



# Isolating Decoupler Pulley Technical Presentation



## Overview

- Alternator Pulley Evolution
- It's what's inside that counts
- Features of the Litens OAD
- Is an Litens OAD really needed? Seeing is belie
- Commonly used names
- Pitfalls to watch out for
- Making money
- Removal and Installation Videos





# Alternator Pulley Evolution

## V belt

- Common pre 1979 system
- Limited drive capability
- Several belts used
- High maintenance lock center systems



## Poly V

- Introduced on the 1979 mustang and quickly became the new standard in the automotive industry
- Capable of driving all accessories with one belt
- Perfectly suited for FWD transverse engines.
- Perfect match for automatic tensioner



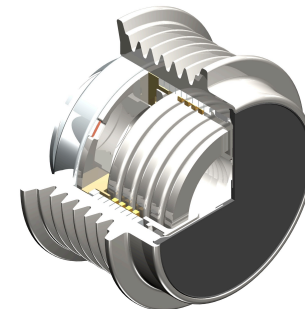
## One way clutch

- Industry trend to use larger alternators with more mass caused belt chirp noises during shifting and engine shutdown.
- A one-way clutch inside the alternator pulley, allows the alternator rotor to overrun during these conditions.



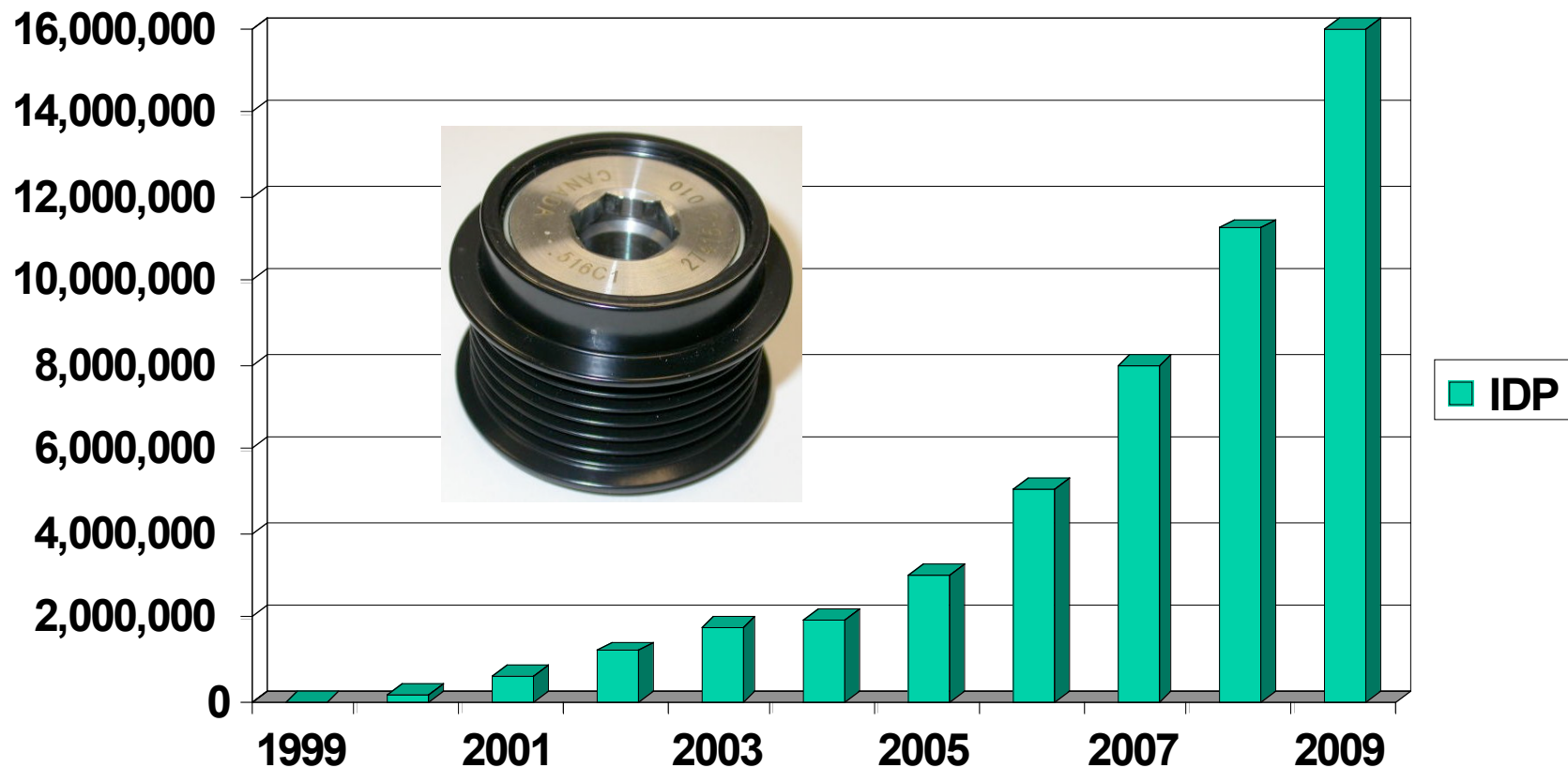
## Litens OAD

- Industry trend continued with larger alternators and smaller engines (including more diesels).
- Car makers reduced idle speed requirements to improve fuel economy.
- These trends caused new problems such as belt slip, belt wear, component bearing durability, and NVH.
- Only the Litens OAD can the isolation required to solve these new challenges.



