

Unfortunately we have to do this...

Disclaimer

This document was compiled to illustrate the steps I took, issues I ran into and thought processes I went through when I upgraded the brake system (Cheapo BBK) on my 2002 Audi A6 (C5).

I make NO CLAIMS to the completeness and or correctness of the information in this document. Do YOUR OWN research to confirm EVERYTHING you read in this document. I am not a professional mechanic, so use the information in this document as a general guide only.

Modifying your vehicle can affect its safety and road worthiness, so consider all the facts before you attempt making alterations of any kind.

Should you decide to use the information in this document you are doing so AT YOUR OWN RISK. I take NO RESPONSIBILITY for ANY damage to property or bodily injury to yourself or others as a result of your actions.

***The brake system(s) on YOUR vehicle is
Fundamental to YOUR safety and the safety of
OTHERS on the road WITH YOU!!***

**PLEASE MAKE SURE YOU KNOW
WHAT YOU ARE DOING!**

OK enough already...

On to the info...

(1) SOME MEASUREMENTS (Front)

2010 Touareg Brembo 4 piston caliper



Brembo Part number



Brembo caliper Bolt size 16mm



OEM bolts are 14mm



MB C230 Sport rotors factory pre-drilled (330mmX28mm)



OEM 321mm rotor on top and MB 330mm below. Not much bigger, but the 2 piston caliper and larger brake pad surface area ("accurately" determined by eyeballing..lol) has much bigger impact on brake performance. The MB rotor also looks like it may cool better as the vanes are not "straight" from the center, but curved to the outside of the disc.



OEM & MB usable pad surface 60mm



OEM 30mm thickness vs. 28mm of MB



MB Rotor



Had

height 46.7mm



OEM Wheel bolts 15mm vs. 13.3mm of MB rotor



OEM rotor hat thickness 7.3mm vs. MB 5.5mm



OEM Hub size 68mm vs. MB 67mm



Brembo Caliper offset to inside. Requires about 3mm machining (removal) of the caliper flange to center caliper on the rotor



3mm removal
needed

(2) SOME MEASUREMENTS (Rear)

I wanted to upgrade the rears to vented rotors and an easy option is the B5 S4 caliper which is the same size as the OEM 256mm (10mm solid stock vs. 22mm vented S4), but used calipers are in high demand and pricey, so I was looking for an alternative... I found that some 1999-2006 TTs had a vented rear and I was able to source the complete calipers with carriers for around \$100! Good plan, but it did not work out as well...

