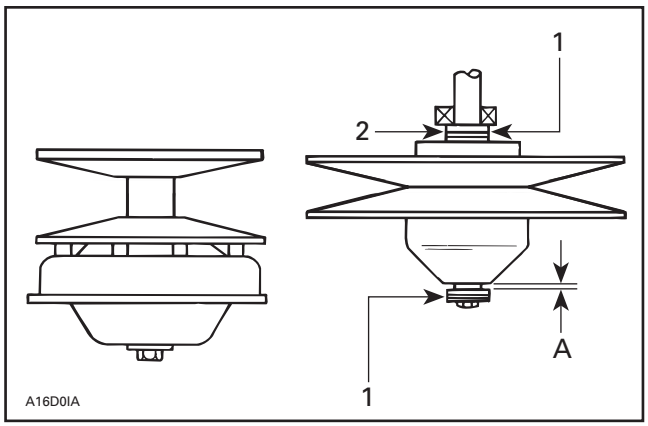
▼ CAUTION

Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

Should installation procedure be required, refer to BRAKE 05-06 then look for **Brake Disc** and **Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

Check end play of driven pulley on countershaft by pushing pulley towards outer housing so that the inner shims (P/N 504 108 200) contact it. Measure end play at the mounting screw end between shim(s) and pulley. See illustration.



TYPICAL — TOP VIEW

1. Shim (P/N 504 108 200) (as required)
2. Contact
A. 0 to 1 mm (0 to 3/64 in)

13, Pulley Retaining Screw

Torque to 25 N•m (18 lbf•ft).

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT 05-05 to adjust pulley distance. Adjust drive belt height between pulley halves to obtain specified belt deflection.

5, Spring

General

It is usual to experience spring setting during breaking period of a new spring. The factory spring preload is slightly higher (about 1 kg (2 lb)) to compensate for spring setting. Specifications in TECHNICAL DATA 10 are applicable after break-in period (about 10 hours of use).

Spring Torsional Pre-Load

To check spring pre-load adjustment, use spring scale hook (P/N 529 006 500) and a spring scale.

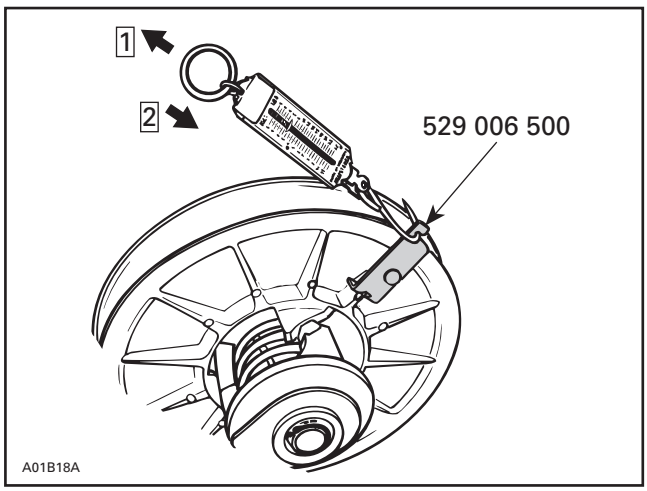
Remove drive belt.

Install the hook on the sliding half. Preventing fixed half from turning, pull sliding half with the spring scale perpendicularly with pulley axle.

Take 1st measurement when sliding half begins to turn. Rotate sliding half to 10 mm (3/8 in) of rotation. Hold fish scale at this position. Slowly release tension from fish scale and take 2nd measurement when sliding half begins to return. Spring pre-load is the average measurement between these 2.

$$\frac{\text{1st measurement (when opening)} + \text{2nd measurement (when closing)}}{2} = \text{Spring pre-load}$$

Example: $\frac{\text{3.8 kg (8.4 lb) (when opening)} + \text{3.4 kg (7.5 lb) (when closing)}}{2} = \text{3.6 kg (8 lb) Actual spring pre-load}$

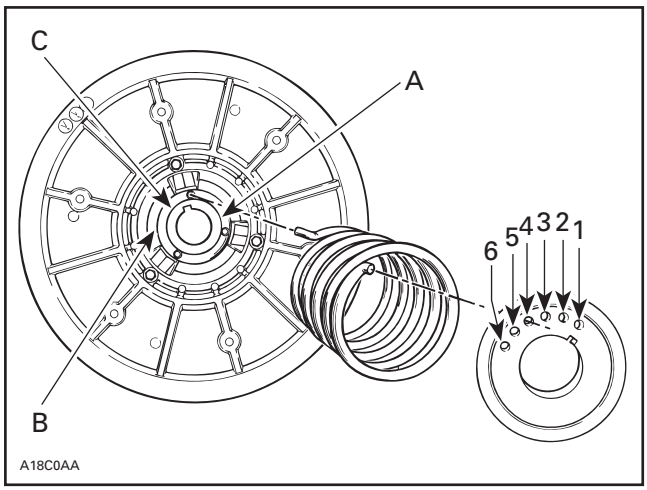


TYPICAL

Step 1 : 1st measurement
Step 2 : 2nd measurement

To adjust spring pre-load, relocate spring end in cam, moving it clockwise to increase the pre-load and counterclockwise to decrease it. Refer to TECHNICAL DATA 10.

NOTE: If spring pre-load can not be adjusted, try to relocate the other end of spring in sliding pulley (holes A, B, C).



Letters and numbers shown in illustration are actual letters and numbers embossed on parts

NOTE: Always recheck torsional pre-load after adjusting.

Pulley Alignment and Drive Belt Deflection

Refer to PULLEY DISTANCE AND ALIGNMENT 05-05 and DRIVE BELT 05-02 to perform adjustments.

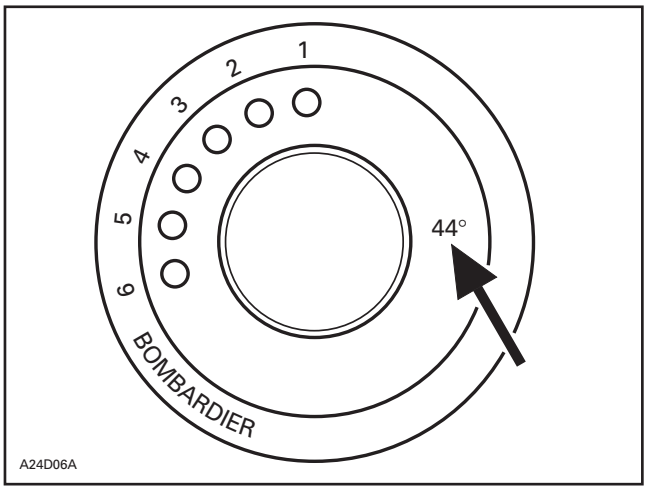
▼ CAUTION

Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

3, Cam

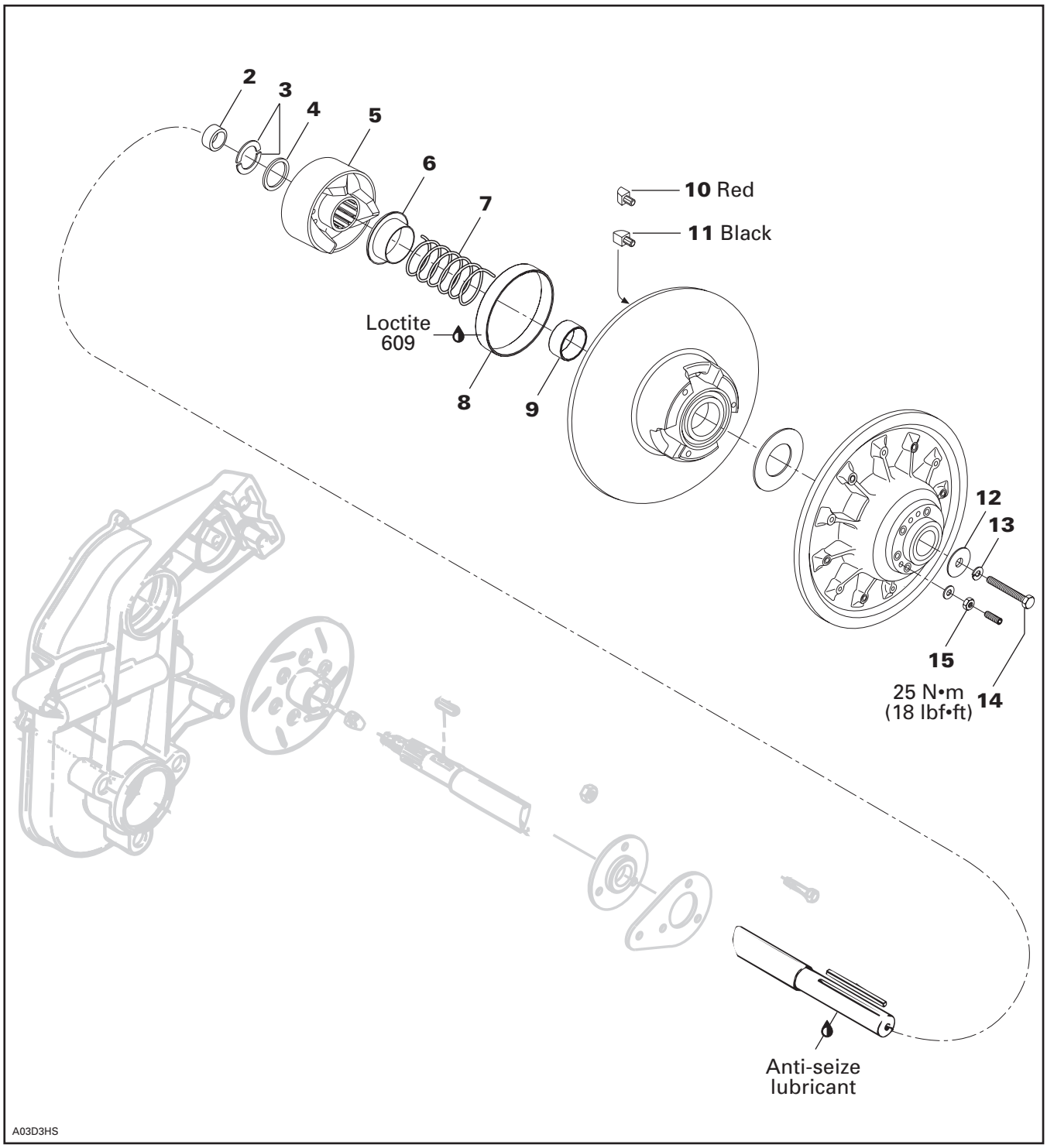
Make sure to install proper cam. Refer to TECHNICAL DATA 10.

Cam angle is identified on cam.



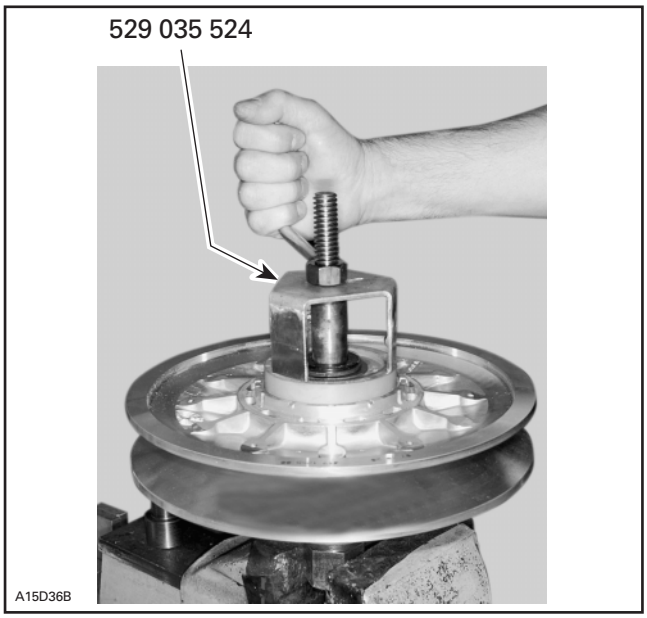
NOTE: For high altitude regions, the *High Altitude Technical Data Booklet* (P/N 484 300 003 and 484 054 500 for binder) gives information about calibration according to altitude.

Skandic 380/500, Touring E/LE/SLE and Formula DLX 380/500



DISASSEMBLY

Use spring compressor (P/N 529 035 524).



TYPICAL

Remove half keys **no. 3** and spacer **no. 4** to disassemble the outer cam and the 2 pulley halves.

◆ WARNING

Driven pulley cam is spring loaded, use above mentioned tool.

INSPECTION

Replace bushing(s) if worn more than specified.

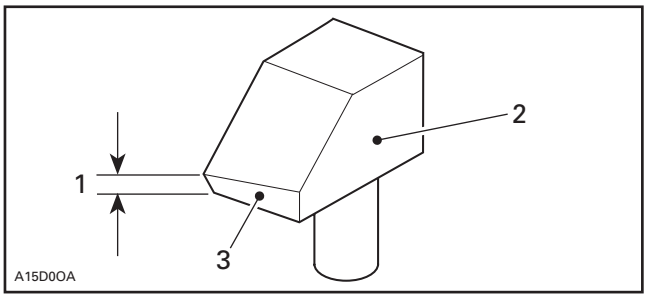
DRIVEN PULLEY BUSHING WEAR LIMIT mm (in)	
Small bushing	38.30 (1.508)
Large bushing	108.2 (4.260)

10,11, Slider Shoe

Black slider shoe = forward

Red slider shoe = reverse

Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope base is worn to 1 mm (.039 in) or less.



1. *Measure thickness of slope base here*
2. *Sliding pulley side*
3. *Slope base*

Bushing Replacement

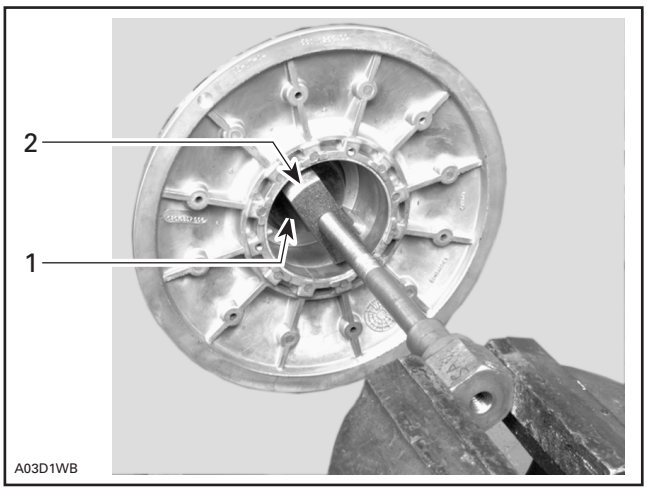
Large Bushing

Remove Allen screws if applicable. Heat to break Loctite bond.

Remove all 3 slider shoes.

Install support plate included in tool (P/N 529 031 100) inside sliding half.

