

FORUMS PICS REVIEWS GROUPS CHAT

SPONSORS

Google Custom Search powered by Google

BMW M3 Forum.com (E30 M3 | E36 M3 | E46 M3 | E92 M3 | F80/X) > BMW M3 Discussions > E46 M3 (2001-2006)

someone tell me the difference between the limited slip "mechanisms" of these diffs

Welcome, GuidoK | Last visited: Thu, Sep-14-2017 at 03:58:29 PM | Private Messages: Unread 0, Total 3 | User CP | My Garage | Log Out

User CP Forum Guidelines / Info Community Gallery All Albums New Posts Search Quick Links Calendar FAQ Invite Friends Log Out

E46 M3 (2001-2006) Engine: S54 - Max Hp: 333 hp at 7,900 rpm / 262 lb/ft at 4,900 rpm Total Produced: 45,000+ - Years Produced: 2001 to 2006.

amazon Tire & Wheel Products > Shop now

Post Reply Like 0 Page 1 of 2 1 2 >

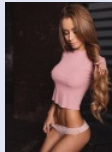
Thread Tools Search this Thread Rate Thread Display Modes

Mon, Mar-02-2009, 06:21:04 PM #1

24601 someone tell me the difference between the limited slip "mechanisms" of these diffs

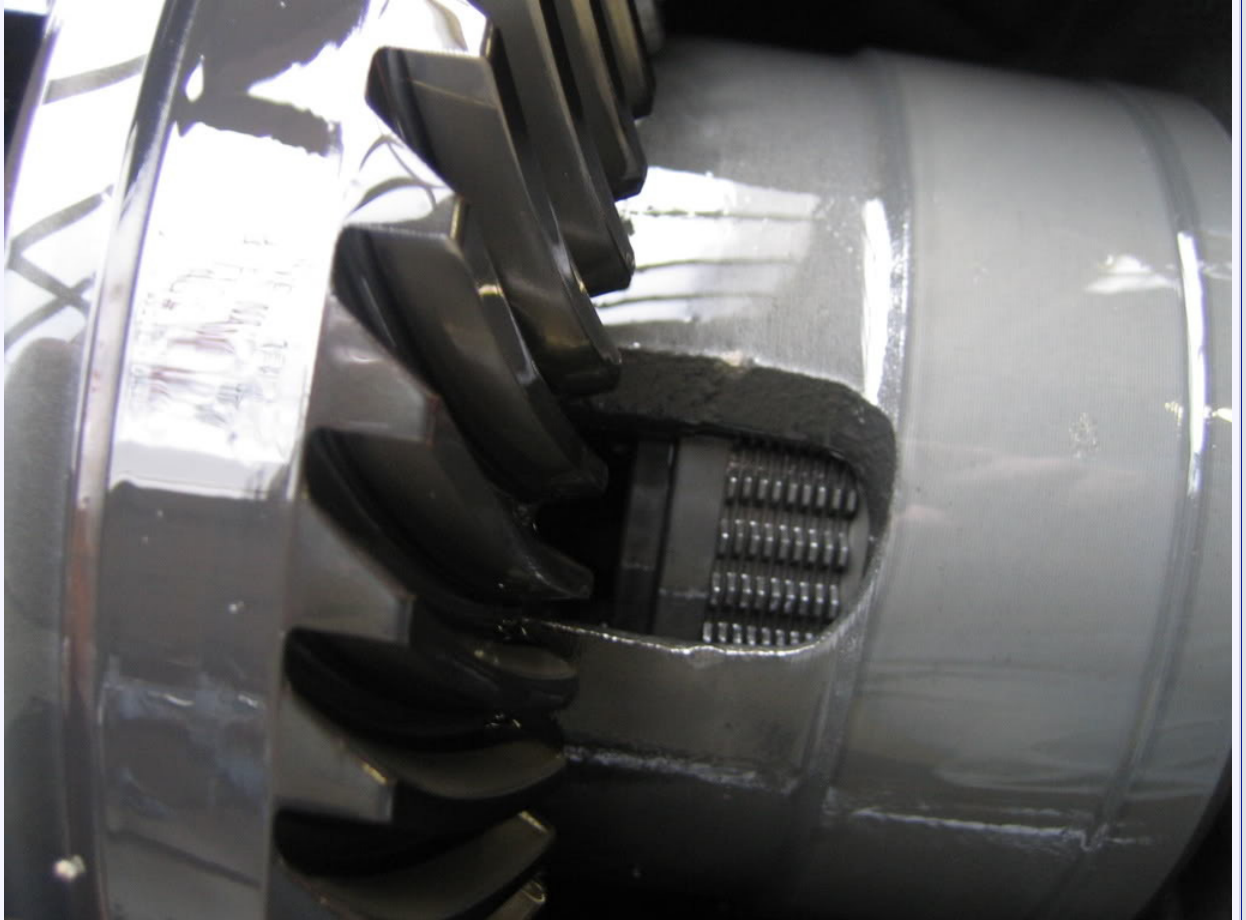
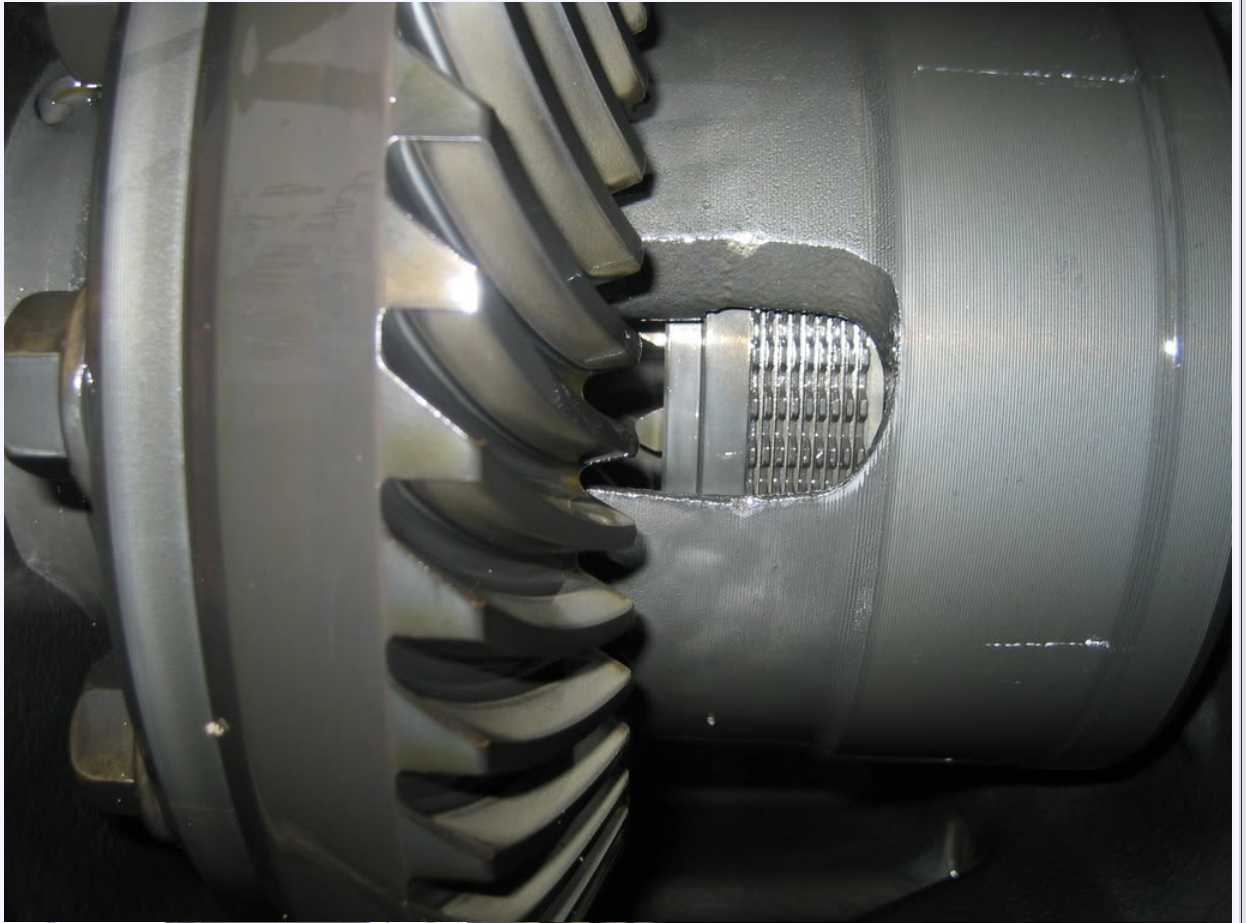
what goes around comes around...pay it forward

so, here is a pic of my stock diff:



Join Date: Mar 2006 Posts: 7,227 Reputation: 0 Location: RVA iTrader: 85 reviews, 100%





it was not that bad to remove. now, here is the "replacement" 3.91 LSD:





and i am not talking about the obvious such as the mechanism look different. i am hoping to find out if one is better than the other in terms of function. when i got the replacement 3.91 diff, i was a bit surprised. i thought it would be identical to the stock one except for the ring and pinion, of course.

and maybe i am using the wrong term, but it appears the stock diff's limited slip mechanism has clutch pack that i do not see on the 3.91s. and at first glance, i thought the replacement diff was not an LSD. well, i compared this diff with detailed pics of a dinan 3.91 LSD and the mechanism is identical.

while i am not an E46 M3 noob, i can certainly say that i am a noob when it comes to the diffs.....yet a friend and i did the swap on our own and it went smoothly. the only problem was feeling a little dizzy after doing lots of figure eights and lock-to-lock turns over and over again in a nearby parking lot.

if anyone well versed in diffs can help me out with an answer, that would be awesome.

TIA.



'06 M3 | '07 A3 2.0T S-Line | '17 GLC43 (hers)



Mon, Mar-02-2009, 10:53:54 PM

#2

Foo2rama

2004 E46 M3



Join Date: Oct 2007
Age: 41
Posts: 4,266
In the garage:
'04 BMW M3
Reputation: 0
Location: Costa Mesa
iTrader: 0 reviews



Who made your 3.91 LSD?

I would assume this is because what you put in is a traditional LSD, while the OEM M sport diff is slightly different. The M sport diff is a variable LSD that offers locks at different loads depending on speed. While a normal LSD will always lock at the same load, regardless of speed. In same ways while we claim to have an lsd we really do not, is it better or worse then an LSD... hard to say I am not the technically knowledgeable about this.

Here is the best info I could find on the OEM diff.

Quote:

Every car has a differential to compensate for the different distances covered by the inside and outside wheel when cornering. Performance-oriented cars have used limited slip differentials for many years. The limited slip differential limits loss of traction by locking the planet gears when one of the two drive wheels threatens to slip, for example, on a wet patch of road. But in more extreme driving conditions, the benefits of the differential lock are limited.

The Variable M Differential Lock recognizes the differential speed building between the driven wheels and generates pressure in an integrated shear pump. This pressure activates a multiple plate clutch via a piston, and conveys drive forces to the wheel with better grip, according to the difference in wheel rotation speed. In extreme cases, the entire drive forces may be transmitted to the wheel with a better frictional coefficient.

Once the difference in wheel rotation speed reduces, pump pressure is reduced accordingly and the locking action decreases. The pump system is maintenance free.

Also this is pretty good.

http://www.autoworld.com/news/bmw/m_difflock.asp

Quote:

Munich, Germany...BMW M Cars have always been powerful and dynamic - and the new BMW M3 is no exception. That is why this high-performance model already features a limited slip differential, ensuring both superior driving stability and optimum traction, particularly when accelerating out of a corner.

Up until now, BMW M Cars have come with a torque-sensing self-locking limited slip differential with locking action of up to 25 per cent and a consistent basic locking force. Differentials are essential, of course, because the two drive wheels of a car cover distances different in length in a corner, the inner wheel not traveling as far as the outer wheel. This fundamental difference is offset by the axle differential.

The limited slip differential builds up a certain locking force whenever necessary - for example when one of the two drive wheels threatens to lock on a slippery surface. Particularly enthusiastic drivers appreciate the limited slip differential since it helps them to capitalize on the positive characteristics of rear-wheel drive - above all with a sporting style of driving and on roads with a frictional coefficient ranging from average to high.

A torque-sensing limited slip differential adjusts the power delivery to each rear wheel based each wheel's ability to deliver power to the road. In very low friction conditions, for example on snow, gravel or particularly smooth ice, the benefits that this conventional limited slip differential is able to offer in terms of traction are limited by the so-called slip forces beyond which the wheel loses its grip.

