Cooling System

The cooling system in an Audi S6 or S7 efficiently manages engine temperature through a network of radiators, fans, and coolant channels, ensuring optimal performance and preventing overheating.

- MercRacing V2 Intercooler Brick vs OEM Brick Analysis by D. Bui
- Cooling Upgrades
  - CWA100 Pump Upgrade
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  - Coolant AN Line Upgrade Install

MercRacing V2 Intercooler Brick vs OEM Brick Analysis by D. Bui

Analysis by: **Daniel Bui**

> **Test Setup:**
> 2014 S6
> TS1 - 30psi
> TS wastegates
> Inlets and intakes
> Upgraded HX
> Upgraded IC Brick & OEM
> E40
> 4 bar map sensors
> CWA 100 feeding CWA 150
> Dual LPFP
> HPFP Upgrades
> DPs
> AWE Exhaust
> custom tuning
> No WMI during these runs

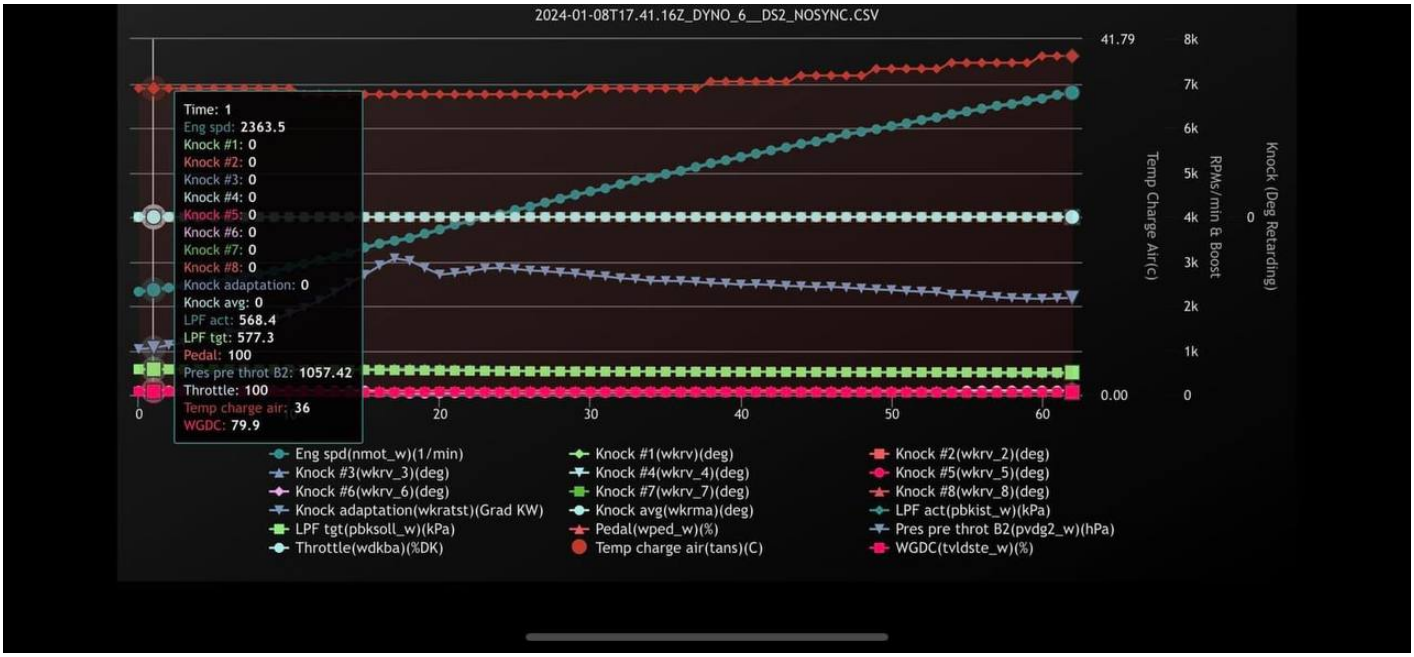
Last year and this year I have had the opportunity to run the OEM IC brick and compare it to the MercRacing V2 IC brick. I did multiple 3rd gear pulls to redline for data logging both last year and this year. Also add all logs were done during 50F degree weather. As my car isn't finalized with tuning, I grabbed the opportunity to use this data for Jose Mercado.

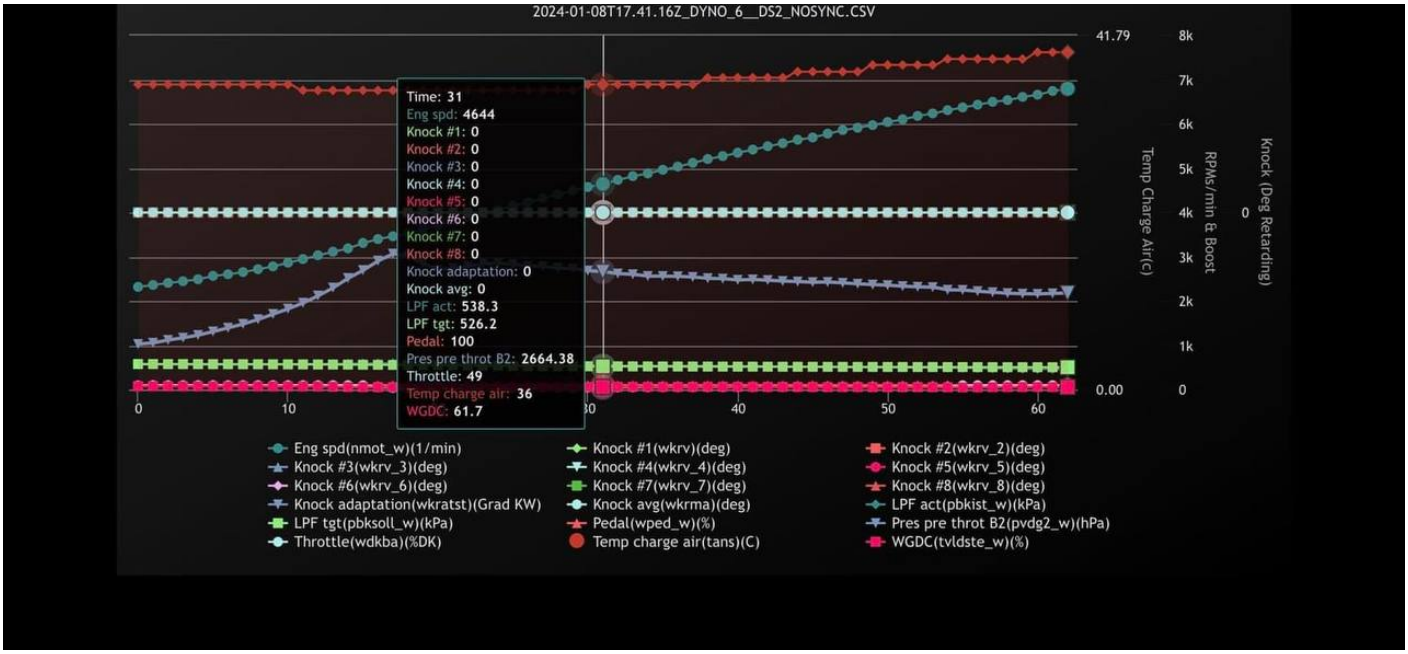
The first three screenshots were from this year with the V2 IC brick. The Temp Charge Air stays a constant 30c - 39c after back-to-back runs. Staying consistent and recovering extremely quickly. Being this linear is a new one for me.