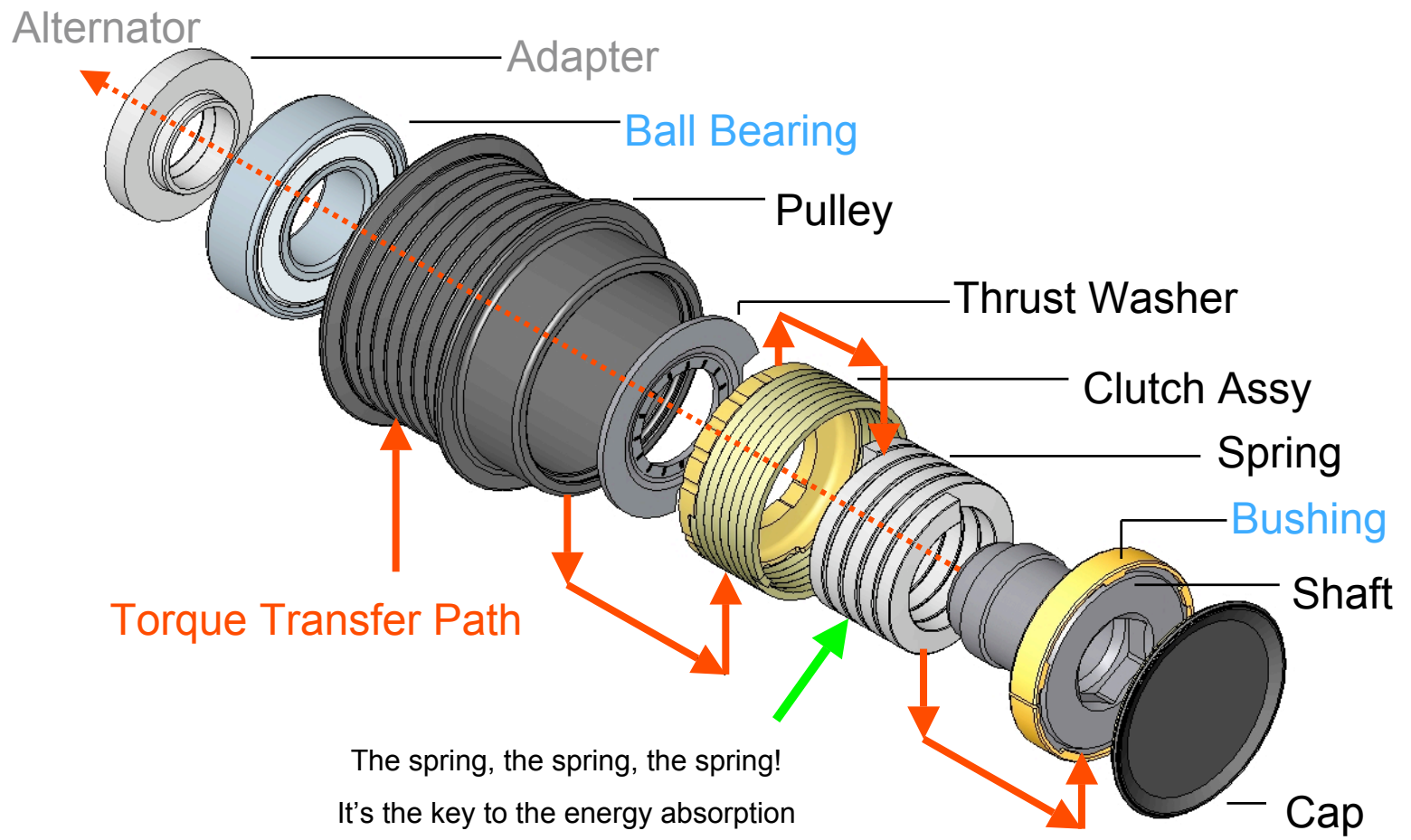


# Why IDPs Are Becoming Important