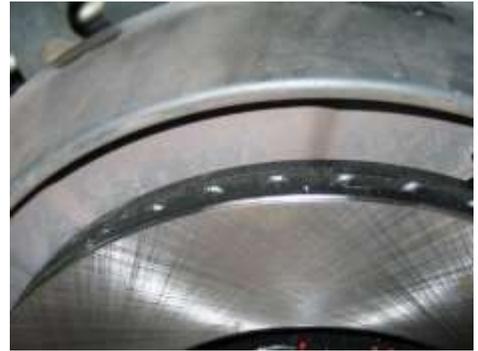
S4 rear dimensions



Stock left



S4 stock dust shield



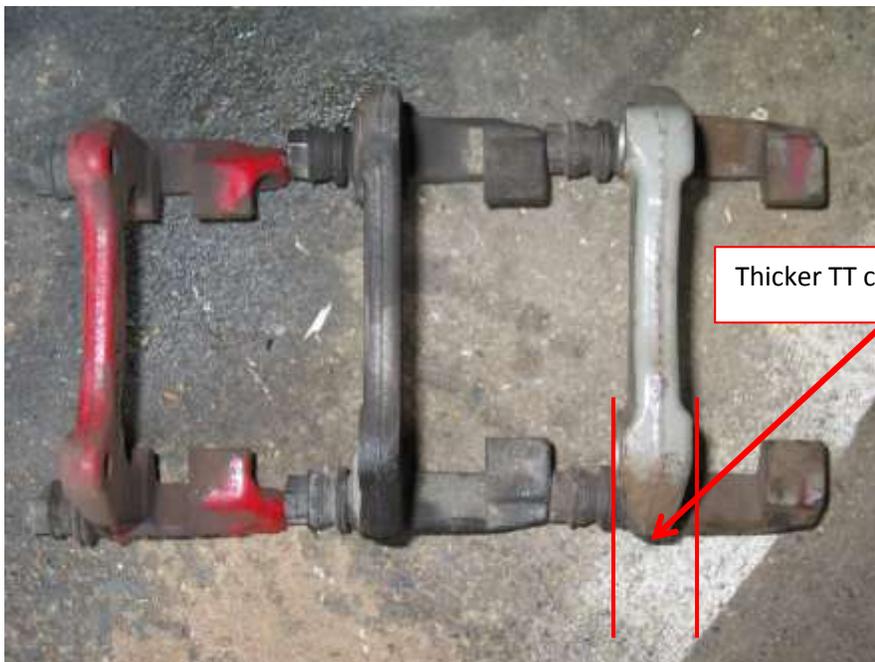
< Centric Part Number 121.33067

A few "gotchas" squashed that plan...

Stock C5

B5 S4

TT



(1) TT carrier's mounting flange is significantly thicker than the C38 (C5 stock) the C43 (S4).

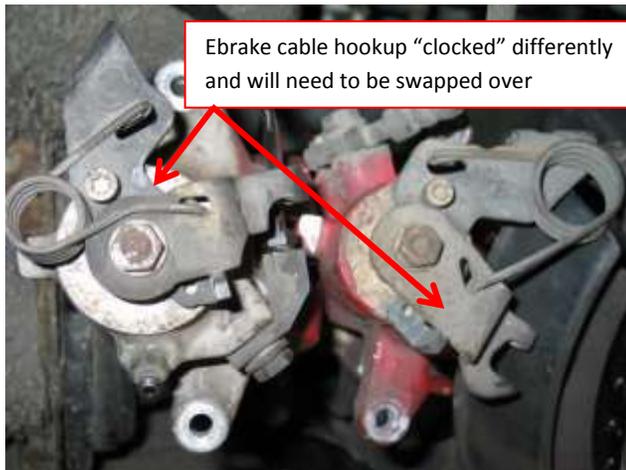


Should fit underneath
knuckle flange

(2) The TT caliper fits on the S4 carrier without a problem, but keep in mind the TT piston is the same as the stock C38 (38mm) where the B5 S4 is a 43mm (C43)



(3) ... so I thought I could just use the S4 carrier, but... that would require moving the ebrake mechanism from the stock over to the TT.



Ebrake cable hookup "clocked" differently
and will need to be swapped over



(4) The Brake line connection was also in opposite side so that would be more of a pita
(5) Ultimately I got an awesome deal on a rest of S4 recons (\$110) and went that route.

(3) LARGER REARS ANYBODY?

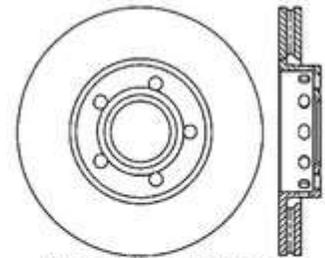
I also considered increasing the rear rotor diameter while I was at it... got some cheap ones off eBay to do some measurements and fitment etc.

First Consideration was the Front 276mm x 25mm from Audi 200 Turbo Quattro



276mm

121.33021
Floating



Outer Dia: 276.0 mm
Height: 46.3 mm
Nom Thick: 24.9 mm
Min Thick: 23.0 mm
Hub Reg: 68.0 mm
Bolt Size: 15.5 mm
Bolt Circle: 5 x 112 mm
Weight: 15.41 lbs

BRADI	1011124
OEM	447-615-301B
BREMBO USA	25387
BREMBO GLOBAL	09.5734.10
AIMCO	34000
BECK/ARNLEY	083-2182
BENDIX	PRT1887
CENTRIC	121.33021
DURA	BR34000
NAPA (BRAKE)	86427
QUALIS	34000
RAYBESTOS	96427
WAGNER	BD61975