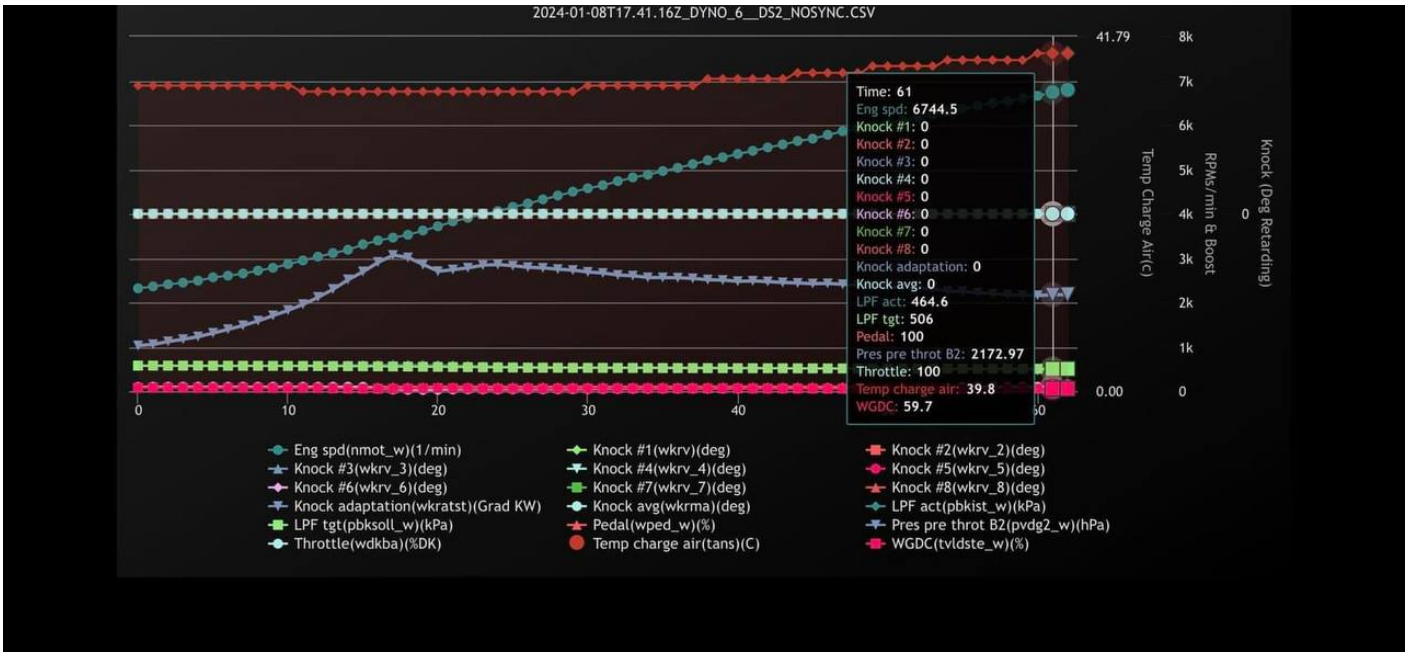
The second set of screenshots were from last year with the OEM IC brick. Same ambient temp of 50F and the temps ranged from 45c - 60c with it staying in 60c+ for a while. Recovery is very poor and slow. Possibly even a few minutes in some cases.

Yes, the V2 is better than the V1 and OEM.
I am not an engineer or technician by any means.

Merc Racing V2:



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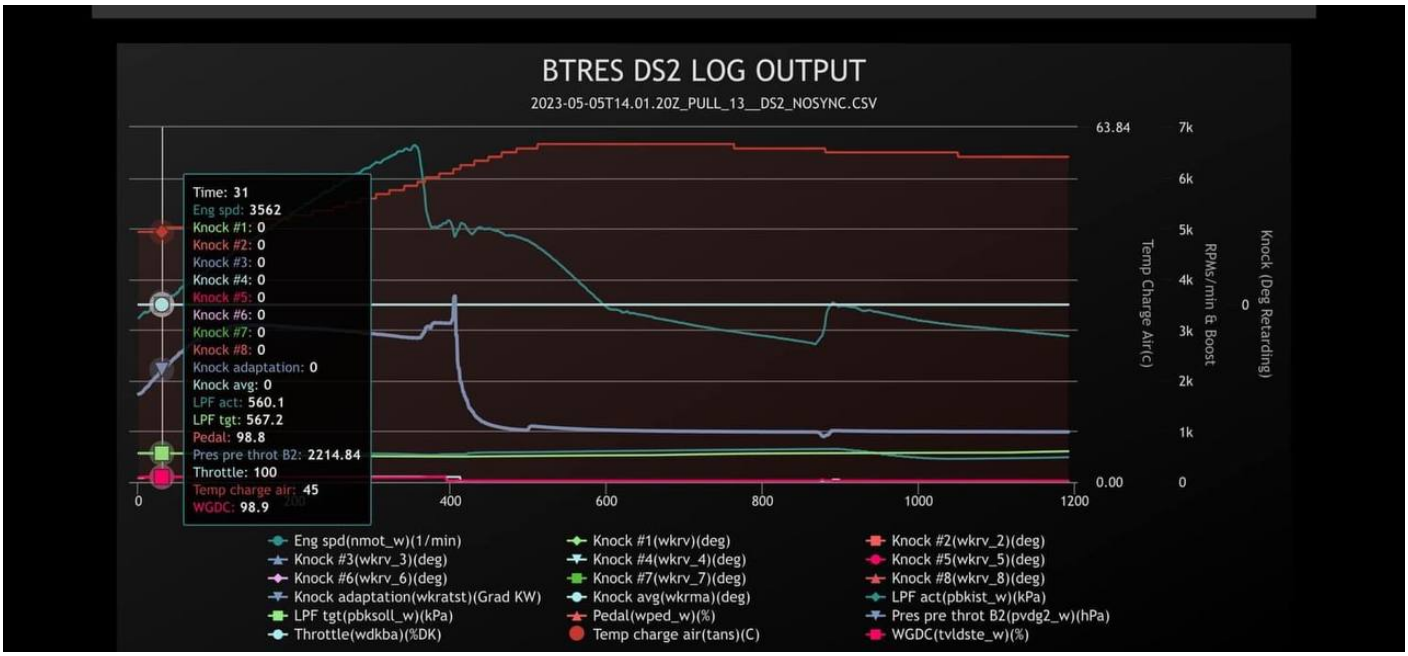
Time: 61
Eng spd: 6744.5
Knock #1: 0
Knock #2: 0
Knock #3: 0
Knock #4: 0
Knock #5: 0
Knock #6: 0
Knock #7: 0
Knock #8: 0
Knock adaptation: 0
Knock avg: 0
LPF act: 464.6
LPF tgt: 506
Pedal: 100
Pres pre throt B2: 2172.97
Throttle: 100
Temp charge air: 39.8
WGDC: 59.7
41.79
0.00
Temp Charge Air(c)
RPMs/min & Boost
Knock (Deg Retarding)
Eng spd(nmot_w)(1/min)
Knock #1(wkrv)(deg)
Knock #2(wkrv_2)(deg)
Knock #3(wkrv_3)(deg)
Knock #4(wkrv_4)(deg)
Knock #5(wkrv_5)(deg)
Knock #6(wkrv_6)(deg)
Knock #7(wkrv_7)(deg)
Knock #8(wkrv_8)(deg)
Knock adaptation(wkratst)(Grad KW)
Knock avg(wkrma)(deg)
LPF act(pbkist_w)(kPa)
LPF tgt(pbksoll_w)(kPa)
Pedal(wped_w)(%)
Pres pre throt B2(pvdg2_w)(hPa)
Throttle(wdkba)(%DK)
Temp charge air(tans)(C)
WGDC(tvldste_w)(%)