Place extractor (P/N 529 035 575) below bushing.



TYPICAL

1. *Support plate*
2. *Extractor*

Mount screw head of new puller (P/N 529 035 524) in a vise.

Turn pulley half by hand to extract old bushing.

Before bushing installation, file sliding half bore to remove burrs from crimping areas.

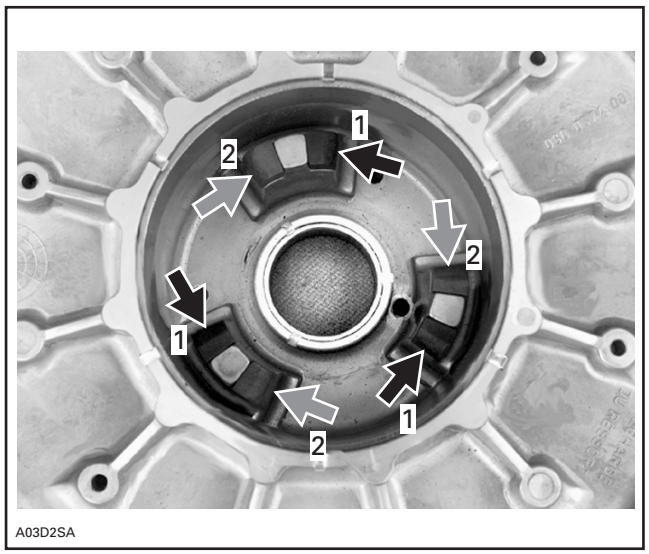
Coat bushing outside diameter with Loctite 609 (P/N 413 703 100). Place new bushing on sliding half and slightly tap to engage squarely the bushing in the sliding.

ASSEMBLY

10,11, Cam Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

Install slider shoes as per following photo. Red slider shoes are being used for reverse and black ones for forward.



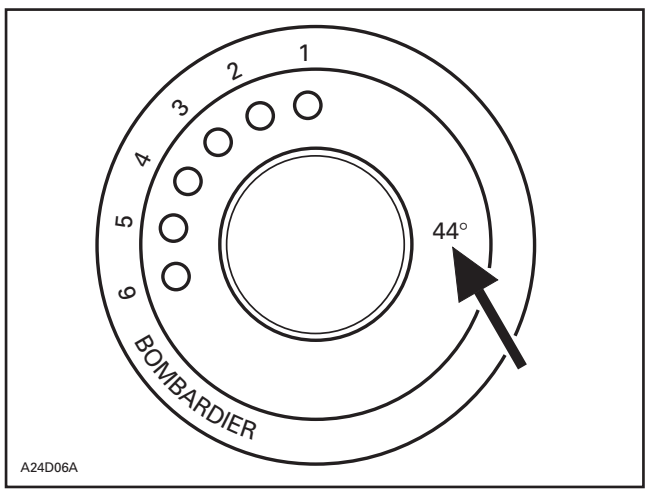
1. *BLACK slider shoe*
2. *RED slider shoe*

Assemble driven pulley components by reversing the disassembly procedure.

5,6,7, Cam, Guard and Spring

Make sure to install proper cam. Refer to TECHNICAL DATA.

Cam angle is identified on cam.



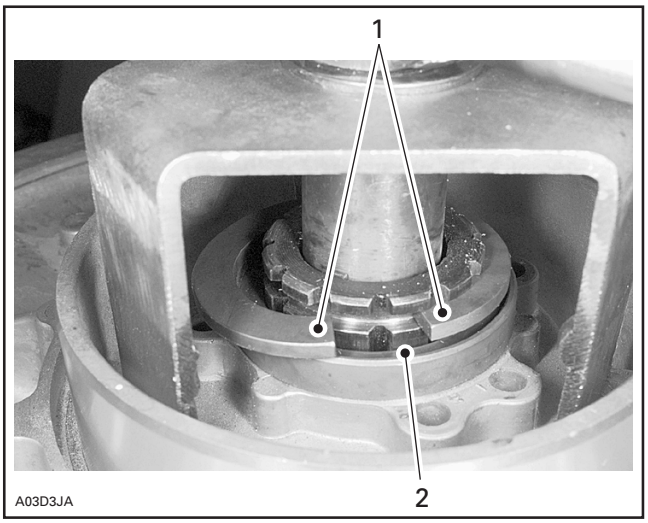
Position guard **no. 6** in cam **no. 5** then insert spring in adjusting hole no. 3 (mid-hole) into outer cam.

Compress outer cam using spring compressor (P/N 529 035 524).

Install spacer **no. 2** then secure outer cam with half keys **no. 1**, as shown in the next photo.

▼ CAUTION

Ensure that half keys are properly inserted into shaft groove and that spacer recess is facing half keys.



1. Half keys inserted into shaft groove
2. Spacer recess facing half keys

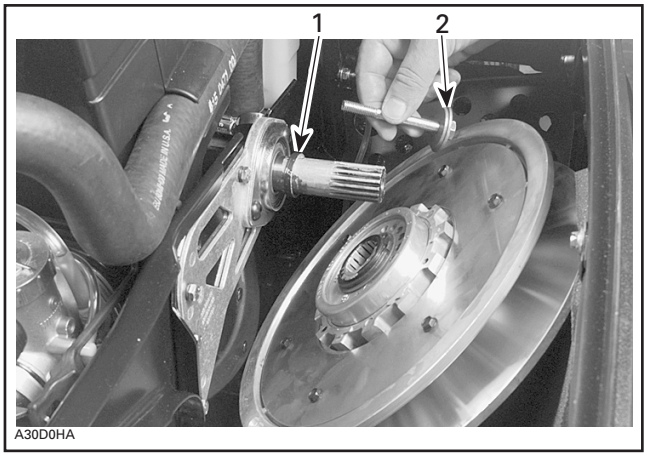
INSTALLATION

14, Countershaft

▼ CAUTION

Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

Make sure that spacer **no. 2** is on countershaft before installing driven pulley. Note also that washer shoulder is facing driven pulley.



TYPICAL

1. Spacer
2. Shoulder on this side

Should installation procedure be required, refer to BRAKE 05-06 then look for **Brake Disc and Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

1, Pulley Retaining Screw

Torque to 25 N•m (18 lbf•ft).

ADJUSTMENT

Pulley Alignment and Drive Belt Deflection

Refer to PULLEY DISTANCE AND ALIGNMENT 05-05 and DRIVE BELT 05-02 to perform adjustments.

▼ CAUTION

Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

PULLEY DISTANCE AND ALIGNMENT

GENERAL

The pulley distance we will refer to in this section, is the space separating the drive and driven pulley outside diameters (Z measurement).

This basic distance is provided as an assembly guide and indicates the dimensions between which satisfactory belt deflection will be obtained.

Both pulley distance adjustment and pulley alignment must be carried out to ensure the highest efficiency of the transmission system. Furthermore, optimum drive belt operation and minimal wear will be obtained only with proper pulley alignment.

▼ CAUTION

Before checking pulley adjustment, the rear suspension must be mounted on the vehicle.

◆ WARNING

Failure to correctly perform pulley alignment may cause the vehicle to creep forward at idle.

All Pulley Alignment Specifications Refer to:

X = Distance between straight bar and drive pulley fixed half edge, **measured between pulleys**.

Y = Distance between straight bar and drive pulley fixed half edge, **measured at the end of straight bar**.

Z = Distance between outside diameter of pulleys.

GENERAL PROCEDURE

Remove guard.

Tundra

By turning and pushing the sliding half, open the driven pulley.

Tundra R

Use driven pulley opening tool (P/N 529 034 200).

S-Series without RER

Use driven pulley opening tool (P/N 529 035 500).

S-Series with RER

Use driven pulley opening tool (P/N 529 035 501).

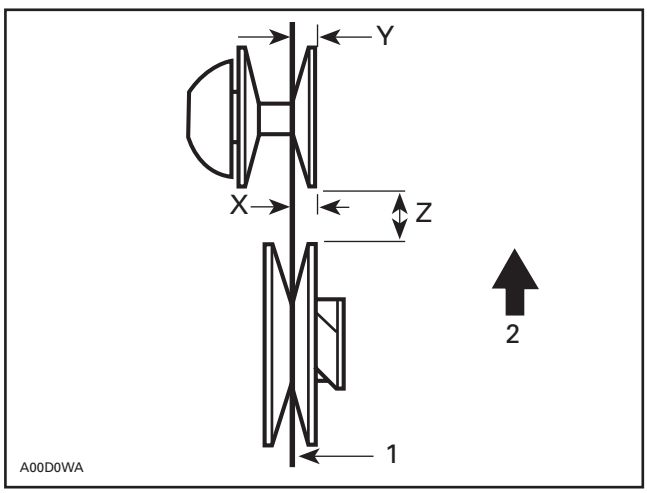
All Models

Remove drive belt. Insert a straight bar 9.5 mm (.375 in) square, 48 cm (19 in) long or the proper alignment template into the opened driven pulley.

Measuring Procedure

Using Straight Bar:

Always measure distances X and Y from the farther straight bar side (including its thickness to the fixed half edge).



1. Straight bar
2. Front of vehicle

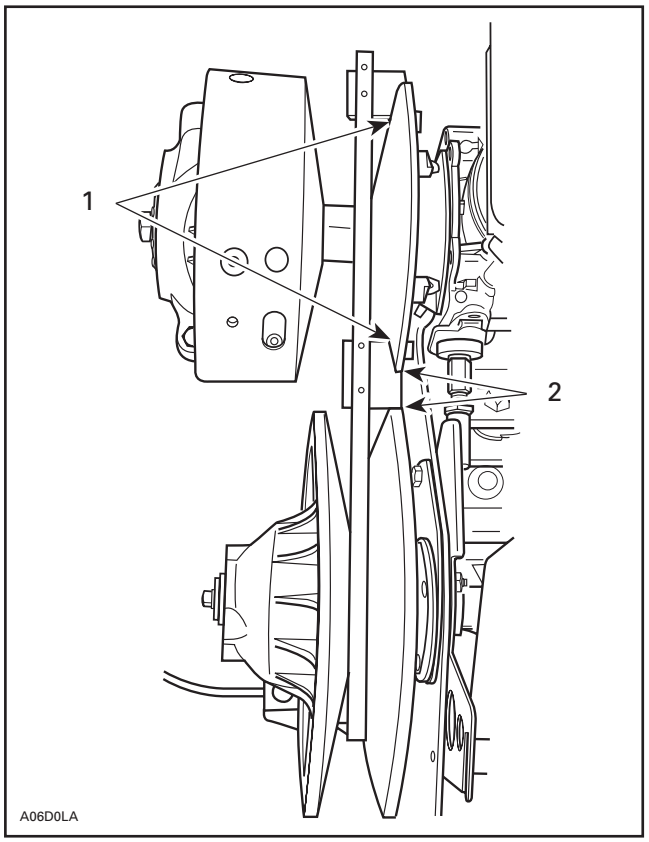
The distance Y **must** exceed distance X to compensate for the twist due to the engine torque.

Nominal Dimension Procedure and Quick Alignment and Distance Check

Alignment template tabs must fully contact fixed half of drive pulley.

Pulley distance is correct when tab contacts both pulley halves.

Refer to below chart for proper alignment template.

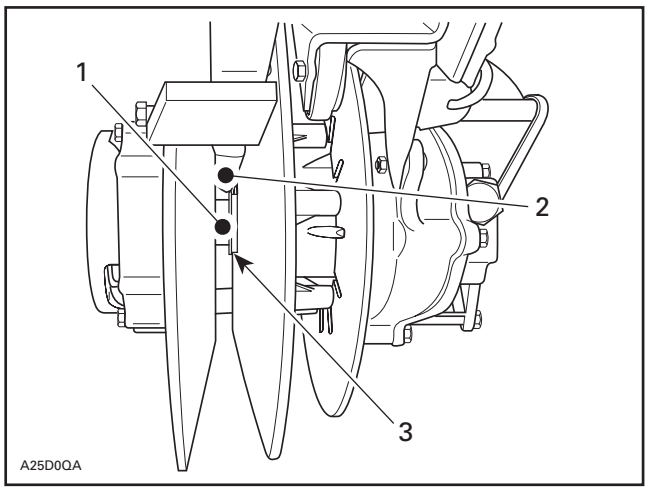


TYPICAL

1. *Contact (alignment)*
2. *Contact (distance)*

Tundra/R Only

Bottom of alignment template must not seat on shaft nor fixed half shoulder and shim(s).



TYPICAL

1. *Shaft*
2. *Alignment template*
3. *Fixed half shoulder and shim(s)*

Drive Belt Deflection

NOTE: When pulley distance and alignment are adjusted to specifications, refer to DRIVE BELT 05-02 to adjust drive belt deflection.

▼ CAUTION

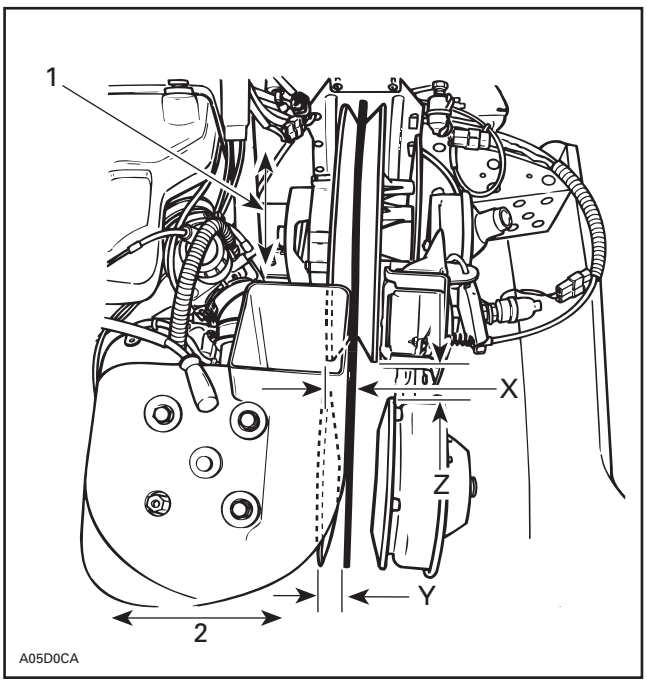
This section deals mainly with adjustment procedures. For complete assembly requirements, refer to the proper ENGINE or TRANSMISSION installation section.