The engineers at BMW M, teaming up with specialists at GKN ViscoDrive GmbH, have developed an all-new differential system for the new BMW M3 - the Variable M Differential Lock. This lock offers decisive advantages in traction even in very demanding driving situations, for example when there is an extremely large difference in frictional coefficients on the drive wheels. Accordingly, the Variable M Differential Lock enables the new BMW M3, in combination with the fine-tuned DSC system and the car's perfect front-to-rear balance, to offer a standard of driving excellence and handling in winter previously regarded as quite impossible with a rear wheel-drive sports car.

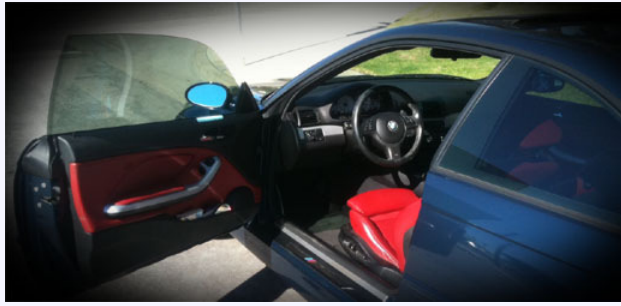
Maintaining Drive Power and Thrust In Every Situation

A further advantage of the Variable M Differential Lock is the increase in locking forces parallel to any increase in differential speed between the drive wheels. As a result, a wheel suddenly relieved of its load and drive force - for example the inner wheel in a corner while driving fast on a mountain pass - can no longer make drive forces "collapse" entirely. Instead, drive power and the car's forward thrust are always maintained at an appropriate level.

The Variable M Differential Lock functions according to a simple principle: The difference in rotational speed that builds up between the two drive wheels whenever one of the drive wheels loses grip, either because it has become unloaded or hit a slippery surface, generates pressure spontaneously in an integrated shear pump. This pressure is then conveyed via a piston to a multiple-plate clutch, thereby channeling power to the wheel with better grip.

In an extreme case, the entire drive power of the engine may be transmitted to the wheel with better grip (provided that enough grip exists). Once the difference in wheel rotation speed between the two wheels becomes smaller, pump pressure is reduced accordingly and locking action decreases. This self-controlled pump system is maintenance free and is filled with highly viscous silicon oil.

The big advantage for the driver of the BMW M3 is the ability to accelerate far better on surfaces with dramatically different levels of grip between the two drive wheels, since there is now more traction available. In addition the Variable M Differential Lock noticeably improves both handling and driving stability, thus elevating safety and driving pleasure to a new, unprecedented level of excellence.



2004 Mystic Blau Imola Rot ///M3 Coupe SMG

Other Rides

- 73- 240z - L28 Block w e31 heads - prepping as a track toy
- 95- Legend Coupe - C32A5 block - totaled while parked
- 96- Dodge Ram 4x4 5.9 - totaled while parked in a seperate incident

Last edited by Foo2rama; Mon, Mar-02-2009 at 10:59:19 PM.



Mon, Mar-02-2009, 11:06:04 PM

#3

LightWerkz
Automotive Lighting Innovations



Join Date: May 2007
Posts: 7,109
Reputation: 0
Location: Oakland NJ
iTrader: 58 reviews, 100%



Subscribed.

Caesar Rowinski - LIGHTWERKZ

2001 BMW M5 - Alpine White on Caramel

Mon, Mar-02-2009, 11:58:47 PM

#4

Viper966
Registered User

Join Date: Dec 2006
Age: 33
Posts: 1,166
Reputation: 0
Location: Buffalo
iTrader: 1 reviews, 100%



Top one is a clutched LSD, the bottom is a Torsen type...

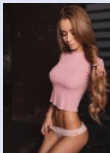
are you sure somebody didnt make a mistake? where did you get this 3.91 diff? it should be identical

Tue, Mar-03-2009, 12:01:28 AM

#5

24601

what goes around comes around...pay it forward



Join Date: Mar 2006
Posts: 7,227
Reputation: 0
Location: RVA
iTrader: 85 reviews, 100%



Foo2rama, thanks for posting the info.