OEM: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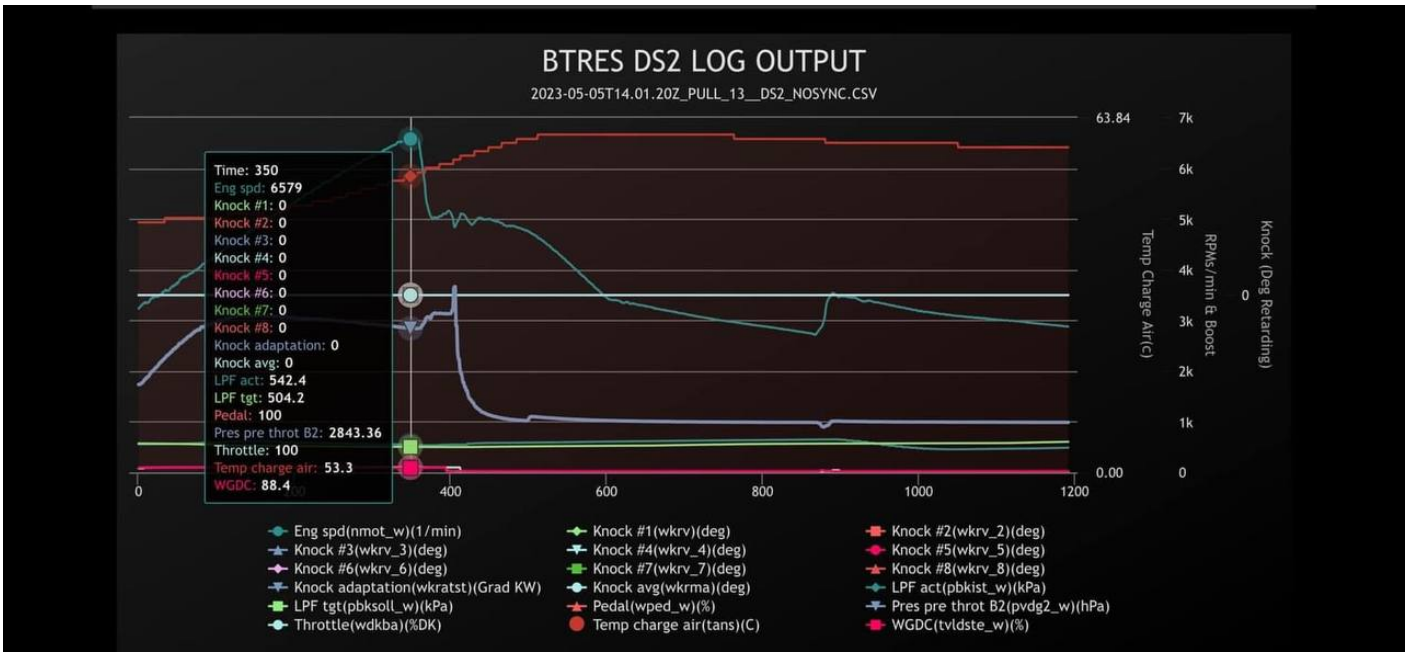
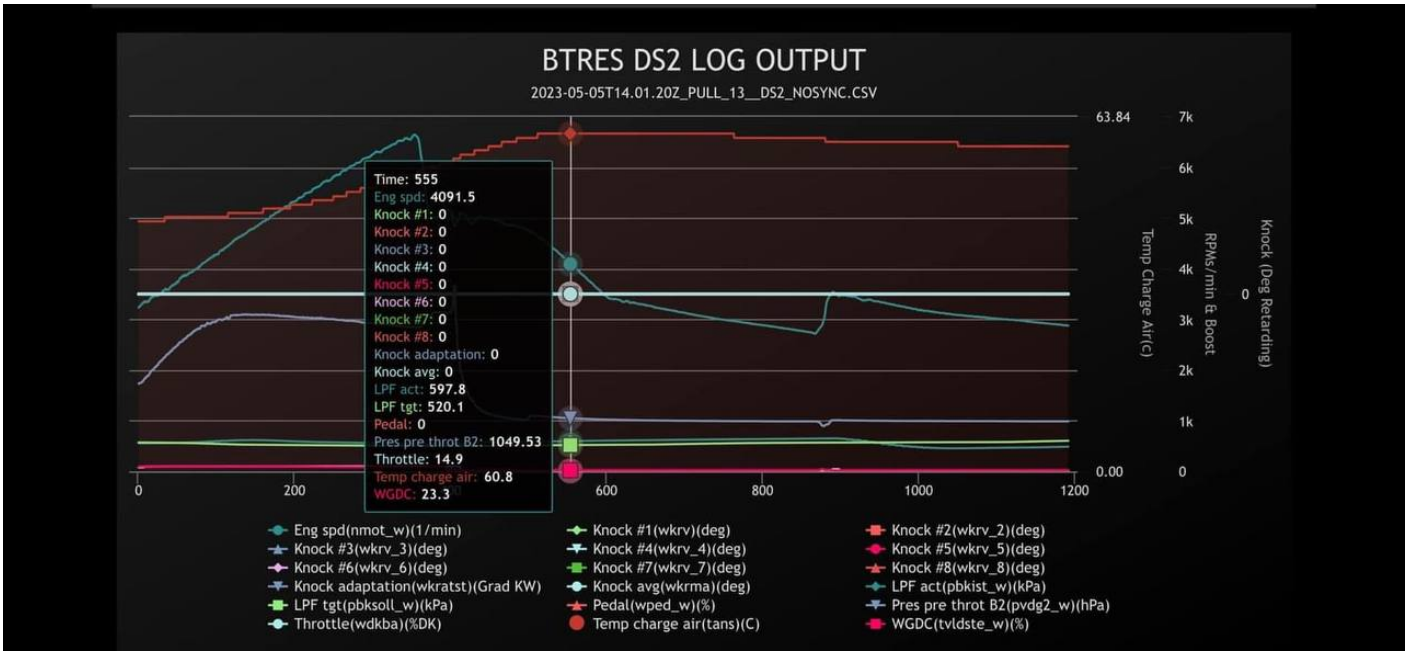
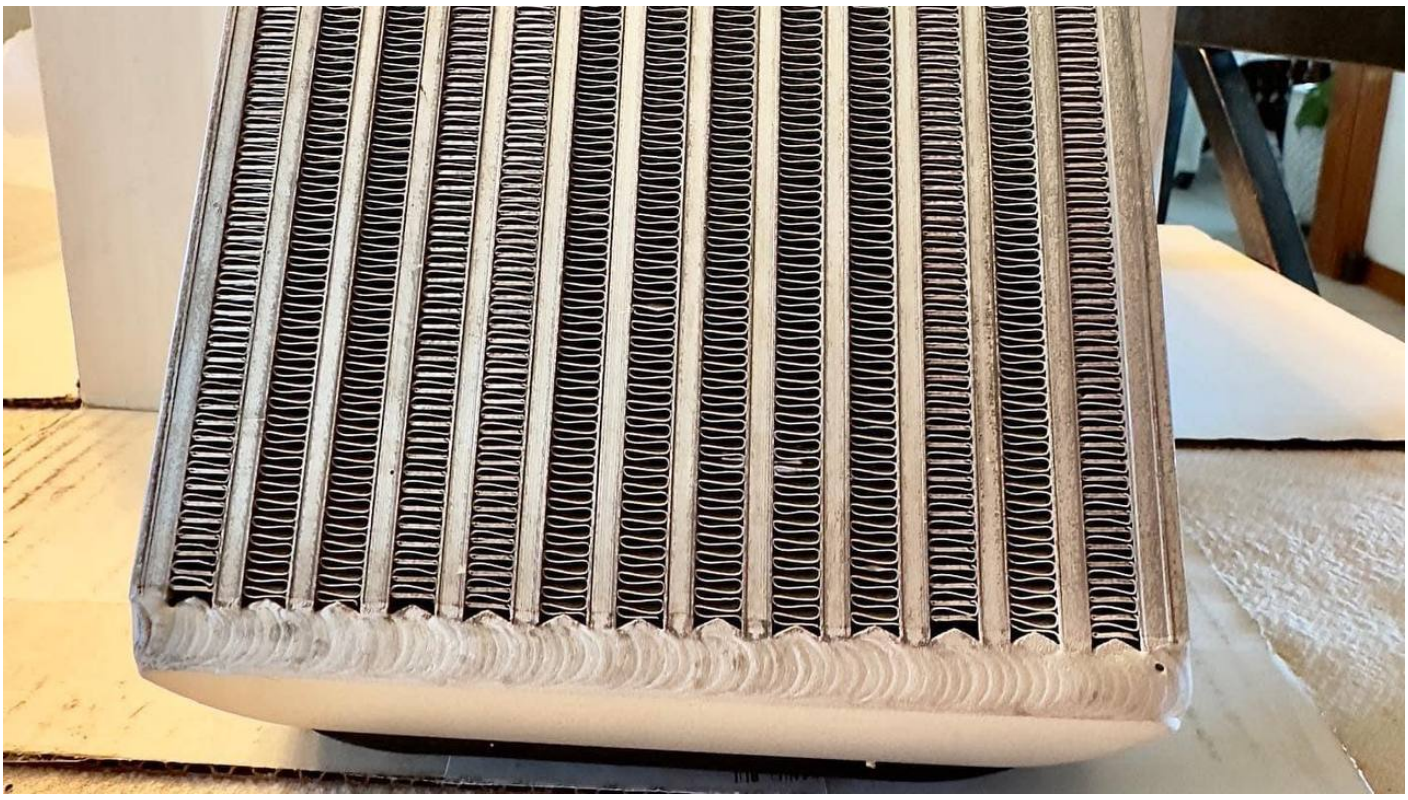
Time: 31
Eng spd: 3562
Knock #1: 0
Knock #2: 0
Knock #3: 0
Knock #4: 0
Knock #5: 0
Knock #6: 0
Knock #7: 0
Knock #8: 0
Knock adaptation: 0
Knock avg: 0
LPF act: 560.1
LPF tgt: 567.2
Pedal: 98.8
Pres pre throt B2: 2214.84
Throttle: 100
Temp charge air: 45
WGDC: 98.9
63.84
0.00
Temp Charge Air(c)
RPMs/min & Boost
Knock (Deg Retarding)
Eng spd(nmot_w)(1/min)
Knock #1(wkrv)(deg)
Knock #2(wkrv_2)(deg)
Knock #3(wkrv_3)(deg)
Knock #4(wkrv_4)(deg)
Knock #5(wkrv_5)(deg)
Knock #6(wkrv_6)(deg)
Knock #7(wkrv_7)(deg)
Knock #8(wkrv_8)(deg)
Knock adaptation(wkratst)(Grad KW)
Knock avg(wkrma)(deg)
LPF act(pbkist_w)(kPa)
LPF tgt(pbksoll_w)(kPa)
Pedal(wped_w)(%)
Pres pre throt B2(pvdg2_w)(hPa)
Throttle(wdkba)(%DK)
Temp charge air(tans)(C)
WGDC(tvldste_w)(%)