Part numbers

- (1) Fits with the stock dust shield,
- (2) Caliper carrier (S4) does not fit. May need the S8 carriers (used with 280MM rear).
- (3) If you fabricate a bracket for the carrier to knuckle the carrier may also need to be widened as it barely fit the 25mm rotor.
- (4) The rear pad is way too small for the rotor surface so you will need a larger pad to make use of the extra surface
- (5) Hat height is slightly lower than the stock S4 46.3mm vs. 47.8mm

Pad too small for surface positions



Second consideration was the Front 288mm x 25mm from many Audi and VW models (used in Front).

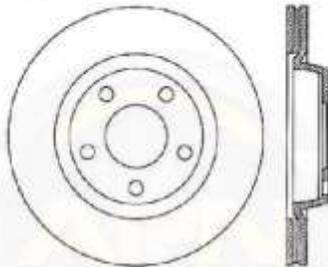
Similar option is the 2003 Audi S8 rears at 280mm (8E0 615 301B), but the carriers are very expensive (4D0 615 425C) and I am not sure what the caliper and pad looks like.

280mm



120.33056

Floating



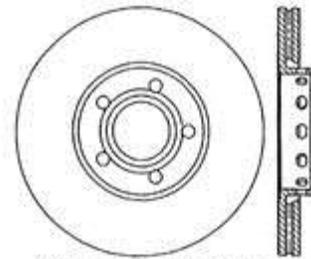
Outer Dia: **280.0 mm**
Height: **46.4 mm**
Nom Thick: **22.0 mm**
Min Thick: **20.0 mm**
Hub Reg: **68.0 mm**
Bolt Size: **15.5 mm**
Bolt Circle: **5 x 112 mm**
Weight: **14.25 lbs**

288mm fills it up nicely



121.33039

Floating



Outer Dia: **288.0 mm**
Height: **46.4 mm**
Nom Thick: **24.9 mm**
Min Thick: **23.0 mm**
Hub Reg: **68.0 mm**
Bolt Size: **15.5 mm**
Bolt Circle: **5 x 112 mm**
Weight: **17.5 lbs**

Not from a C5 mod, but same principle would work to move carrier out... still need a larger pad though



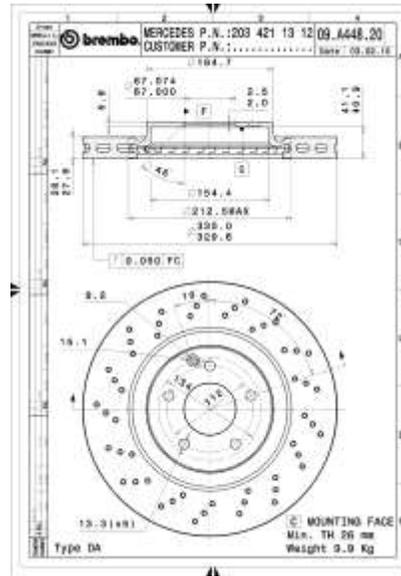
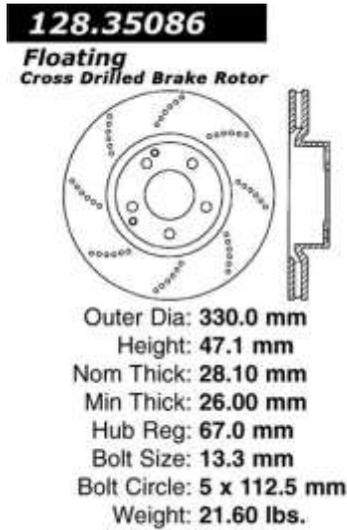
Images "borrowed from" BlindHorse.ru (Installation 310 mm. rear brake discs on Audi 100/S4.)

(4) FRONT CONSIDERATIONS & OPTIONS

All the technical drawings I found during my research for the Rotors etc.