PULLEY ALIGNMENT AND DISTANCE SPECIFICATIONS CHART

MODEL	PULLEY DISTANCE	OFFSET		ALIGNMENT TEMPLATE ①
	Z	X	Y-X	
	1 mm (in)	mm (in)	mm (in)	P/N
Tundra/R	37.0 + 0, - 1.5 (1.457 + 0, - .059)	36.0 ± 1 (1.417 ± .039)	0 to 1.5 (0 to .059)	529 026 900
Formula S	26.0 + 0, - 1.0 (1.024 + 0, - .039)	33.4 ± 0.5 (1.315 ± .020)	0.5 to 1.5 (.020 to .059)	529 030 000
Skandic 380, Touring E, Formula DLX 380	26.0 ± 0.5 (.1.024 ± .020)	33.4 ± 0.5 (1.315 ± .020)	0.5 to 1.5 (.020 to .059)	529 035 586
Formula SL	17.0 + 0, - 1.0 (.669 + 0, - .039)	35.5 ± 0.5 (1.398 ± .020)	0.5 to 1.5 (.020 to .059)	529 026 700
Skandic 500, Touring LE/SLE, Formula DLX 500	17.0 ± 0.5 (.669 ± .020)	35.5 ± 0.5 (1.398 ± .020)	0.5 to 1.5 (.020 to .059)	529 035 530

① Alignment templates have been made according to pulley alignment nominal dimensions. However, they do not take into account allowed tolerances for alignment specifications. They are used as GO/NO GO gauges for quick alignment and pulley distance check and as templates to reach alignment nominal values.

Tundra/R



1. Driven pulley movement
2. Engine movement

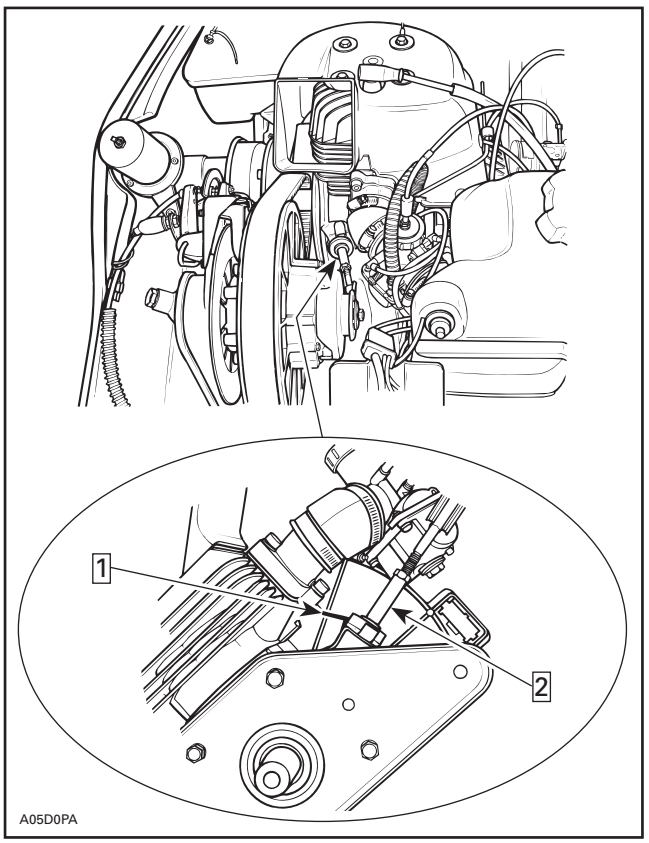
▼ CAUTION

The rear suspension must be mounted on the vehicle and track tension and alignment must be done to provide the right frame width.

Pulley Distance Adjustment Method

Loosen the 4 chaincase retaining bolts, unlock and raise pulley support.

Move chaincase to obtain specific adjustment and adjust driven pulley support length accordingly (light contact).

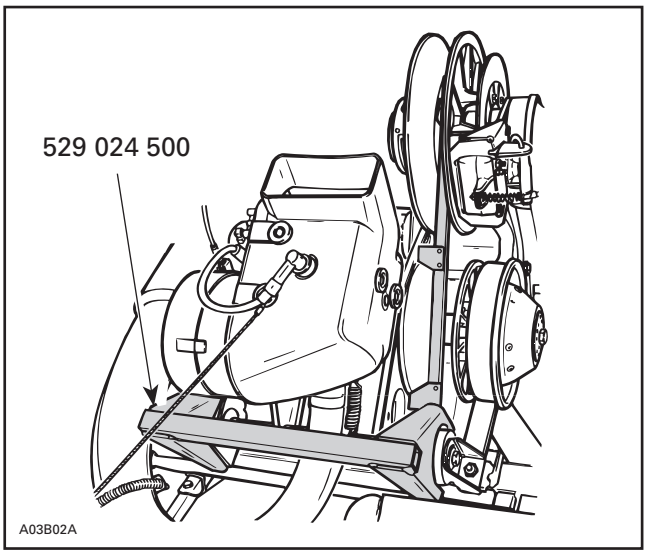


Step 1 : Push and hold
Step 2 : Raise support

Pulley Alignment Method

Engine Movement

Loosen the support retaining bolts and install engine support positioner (P/N 529 024 500) to keep from altering distance between both supports.



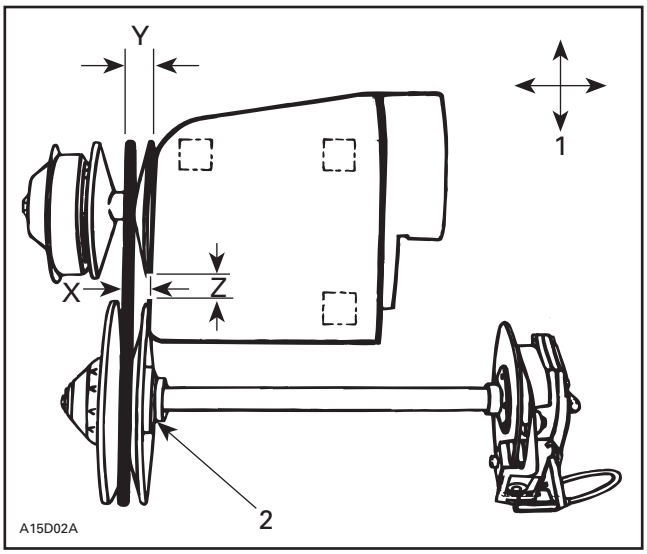
TYPICAL

Move the engine to obtain specified pulley alignment, torque engine support bolts to 55 N•m (41 lbf•ft) and remove engine support positioner.

Driven Pulley Movement

Shims can be mounted between chaincase and frame. Use shim (P/N 504 039 800), 0.53 mm (.021 in) thick.

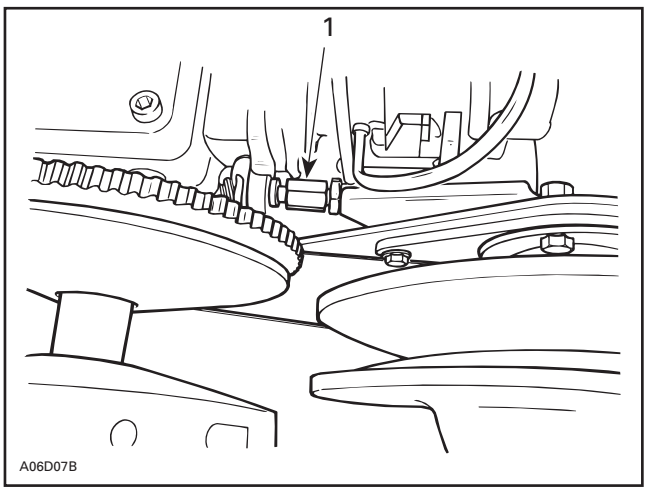
S-Series



TYPICAL

1. Engine movement
2. Contact

NOTE: Prior to performing pulley adjustment, loosen torque rod nut to allow engine movement. Engine supports have tendency to stick to frame, work engine loose prior to aligning.



1. Loosen

Pulley Distance Adjustment Method

Engine Movement

The engine support has slotted mounting holes. Move engine to obtain specified distance between pulleys.

Pulley Alignment Method

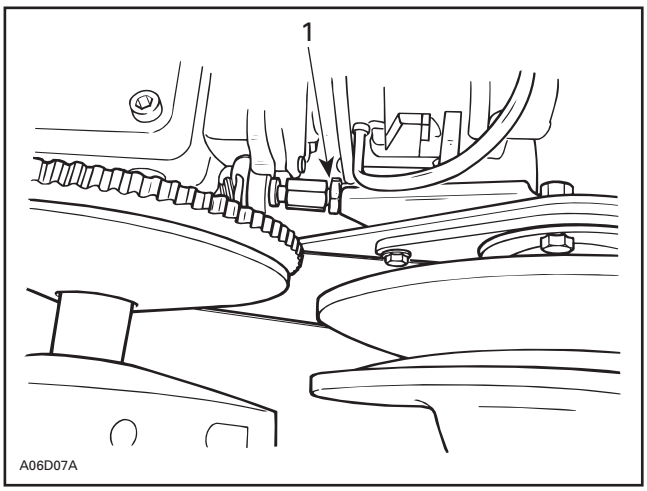
Driven Pulley Movement

When engine slotted mounting holes do not allow to set proper pulley offset X, adjust with shims (P/N 504 108 200) between pulley and countershaft bearing support (pulley pushed toward brake disc).

Engine Movement

Loosen the 4 bolts retaining engine support to the frame. Position engine to obtain the specified alignment.

NOTE: After alignment, adjust torque rod so it slightly contacts stopper plate. Do not over tighten, it will disalign pulleys.