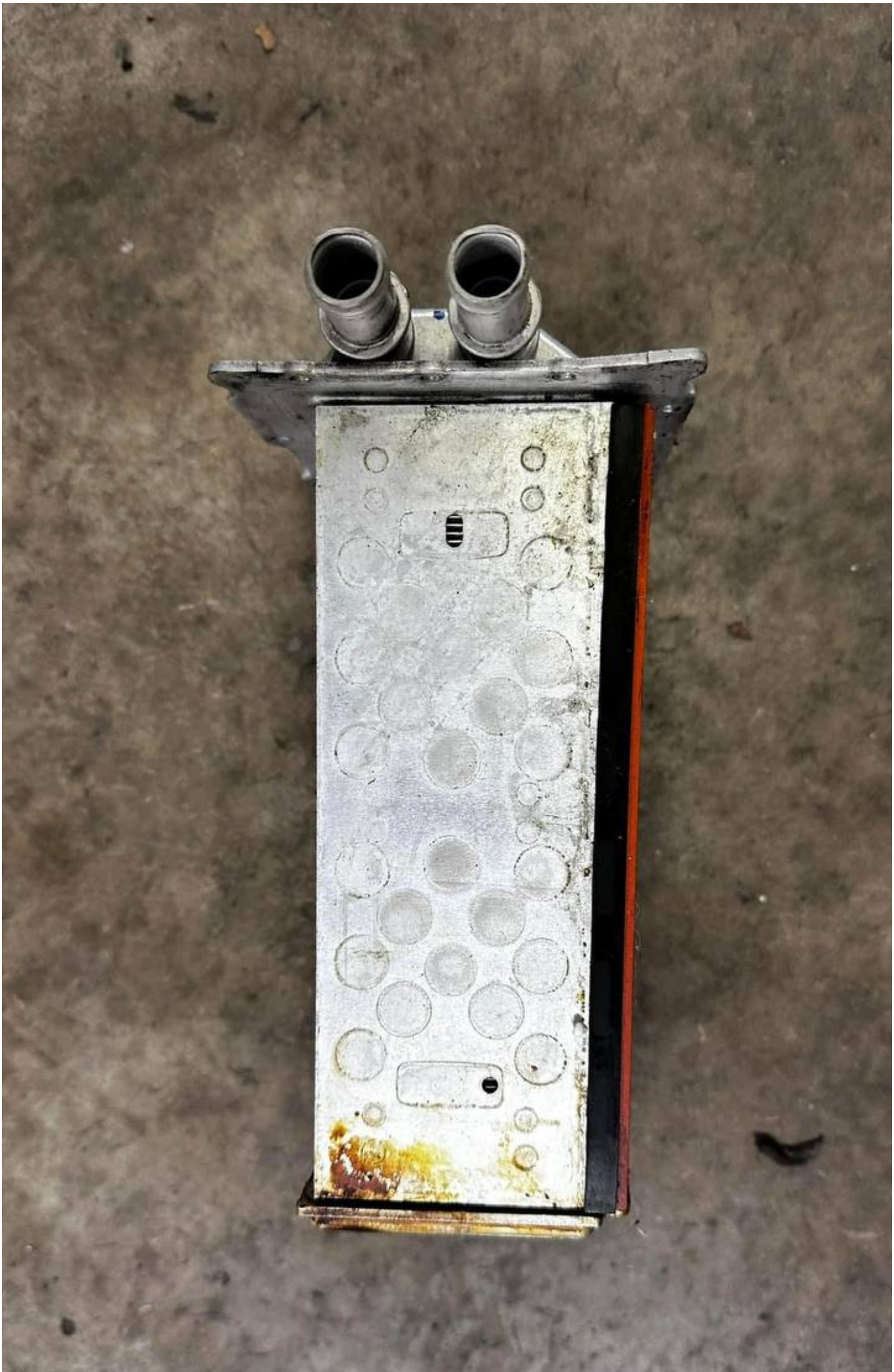


MERC Racing V2:



OEM:


WARNING ATTENTION



Cooling Upgrades

Potential cooling upgrades for your Audi S6 / S7

CWA100 Pump Upgrade

Original by BHVRDR

I have finally gotten around to writing on this topic after people have shown interest. I want to thank Tecomotive.com for making the specifications of these pumps so readily available. The data they provide is available from Pierburg, but Tecomotive graciously makes this information easy to find and decipher on their site. They also offer wiring harnesses. For more information on these pumps, please see this thread: https://mbworld.org/forums/w211-amg/...now-about.html

What is the CWA100?

The stock supercharger coolant recirculation pump in our car is an extremely robust and powerful pump, especially when flowing against head pressure. The stock pump is a Pierburg CW50. As people add additional heat exchangers, killer chillers, or increased boost, they may want improved circulation.

Here are the specifications of the stock Pierburg CWA50 and CWA100:

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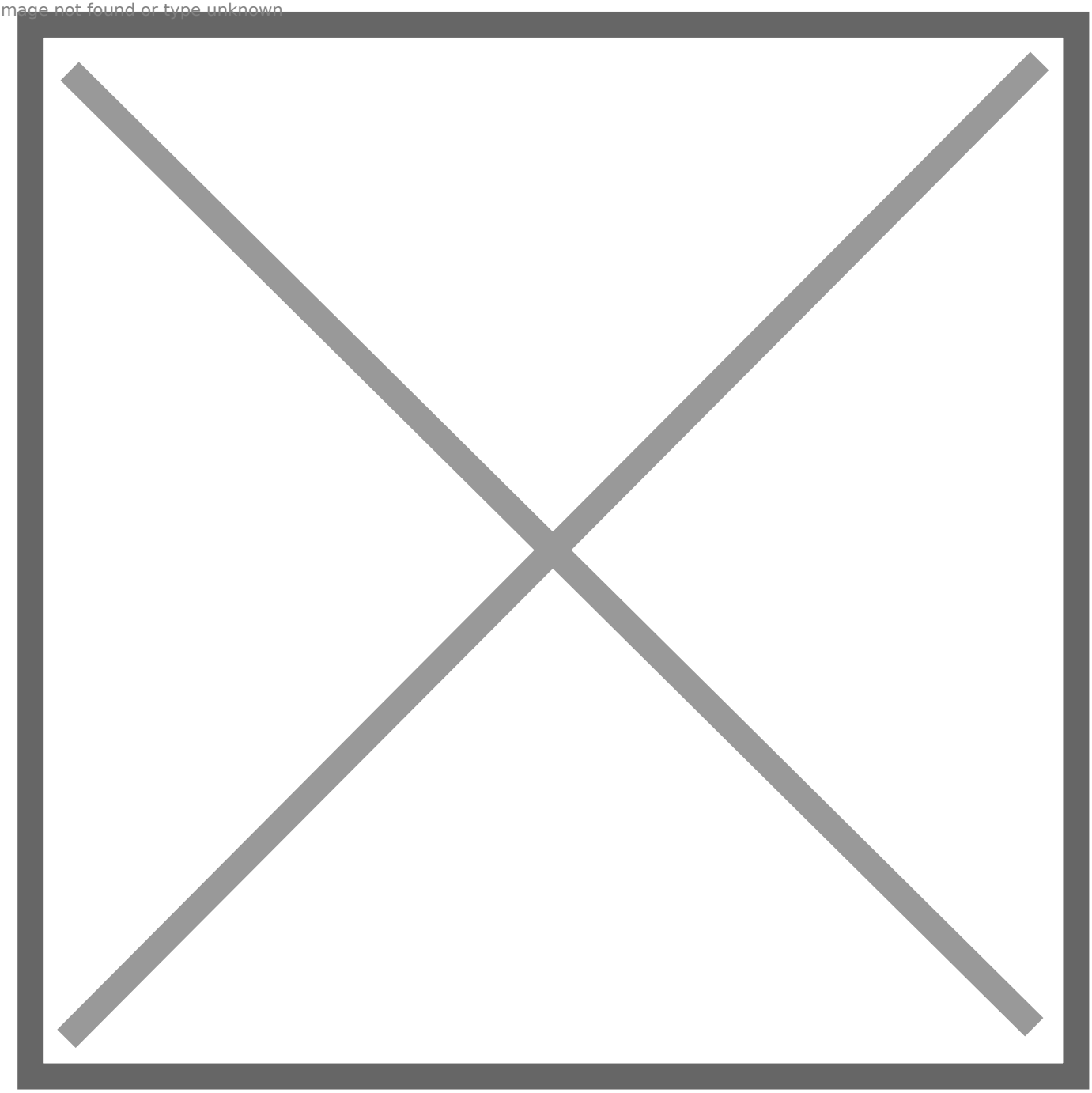

As you can see, the CWA100 almost doubles the flow of the CWA50. According to the technical documents, it also significantly outperforms hobby-style pumps such as the Varimax and Meziere pumps when any head pressure is encountered.