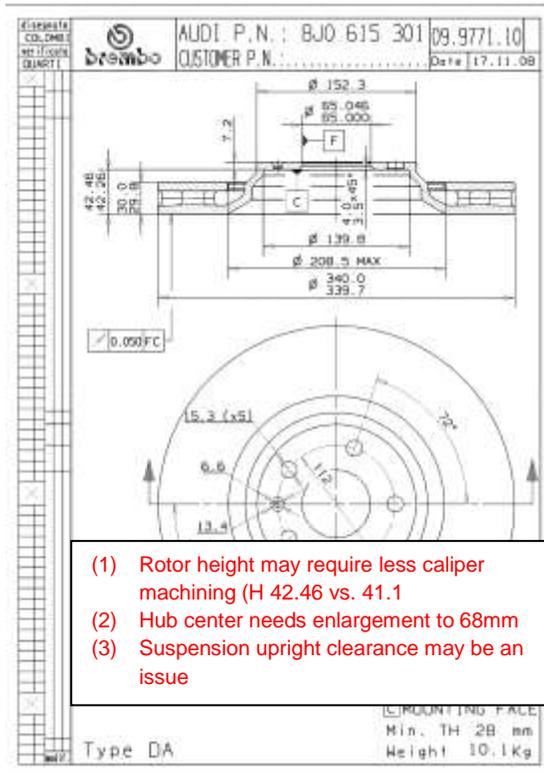
http://www.vaglinks.com/Pics/Brake_Info/

330mm Mercedes C230 Fronts (used by me and many others)



Picture "borrowed" from somewhere. Thanks to original owner

340mm 2008 TT Quattro



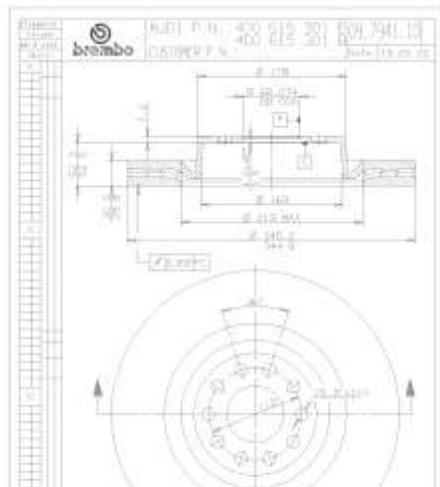
- (1) Rotor height may require less caliper machining (H 42.46 vs. 41.1)
- (2) Hub center needs enlargement to 68mm
- (3) Suspension upright clearance may be an issue

344mm 2010 S4 & S5 Quattro 4.2



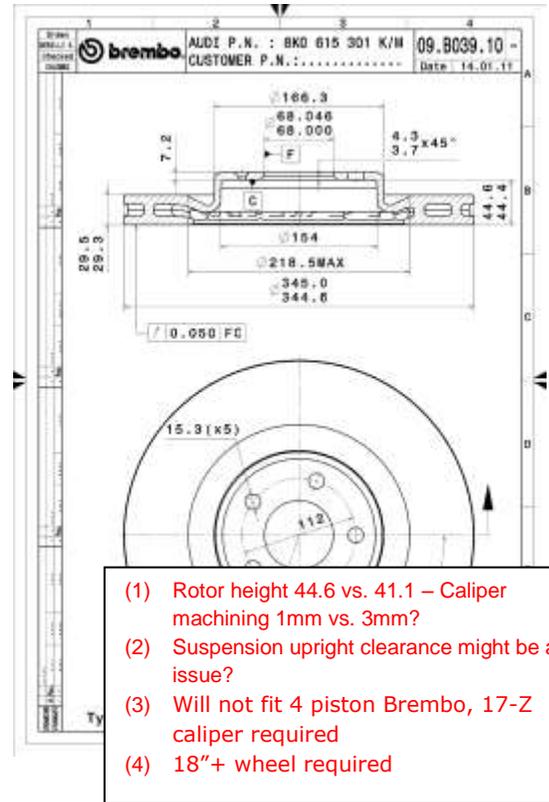
- (1) Rotor height significantly higher
- (2) Suspension upright clearance probably an issue
- (3) Will not fit 4 piston Brembo, 17-Z caliper required