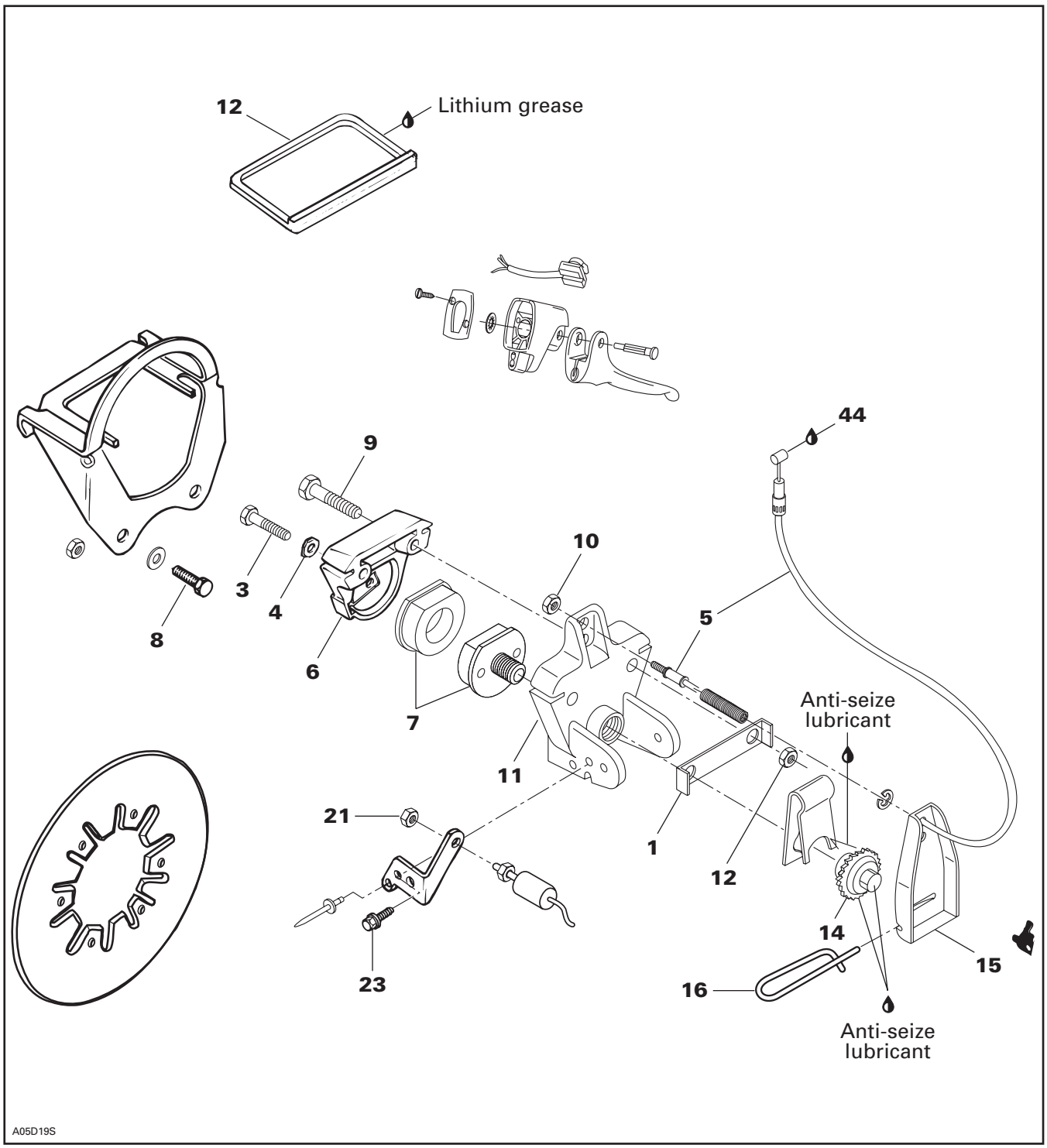


1. Retighten

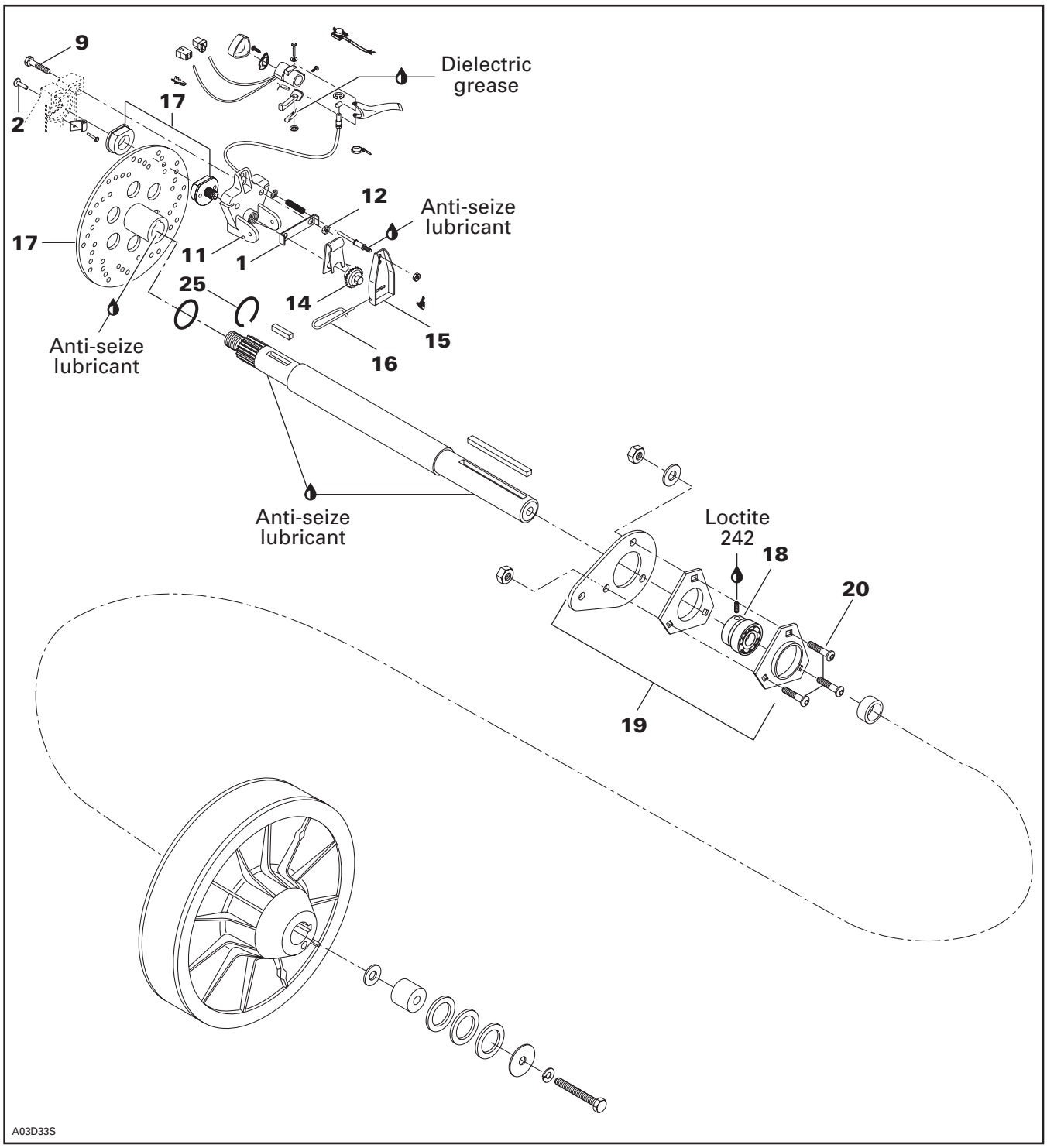
BRAKE

MECHANICAL BRAKE

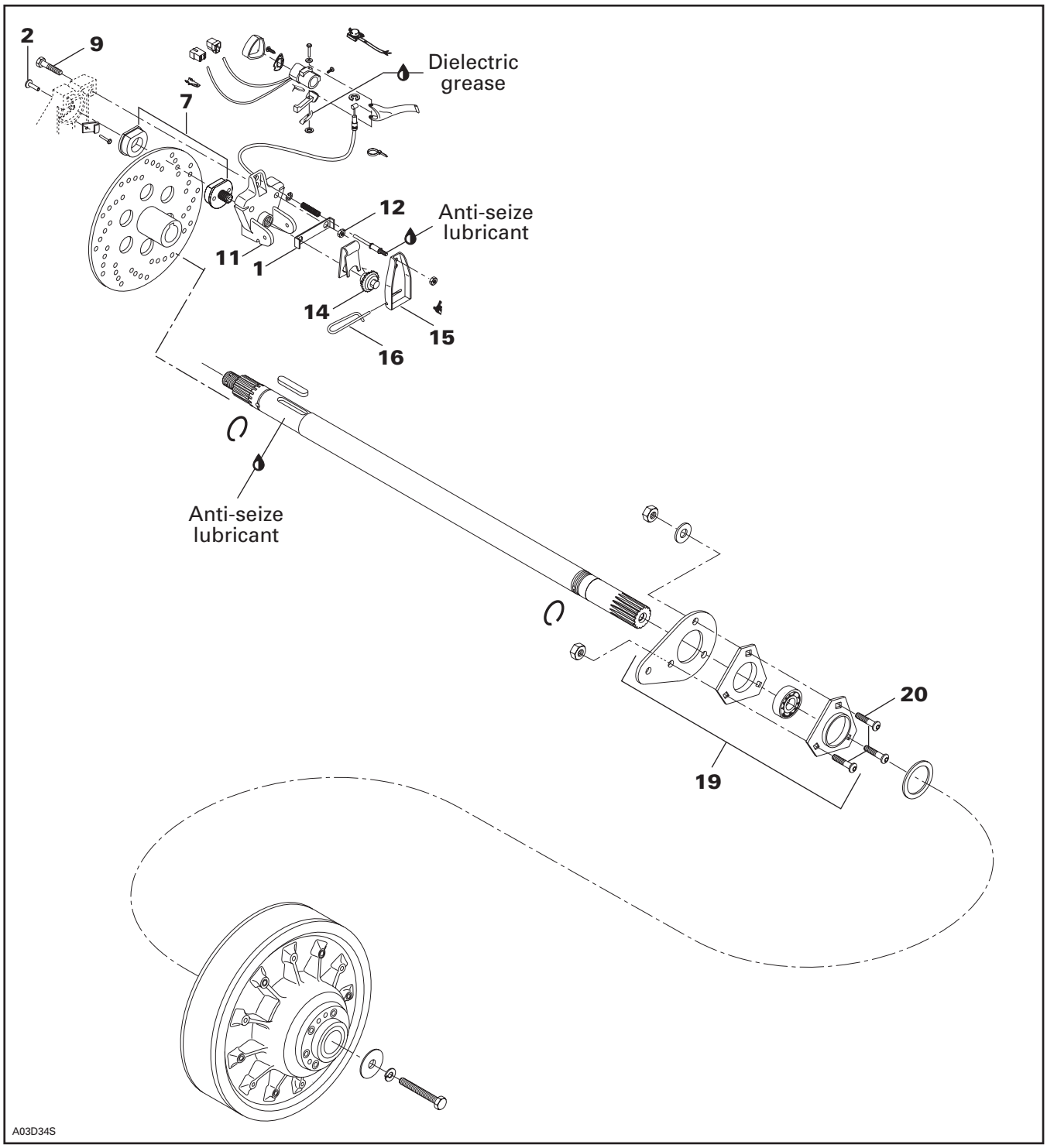
Tundra/R



Formula S

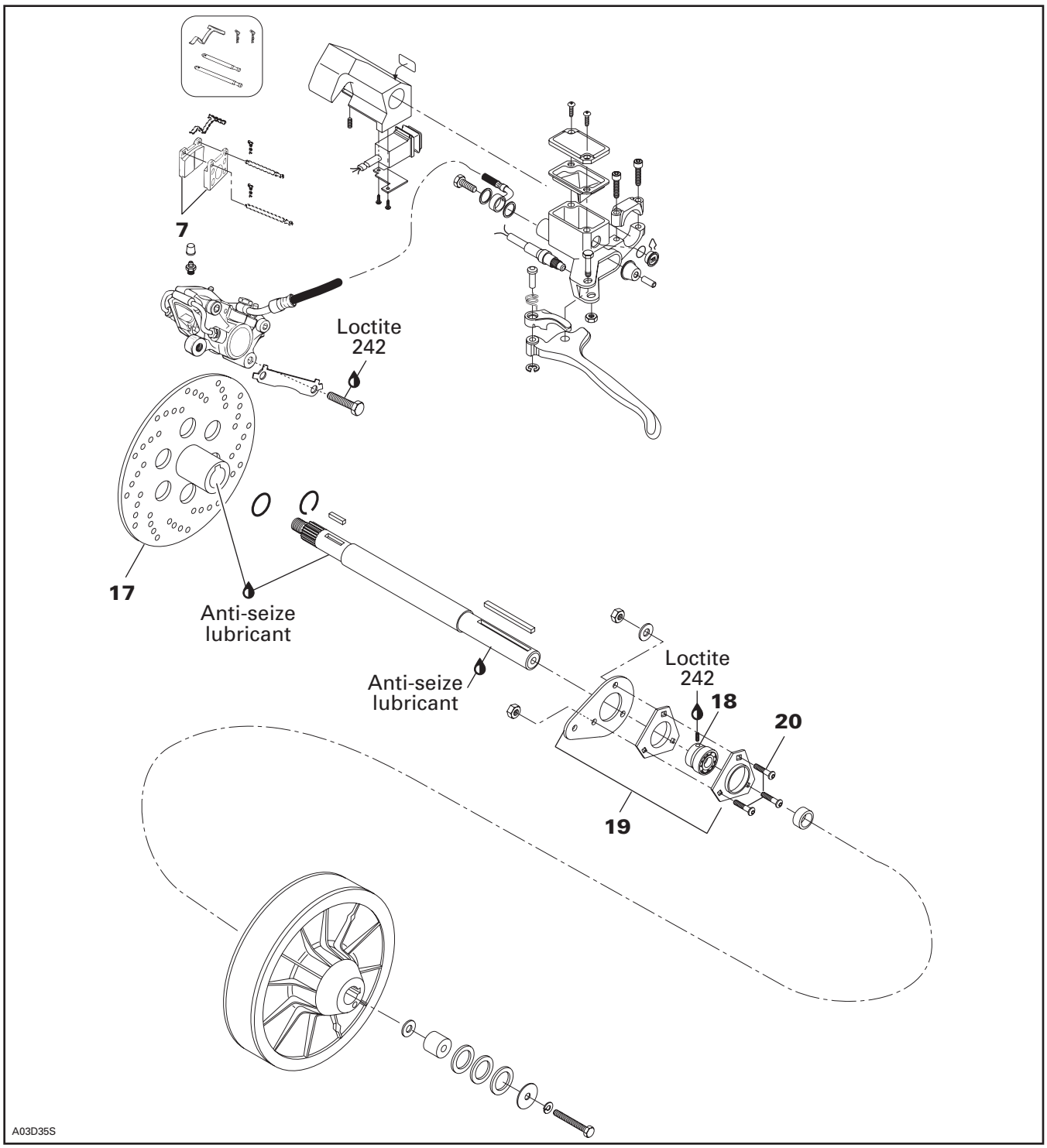

9
2
17
Dielectric grease
12
Anti-seize lubricant
17
11
1
25
14
15
16
Anti-seize lubricant
Anti-seize lubricant
Loctite 242
18
20
19
A03D33S

Formula DLX 380, Touring E and Skandic 380

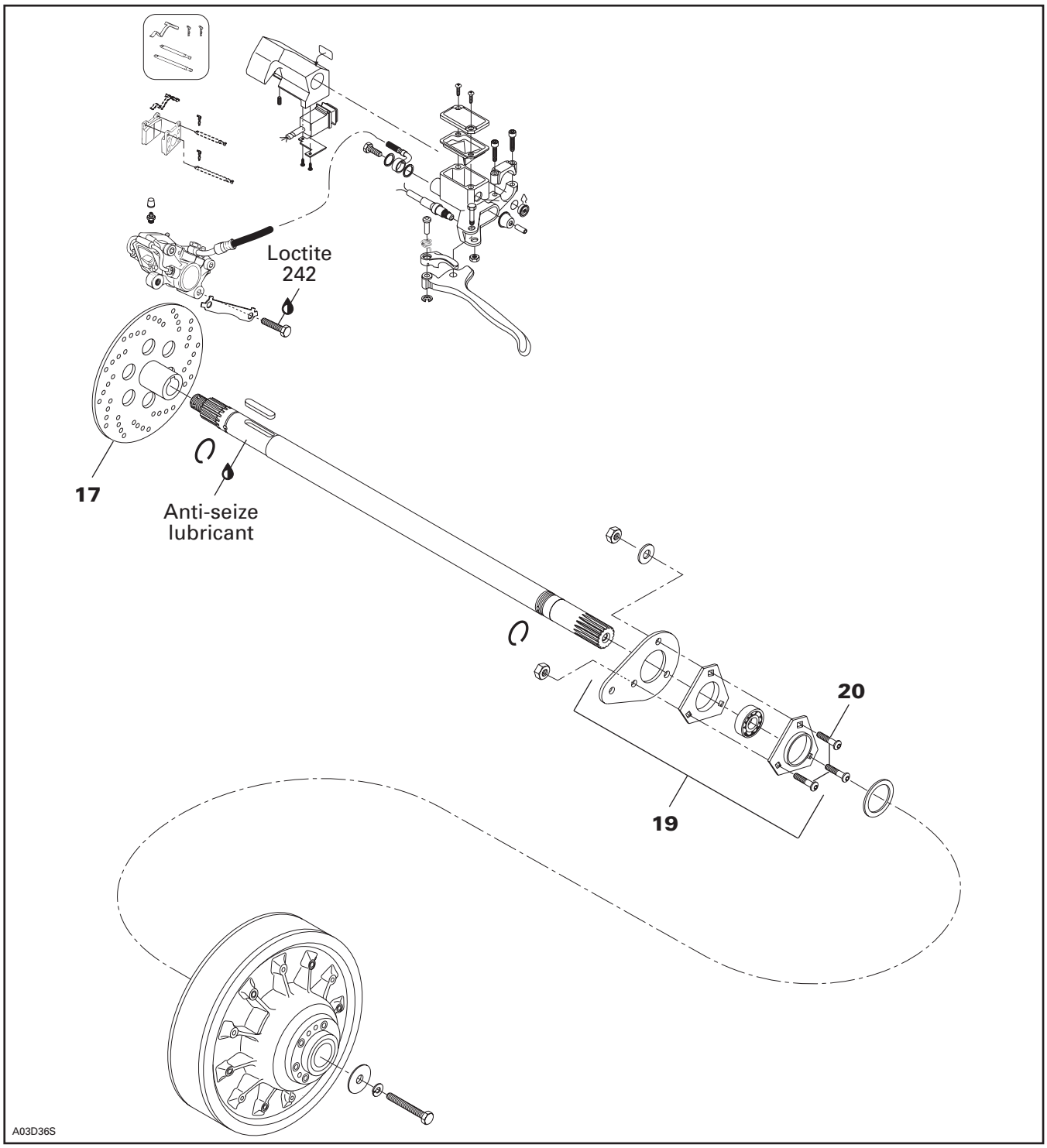


HYDRAULIC BRAKE

Formula SL



Formula DLX 500, Touring LE/SLE and Skandic 500



REMOVAL

Tundra/R

The split caliper type brake should be removed from chaincase as an assembly. Proceed as follows:

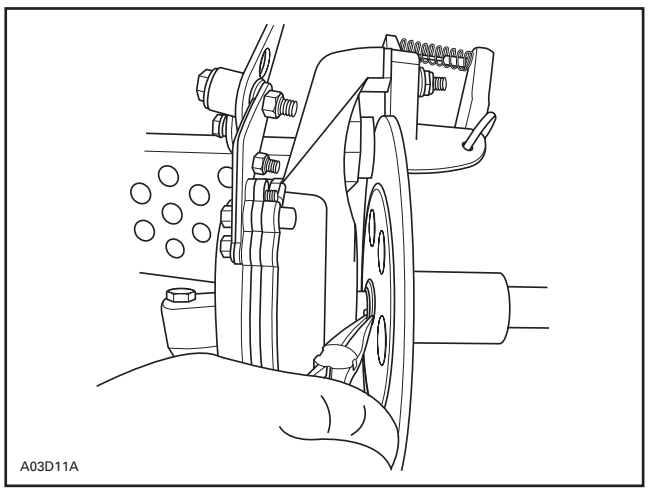
– Remove belt guard.
– Disconnect brake cable.
– Remove bolts no. 8 securing brake support to chaincase.
– Slide brake caliper ass'y out of brake support.
– To remove brake disc, refer to DRIVEN PULLEY 05-04.