CWA100-2 versus CWA100-3

There are three different versions of the CWA100 pump, but we will focus on the currently available versions, the CWA100-2 and the CWA100-3. According to the specifications, there are no flow differences between these pumps; they should both work identically. The only differences are as follows:

- The CWA100-3 has slightly shorter water inlets and outlets.
- The connectors on the CWA100-2 and CWA100-3 are different.

I have had both of these pumps.

Here is the connector/socket for the CWA100-2:

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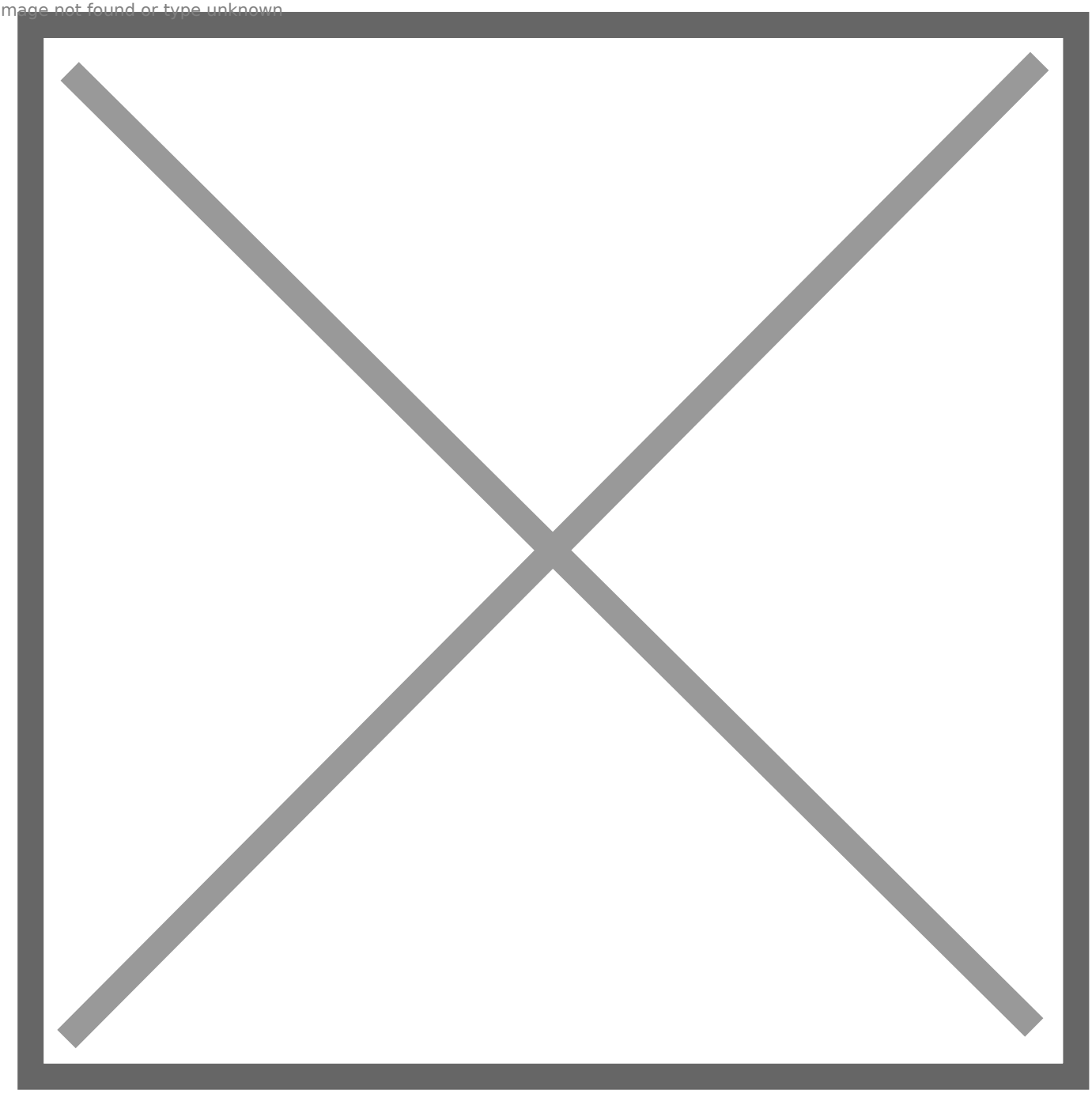

Here is the connector/socket of the CWA100-3:

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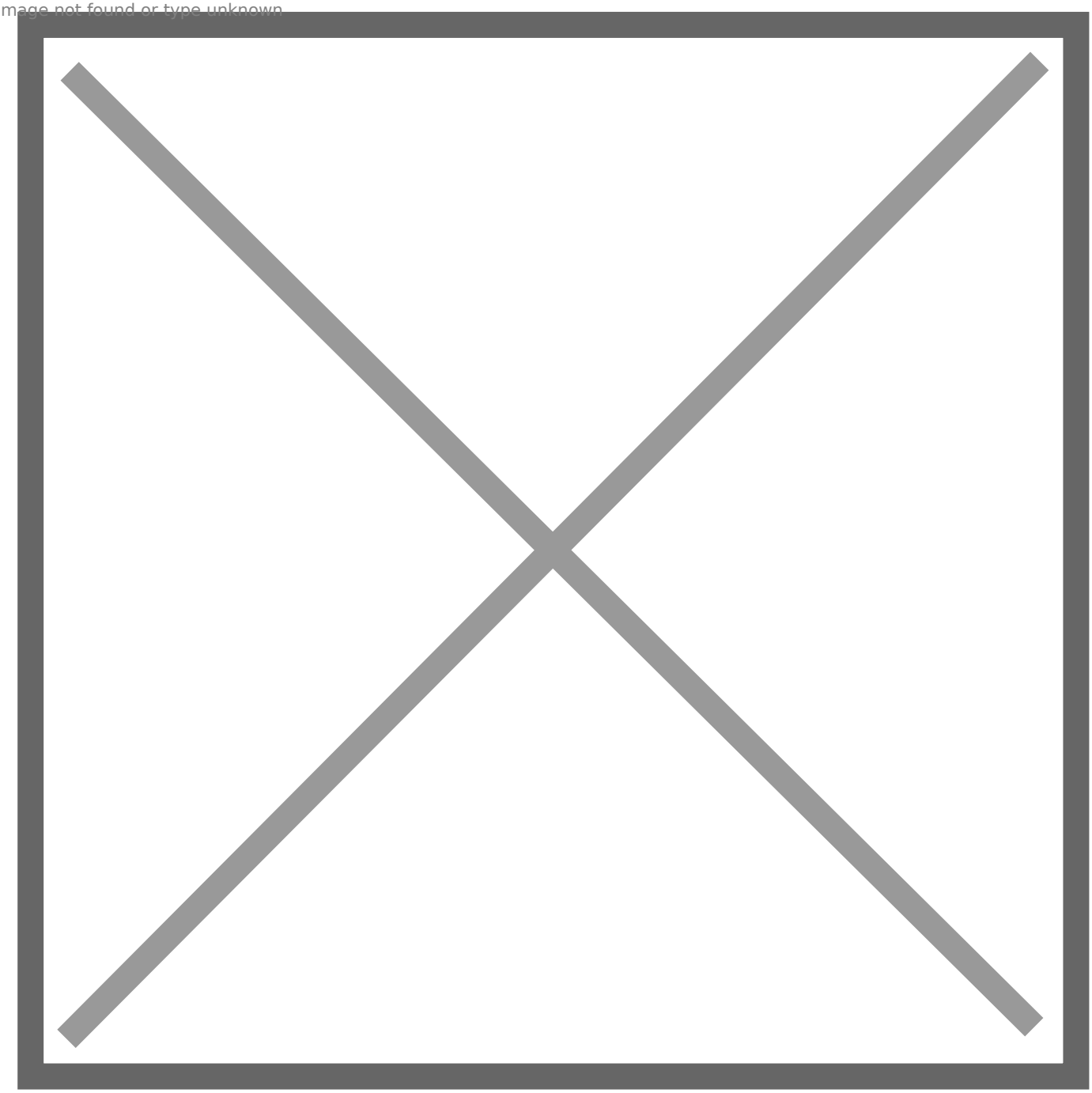

Availability of the CWA100 Variants:

- CWA100-2: This is an old AMG pump that was used in many Mercedes-Benz supercharged applications. The Mercedes-Benz part number is: A0005000486. You can source this part from many MB dealerships as a remanufactured item in the $300 to $350 range. FCP Euro currently has it for $342, with a lifetime warranty. Tecomotive also has it available for 249 Euros, and you can buy the plug-and-play connector from them. They are a great site to support, as they have published most of the research you see here.
- CWA100-3: This is a new VAG pump used in the Audi Q7 4M hybrid overseas. The VAG part number is: 4N0965567. Interestingly, you can find this pump from salvage cars on eBay for around $75. HOP ON THIS WHILE YOU CAN!

