

Cadillac CTS 3rd Gen WHITE PAPER
Revelry Racing, LLC
www.revelryracing.com



Example VINs used for part search and dealership assistance.

2019 CTS-V VIN - 1G6A15S67K0141377

2014 CTS V-Sport Standard VIN – 1G6AU5S8XE0186066

2016 CTS4 (AWD) LGX Premium – 1G6AZ5SS7G0106108

2017 ATS-V VIN 1G6AN5SY6H0166673

Amsoil compatible oils with LF3 and LF4

Product	5w-30 Sig. Series*	0w-40 Sig. Series**	5w-40 European*
Product code	ASL	AZF	AFL
Kn. Vis. @ 100C	10.3	14.8	14.3
Kin Vis. @ 40C	59.7	84.6	88.5
CCS Vis. CP	3968 (-30)	6062 (-35)	5855(-30)
Flash Point	220C(428F)	222C(431F)	224C (435.2F)
Fire Point	244C(475F)	238C(460F)	240C(464F)
Noack Volatility	6.7%	7.7%	10
HiTemp ShearStab.	3.11	3.76	3.8
TBN	12.5	12.5	8

* = Dexos 2 compliant

**= Dexos R compliant. Dexos R has been approved for ALL V8 Cadillac V-Series models, period. Dexos R oils can be 0w-40 or 5w-50. Dexos R, however, has NOT been yet approved for use with V6TT motors like LF3 and LF4 and it probably will never be. It is something that GM finds as unnecessary and there's no economical point to it doing so, despite what we fans may want. It was unofficially reported by unnamed Mobil1 sources that Dexos R oils had been dyno tested on LF4 for the equivalent of 600,000 miles and that it would be completely expected to pass, should it actually be put through the test. But, tests are expensive and it isn't gonna happen, "they" say.

1 NAV & CARPLAY PARTS

For earlier 3rd gen CTS models like my 2014 Cadillac CTS V-Sport (and presumably early ATS and Camaro6 models) the factory installed hardware cannot run CarPlay or Android Auto. Want to gain that functionality? No problem. You need to replace two electronic boxes in your car (the Radio and HMI modules) and have they programmed to your vin. You can easily spend north of \$1,200 through a dealer and some shops. Several outfits offer the service for about \$625-\$850 including new parts. There are varying warranties, so shop around. There are varying additional charges such as a premium to update factory nav maps to the latest settings and enable video or navigation entry while in motion (usually \$195-300 additional). This is the way to go for maximum convenience, giving you a plug and play experience. Some private parties offer used parts and programming for about the same price.

There are companies that will do the programming alone with parts that you supply; this is the cheapest option to gain this functionality.

There are several vendors whom offer full service and programming only. Prices below are current as of Jan 2023. Check out these outfits:



- [White Automotive & Media Services](#) out of Michigan (aka WAMS)
 - I see a full upgrade with brand new hardware and warranty is \$960 (as of Jan '23)
 - [Programming alone on customer sourced hardware](#) is **\$125, GOOD VALUE!** Extras are:
 - \$50 for 2023 GM map update to FACTORY NAV (questionable if you're going to use CarPlay for navigation anyway)
 - \$150 (good value) for video in motion from usb media, nav entry in motion, and rear camera in motion.
 - These features do not exist on 2016 and up models from the factory
 - They give you a specific list of part numbers to use as part of their ["Best Practices" here](#). These parts are guaranteed to be compatible if they are in working order.
 - Compatible **HMI modules** for related 3rd gen CTS models that are North American Spec with Navigation (RPO IO6) are GM part **numbers**
 - **84006103, 84048396, 84096817, *84156701, 84131943, 84296482**
 - Finding \$340 about the lowest on e-bay
 - Current **radio module** part numbers for the same **are**
 - **84062073, 13506371, 23402903, or 84293226**
 - **Finding \$80 about the best on ebay**
- MVI out of Colorado at www.gm-navigation.com
 - Full setups costs \$899 and up.
 - Programming of modules you send in starts at \$199
- Coastal Flash in Victoria, B.C., Canada charge \$850, plus shipping international....
- [JD IVI Systems, LLC](#) – they have kits ready to plug and play for \$1,200

HUD RETROFIT into standard models. First, you need a proper instrument cluster (full digital one) to be installed and programmed to the car. Then you need an instrument cluster cover with the larger opening for the HUD projector, which you also need. You'll also need the driver's left side kick panel for the lower dash that includes the HUD controls for menu, brightness and aiming it up and down. These all bolt in easily enough. There is a cable between the digital cluster and the HUD projector, GM part number 22829189 (thanks to AlphaMod's Lee Sommor). Also, alpha mods sells a wiring harness to connect the power, ground, bus signal and LED lights in the HUD switch. Install it and you're almost done. The last piece is to install a HUD reflective film on the windshield. These are available anywhere for about \$5-10, amazon or ebay are easy and cheap and voila, done.