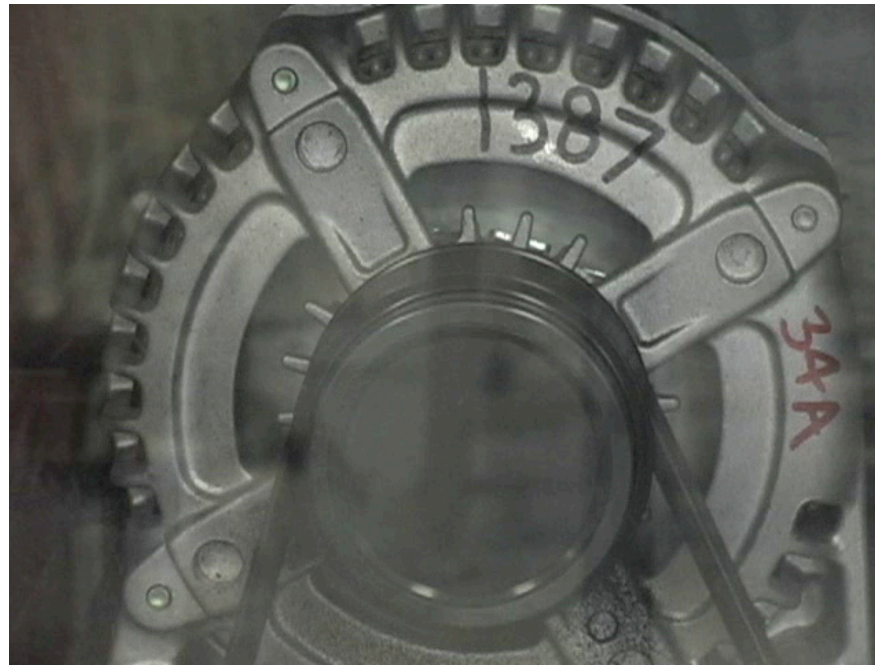
# It's what's inside that counts!





