Caterham Buyers Guide

I will try to answer and highlight the more general information which can be applied to your car before making recommendations at the end. You may find me rambling a little and referring to specific cars half way through.

As I hope you are aware I sell a range of brands of dampers. I also sell a range of specifications - non adjustable all the way to 4 way adjustable.

In order to justify to the manufacturers and customers why I recommend one product in a price range and specification over another I have set out all similar products to make the same margin in actual £ not percentage.

So on a 1 way set of Nitron's will achieve the same margin as a 1 way set of Quantum and so on through the various specifications. I hope this justifies our independence and impartial advice.

Here we go then – fixed rate, 1 way, 2 way,3 way or more:?

Justifying a set of the 4 way Ohlins TX40 or 3 way Penske for road use will be difficult, however if you want the best specification at a very reasonable cost and you really want the ultimate adjustment, quality of product and brand then they are worth every penny. Indeed I have sold a number of sets to road going owners who wanted just that ultimate performance. You will never ever need another set of dampers! In many respects I think you possibly feel the better quality of a damper on the road than you do on a track where surfaces are far smoother and consistent. On track the clock and your confidence will always feel that performance gain.

All costs are for full kits of 4 dampers – springs, spacers and adjustment tool.

Fixed Rate Dampers

As it says really these are suspension dampers which have no adjustment for the valving of the damper. They do have ride height adjustment but nothing else. For this specification we only offer the Quantum Zero. It is available in regular linear piston and valve configuration, digressive/linear piston formats. Our specification will make sure the suspension will be set up exactly for your needs not to hard and certainly a great improvement on standard dampers. (For digressive valving and pistons please see the information below).

The Quantum Zero is fully upgradeable to either one or two way in the future if required as it would be to add digressive pistons at a later date.

Quantum Zero £1091.08 incl springs + vat

1 **Way Adjustment** – One adjuster that alters both Compression and Rebound settings

In the one way range we have Nitron Street Series, Quantum One.Zero, Nitron NTR1, Nitron NTR1 Pro 46mm and Penske 7500. The most cost effective of the 1 way damper is the Nitron Street Series @ £699.00 (Only available for certain car specifications).
Nitron NTR1 @ £1356.25 + vat
Nitron NTR1 Pro 46mm @ £1587..50 + vat
QRS One.Zero @ £1541.40 + vat
Penske 7500 1 Way @ £1964.00 + vat
Penske 8300 1 Way @ £2060.00 + vat
Tractive 1 Way £1579.08 + vat

Nitron offer two great value, well specified products within this range, both recognizable by the smart hard anodised grey exterior coating. The Street Series may well be the damper for you if you are looking to upgrade your regular road use damper to something for more focused and spirited driving. These offer a wide range of adjustability, albeit having factory specified valving, which is the same both front and rear. Spring rates are also factory specified and are biased slightly towards retaining a reasonable degree of compliance on the road. The Street Series has at least 35 clicks of adjustment.

The NTR1 is probably the more familiar of the Nitron 1 way dampers which you will see on many Caterham's. This is altogether a more focused product that benefits from being 'made to order' so allows input from Meteor to ensure our massive experience with Caterham suspension is fully utilised. The NTR1 has 24 clicks of adjustment.

The Nitron NTR1 Pro 46mm until recently has not been something I would have recommended for use with a lightweight car. It has not been able to flow enough oil at low speed damper movement (giving to firm a ride). Now though following work with our Autograss customers I am able to use a high flow 46mm piston in the build specification. This now means that the 46mm Pro damper performs exactly as required. With the benefits arising from greater oil capacity and strength it's a great damper that should be considered. Nitron is a UK manufacturer.

The Quantum is entirely manufactured and assembled in the UK save for perhaps the O rings or seals used. The quality of engineering design and indeed finish is second to none. Hard anodized just like the Nitron and available in an all black finish if required for a small additional cost.

The One.Zero has 27 "clicks" of adjustment. Very progressive and you really do feel the "clicks". The Quantum has finer adjustment but the Nitron can be adjusted over a wider range.

The main differentiator between the two dampers is the upgrade path and options. The most significant difference is the availability of the Digressive piston with Quantum. I think this makes a significant difference particularly to front end "turn in" and positive feedback through the wheel. Additionally the Quantum can be built into a 2 way damper with very little work perhaps at the time of service.

The Penske 7500 is as you would expect a fantastic product but I feel the Nitron and Quantum offer better value at there respective prices. However the introduction of the 8300 series 1 way damper makes things a little more complicated. Since it uses the same external hardware as both the 8300 2 way and the 8700 3 way damper it really makes sense if you think you may want to upgrade in the future. If you want the ultimate performance it remains an valuable option.

New on our list of suspension is Tractive Suspension. Tractive are a Dutch company and started in 2010. They have vast experience working for one of the longest established performance brands. The quality of the engineering is second to none. I like the products very much.