345mm D2 S8 Fronts (59mm height issue)



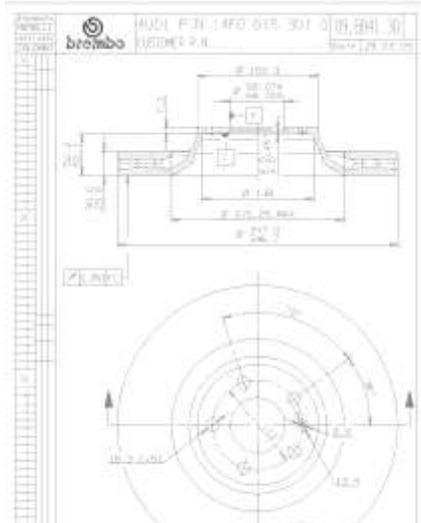
- (1) Rotor height 52.3 vs. 41.1 could potentially space caliper inward
- (2) Suspension upright clearance probably be an issue
- (3) Will not fit 4 piston Brembo, 17-Z caliper required
- (4) 18"+ Wheel required

345mm 2010 S4 & S5 4.2



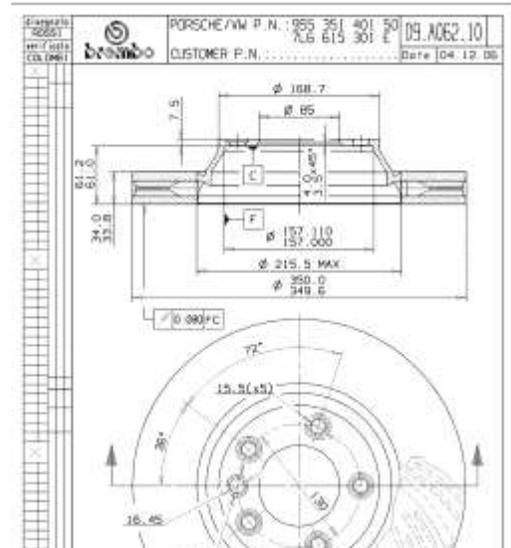
- (1) Rotor height 44.6 vs. 41.1 – Caliper machining 1mm vs. 3mm?
- (2) Suspension upright clearance might be an issue?
- (3) Will not fit 4 piston Brembo, 17-Z caliper required
- (4) 18"+ wheel required

347mm C6 A6 4.2I



- (1) Rotor height 52.3 vs. 41.1 could potentially space caliper inward
- (2) Suspension upright clearance probably be an issue
- (3) Will not fit 4 piston Brembo, 17-Z caliper required
- (4) 18"+ wheel required

Porsche/VW 350mm Cheyenne/Touareg



- (1) Rotor height 61.2 vs. 41.1 could potentially space caliper inward
- (2) Suspension upright clearance likely to be an issue
- (3) Bolt circle re-drill required to 112X5
- (4) Will not fit 4 piston Brembo, 17-Z caliper required
- (5) 18"+ wheel required

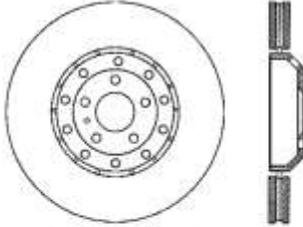
The following options will not fit the 4 piston Brembo caliper without machining. Might fit the 17-Z 6 Piston Brembo, but will likely have other clearance issues with the suspension upright etc. 18"+ wheel would be required for anything over 345mm.

If you have additional info you would like to share please email me at Massboykie@VAGLinks.com

356mm

120.33122

Floating

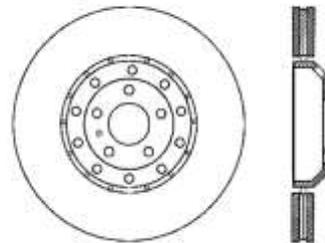


Outer Dia: 356.0 mm
Height: 52.4 mm
Nom Thick: 33.9 mm
Min Thick: 32.4 mm
Hub Reg: 68.0 mm
Bolt Size: 15.2 mm
Bolt Circle: 5 x 112 mm
Weight: 24.55 lb.