## Features of the Litens OAD – It Overruns !

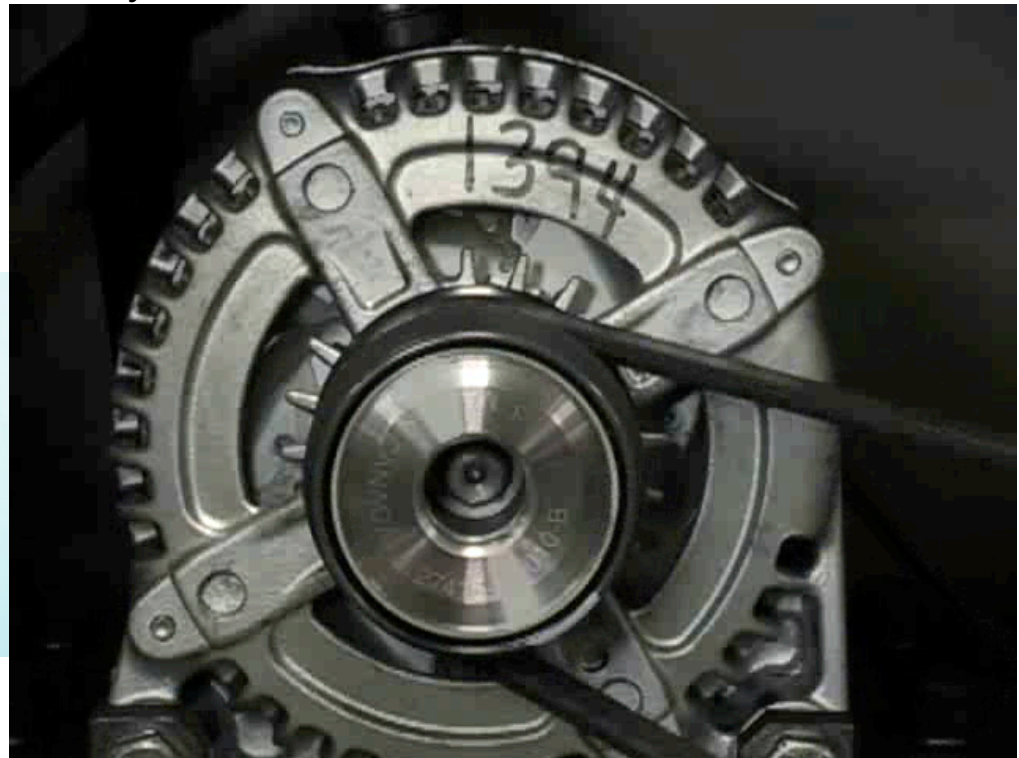
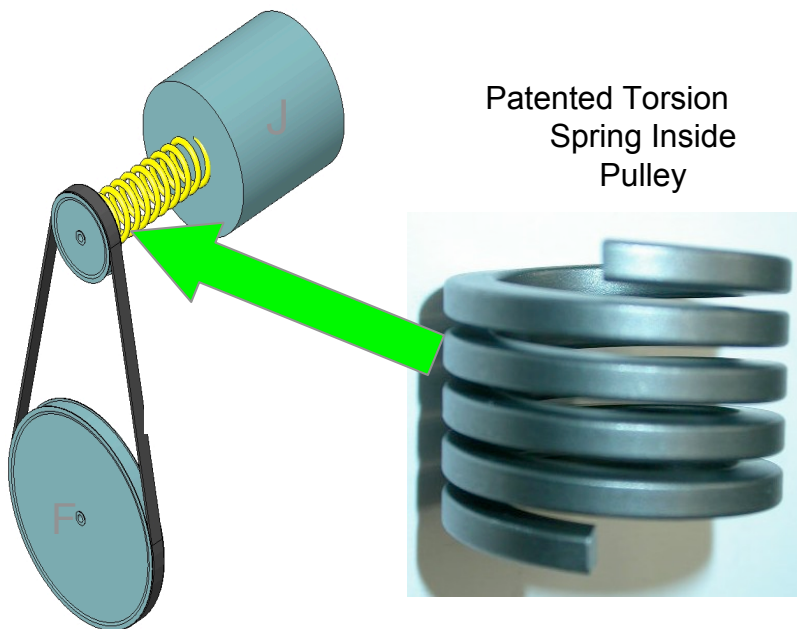
- **Feature #1 Overrun-** Similar to a one way clutch, the Litens OAD allows the alternator to gently coast to a stop when the vehicle engine shuts off. This eliminates shut down chirp noises that are created when the mass of the alternator rotor tries to over spin on shutdown (inertia). These noises are more prevalent, but not limited to, vehicles with larger alternators and diesel engines.
- This overrunning feature also occurs during transmission shifting. It allows the rotor of the alternator to actually spin faster (or play catch up to the engine deceleration rate) during engine deceleration ( i.e. A hard 1-2 transmission shift). These chirp noises are also eliminated by the overrun function.