The Tractive 1 way damper is very competitively priced at just £1639.08 + vat

I would have no difficulty recommending any of the above – it is dependent on the options and upgrades you may wish to make in the future.

Penske 8300, Quantum and Tractive all have Digressive Piston options.

2 Way Adjustment

QRS Two.Zero @ £2250.80 + vat
Penske 7500 @ £2337.60 + vat (sweep adjuster) and @ £2677.60 + vat. (clicker knob adjuster).
Penske 8300 @ £3744.00 + vat - *remote reservoir and upgradeable to 3 way 8700 specification.*
Ohlins 2 way with remote reservoir @ £3390.00 + vat
Ohlins ILX 2 Way - no reservoir required @ £4010.00 + vat (Fantastic dampers with great performance and packaging. Very easily tuned or modified to adjust in more "ways").

The Penske 8300, Ohlins and Quantum all have digressive piston options. Penske and Ohlins included in cost and Quantum @ £250/set. I think the Quantum offers the better value for money at this level but you need to offset this with Penske and Ohlins reputation, performance and brand. The Penske 8300 however is a fantastic spec and damper with the possibility to upgrade easily to 3 way. This would be my choice if funds were available. I must emphasize that the Quantum has nothing to worry about here either coming from F1 History. I guess I am saying its personal choice.

3 & 4 Way Adjustment

At this level we have the Nitron NTR3 and NTR Pro 46mm, Ohlins ILX, TTX40, Tractive and Penske. I have owned and used the Nitron NTR3 Pro for a competitive season and they were faultless. The regular NTR3 is great value for money. New for this level of damper is the Tractive 3 way. Superb quality and engineering at very good value for a wide body damper.

Although a significant price differential my current damper of choice is the Penske 8700. There currently is a significant difference in the way the dampers perform and the way the car responds. If you are choosing a multi way damper it is likely you require the fine adjustment and performance of the Penske. It comes with a Digressive/Linear piston and is infinitely adjustable. Simply superb. I use this myself as it offers huge performance. This damper has won the Indy 500 many times in recent years. It is the spec damper for all BTCC cars. We have specifications for Ohlins ILX and TTX40. The ILX are an all in one damper with no remote canister and are of a very high specification. The TTX40 is a damper of a through rod design and just like the ILX have no external reservoir and are easy to install. These dampers require no remote canister and are available in 2, 3 and 4 way adjustment. The like for like cost is shown below. I would certainly recommend them if you have the budget. I have tested them on our dyno and the results and range of adjustment are at another level again. This is though reflected in the cost!

Nitron NTR 3 - £2712.50 + vat
Nitron NTR 3 Pro - £3062.50.00 + vat
Tractive 3 Way - £3090.00 + vat
Penske 8700 – 3 Way - £4904.00 + vat
Ohlins ILX – 3 Way - £5190.00 + vat

Tractive Active Ride

The Tractive Suspension – ACE system can run in super compliant supple ride and the moment a sharp or positive action is input whether steering, acceleration or deceleration the damper reacts. Going from full hard to full soft or vice versa in less than 10 milli sec. (Less than 1/100th sec). Its simply unbelievable and for a road and track or just fast road user transforms the car.

The R-ACE system allows on the fly adjustment. Should the track surface change mid-race or track session, if your tyres go off mid-race or the balance change you can adjust the balance and settings via the remote control.

Again I have used this system and thoroughly tested it before offering it for sale. Its difficult to explain here how amazing the active ride really is. For those on the road and track it should be something you consider.

Active Ride – Remote Adjustment £3850.00 + vat

Active Ride – 3 way and Remote Adjustment £4995.00 + vat

Springs

All of the above dampers (except the Street Series) are supplied with linear springs or with our own twin spring progressive set up. (£175 option for the rear only). The benefits of the progressive set up make for a far less harsh ride. I particularly like them on the rear of a 7. Do not underestimate the significant benefit that the new dampers and valving will bring to ride quality but the twin spring is a fantastic extra.

Pistons and Digressive Valving

Now just to confuse or add to the decision making process further I have developed with Quantum a valving and set up with what we call a "Digressive" piston. This affects the shape of the damper force curve/plot. It brings a further enhancement to ride and performance. Unfortunately as always there is a cost implication as the machining process for the digressive piston has to be completed on 2 different machines and has to be handled by a “man” a number of times. The linear piston is one machine - one time handling.

The digressive set up is available as an additional cost for both 1 way and 2 way QRS dampers @ £260.00 + vat For reference the 8300 and 8700 Penske's comes with a digressive piston as standard.

General Information

Lets look at the standard dampers.

Bilstein. I have tested many and most of the various M1/M0 types etc (there are far more than the 2 specs). They perform well - the curve/plot is good except it’s all a little soft IMHO. Digressive in shape = good but just under damped. Works well on a road car with less power and momentum. Spring rates OK - front could be stiffened a little - rear is progressive and good.