Brake Disc Removal

S-Series with Mechanical Brake

Brake disc can be withdraw without removing caliper. Proceed as follows:

– Remove belt guard, belt and driven pulley.
– Remove air silencer.
– Unbolt bearing support from chassis.
– Open chaincase and remove upper sprocket.
– Pull countershaft ass'y toward driven pulley side to gain access to clip no. 25.
– Remove clip no. 25 on countershaft.



– Pull countershaft toward driven pulley side to free from chaincase and disc.
– Remove disc.

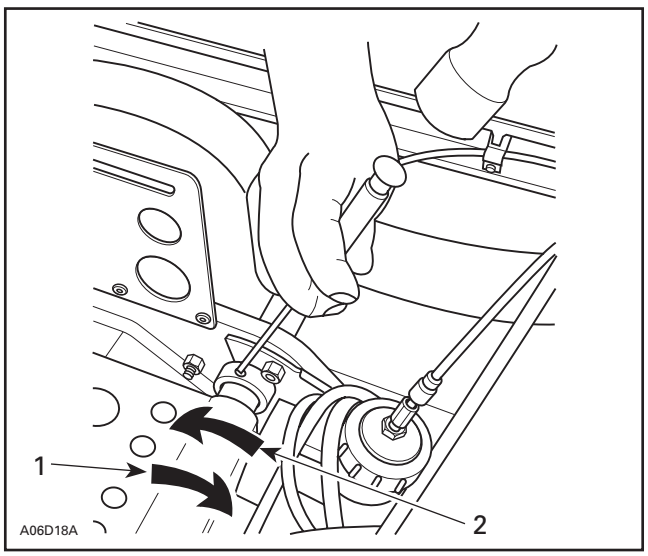
Countershaft Removal

S-Series with Mechanical Brake

Proceed the same as for brake disc removal and to the following.

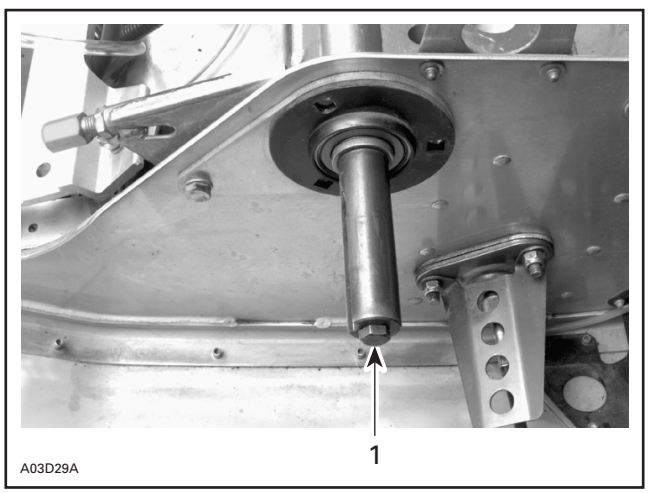
Formula S

Unlock bearing collar on driven pulley side.



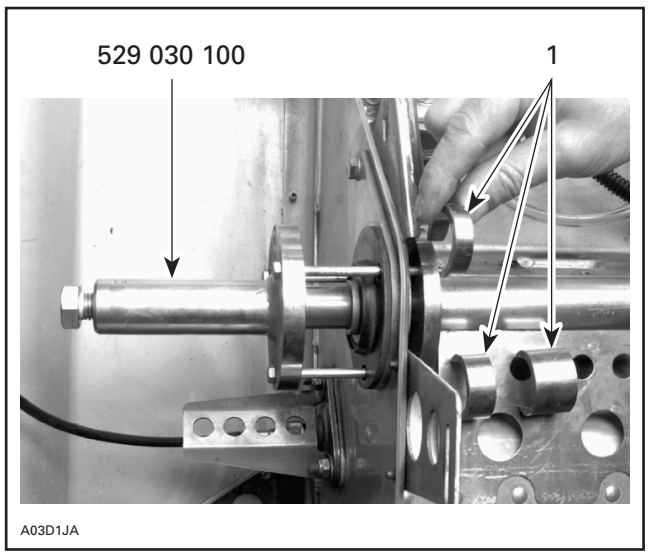
1. Lock
2. Unlock

Unbolt bearing support. Install screw included with remover (P/N 529 030 100) on countershaft.



1. Screw included with remover

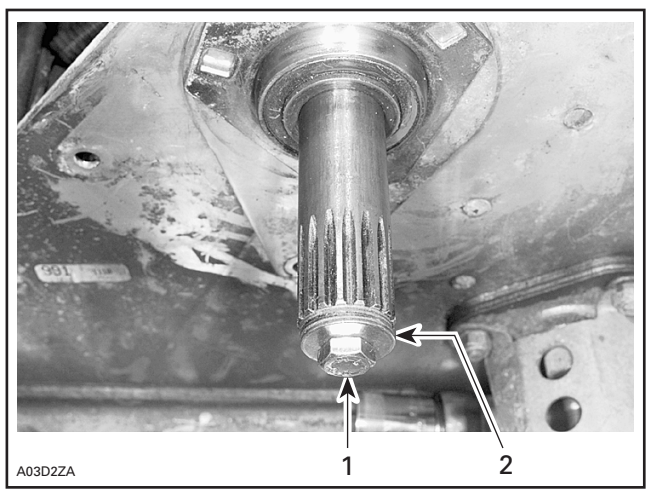
Pull bearing to driven pulley side out of countershaft, using remover (P/N 529 030 100). Begin with only the remover then add a spacer of different width as the bearing comes out.



1. Spacers

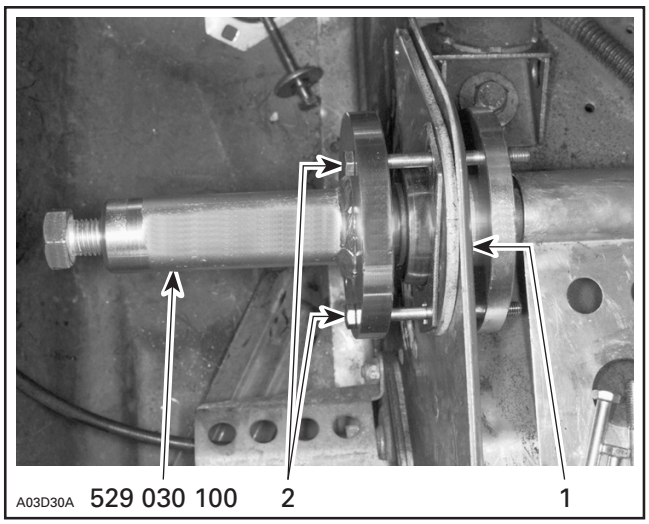
Skandic 380 and Touring E

Unbolt bearing support and triangular support. Install screw from remover (P/N 529 030 100) and some flat washers of 3 mm (1/8 in) total thickness.



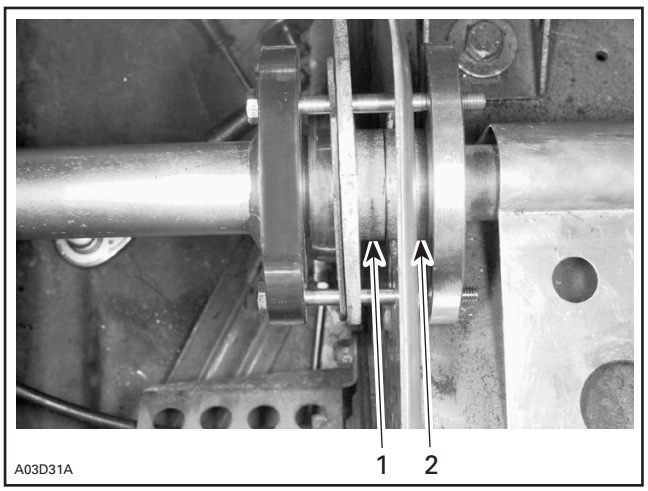
1. Screw from tool
2. Washers use as a 3 mm (1/8 in) spacer

Install remover (P/N 529 030 100) on countershaft and medium thickness spacer. Use M6 x 70 mm screws instead of screws supplied with remover.



1. Medium thickness spacer
2. M6 x 70 mm screws

Add the thin spacer to complete bearing removal.



1. Thin spacer
2. Medium thickness spacer

Countershaft and Brake Disc Removal

S-Series with Hydraulic Brake

– Remove muffler.
– Refer to CHAINCASE 05-07 in order to remove chaincase cover.
– Remove upper sprocket castellated nut.
– Remove belt guard, drive belt and driven pulley referring to DRIVEN PULLEY 05-04.

Formula SL Only

– Loosen set screw and unlock collar no. 18 if bearing is needed to be disassembled. See above S-Series illustration and procedure.

S-Series with Hydraulic Brake and RER

If bearing is needed to be disassembled follow Skandic 380 and Touring E procedure above.

S-Series with Hydraulic Brake

– Remove 3 retaining screws no. 20 from countershaft bearing housing.
– Unbolt oil reservoir support to make room for countershaft or brake disc removal.
– Pull countershaft toward driven pulley side to gain access to clip no. 25.
– Remove clip no. 25 on countershaft.
– Pull countershaft toward driven pulley side to free from chaincase. Withdraw countershaft toward chaincase.
– Remove connecting pipe between tuned pipe and after muffler.
– Disconnect brake line from caliper and plug it.
– Unbolt caliper from chaincase.
– Remove brake disc from countershaft.

DISASSEMBLY

7,15,16,23, Brake Pad, Brake Lever, Pin and Screw

All Models with Mechanical Brake

Pull pin out of caliper and remove lever.

On Tundra/R, remove self-tapping screw. Unscrew ratchet wheel in order to remove moving pad.

Remove fixed pad.

S-Series with Mechanical Brake

Fixed pad is riveted to chaincase on these models. Caliper must be split to remove moving pad. To removed fixed pad, drill out its rivet then pry disc in order to free fixed pad.

All Models with Hydraulic Brake

Only brake pads are available as spare parts. If caliper or master cylinder are damaged, replace each of them as an assembly.

CLEANING

Clean all metal components in a general purpose solvent. Thoroughly dry all components before assembling.

▼ CAUTION

Do not clean brake pads in solvent. Soiled brake pads must be replaced by new ones.

INSPECTION

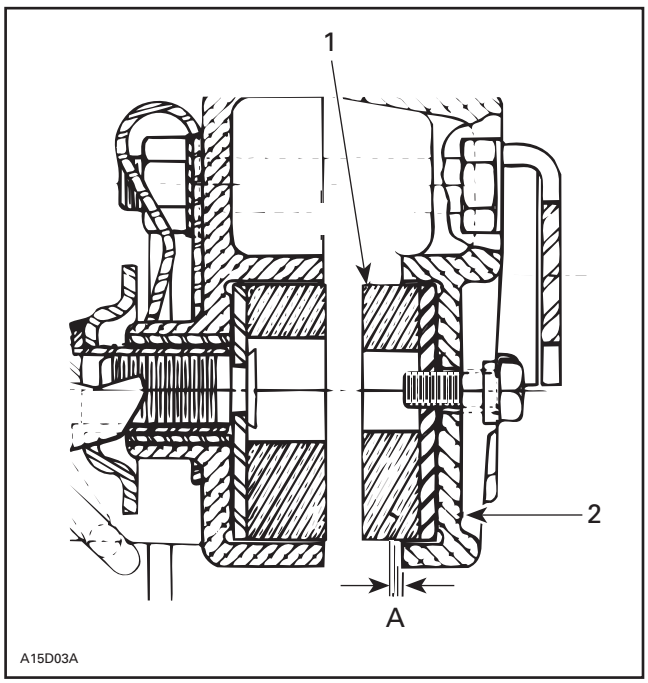
7, Brake Pad

Models with Mechanical Brake

Brake pads must be replaced when fixed pad projects only 1 mm (1/32 in) from caliper.

▼ CAUTION

Brake pads must always be replaced in pairs.



TYPICAL

1. Fixed pad
2. Inner caliper
A. 1 mm (1/32 in) minimum

Models with Hydraulic Brake

Brake pads must be replaced when lining is 1 mm (1/32 in) thick.

▼ CAUTION

Brake pads must always be replaced in pairs.

Brake Disc

All Models

Check for scoring, cracking or heat discoloration, replace as required. Refer to DRIVEN PULLEY 05-04 for replacement procedures on Tundra/R.

▼ CAUTION

Brake disc should never be machined.

ASSEMBLY

14, Ratchet Wheel

Apply synthetic grease (P/N 413 711 500) on threads and spring seat prior to installing. Fully tighten then back off one turn.

16, Pin

Install so that it can only be removed upward. Lock it in the caliper casting notch.

7, Fixed Brake Pad

Tundra/R

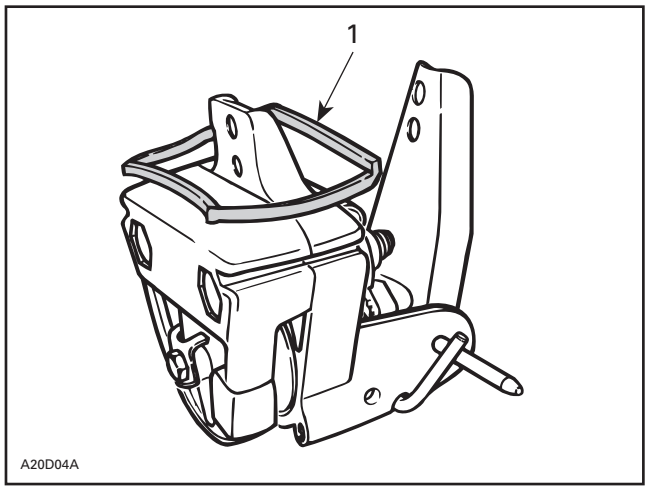
Torque screw **no. 3** to 4 N•m (35 lbf•**in**). Bend locking tab **no. 4** over a flat of screw head.

1,6,11,12, Locking Tab, Inner, Outer Caliper and Nut

Tundra/R

Assemble both caliper halves. Insert bolts **no. 9**, locking tab **no. 20**, then nuts. Torque nuts to 24 N•m (18 lbf•ft). Caliper half side slots must align to allow proper sliding in brake support. Bend locking tab over a flat of each nut.

Install rubber slider **no. 12** lubricated with lithium grease into side slots of caliper. It must be installed so that the raised edge is upward and on the same side of nuts as shown.



1. Raised edge upward and same side of nuts

▼ CAUTION

Positioning of rubber slider is important to avoid the possibility of damage against locking tab edges.

INSTALLATION

To install brake, reverse removal procedure paying attention to the following.