Quote:

Originally Posted by **Viper966**
Top one is a clutched LSD, the bottom is a Torsen type...
are you sure somebody didnt make a mistake? where did you get this 3.91 diff? it should be identical

thanks for the clarification of the difference.

it is essentially a dinan diff. dinan's diff for sure has the same type of limited slip mechanism.


clutched LSD seems to be a much better option, but is there an advantage to torsen over clutched?




'06 M3 | '07 A3 2.0T S-Line | '17 GLC43 (hers)

Wed, Mar-04-2009, 10:48:14 PM #6


Foo2rama
2004 E46 M3



Join Date: Oct 2007
Age: 41
Posts: 4,266
In the garage:
['04 BMW M3](#)
Reputation: 0
Location: Costa Mesa
iTrader: 0 reviews



No new info?




2004 Mystic Blau Imola Rot ///M3 Coupe SMG

Other Rides
73- 240z - L28 Block w e31 heads - prepping as a track toy
95- Legend Coupe - C32A5 block - totaled while parked
96- Dodge Ram 4x4 5.9 - totaled while parked in a seperate incident


Quote ? ? ?

Thu, Mar-05-2009, 12:38:25 AM #7

Serious
Now Rated PG-13



Join Date: Oct 2003
Posts: 7,179
In the garage:
['11 BMW ///M3](#)
['04 Yamaha R6](#)
['12 BMW S1000rr](#)
Reputation: 0
Location: Seattle
iTrader: 5 reviews, 100%



no doubt they are different, the stock one is the "M-lock diff" which is a shear pump. The bottom doesnt appear to be the same leading me to think its a normal "torsen" LSD.


which is kinda ghetto, if you were specifically going for a torsen.

I know that alot of racers and hardcore track guys get rid of the M diff due to some fragility vs. a quaipe for example... but it seems pretty weird your new diff wouldn't use stock design if thats what you wanted.


Quote ? ? ?

Thu, Mar-05-2009, 10:25:02 AM #8

24601
what goes around comes around...pay it forward



Join Date: Mar 2006
Posts: 7,227
Reputation: 0
Location: RVA
iTrader: 85 reviews, 100%



Quote:
Originally Posted by **Foo2rama**
No new info?


working on it.

Quote:
Originally Posted by **Serious**
no doubt they are different, the stock one is the "M-lock diff" which is a shear pump. The bottom doesnt appear to be the same leading me to think its a normal "torsen" LSD.
which is kinda ghetto, if you were specifically going for a torsen.
I know that alot of racers and hardcore track guys get rid of the M diff due to some fragility vs. a quaipe for example... but it seems pretty weird your new diff wouldn't use stock design if thats what you wanted.

yes, we know that they are different. i appreciate the info.

i was not specifically going for torsen or the variable. i really could not pass on the deal i got on this diff...

the diff that i swapped in is essentially a dinan 3.91 diff. i guess this is good to know for those who have one and did not see the internals before it was installed (which i am assuming is most folks), those who did not stop to compare the internals (not sure why one would not), and those thinking of getting a dinan diff or similar torsen setup.

it is not a big deal for me, and to be honest, at first, the thought that the new diff was not an LSD did creep into my mind.  closer inspection squashed that thought.

i have been collecting info on the advantages of one over the other. there are several that i have found but i would like to find more supporting "references".

thanks!



'06 M3 | '07 A3 2.0T S-Line | '17 GLC43 (hers)



Thu, Mar-05-2009, 02:38:47 PM

#9

vndkshn

Goin' crazy... wanna come?

Join Date: Feb 2004
Posts: 8,808
Reputation: 0
Location: Parker
iTrader: 3 reviews, 100%



OP... while not actually helping your quest... THANK YOU! Finally a decent thread in the E46 section!

I've heard people make the comment about the stock diff not being up to heavy track work, but I've never actually seen proof of this, which makes me believe its a urban legend.