## Features of the OAD – It Isolates !

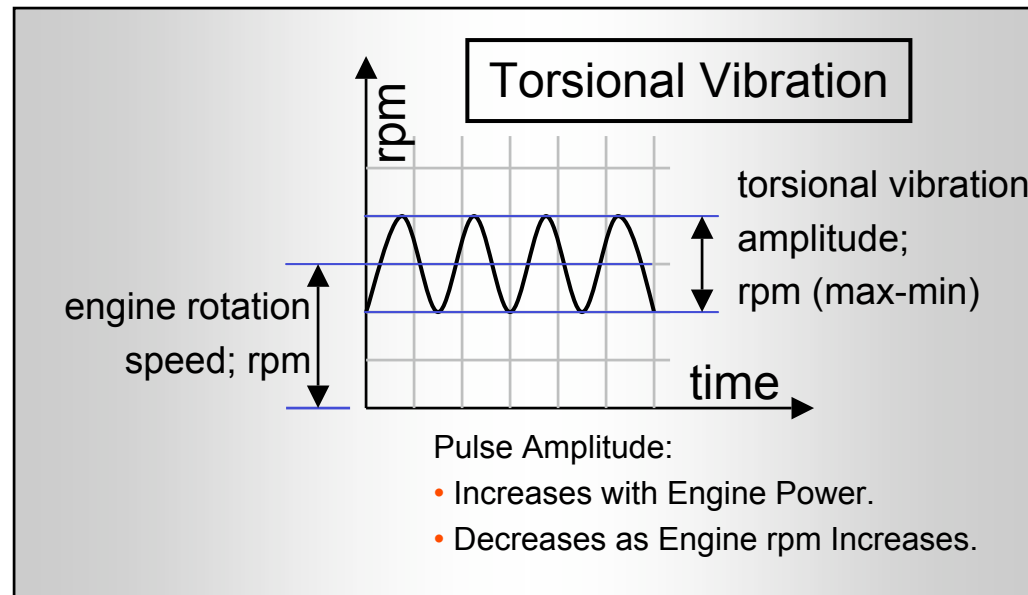
- **Feature #2 Isolation-** The Litens OAD has a **patented** torsion spring inside. This is the secret to the higher level of function that the Litens OAD is world famous for. This spring connects the alternator pulley to the rotor. Think of it as a “suspension system” for the alternator. This “suspension system” is needed because of something called Torsional Vibration (TV). TV, acting on the alternator inertia, will seriously affect the belt drive system durability as well as the NVH felt by the driver.





# Understanding Torsional Vibration

- Each time a cylinder fires, the crankshaft speeds up and slows down a little bit. These firing pulses are known as Torsional Vibration. The lower the RPM, the higher the Torsional Vibration will be. It is these firing pulses that act on the alternator rotor, trying to speed it up and slow it down several times during every revolution of the engine. Without the Litens OAD, these pulses create vibration for the driver and cause the belt tensioner to exhibit increased movement. Increased tensioner movement equals less durability for both the tensioner and belt, as well as all the other components within the belt drive system (including the alternator).





## Is the Litens OAD really needed?

- **Absolutely !** The manufacturer chooses to utilize the patented Litens OAD very early in the engine design phase. They actually design the engine and the belt drive with the function of the Litens OAD in mind. The OAD allows the manufacturer to utilize larger alternators, less expensive belt tensioners, narrower belts, thinner pulleys and thinner brackets. It even allows them to lower the idle speed and gain some fuel economy (.ie. Corvette 550 rpm). A Litens OAD is often required when manufactures incorporate a dual mass flywheel (DMF) into the vehicle.
- Manufactures often choose the Litens OAD over the one way clutch because of how well it performs under load. A prime example of this is V6 Cylinder deactivation engines.
- Seeing is believing...

**System Response**  
**120A Alt Full Load**  
**20 Hz 8g Input Accel**  
**800 RPM**

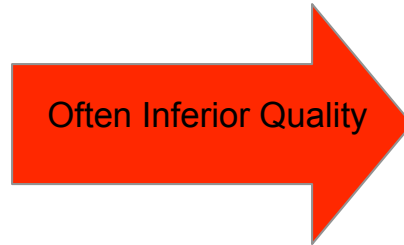


# Commonly Used Names

## OE World

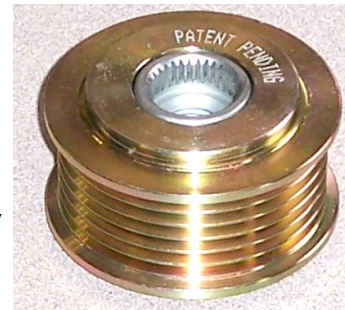


OAP or an OWC



Clutch pulley,  
OAP  
OWC  
Freewheel pulley  
Decoupler

## Aftermarket



No Internal Spring =  
No Isolation



"The Litens decoupler"  
OR an OAD



—  
Litens IDP  
OAD  
Clutch pulley  
Decoupler  
RotoRx®.



RotoRx® Patented  
Internal Spring  
100% OE Function





## Pitfalls to watch out for...

- **Never interchange a RotoRx® IDP for another one.** The diameter, threads, spacing, and length make each application unique. The internal spring is also tuned to the specific engine application and therefore two identical IDPs may look alike but are very different. Damage to the alternator or durability of the IDP will be affected if the incorrect one is used. Read the part number and replace accordingly. You should always check the Lester online catalog to see if the alternator you are rebuilding requires a Litens OAD or not.