◆ WARNING

Avoid getting oil on brake pads. Do not lubricate or apply antirust or antifreeze solution in brake cable.

17, Brake Disc

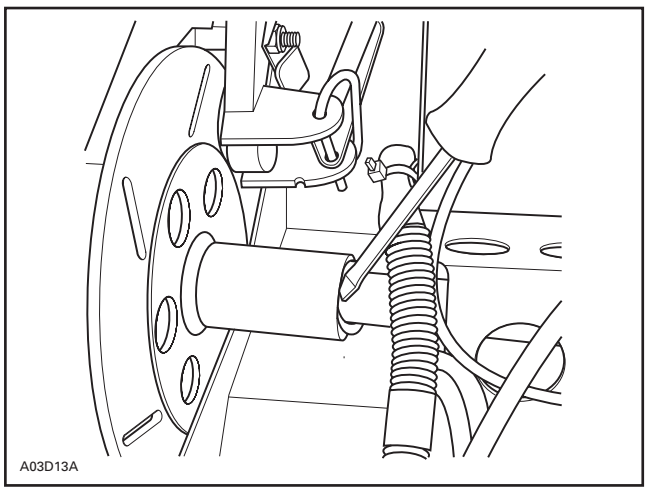
S-Series

The brake disc must be floating on countershaft for efficient operation of brake.

Apply anti-seize lubricant (P/N 413 701 000) on shaft and check that disc slides freely.

The disc hub exceeds the disc more from one side than from the other. Install disc with the longer exceeding portion toward driven pulley.

Push O-rings inside disc hub.

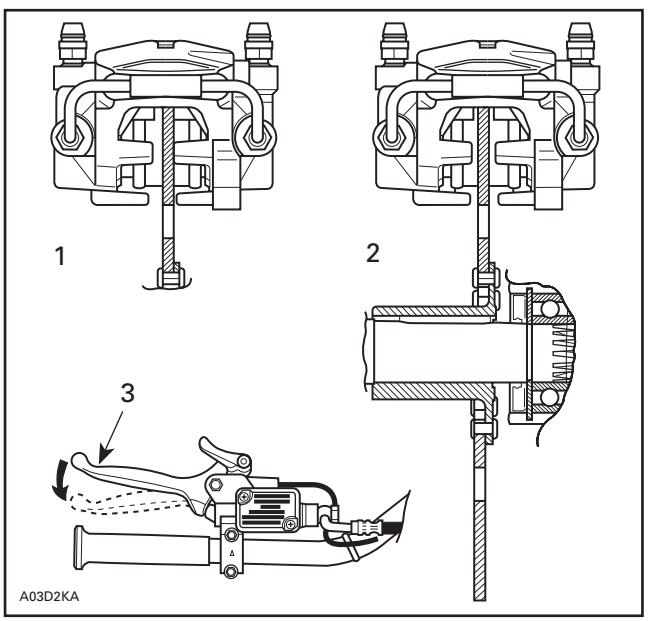


7, Brake Pad

Models with Hydraulic Brake

After brake pads installation, brake disc must be centered in caliper. Apply brake then check for proper brake disc positioning.

Push on appropriate caliper piston in order to move pad inward allowing proper brake disc positioning.



1. Brake disc not centered
2. Brake disc centered
3. Apply brake before checking

Apply brake then recheck.

Countershaft Bearing Adjustment

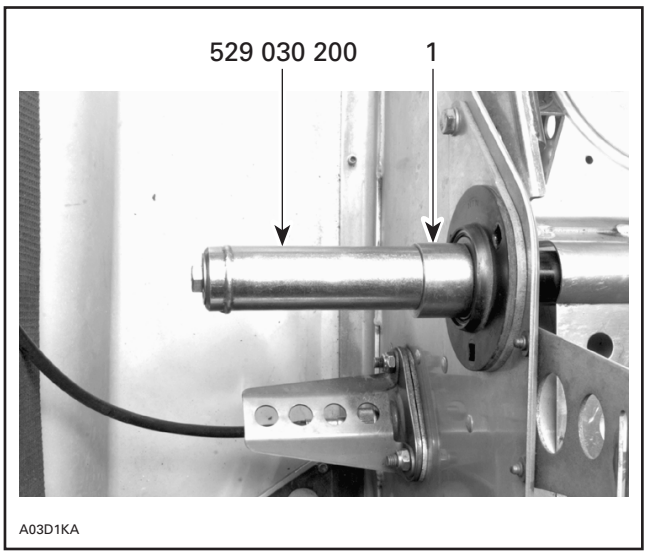
S-Series

Insert countershaft (with brake disc) from chaincase side through countershaft support (driven pulley side), then insert into chaincase.

Install countershaft bearing no. 19 using proper tool.

Formula S/SL

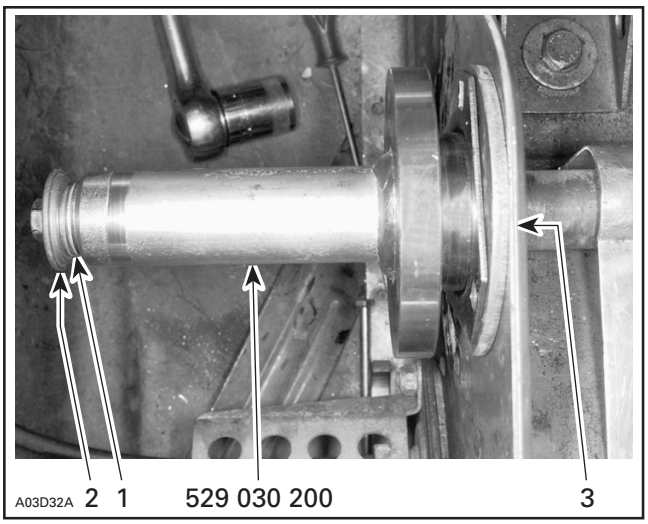
To install bearing on countershaft, use installer (P/N 529 030 200) and spacer(s) from remover as required.



1. Spacer

S-Series with RER

To install bearing on countershaft, use remover (P/N 529 030 100) and some flat washers of 3 mm (1/8 in) total thickness. Using original retaining screw and shouldered washer tighten until bearing rests against circlip.



1. *Washers use as a 3 mm (1/8 in) spacer*
2. *Original retaining screw and shouldered washer*
3. *Bearing against circlip*

S-Series

Ensure that countershaft is properly aligned, then tighten 3 retaining screws.

NOTE: A misaligned countershaft will result in difficulty to center the bearing in its support.

Refer to DRIVE AXLE 07-04 then look Chaincase Perpendicularity Adjustment.

Torque castellated nut of upper sprocket to 53 N•m (39 lbf•ft).

▼ CAUTION

Upper sprocket castellated nut must be tightened **before** adjusting bearing collar.

Formula S/SL

Slide collar no. 18 towards bearing and turn, by hand, to engage the eccentric. This should require about a quarter turn.

Turn collar in direction of countershaft rotation until collar and inner race lock together.

Insert a punch into collar hole and strike sharply in the same direction to lock firmly.

Apply Loctite 242 (P/N 413 703 000) on set screw threads, then tighten.

S-Series

Close chaincase referring to CHAINCASE 05-07.

1,11,12, Locking Tab, Outer Caliper and Nut

S-Series

Install caliper retaining bolts.

Assemble outer caliper. Install locking tab then nuts. Torque nuts to 24 N•m (18 lbf•ft). Bend locking tab over a flat of each nut.

5,10, Brake Cable and Nut

Insert brake cable into upper hole in brake lever and caliper. Install nut and tighten until a few threads exceed.

◆ WARNING

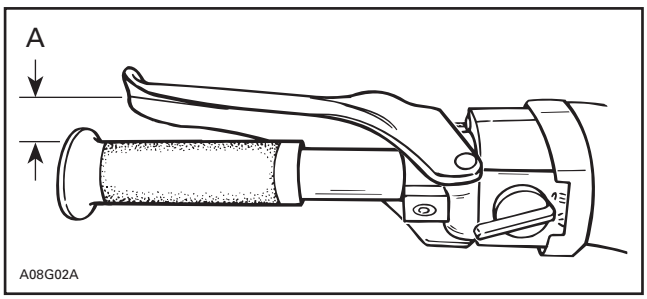
At least 3 threads must exceed the elastic stop nut.

ADJUSTMENT

Brake

Models with Mechanical Brake

Fully depress brake handle several times to obtain 13 mm (1/2 in) between brake handle and handlebar grip when brake is fully applied.



A. 13 mm (1/2 in)

Should this adjustment be unattainable, retighten nut no. 10 as needed.

Models with Hydraulic Brake

Change brake fluid once a year.

Bleed brake system as follows:

Keep sufficient DOT 4 brake fluid in reservoir at all times.

▼ CAUTION

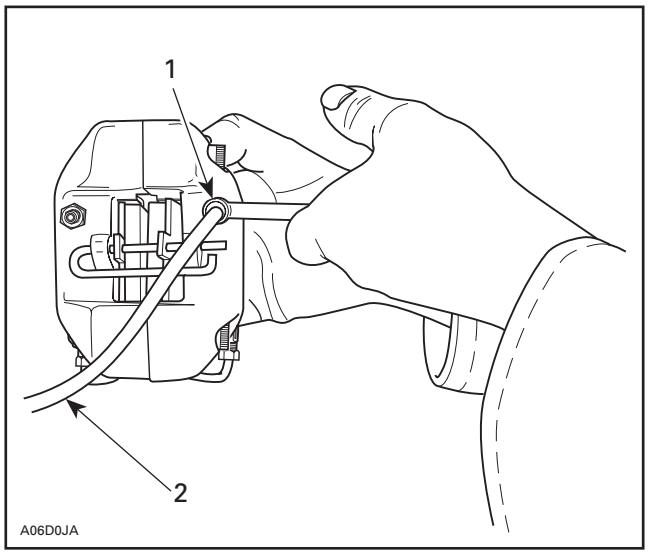
Use only DOT 4 brake fluid.

Install a hose on left side bleeder. Route this hose to a container.

Pump a few times brake lever and while holding brake lever depressed, open bleeder and check for air to escape.

Repeat with the same bleeder until no air appears in hose.

Proceed the same way with the right side bleeder.



TYPICAL

1. *Open bleeder*
2. *Clear hose to catch used brake fluid*

Brake Light

Models with Mechanical Brake Except Tundra/R

Brake light should light up before brake pads touch brake disc. To adjust, unscrew nut no. 10 until brake light goes on.

◆ WARNING

At least one full thread must exceed the elastic stop nut.

Check brake adjustment as described above.

NOTE: If brake light adjustment is unattainable while respecting brake adjustment, ratchet wheel may be too far out. If so, tighten ratchet wheel.

Tundra/R

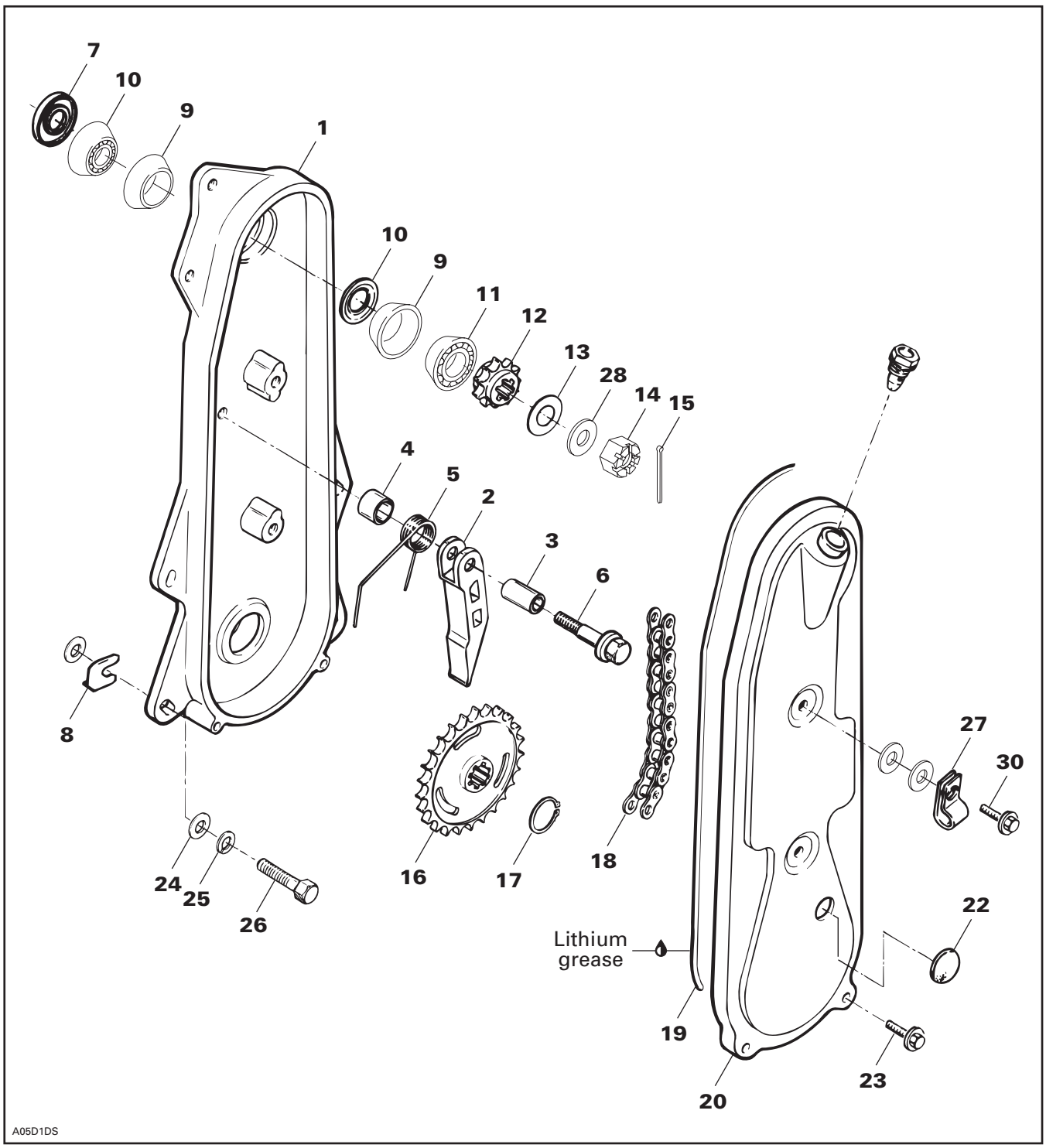
Brake light should light up before brake pads touch brake disc. To adjust, unlock nut no. 21 and turn brake switch no. 22 accordingly. Lock in position by tightening nut no. 21.

Models with Hydraulic Brake

There is no adjustment on these models. Check that switch is securely installed.

