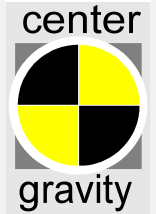


**'GETTING WIFE TO GO ROAD TRIP IN A
PORSCHE 996' - PUTTING THE
COMPLIANCE BACK INTO PORSCHE**

PCGB Modified and 996 Register Zoom Meet

14.06.2023



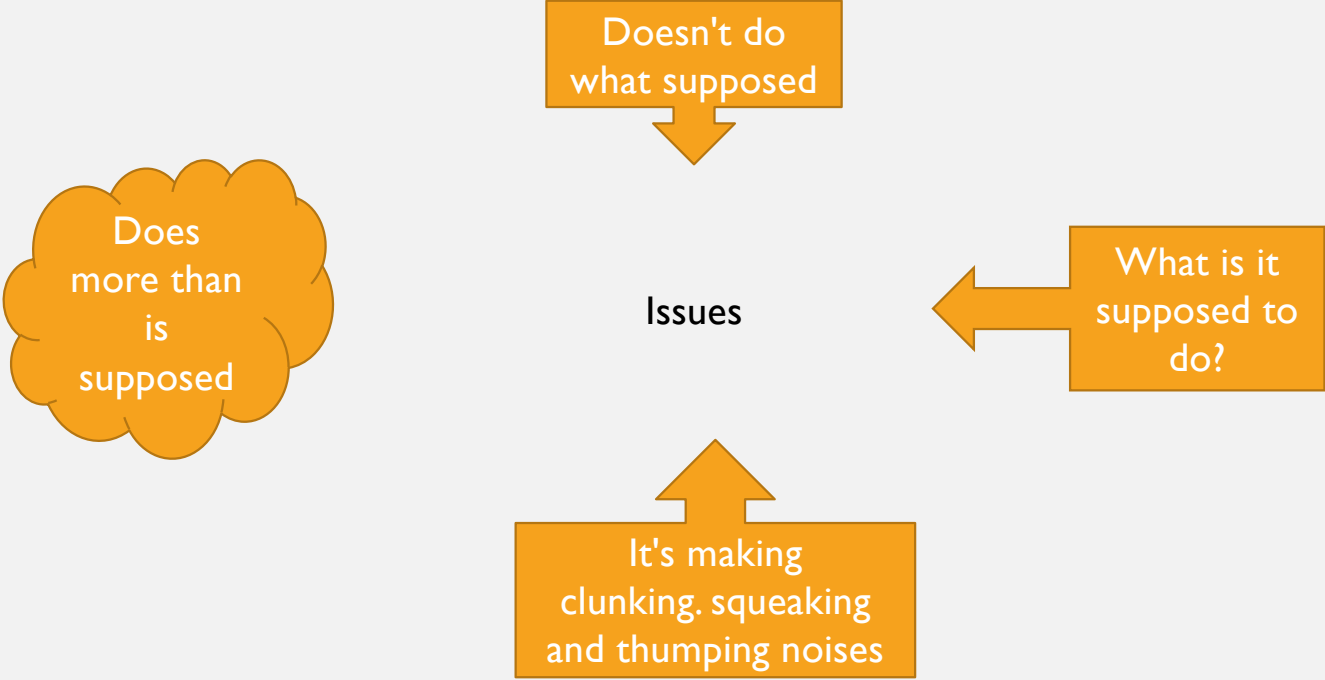
LET'S REFRESH

- 996 four wheel drive: C4, C4S, Turbo on M029 or M030 suspension.
- There's a myth – the C4S and Turbo can ONLY be M030 – the C4 can be M029 but this is uncommon. The C2 can be either M029 or M030.
- It isn't only **dampers and springs** that can cause harshness – worn/hard bushes and polyurethane upgrades can also be attributed to harshness.
- **Tyres** can also be attributed to harshness – stiffer sidewalls (Pirelli P Zero for example) compared to tyres like the Michelin PS2.
- It makes sense then, that **wheel size** also affect ride quality – the bigger the wheel (those of you with 19's on!) can expect poorer ride quality over 18's.