356mm

120.33126

Floating

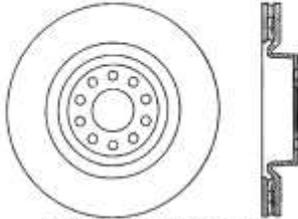


Outer Dia: 356.0 mm
Height: 43.5 mm
Nom Thick: 32.0 mm
Min Thick: 30.4 mm
Hub Reg: 68.0 mm
Bolt Size: 15.2 mm
Bolt Circle: 5 x 112 mm
Weight: 19.95 lb.

2004 A8 360mm

121.33092

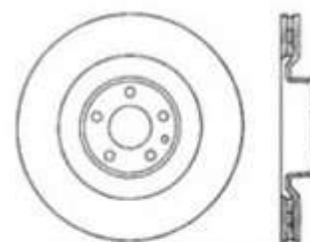
Floating



Outer Dia: 360.0 mm
Height: 59.6 mm
Nom Thick: 34.0 mm
Min Thick: 31.0 mm
Hub Reg: 68.0 mm
Bolt Size: 14.4 mm
Bolt Circle: 10 x 112 mm
Weight: 30.5 lbs

384mm

120.33118



Outer Dia: 384.0 mm
Height: 61.3 mm
Nom Thick: 35.9 mm
Min Thick: 33.5 mm
Hub Reg: 68.0 mm
Bolt Size: 15.3 mm
Bolt Circle: 5 x 112.5 mm
Weight: 38.75 lb.

(5) FRONT CLEARANCES ETC (MB 330mm Rotor)

Front Pad position on MB rotor and caliper clearances



Machining centered rotor in caliper



Machined flanges



(6) FRONT PAINT JOB

Taped and cleaned



Rear piston assembly



Fronts done



Rear Carriers



(7) FINALLY INSTALL TIME.... CRAP!

After all the planning, research and test fitting I forgot to account for the 3mm I had machined off the caliper mounting flanges....

The Brembo 4 piston **DOES NOT FIT under the stock 17" BBS RCs** without a spacer after machining.

Luckily I had a set of 17" 9 spoke (Stock C5 S-Line) rims. Future plans were to repaint these in VW Silverstone Grey. I guess the future had arrived as these guys fit the calipers! Clearance was tight, probably around 4mm on front and 3mm on inside of the rim barrel, but they fit.

RCs went back on and the wheel refinishing project started up....



(8) WHEELS

C5 S-Line 9 Spoke rims, I got off eBay years ago for a steal... Had some curb rash and needed some TLC. Had to get one straightened, but the rest were fine.

Sanding, sanding sanding...



Primed (Eastwood Epoxy Primer)



Center cap too "bright" with the Silverstone Grey



Post install and cap paint...



(9) INSTALL TIME AGAIN

Did not take pictures of the install, but here are the basic steps:

- (1) The MB rotor requires the lug holes to be drilled to 14mm and the hub center opened up by 1mm. For the hub center, I used a cordless drill and a small stone grinder bit. Kept moving the stone up and down in the hole and in a circle on the inside of the hole, to try to keep the material removal as even as possible. Kept test fitting it on the hub as I went along, until it slipped on. Probably took about 10 minutes per rotor, if that.
- (2) The Centric MB rotors came pre-drilled from the factory, but had no rust protection so I sprayed all four (rears were zinc coated, but for consistency) with silver VHT.
- (3) Install day...Lift vehicle and remove wheels. I did front first and then rear.

What you need to do the job...