CHAINCASE

Tundra/R

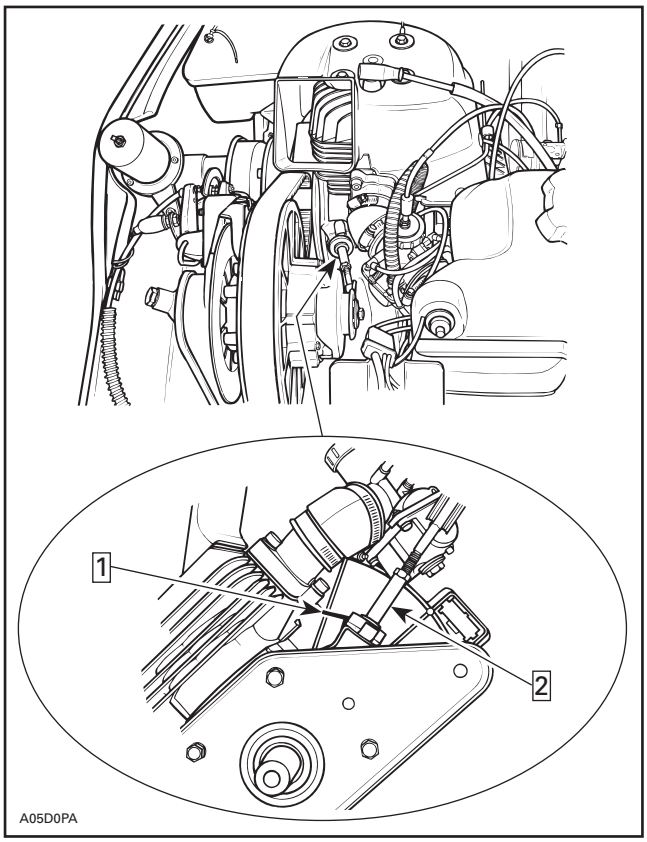


REMOVAL

Chaincase and driven pulley can be removed from the vehicle as an assembly.

Remove guard and drive belt.

Unlock and raise driven pulley support.



Step 1 : Push and hold
Step 2 : Raise support

▼ CAUTION

Be careful not to ground positive terminal with the chassis. Always disconnect BLACK negative cable first.

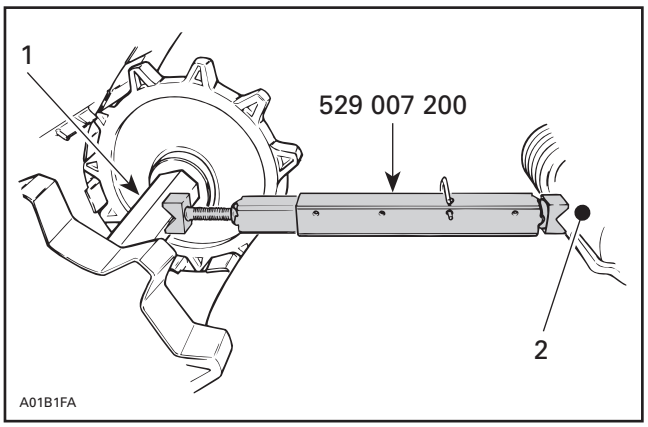
Remove chaincase cover **no. 21** and drain oil.

Pry out drive axle from chaincase.

Unscrew the nut **no. 14** on the upper sprocket **no. 12** and remove circlip **no. 17** on the bottom one **no. 16**. Remove chain tensioner assembly **nos. 2** to **6**, then simultaneously remove chain **no. 18** and both sprockets.

Remove the 4 cap screws **no. 26** securing chaincase to frame. Save alignment shims **no. 8** for installation.

Release track tension, use drive axle holder (P/N 529 007 200).



1. Drive axle
2. Suspension cross shaft

Chaincase and Driven Pulley Assembly

Using 2 large screwdrivers inserted between chaincase and frame, pry complete assembly from vehicle.

DISASSEMBLY

Disassemble driven pulley from chaincase. Refer to DRIVEN PULLEY 05-04.

INSPECTION

Visually inspect the chain for cracked, damaged or missing link rollers. Check for defective bearings, sprockets and worn chain tensioner components.

◆ WARNING

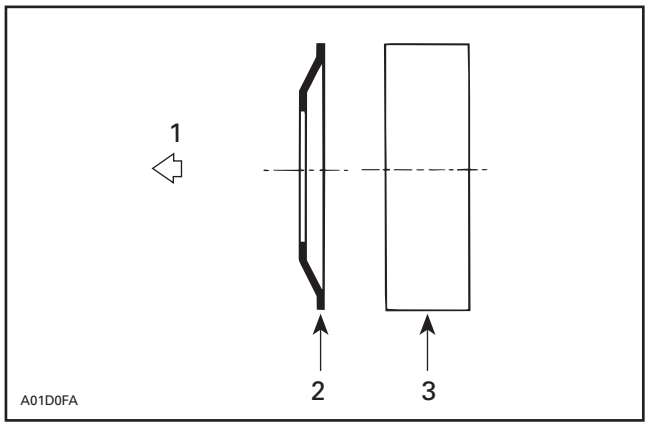
If chain deflection is greater than 38 mm (1.5 in) (without chain tensioner), replace chain and check condition of sprockets.

GEAR RATIO MODIFICATION

NOTE: For high altitude regions, the *High Altitude Technical Booklet* (P/N 484 300 003 and P/N 484 054 500 for binder) gives information about calibration according to altitude.

ASSEMBLY

Position oil deflector ring **no. 10** then sit bearing in chaincase aperture. Install spacer then the other bearing.



1. Toward chaincase
2. Oil deflector
3. Bearing

1, Oil Seal

Using an appropriate pusher, press new oil seal **no. 7** into chaincase hub. Oil seal must sit flush with case hub edge.

INSTALLATION

Reverse removal procedure. Pay particular attention to the following:

Torque castellated nut **no. 7** to 14 N•m (124 lbf•**in**), slacken then retorque to 0.5 - 2.5 N•m (5 - 22 lbf•**in**).

In case of a vehicle equipped with an 11 teeth sprocket, check the wear of protectors **no. 8**. Replace if required.

Grease new gasket **no. 20** with petroleum jelly, or other suitable product, and install gasket making sure gasket it does not shift from its correct position. Tighten bolts evenly.

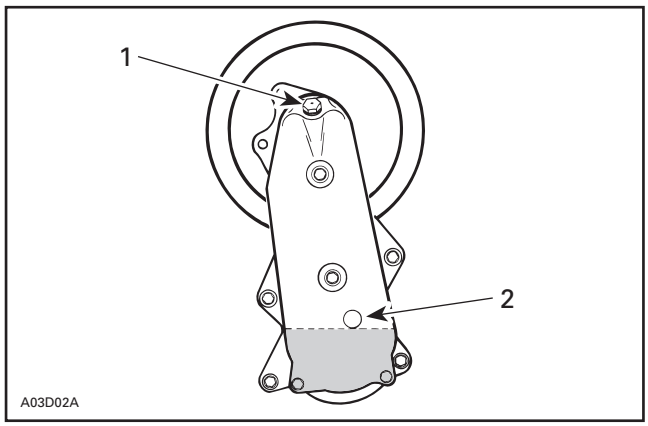
NOTE: Bottom pan has an emboss below chaincase housing to ease installation.

23, Chaincase Oil

Remove filler cap and pour 250 mL (8.5 fl. oz) of chaincase oil (P/N 413 801 900) into chaincase.

NOTE: Chaincase oil capacity is 250 mL (8.5 fl. oz).

Check the oil level by removing the chaincase oil level plug.



1. Filler cap
2. Oil level plug

The oil should be leveled with the bottom of the oil level orifice.

Reinstall battery and connect cables on electric starting model.

▼ CAUTION

Always connect positive RED cable first to prevent sparks.

ADJUSTMENT

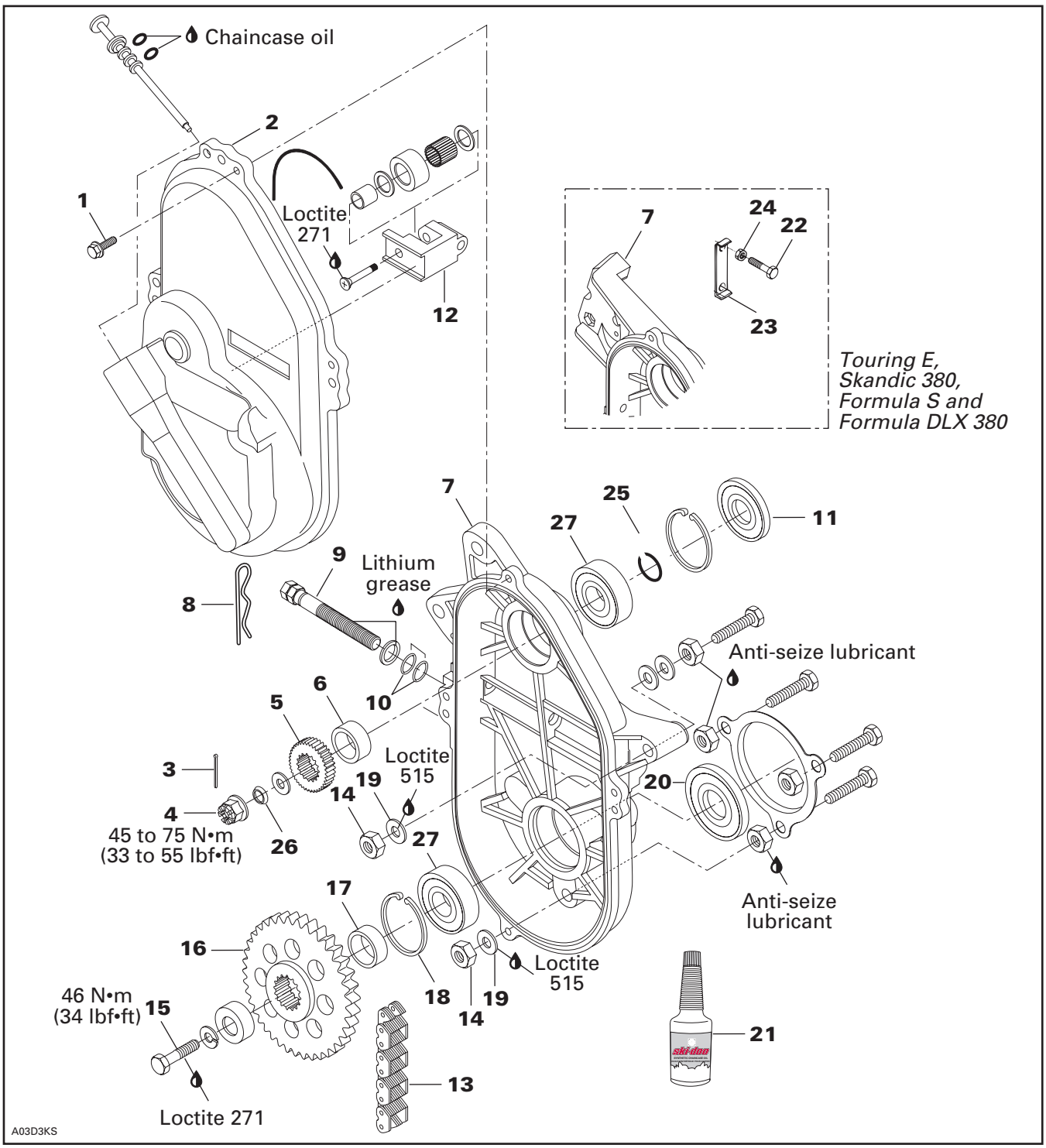
Pulley Alignment

Refer to PULLEY DISTANCE AND ALIGNMENT 05-05.

Track Tension and Alignment

Refer to TRACK 07-05.

S-Series


Chaincase oil
2
1
Loctite 271
12
7
24
22
23
Touring E, Skandic 380, Formula S and Formula DLX 380
7
25
27
11
9
Lithium grease
8
Anti-seize lubricant
6
5
10
3
Loctite 515
19
14
20
4
45 to 75 N•m (33 to 55 lbf•ft)
26
27
17
Anti-seize lubricant
16
Loctite 515
46 N•m (34 lbf•ft)
15
18
19
14
21
13
Loctite 271
A03D3KS

REMOVAL

To remove chaincase proceed as follows.

Remove tuned exhaust pipe and muffler.

◆ WARNING

Never remove exhaust components when engine is hot.

Remove hair pin **no. 8**. Release drive chain tension by unscrewing tensioner adjustment screw.

Drain oil by removing chaincase cover **no. 2**.

Remove cotter pin **no. 3**, nut **no. 4**, washer **no. 26** retaining upper sprocket **no. 5** and screw **no. 15** retaining lower sprocket **no. 16**. Pull sprockets and drive chain simultaneously. Remove shims **nos. 6** and **17**.

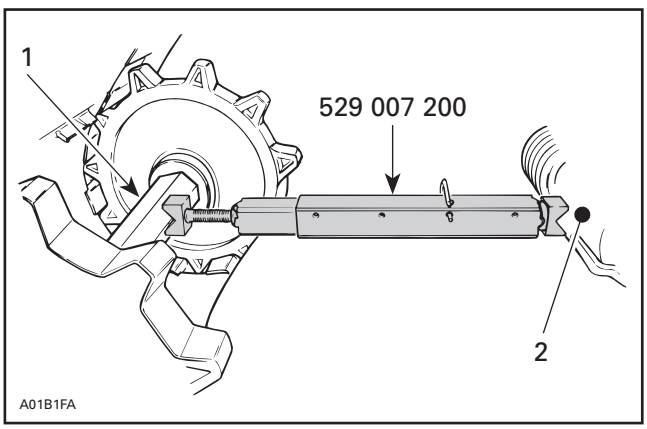
NOTE: Should countershaft removal be required, refer to BRAKE 05-06 then look for **Brake disc**.

Remove 5 nuts **no. 14**. Three nuts are behind the lower sprocket.

Skandic 380, Touring E, Formula S/DLX 380

Unfold locking tab **no. 23**, unscrew nuts **no. 24** then remove caliper retaining screws **no. 22**.

Release track tension, use drive axle holder (P/N 529 007 200).



TYPICAL

1. *Drive axle*
2. *Suspension cross shaft*

Pry out drive axle oil seal **no. 20** from chaincase.

Pull chaincase from drive axle and countershaft.

Using 2 large prybars inserted between chaincase **no. 7** and frame, pry chaincase from vehicle.

INSPECTION

Visually inspect the chain for cracked, damaged or missing links. Check for worn or defective bearings, sprockets and chain tensioner components.

◆ WARNING

If chain deflection is greater than 38 mm (1.5 in) (without chain tensioner), replace chain and check condition of sprockets.

GEAR RATIO MODIFICATION

For particular applications, the number of teeth of the sprockets can be increased or decreased on lower and upper sprockets.

Refer to TECHNICAL DATA 10 for gear ratios.

▼ CAUTION

Gear ratio modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance.