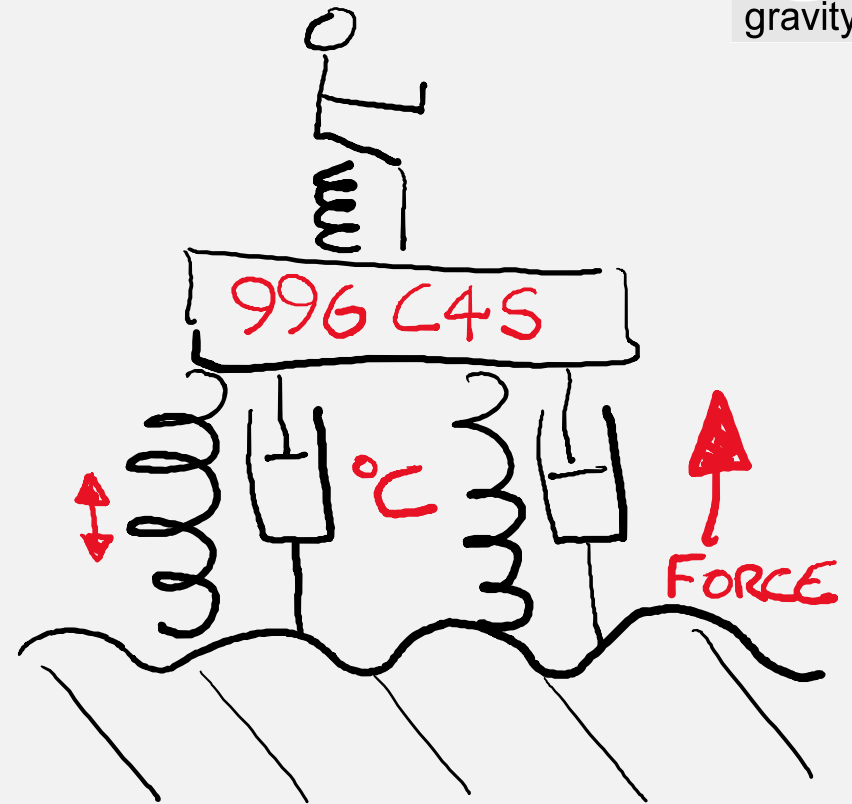
SUSPENSION ISSUES

* when driving



THE THEORY

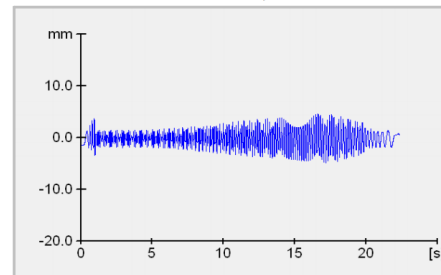
Springs and dampers
Energy of the bump is absorbed by the spring and dissipated by the damper



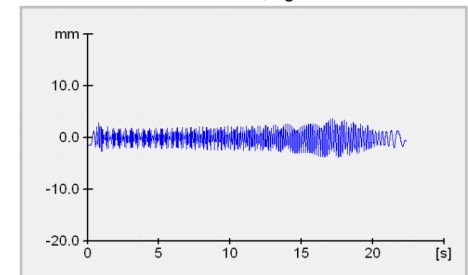
Results Suspension Test

	left	Front axle diff	right	left	Rear axle diff	right
Absorption Theta	0.30	0 %	0.30	0.30	0 %	0.30
Wheel weight	269 kg		261 kg	450 kg		418 kg
Axle weight		530 kg			868 kg	
Start time	13/08/2018 11:19:03			End time 13/08/2018 11:21:59		

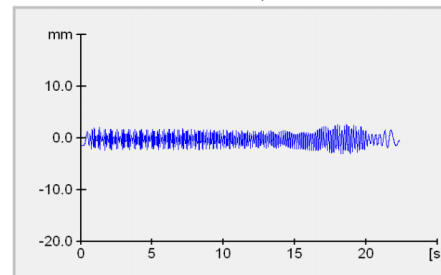
Front axle, left



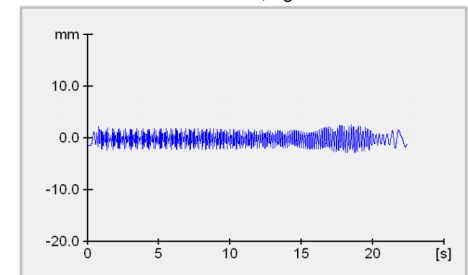
Front axle, right



Rear axle, left



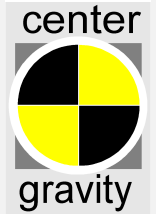
Rear axle, right



DODGY DAMPERS...?

996 C2 M030

Slightly loose FL damper in low speed
bump and rebound



WHAT IS SUPPOSED TO HAPPEN ^{* and not}

996 driving themes

- Optimise grip to accelerate, brake & turn
- Safe, fun, sportier with confidence
- Give precise control
- **Wheels conform to the road surface**
- **Comfort for driver and passengers**

996 driving gripes

- Lack of grip in powering turn
- Lightness at the wheel at higher speed
- **Skittish behavior off smooth roads**
- Steering feels light and vague at high speed
- **Wheels react to road** (mouse and the elephant !)
- **My wife will not get in it (too harsh)**
- **CRASHY – PARTICULARLY OVER REAR**

DAMPERS AND SPRINGS SHOCK ABSORBERS STRUT

Wear due to mileage/age/over exertion

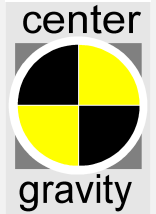
Leaking possible (dampers)

Quiet – even when worn

Get old gracefully

Springs can snap – longstanding in cold weather or overexertion





BESPOKE SOLUTIONS FOR YOUR 996

Timeline

996 C2

- OEM M030
- Koni Special Active and M030 springs
- Ohlins DFV with specified spring rates
- Panic!!!!
- 996 GT3 OEM dampers, revalved to CG specification, matched with specified springs
- The CGGT development begins to take shape!