Caliper hardware



Brake lines



B5 S4 Rear Rotors 256X22mm

Centric: 121.33067
Brembo: C09.A597.10
VAG: 8D0-615-601-D

MB C230 Sport Front Rotors 330X28mm

Centric: 128.35086
Brembo: C09.A448.20
MB: 203-421-13-12

Brake pads F&R



(4) Front:

- a. Unbolt the existing caliper, carrier and remove the old rotor. Hang caliper.
- b. Bolt the new rotor to the hub and spin to confirm no clearance issues with suspension upright or dust shield. I tried to flatten and bend my driver's dust shield, but could not get it to clear. I know some people simply leave these off when they upgrade to larger rotors, but being a north eastern car I would prefer to keep at least some of the salt and sand out of the brakes, so that was not an option. I had to cut the shield to fit around the bottom part of the upright. The bottom of the upright also had to be machined down a little. Maybe 1mm if that. I used a belt sander which worked well on the alluminium (yes I spelled that correctly.. lol). The sanding was only necessary on the drivers side. Passenger side only required the dust shield modification.
- c. I bolted on the new caliper and wheel to confirm everything cleared properly.
- d. Connected the RS4 stainless line to the caliper, then disconnected existing brake line and reconnected new line. Did it this way so I did not leak brake fluid everywhere. FYI – For those of you that are not aware of this... BRAKE FLUID EATS PAINT SO KEEP IT AWAY FROM THE CAR'S BODY PANELS.
- e. I made the mistake (in hindsight a pretty dumb mistake, but whatever..) to bolt the calipers with the bleed nipples facing downwards... Obviously air travels up in a liquid so they need to point upwards to bleed etc... enough said...
- f. Slide in the pads (the RedStuff pads I got did not have wear sensors so I made a bridge with the old pad wire.
- g. Install pad retaining pins and clip.
- h. Now do the other side.



(5) Rear:

- a. I had a complete set of stainless lines for the stock C5, but would basically only use the rear set as the fronts needed a longer RS4 line for the Brembo calipers... or so I thought...
- b. Once I had the old calipers off the car I noticed the Goodridge kit had a banjo bolt setup for the rear calipers. This would have been correct if I was using stock calipers! Unfortunately the S4 C43 caliper needed a flare fitting similar to the stock fronts. CRAP again!
- c. I had to use the hard lines from another old set of VW calipers I had and modify the bracket to fit the S4 calipers. Then I ended up using the stock front lines on the rears as they were female to female. Once that was sorted out... If you have a set of S4 rear lines you would not have to worry about this modification.
- d. Fit new rotor and bolt on new caliper carrier (B5 S4).
- e. Bolt caliper to carrier
- f. Disconnect the stock brake line and connect the new line to the car's hard line
- g. All set... now do the other side...

(6) Next bleed the system. Might actually be a good idea to do a complete Brake Fluid flush.



I ultimately decided to add some spacers to gain some extra clearance and get a better stance... 10mm front and rear



All the full size images, used in this document, are available here:

http://www.VAGLinks.com/Pics/Brake_Info/My_C5_A6_Low_Cost_BBK/

Many blue prints:

http://www.vaglinks.com/Pics/Brake_Info/

Documents & forum thread resources:

<http://www.audizine.com/forum/showthread.php/460051-Cayenne-Touareg-Front-Brake-I>

<http://www.audizine.com/forum/showthread.php/274285-cayenne-brake-upgrade-what-rotors>

[http://www.audizine.com/forum/showthread.php/314943-Touareg-Brake-Calipers-\(same-as-Cayenne\)](http://www.audizine.com/forum/showthread.php/314943-Touareg-Brake-Calipers-(same-as-Cayenne))

PDF Versions:

http://www.vaglinks.com/Pics/Brake_Info/Audizine.com_Cayenne-Touareg_Front_Brake_Upgrade_BBK.pdf

http://www.vaglinks.com/Pics/Brake_Info/Audizine.com_Touareg_Brake_Calipers_Big-Brake_Upgrade.pdf

More Part Numbers:

17Z Cayenne - Driver 955 351 421 32, Passenger 955 351 422 33

17Z Touareg - Driver 7L6 615 123 T, Passenger 7L6 615 124 H

17Z Audi Q7 - Driver 7L6 615 149, Passenger 7L6 615 150