Harnesses for Each of These Pumps

You can easily make a harness for each of these pumps.

Here are the part numbers needed for the CWA100-2:

- Connector to the CWA10-2 Pump: BMW part number: 12527549033 (available at ECStuning or FCP for under $5)
- Connector to the stock harness: TE Connectivity p/n 1-1703494-1 (available on arrow.com for $1.69)

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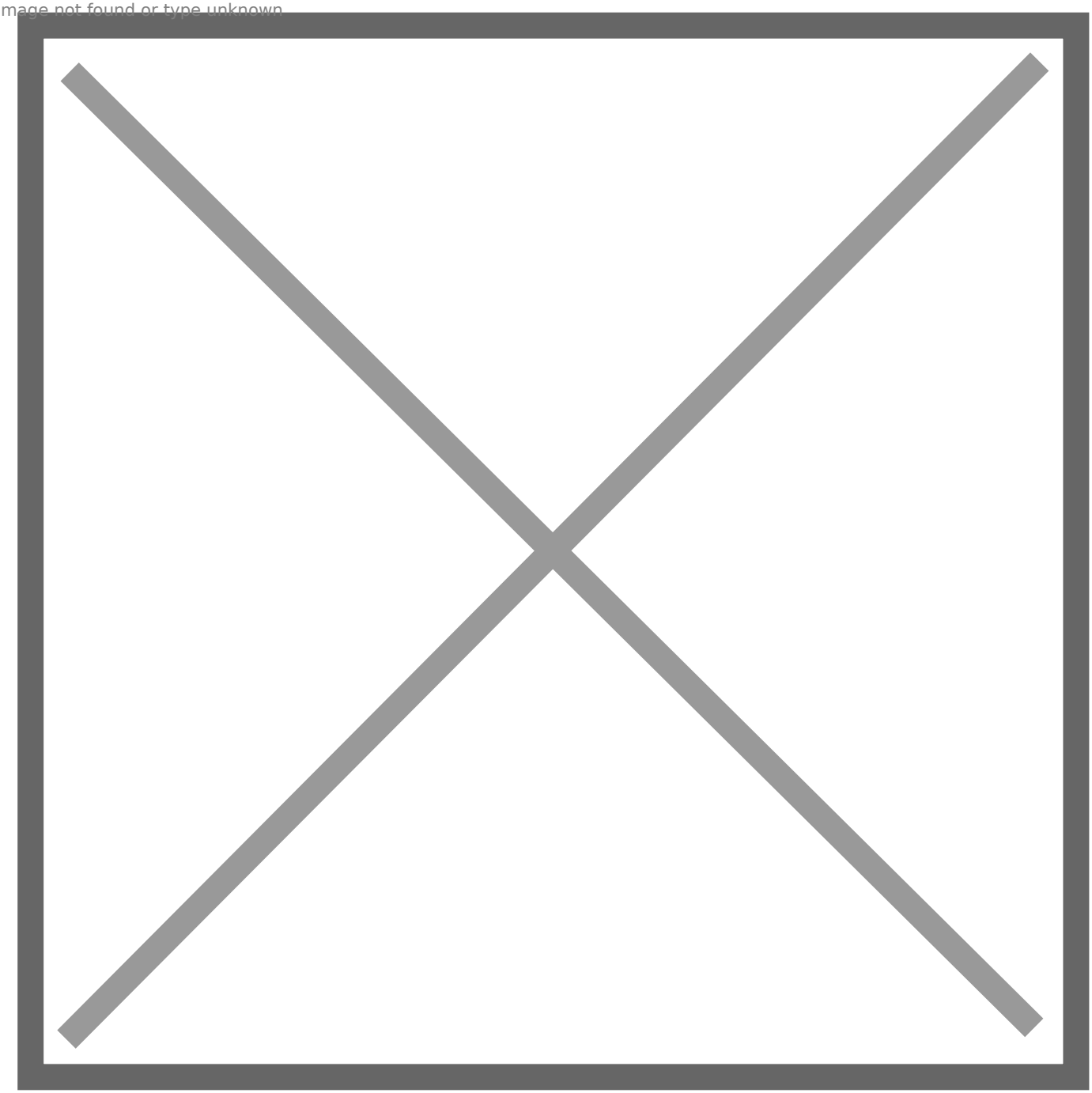

Here are the part numbers needed for the CWA100-3:

- Connector to the CWA100-3 Pump: VAG part number: 4D0971993 (available on eBay for around $8)

- Connector to the stock harness: TE Connectivity p/n 1-1703494-1 (available on arrow.com for $1.69)

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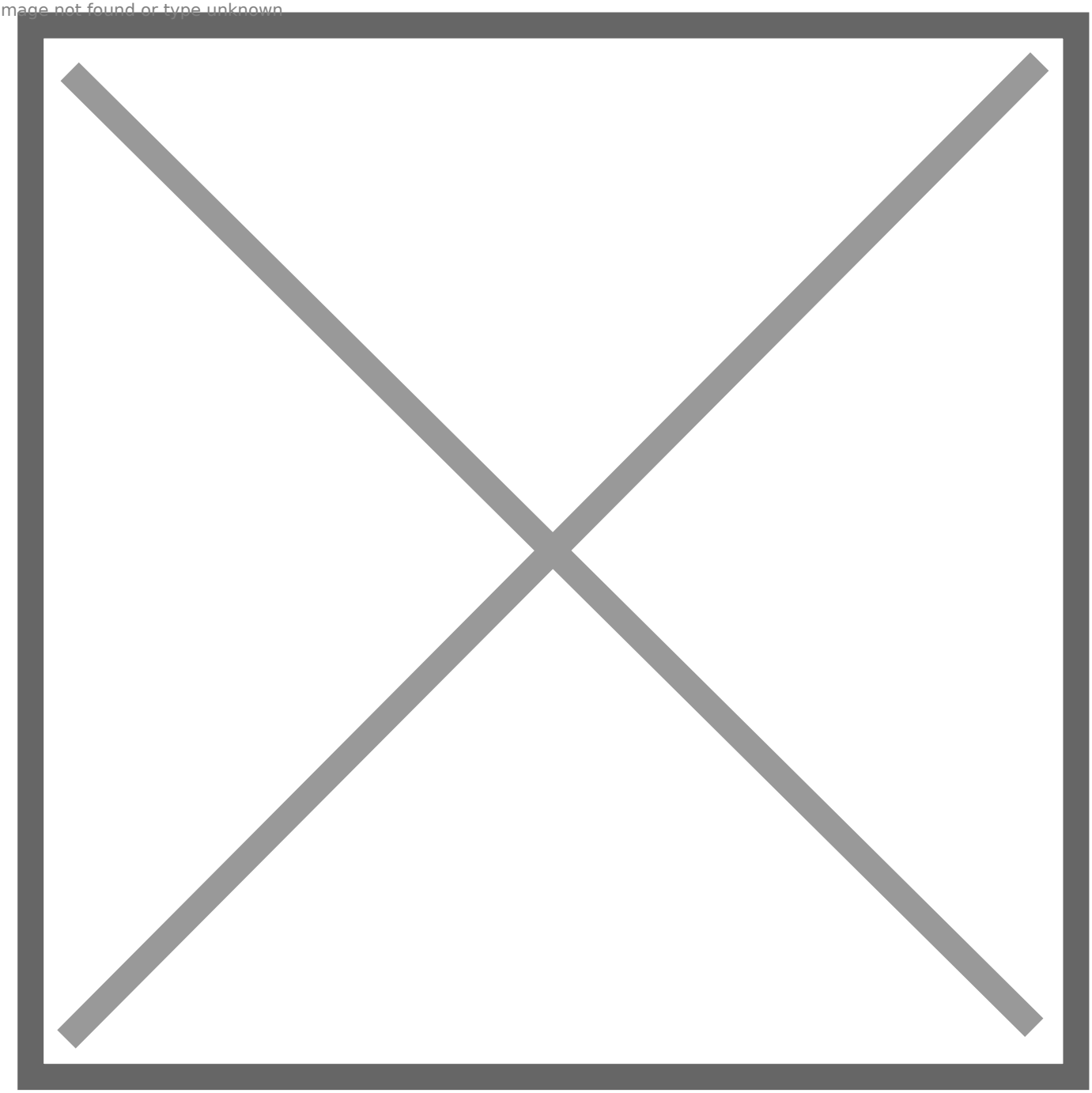