WHAT DO WE WANT?



Remember – COMPLIANCE IS KING

Let's get across country quickly, with little effort and greater speed

Less back ache

Less fillings rattling around

A little lower ride height, but without introducing harshness

No twiddling of knobs – let's just get in and drive

Most importantly.... we want the wives to get in and enjoy the drive too!

REDEFINING THE TERM GT

GT in American English



ABBREVIATION

1.

gigaton; gigatons

2. *Also called:* GT car, grand touring car, grand touring *Automobiles*

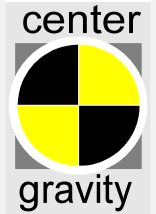
a.

an [automobile](#) in the style of a coupe, usually seating two but [occasionally](#) four, and designed for [comfort](#) and high [speed](#)

b.

a [high-speed, two-door model](#) of a [four-door sedan](#)

SO... WHAT FITS MY MODE OF USE?



GT

Standard/Stock

Sport

Track/Sport

CGGT

OEM M029/30

Bilstein B6 or B8

Ohlins TTX

Bilstein B4

DesignTek Coilover

KW Clubsport

Koni Special
Active

Ohlins DFV (Road and
track)

Bilstein
CLUBSPORT

KWV3

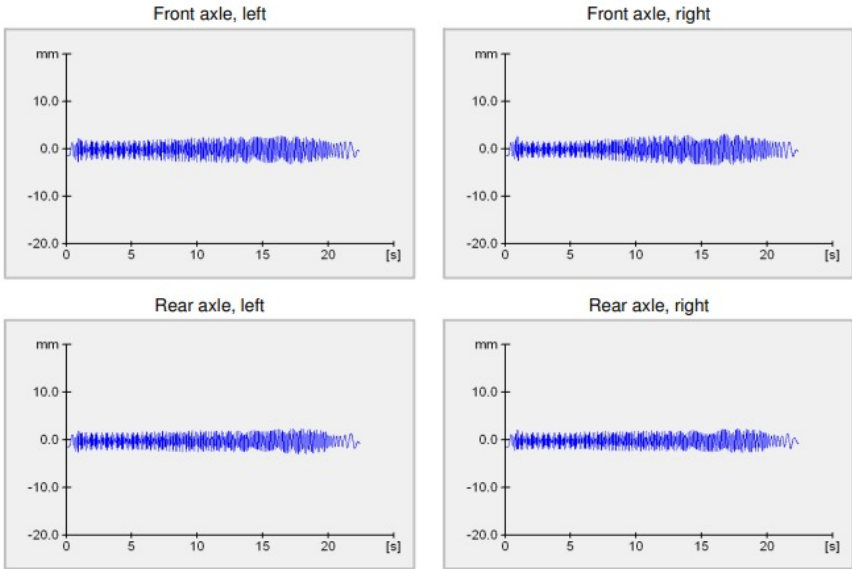
Tractive R-Ace

Bilstein PSS10

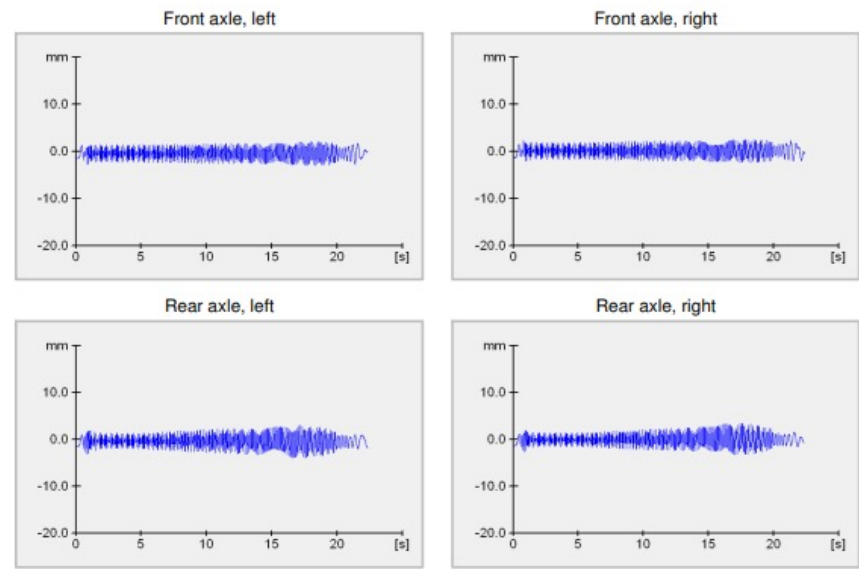
Tractive ACE

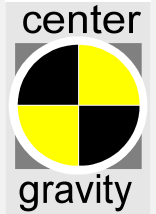
LET'S SEE THE DIFFERENCE BEFORE WE FEEL IT