My testing of these has found that although they seem not to fail to often they do not match each other very accurately. Indeed after testing one batch of 9 front dampers the range across all was in excess of 60% of the adjustment in a Quantum. Additionally it was the newest set that were the furthest apart. - hardest and softest. This not a criticism – they are simply different spec dampers intended for different work.

Any of the new dampers will make an improvement to ride and control, precision etc. So long as we get the spring rates correct they will not be harsh either.

So what to do? Well I do not yet know your budget. I will therefore make some assumptions.

You would like to see a good step up in performance - you probably drive it faster than when you first had the car so it's not so much as the car falling away as you improving and feeling more comfortable. It's a very very fast and stable car so you need to ensure it has the poise to make use of its power.

Option 1 - Ultimate spec.

Penske 8700 Series - 3 way adjustable - £4904.00+vat or Tractive Active Ride @ £3850.00 + vat

Option 2 - High Spec/Performance 2 way

Penske 8300 £3744.00 + vat or

QRS 2 Way - Digressive piston £2510.80 + vat

Ohlins ILX 2 way - £4010.00 + vat

Option 3 - 1 way adjustable

Difficult Choice – its up to you and your future plans.
Nitron NTR1 – Linear £1356.25 + vat
QRS - 1 Way - Digressive/Linear Piston £1801.40 + vat

There are so many options without a budget it is difficult for me to make a selection. Let me have some figures and I will guide you more accurately.

The only thing I would add in the first instance is that I do offer a stiffer set up for the track guys – that's the whole idea of speaking to me rather than a manufacturer who knows the dampers but not the car.

Lead Times

The approximate lead time for the manufacturers is stated below.
Nitron 5 Weeks
Penske 3 Weeks

Ohlins 10 - 12 Weeks

Quantum 4 Weeks

Further Reading

Before explaining a little more about the 1 way/2 way lets look at your existing dampers.
I can not say if anything is wrong until they are dyno tested.
It is unlikely the Billstein dampers have failed - just that they are under damped - not enough force to control the car momentum (bump) and the spring strength - rebound.

You could look for leaking seals etc but its not the full picture. Billstein's should be good for 100k miles. But they are more closely related to an OEM damper for a road car than a performance damper. Far more friction.

3 Way Dampers

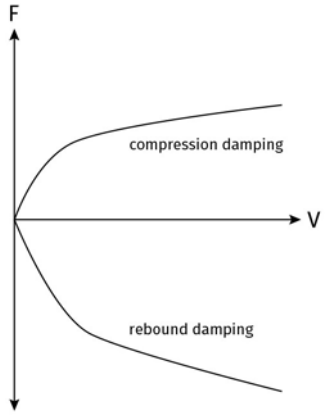
Similar to the 2 way by separating the bump and rebound but it also splits the compression adjustment into 2 sectors. Low speed damping (which is the area a driver will feel the most) and high speed which you will only feel if hitting a hole in the road or a kerb at the race track.

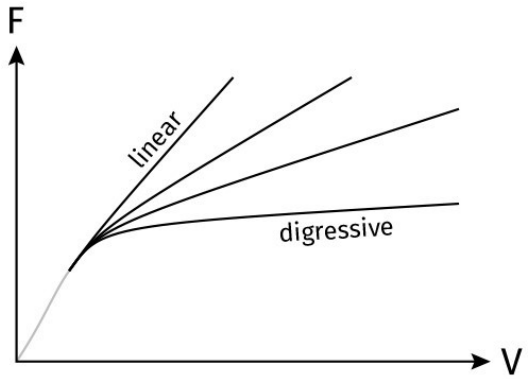
Digressive Piston

In a linear piston the forces increase hmmmm in a "linear" way. From slow speed (damper travel speed) through to high speed (pot holes or kerbs on a circuit).

The digressive piston allows the force to blend way at the high speed end - so it's not too firm when you find those sharper bumps and holes. Likewise I opt for a double digressive - meaning the rebound is also digressive and the spring can push out quite quickly under high loads to keep tracking the surface.

But when the speed (damper) are lower the control forces are still relatively strong. This give great feedback and confidence when driving.





Progressive springs.

Good on all the dampers but if I had to choose between digressive piston and progressive springs I would opt for the digressive piston on the front and progressive springs on the rear - particularly for road spec. On the 2 way damper I would want both on the road and just the pistons on track. The linear spring being more predictable on the smoothest of surfaces.

So the progressive springs on a 2 way damper can be left to do their own thing - you can soften off the rebound and let the spring take care of things. They will sit at a fairly soft rate at ride height but stiffen under compression when needed. The rear will roll less as one side stops pushing out so hard and the other side increases the force at which it pushes back against roll.

It's all very subtle but quite effective and you would certainly feel all the changes if tested back to back.

I don't think there is much more I can say other than they will be very confidence inspiring - they will change the car dramatically for the better - like you will get a new grin on your face again when you drive.

All of the above dampers come with valving and set up that we have developed along with the manufacturer's to meet our specific criteria. You may find what is supposedly the same damper for sale elsewhere – But it's what is inside that counts !