2005 Interlagos Blue M3 - Cinammon Interior - ZCP - 6MT - Premium - HK Sound
Performance Mods: D/A Race Software, D/A VAC Lightweight UnderDrive Pulleys, Streamline Panel, Ceramic Coated Stainless headers, Race-cats, B&B Tri-Flow, Motons, Vorshlag plates, GC Adj. Rear Camber Arms, GC Race Hybrid FCAB, Powerflex RTABs, H-Sport Sways, GC adjustable endlinks, GSP Clutch Pedal, 40% Autosolutions SSK, Rogue Trans Mounts, PFC WC/GAC front brake kit, PFC-01s for the track.
Click [Here](#) for nightmare ECS story. - LOL, it was deleted, guess it shows the sponsors can get away with anything here.



Thu, Mar-05-2009, 02:56:14 PM

#10

King Luis

Porsche Fanboi



Join Date: Jul 2007
Posts: 15,447
In the garage:
['13 VOLKSWAGEN GOLF](#)
Reputation: 0
Location: Milton, Ontario
iTrader: 5 reviews, 100%



^^^ +1. a read worth thread.

so they are both LSD but work in different ways?
whats the deal with a quaipe differential? how does that compare with the stocker and a torsen diff?



2015 Ducati Monster 821 Dark
2013 Volkswagen Golf TDI Wolfsburg Edition
Sold: 2004 BMW M3 Coupe.
[My Flickr](#)



[Post Reply](#) [Like 0](#)

Page 1 of 2 [1](#) [2](#) >

Bookmarks

[Facebook](#)
[My Yahoo](#)

[Myspace](#)
[Digg](#)

[StumbleUpon](#)
[del.icio.us](#)

[Google](#)

Tags

[difference](#), [diffs](#), [limited](#), [mechanisms](#), [slip](#)

Quick Reply

Message:

Rich text editor with icons for Bold, Italic, Underline, Text Color, Background Color, Bulleted List, Numbered List, Link, and Unlink. A large text input area is below the icons.

Options

Quote message in reply?

[Post Quick Reply](#) [Go Advanced](#)

[<< Previous Thread](#) | [Next Thread >>](#)

Currently Active Users Viewing This Thread: 3 (1 members and 2 guests)

[GuidoK](#)

Posting Rules

You **may** post new threads
 You **may** post replies
 You **may** post attachments
 You **may** edit your posts

BB code is **On**
 Smilies are **On**
 [IMG] code is **On**
 HTML code is **Off**

[Forum Rules](#)

Forum Jump

Similar Threads

Thread	Thread Starter	Forum	Replies	Last Post
Check out this "VERY LIMITED" 03 M3 for sale...LOL...	EddieK22	Off Topic	20	Mon, Jul-28-2008 08:07:56 PM
*****1st Mini M3 Meeting in Qatar*****	Silver///M	Member Photos and Videos	34	Mon, Dec-25-2006 07:57:32 AM
What's the difference between "shocks" and "struts"? Are they interchangeable?	lllgrasshopper	E46 M3 (2001-2006)	2	Mon, Jun-20-2005 12:22:32 AM
FS: "1964-2004" 40 years limited Edition Jack Heuer Carrera	S54Rule	Parts for Sale/Wanted	1	Thu, Jul-01-2004 08:09:40 AM
are M3s considered "limited production" cars?	bender73	E46 M3 (2001-2006)	15	Tue, Jun-22-2004 06:18:55 AM

Save on Auto Parts  

[Shop now](#) Privacy

All times are GMT +2. The time now is 06:33:55 PM.

Powered by vBulletin® Version 3.8.6
 Copyright ©2000 - 2017, Jelsoft Enterprises Ltd.
M3Forum.com and **M3forum.net** is in no way sponsored, endorsed or affiliated by or with BMW NA / BMW AG or any of it's subsidiaries or vendors.
BMW and **M3** (E90 M3 | E92 M3 | E93 M3 | E46 M3 | E36 M3 | E30 M3) are registered trademarks of BMW AG.
 M3Forum [Terms of Service](#)
 Copyright ©1999-2017 [M3Forum.com](#)
 Discussing someone tell me the difference between the limited slip "mechanisms" of these diffs in the E46 M3 (2001-2006) Forum - Engine: S54 - Max Hp: 333 hp at 7,900 rpm / 262 lb/ft at 4,900 rpm
 Total Produced: 45,000+ - Years Produced: 2001 to 2006. at BMW M3 [Forum.com](#) (E30 M3 | E36 M3 | E46 M3 | E92 M3 | F80/X)