Customer no.	L00001337	Chassis no.				
Order no.	L00002145	Licence no.	cf52kfl			
Results Suspension Test						
		Front axle		Rear axle		
Absorption Theta	left 0.30	diff 0 %	right 0.30	left 0.30	diff 0 %	right 0.30
Wheel weight	294 kg		298 kg	493 kg		456 kg
Axle weight		592 kg		949 kg		
Start time	28/05/2021 17:33:45		End time 28/05/2021 17:35:34			



Customer no.	L00000590	Chassis no.				
Order no.	L00002359	Licence no.	cf52kfl			
Results Suspension Test						
		Front axle		Rear axle		
Absorption Theta	left 0.30	diff 0 %	right 0.30	left 0.28	diff 3 %	right 0.29
Wheel weight	308 kg		311 kg	465 kg		474 kg
Axle weight		619 kg		939 kg		
Start time	12/07/2022 12:34:28		End time 12/07/2022 12:37:25			





BRITISH ROADS VS THE REST OF THE WORLD

UK

Potholes (and lots of 'em)

Divots

Camber sensitive

Undulations

ROW

Potholes (but not QUITE as many)

Smooth tarmac

Less camber sensitive

High speed autobahns

2 years of development on our own 996 C4S...



Paul Stephen's own C2 testing our C2 prototype



TESTING...
TESTING...

It's not all pipe and slippers... the C4S at the Nurburging post track session



4 iterations produced by Bilstein UK technical team to perfect the valving and internal bump stop length... and countless spring revisions



Testing on both hollow and solid spoke wheels

THE SAME... BUT DIFFERENT

CGGT

- McPherson strut
- Inverted monotube
- Revalved damper insert specifically for CG
- Adjustable height spring perch allowing adjustment of ride heights and corner weighting
- Adjustable ride height designed for 'sport' ride height (M030) or X73 (C4/C4S/Turbo) or X74 (C2)
- Modified internal bump stop to allow greater damper travel
- Non-adjustable bump/rebound (fixed damping)
- Eibach specially selected spring rate to match the bespoke damper valving

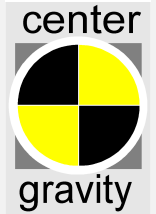


Bilstein B16 PSS10

- McPherson strut
- Inverted monotube
- Valved for road sport and amateur track use
- Adjustable height spring perch – X73 to GT3 ride height
- Adjustable bump/rebound (10 'clicks' of bump/rebound)
- Bilstein proprietary main and helper spring of higher spring rate (higher than stock OEM circa 20-40% stiffer)

WHAT THE PUNTERS ARE SAYING...

C4/C4S/Turbo clients and their initial feedback.....



996 Turbo

After thorough testing I can safely say that the car is absolutely amazing now and so confidence inspiring. All clanks, clatters and crashes that I assumed were just the character of a 22 year old car, have gone. The CGGT kit that I chose is perfectly matched to our dreadful roads. Undulations and potholes are dealt with by the suspension without the car's trajectory being altered. I asked for a fast road setup and damping for UK country lanes.

Well done Center Gravity! I can highly recommend their work and particularly the CGGT kit.

996 C4

And as for the car...well, although most of the journey home was on the M1, the twisty bits in between allowed me to get to know the differences with the car pre and post CG GT.

Overall, I am delighted. I am not a massively experienced driver like yourself, and the CAT driver training is on my list to help address that, but the car feels more planted to the road and I have a better feel for what it is doing. I feel more connected to the actual road through the controls of the car and the way I can feel the grip, all of which inspires a great deal more confidence than was the case prior to the suspension overhaul.

Steve Bennett, Journalist, post 996 C4S evaluation

Anyway, all very positive and just what the UK market needs - a kit for UK roads. I could tell even before I had got to the end of your road, that the famous MO30 rear end lock-up had been banished!

My journey back was mostly motorways, but there was a bit of B-road. Ride is excellent on the standard spring rates and the damping is what I would call 'firm but fair' Above all, there is no situation that the damping can't cope with, or where the spring rate takes over, as with M030.



C2 CGGT PROTOTYPE

Testing is in it's final stages...

Release Q3 in 2023