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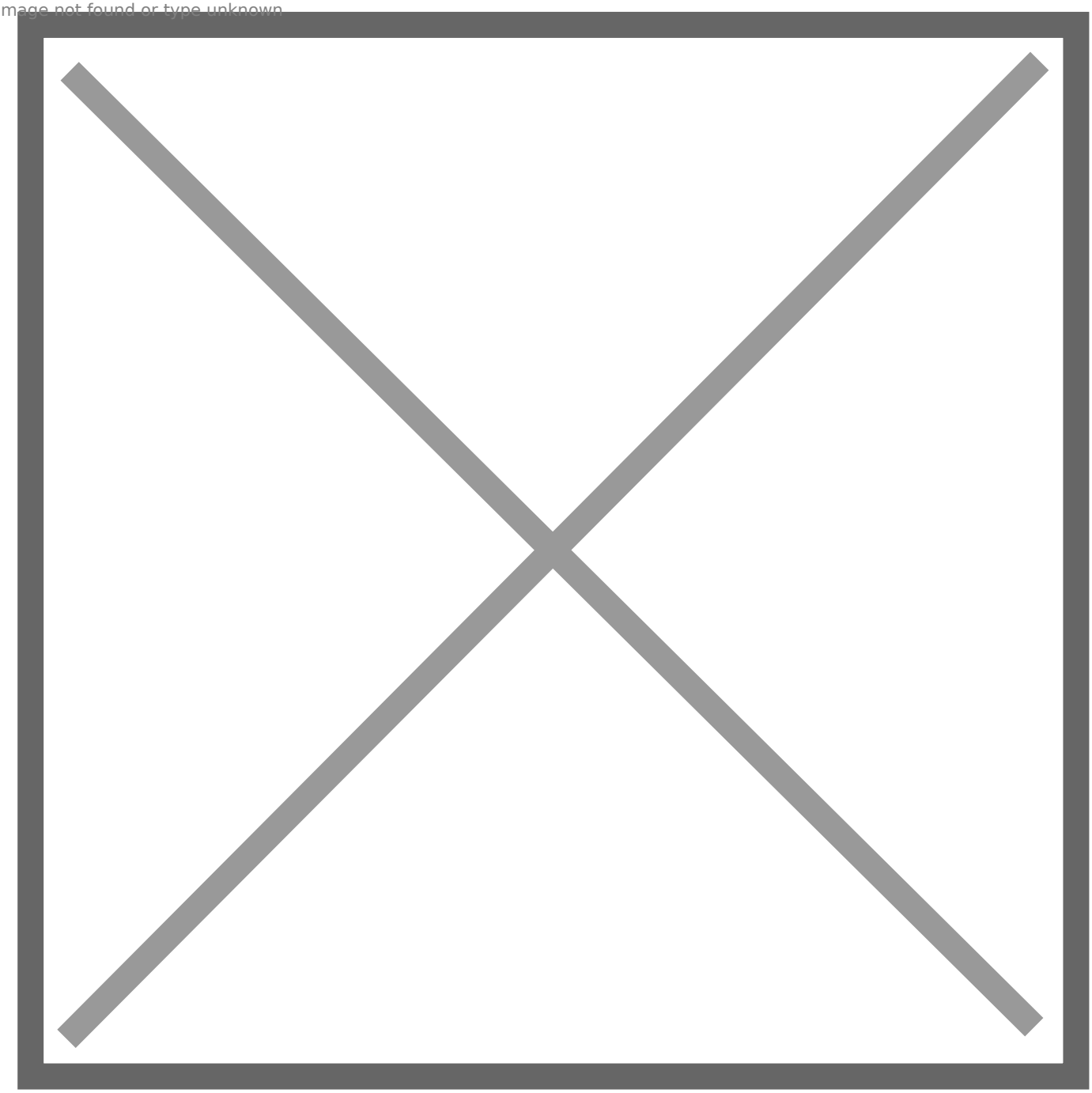

You should be able to make either of these harnesses for around $10-$15 or less.

PIN Diagrams:

CWA50

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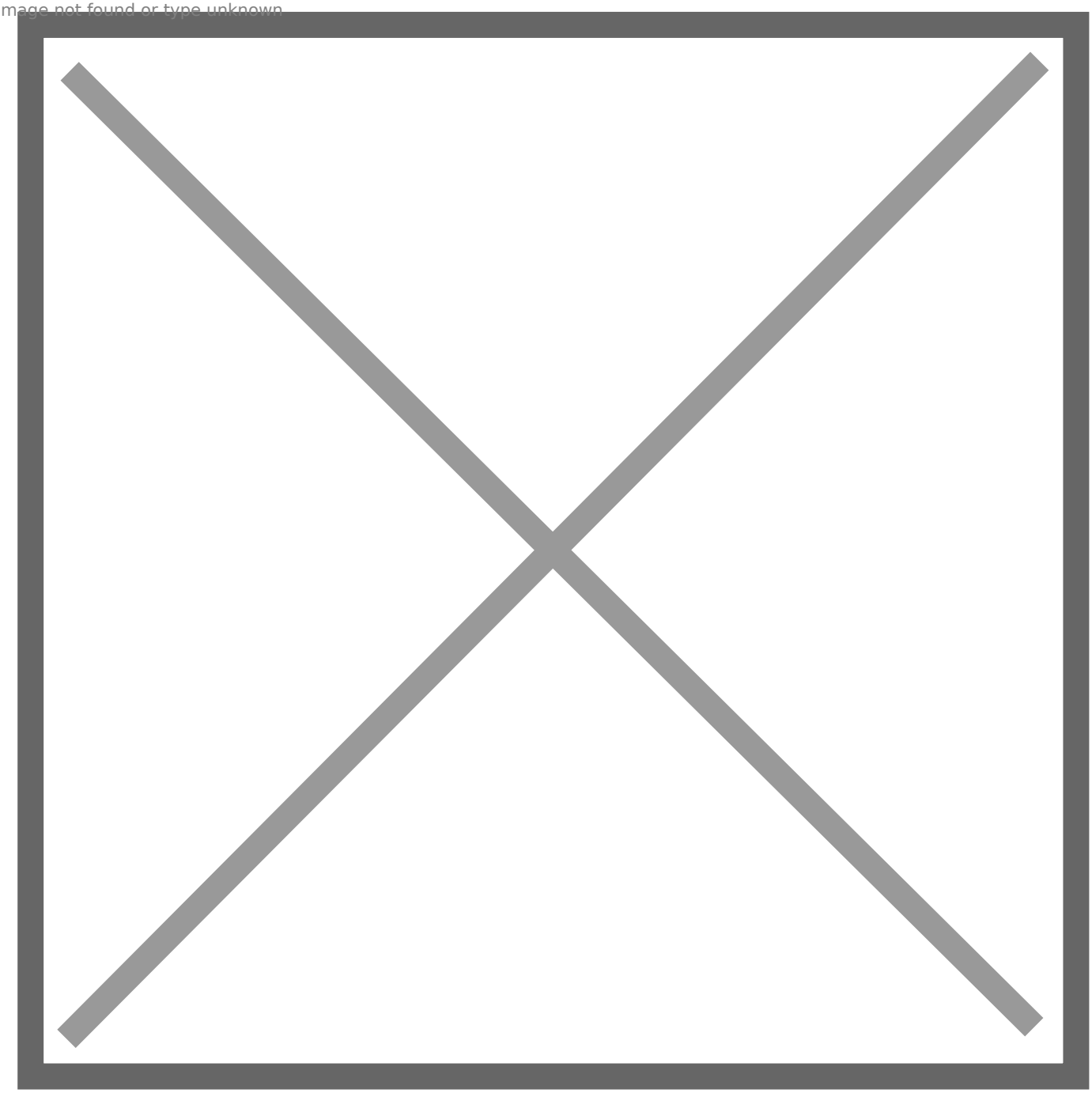