LESTER 13870 / PIC # 290-5118

Type ALTERNATOR  
Mfr NIPPONDENSO

Voltage 12  
Rotation CW  
Amperage 160  
Pulley SD6  
Regulator E/R

Short Note CHRYSLER AND DODGE CARAVAN SERIES 2001-05 6-GROOVE DECOUPLER PULLEY, 57MM OD NOTE: CLUTCH PULLEY NOTE: 2-PIN PLUG

Long Note Caravan Series. This is Rated at 160A. The 13871 (421000-0011) is a Lower Amp Version, Used on the Same Vehicles. Both Units Use a 6-Groove "Decoupler - Style" Pulley.

INTERCHANGES

|             |  |
|-------------|--|
| AES         | 13870  |
| AES NEW     | 13870N   |
| AIM         | AZ-0078R   |
| ARROWHEAD   | AND0249  |
| BECK ARNLEY | 190-6414   |
| BOSCH REMAN | AL8550X  |
| BOSTON AUTO | 3290-5118  |
| CHRYSLER    | 4868430AF, 4868430AB, 4868430AC, 4868430AD, 4868430AE, 4868430AF |
| CPI KIT     |  |
| DIXIE       | A-80007  |
| MPA         | 13870  |
| NASTRA      | A13870   |

PARTS BREAKDOWN

|                 |           |           |
|-----------------|-----------|-----------|
| BRUSH COVER     | 9290-9101 | 9290-9102 |
| BRUSH HOLDER    | 7490-9204 |           |
| COVER/RECTIFIER | 8490-9030 |           |
| INSULATOR       | 9290-9210 |           |
| PLUG CODE       | 9801-332  |           |
| PULLEY          | 7990-9044 |           |
| RECTIFIER       | 7790-4033 |           |
| REPAIR KIT      | 6990-1086 |           |
| STATOR          | 7290-8512 |           |
| TERMINAL BLOCK  | 9090-1000 |           |

MY NOTES

Price1  Price2

Submit Reset Erase

PIC # 7990-9044

Type PULLEY  
Mfr LITENS  
Class SD6

Dimensions 45.5mm L x 58.70mm OD x 17mm Bore  
M14 x 1.5 Thread

Short Note Used on Chrysler Cars and Vans 6-Groove Decoupler Pulley Note: This is the OEM Version See: 7990-9044A (Clutch Version)

Long Note This is an IDP Style Pulley. IDP Stands for Isolating Decoupler Pulley. This is Different Than "Clutch" Pulley, Which Has a "One-Way" Clutching Feature. Some of These IDPs Came With Belt Flanges and Some

INTERCHANGES

|             |   |
|-------------|---|
| CHRYSLER    | 4861506AB, 4861506AC, 4861506AD, 4861506AE, 4861506AG |
| DUBOIS      | 197200  |
| IAT         | 39501   |
| NIPPONDENSO | 021040-1130, 021040-1170, 021040-1320, 021040-1441    |
| TENDECO     | 920685  |

UNIT NUMBERS

|        |   |
|--------|---|
| LESTER | 11063, 13870, 13871, 13871              |
| PIC #  | 290-5117, 290-5117A, 290-5118, 290-5177 |

MY NOTES

Price1  Price2

Submit Reset Erase



## Pitfalls to watch out for...

- **Never replace a Litens RotoRx® IDP with a solid pulley or one way clutch.** Whenever servicing an alternator, always replace the Litens OAD with an exact Litens replacement OAD. As an alternator rebuilder or technician, even if you know the mileage of the vehicle, you will never know how worn the IDP is. The amount of engine idle, engine starts as well as transient events are directly related to internal component wear.





# VW Accessory Drive TSB

## – Caution to the rebuilding market

### Accessory Drive Tensioner - Ineffective, broken

Procedure No.: 250901/3

Approval Date: 20.06.2006

**Problem Description:** Accessory Drive Tensioner ineffective, broken, V-  
**Cause :** Due to high dynamic movement of the V-belt noises might occur and lead to fracture of the Accessory Drive Tensioner.

#### Solution on OE-side

Use of a One Way Clutch on the alternator.