NOTE: For high altitude regions, the *High Altitude Technical Booklet* (P/N 484 300 003 and P/N 484 054 500 for binder) gives information about calibration according to altitude.

INSTALLATION

Reverse removal procedure and pay attention to the following. Replace oil seals, gaskets and O-rings.

Refer to DRIVE AXLE 07-04 for drive axle axial play adjustment.

19, Washer

Apply Loctite 515 (P/N 410 702 700) on side of washer facing chaincase.

27, Bearing

Position both bearings in chaincase with their **sealed side** facing **inside** of chaincase.

11,20 Oil Seal

Using chaincase upper seal pusher (P/N 529 032 300), press the oil seal into chaincase hub.

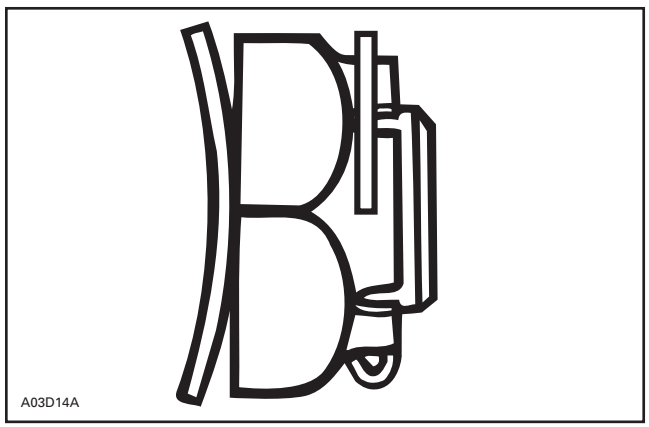
NOTE: Should installation procedure for countershaft be required, refer to BRAKE 05-06 then look for **Brake Disc and Countershaft Bearing Adjustment**.

5,16, Sprockets

Position the sprockets with the writing facing the chaincase cover.

26, Conical Spring Washer

Install washer with its concave side towards drive pulley.



4, Upper Sprocket Castellated Nut

Torque to 45 to 75 N•m (33 to 55 lbf•ft).

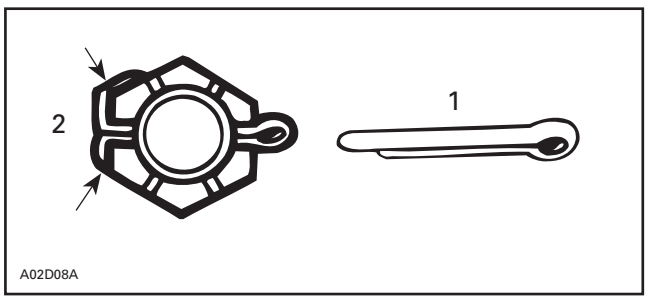
Install new cotter pin in the position shown.

▼ CAUTION

When removing a cotter pin always replace with a new one.

▼ CAUTION

Cotter pin will rub on chaincase cover if installed otherwise.



1. New
2. Fold cotter pin over castellated nut flats only

18, Circlip

▼ CAUTION

It is of the utmost importance to install the circlip otherwise damage to the chaincase components may occur.

DRIVE CHAIN ADJUSTMENT

10, O-Ring

Replace O-rings **no. 10** on tensioner adjustment screw. Apply lithium grease on O-rings.

Fully tighten tensioner adjustment screw **by hand**, then back off only far enough for hair pin to engage in locking hole.

This initial adjustment should provide 3-5 mm (1/8-13/64 in) free-play when measured at the outer circumference of the brake disc.

▼ CAUTION

Free-play must not exceed 5 mm (13/64 in), readjust if necessary.

◆ WARNING

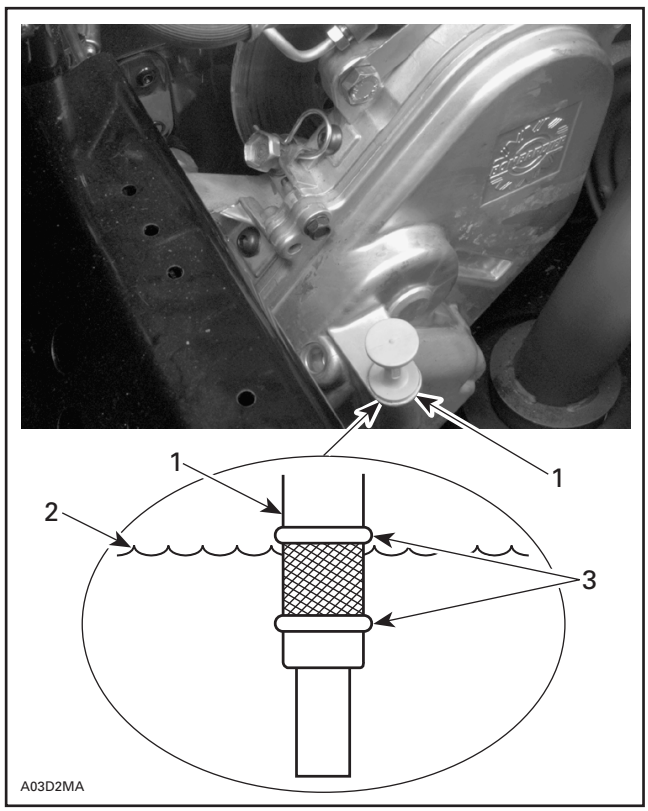
If the specified free-play is not reached with the tensioner screw fully tightened, replace chain and check the condition of sprockets.

21, Chaincase Oil

Pour 250 mL (8.5 fl. oz) of chaincase oil (P/N 413 801 900) into chaincase.

NOTE: Chaincase oil capacity is 250 mL (8.5 fl. oz).

Check oil level with the dipstick then add if required.



TYPICAL

1. *Dipstick*
2. *Oil level*
3. *Level between marks*

NOTE: Chaincase must be in its proper position when checking oil level.

ADJUSTMENT

Pulley Alignment

Refer to PULLEY DISTANCE AND ALIGNMENT 05-04.

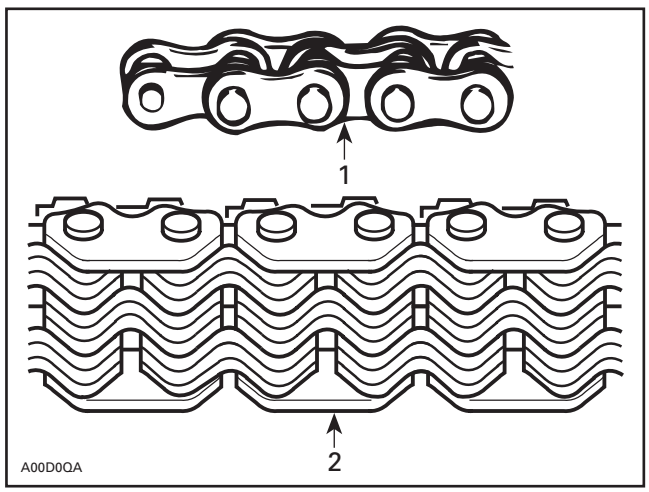
Track Tension and Alignment

Refer to TRACK 07-05.

DRIVE CHAIN

GENERAL

Bombardier drive chains exist in 2 types, for proper use refer to TECHNICAL DATA 10.



1. *1/2 in single*
2. *3/8 in silent chain*

SILENT CHAIN

There are 2 types of silent chain. One is 11-plate wide and the other (stronger) is 13-plate wide. Do not interchange sprockets. Fit chain on sprockets to make sure using right ones according to width. Refer to TECHNICAL DATA 10.

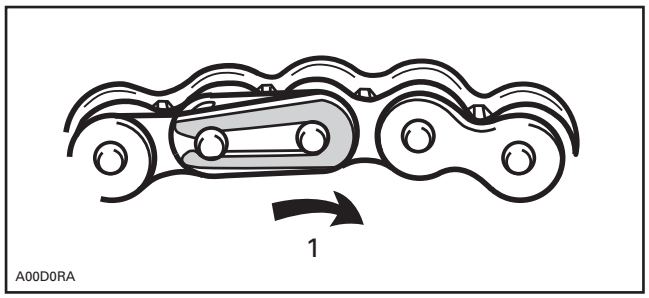
NOTE: No work (separation, lengthening) can be done on the silent chain type.

CHAIN ATTACHMENT

When joining chain ends, the open end of the circlip must be on opposite side of chain rotation. The circlip should also be facing the outer side of chaincase.

◆ WARNING

Always ensure that the connecting link circlip is in good condition and is properly secured.

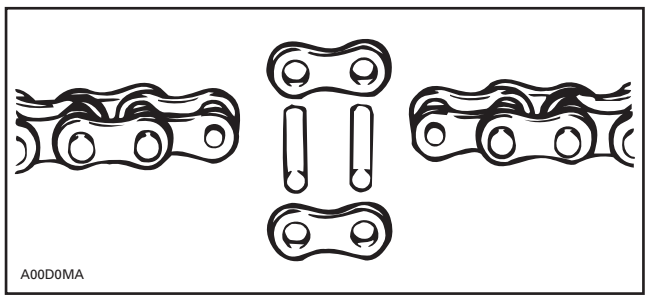


TYPICAL

1. *Rotation*

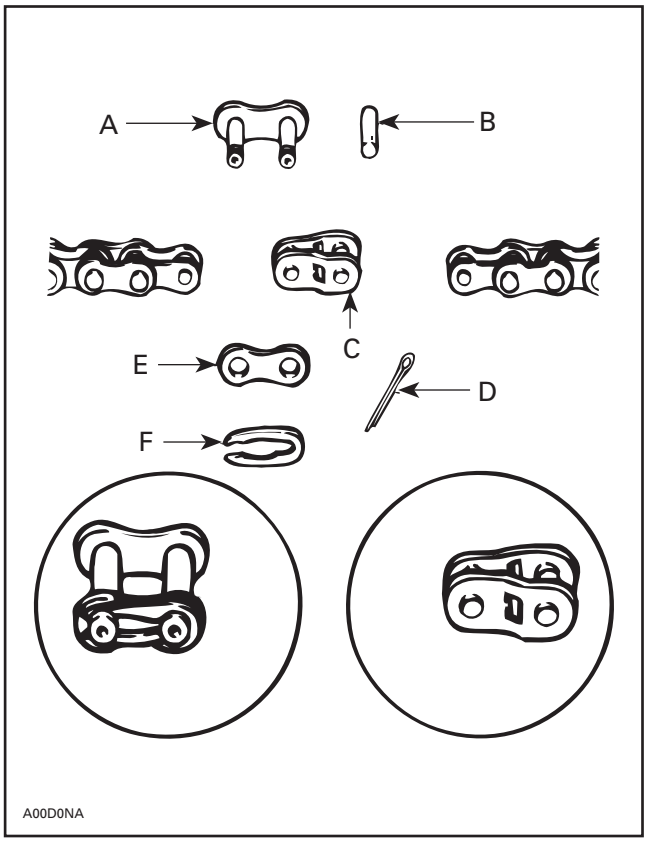
CHAIN SEPARATION

When separating an endless chain, always use a chain bearing pin extractor. Also, make sure to remove one complete link.



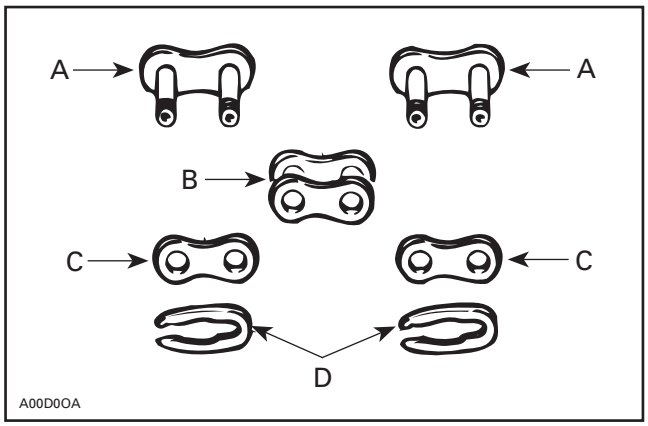
NOTE: Chain connecting link should only be used to lengthen or shorten a chain when changing the number of teeth of sprocket(s). A stretched chain must never be shortened because the chain pitch has changed (increased) and will not properly match the sprocket pitch, causing premature wear.

NOTE: Refer to TECHNICAL DATA 10, for chain length according to gear ratio of each specific vehicle.



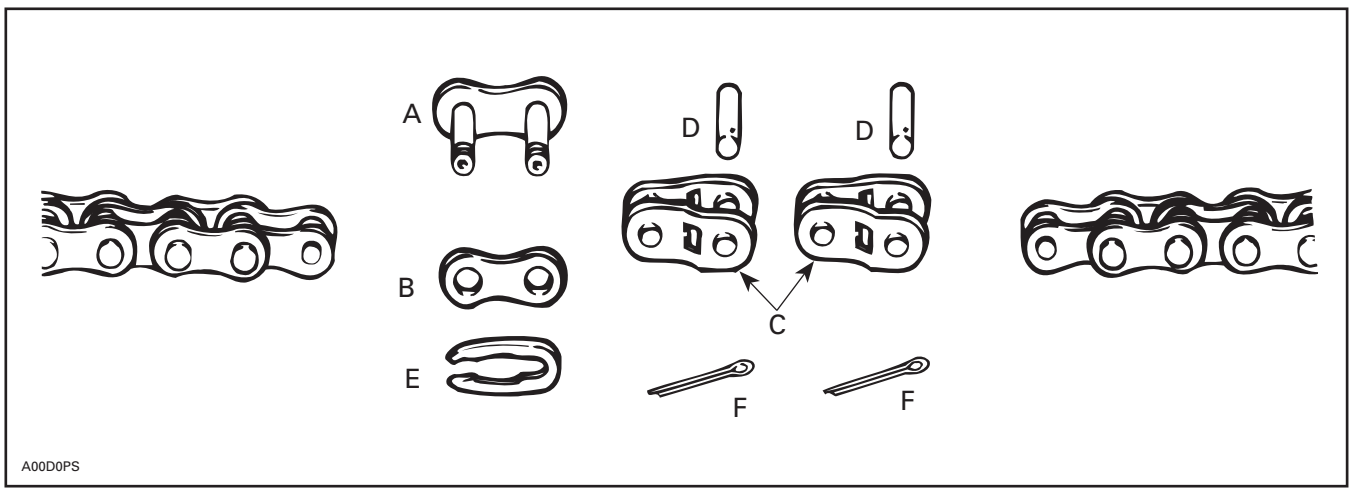
LENGTHENING 1/2 LINK

A. Connecting link
B. Link pin
C. Cranked link
D. Cotter pin
E. Outer link
F. Circlip



LENGTHENING 1 LINK

A. Connecting link
B. Inner link
C. Outer link
D. Circlip



LENGTHENING 1-1/2 LINKS

A. Connecting link
B. Outer link
C. Cranked link
D. Link pin
E. Circlip
F. Cotter pin