CWA100-2

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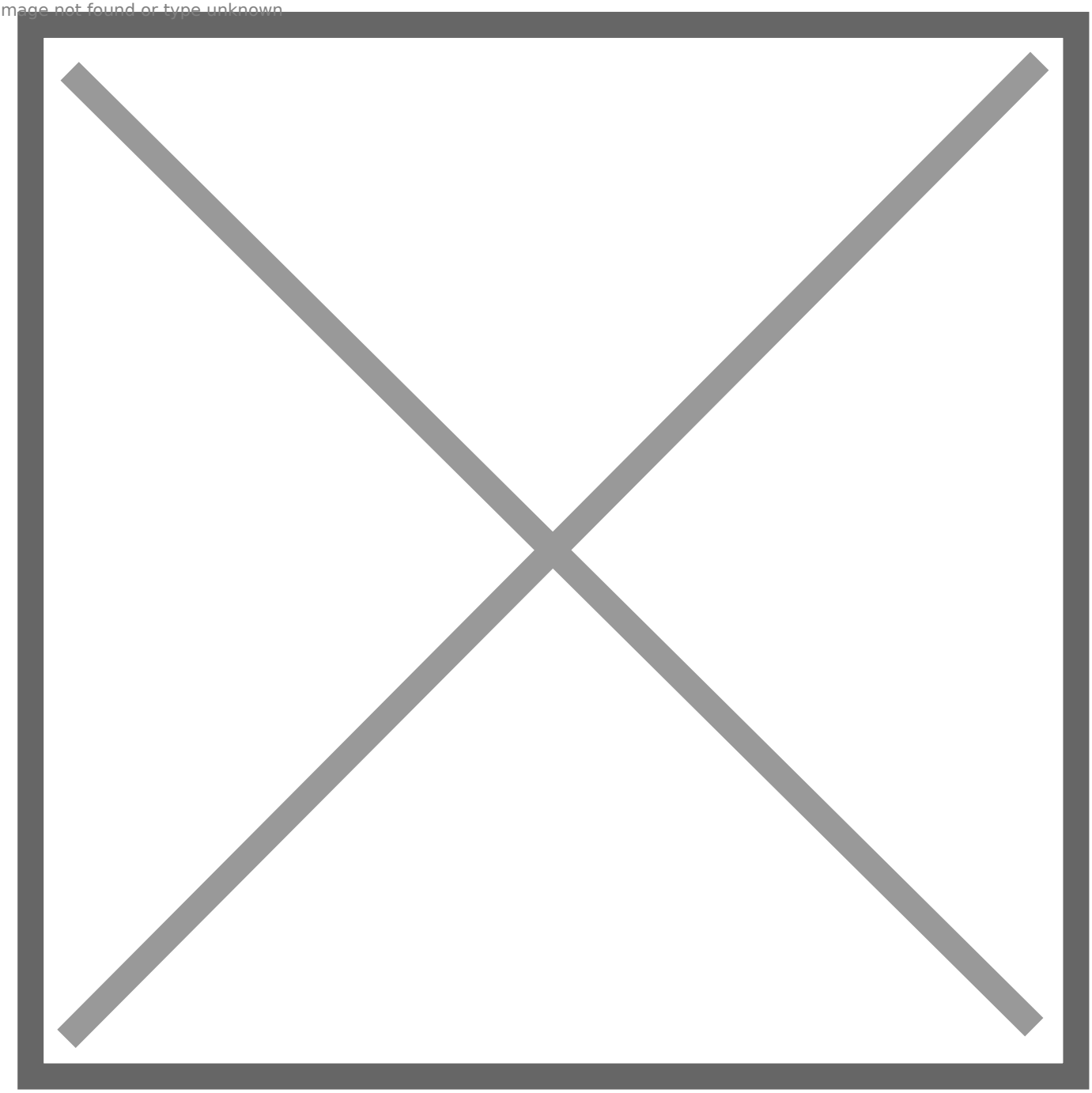

CWA100-3

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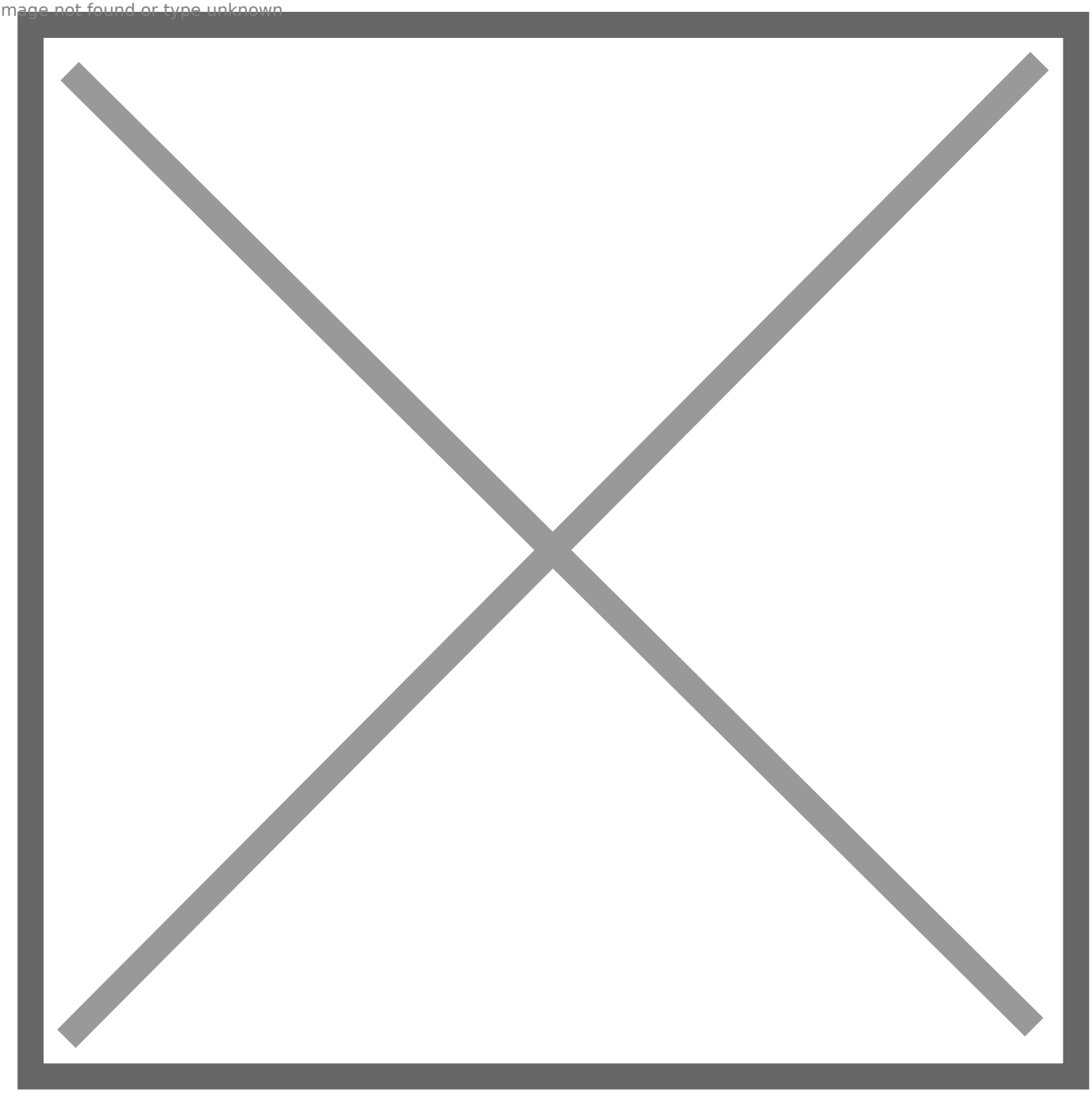

Cooling Upgrade Installations

Installation instructions for cooling upgrades on your Audi S6 / S7.

Coolant AN Line Upgrade Install

Part Available: TGK Motorsports

1. Remove OEM fittings (pull up on the tab wire), then pull straight out.

2. Once the OEM lines are removed, disassemble the new fittings. Push the new collar portion down on the tabs, and then thread the insert into the collar to lock the fitting into the tank.

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3. Remove the OEM lines from the radiator. This will create a mess due to coolant spillage, so ensure you have a rag or something to collect the dripping coolant.

4. The front coolant line consists of the 45-degree and 90-degree line. Do not follow the OEM routing for this line. Route the line around the front of the motor and through the center of the core support to the radiator.

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5. The line coming from the side of the bottle attaches to the coolant crossover line on the passenger side of the motor. Use the barb fitting and attach it to the rubber hose on the coolant crossover line. The easiest method we found was to remove the rubber hose entirely from the car, attach the barb/fitting to the rubber hose, and then reattach it to the crossover line.

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