From 07.1998

#### Customer Service Solution

Replace V-Belt and Accessory Drive Tensioner.

Absolutely replace solid pulley of the alternator with proper One Way Clutch

One Way Clutch P/N (Bosch alternator): P/N 028 903 119 T.

As of now, a One Way Clutch for Valeo alternator is available –  
P/N 028 903 119 AC.

NOTE: Must use the provided washer between One Way Clutch and alt

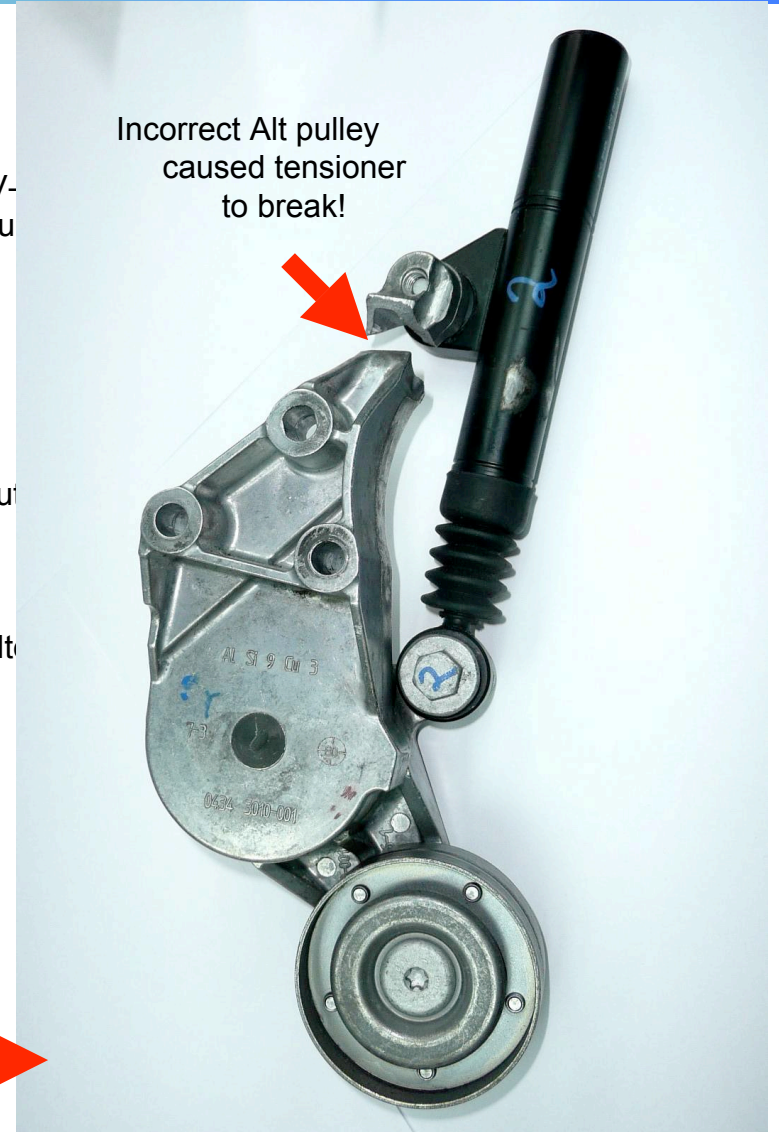
#### Information

Change of alternator will not be compensated.

#### Accounting Note

Customer-No./Failure Mode/Manufacturer: 27 30 010 ...

- Know which alternator pulley you need and don't substitute or else tensioner may fail!





## Pitfalls to watch out for...

- **Beware of Counterfeits** – Some companies are making OWCs as well as solid pulleys to look exactly like a Litens OADs in an effort to confuse people and make a quick sale. Watch out for counterfeits ! System performance and durability will be seriously affected!
- One company is removing the internal components and refitting with a sprag type clutch. Litens is making the rebuilding market aware of counterfeits and the prosecution of illegal copies.
- Litens has successfully protected its patents and prosecuted companies that buy or sell counterfeit product.





## Making Money



- Some OADs are only available in the aftermarket – i.e. Toyota and most GM vehicles.
- Stock the most popular OADs- 920834,920720,920726,920629,920810





## Removal and Installation

- This procedure applies to dry clutch OADs with plastic caps (early design) such as 920538 and 920685





Thank you