- HUD Display/projector GM 84151451.
 - Supersedes 22979552, 23470683, 23314313

- HUD switch – ACDelco 22779854. Also can purchase used with “left lower knee bolster panel trim” part that includes the above and the parking brake and dimmer switch
- HUD USB Data Cable for HUD – GM 22829189
- Upper Dash panel extension from 2014-2019 premium- jet black 23282316
 - Supersedes 23188177
-



2 WHEELS & TIRES

All 3rd gen CTS models: Bolt pattern 5x120mm, wheel studs are 14x1.5mm, hub size 66.9mm

- Standard wheel dimensions: Front 18X8.5 ET32mm, OEM Rear 18X9.5 ET46mm
 - Tire specs for std wheels: FR 245/40ZR18 93Y, RR 275/35ZR18 95Y
- Optional equipment wheel dimensions: Front and rear, 19x8.5 ET34
 - Tire specs for optional wheels: 255/35ZR19 93Y
- CTS V (V3) wheel dimensions: FR 19x9.5 ET23, RR 19x10 ET39, 265/35/19 94Y and 295/30/19 100Y
- J. Kinch FB V3 group fit rear 18x11 +41 rear with 305/35/NT555R11 tires, stock springs, no rub reported.



Figure 1 Figure 18x11 et41

I have run 15mm spacers on the front axle with extended wheel studs in the following configurations:

- (1) On a 2014 V-Sport with the OEM 18x8.5" V-Sport wheel with 245/40R18 at stock height and on Swift springs with NO rubbing whatsoever.
- (2) On a 2016 CTS4 with the OEM alternate 19x8.5" polished 8 spoke wheel with 255/35R19 at stock height and on Weapon-X springs. Lowered, there was no rubbing on the stock Pirelli Cinturato P7 run flat tires. After installation of Continental DWS06+, there was slight rub at the front fender liner when backing up at full turn/lock.



Stock wheel stud is GM 11588811, supersedes 15027048 and 92171058.

Wheel studs are the same through all Camaro and CTS models. ARP (top shelf products) offers extended wheel studs in ½" and 1" extended lengths with the same factory bullnose shape.

3 ALIGNMENT

Walgrave needed the car set up for One Lap of America competition. Below is the alignment. The car feels nice on the street and with a lot less tramlining. We had a discussion about why so much toe, but he assured me it won't eat rear tires and recommended I take it to the track and beat on it for a while. I'll provide some feedback here after I get a chance to test this setup.

1/28/22 9:12 AM

GRAN TURISMO EAST
770-455-0347

Cadillac : ATS (Including ATS-V) : 2013-15 : Rear Wheel Drive : with RPO FE3

Front : Left

Actual	Before	Specified Range
-2.3°	-2.3°	-1.3° 0.3°
6.1"	6.1"	5.7" 6.9"
0.03in	-0.13in	0.00in 0.10in
14.7°	14.7°	
12.4°	12.4°	

Camber
Caster
Toe
SAI
Included Angle
Turning Angle Diff.

Front : Right

Actual	Before	Specified Range
-2.3°	-2.6°	-1.3° 0.3°
6.4"	6.4"	5.7" 6.9"
0.04in	-0.20in	0.00in 0.10in
14.8°	15.0°	
12.5°	12.5°	

Front

Actual	Before	Specified Range
0.0°	0.3°	-0.6° 0.6°
-0.3°	-0.3°	-0.6° 0.6°
-0.1°	-0.3°	
0.07in	-0.33in	0.00in 0.20in

Cross Camber
Cross Caster
Cross SAI
Total Toe
Cross Turn Diff.

Rear : Left

Actual	Before	Specified Range
-1.8°	-1.3°	-1.7° -0.1°
0.07in	0.03in	0.03in 0.13in

Camber
Toe

Rear : Right

Actual	Before	Specified Range
-1.8°	-1.3°	-1.7° -0.1°
0.08in	-0.02in	0.03in 0.13in

Rear

Actual	Before	Specified Range
0.1°	0.0°	
0.15in	0.01in	0.05in 0.25in
-0.02°	0.06°	-0.30° 0.30°

Cross Camber
Total Toe
Thrust Angle

Some other interesting points: w/o crash/cam bolts out, the left front camber was limited to 2.3* while the right front retained 2.6*. With 8mm spacers on ET35 9.5"x18" wheels, the 275/35R18 front tires are REALLY close to the struts, but not touching. (total ET27, per RR)

David Donahoe – Reports 6/11/2022 the following. "I wanted wheels with the same specs as V3 wheels, as I figured Cadillac did a lot of testing before choosing their V3 wheel and tire specs. My wheels are staggered 9.5x19 et+22, and 10x19 et+40.

They are the same widths as V3 wheels and V3 wheels have et23 and et 39. So, the only spec differences in my MOMO

Barletta (lighter weight than usual) wheels is my fronts sit 1 mm more to the outside and the rears sit 1

mm more to the inside than V3 wheels. I didn't know that V3 front fenders are a little wider than VS's front fenders, so when they aligned it at the dealer, my left front wheel sits slightly outside the front fender's edge and the right is a little less that way. It looks good and it's only noticeable if the car is sitting still and you get close up and look down from above. Tires are 255/35 and 295/30. The V3 has 265/35 and 295/30 tires. My speedometer is off less than one mph at 60 mph and about 1 mph at 90 mph. Multiple VS owners have commented that the V3 front wheel with 265/35/19 tires will rub on a VS, as there is less room under there. I don't know if there is an offset that works for 265's without rubbing, but the 255's look good, although I might choose a 9 inch rim in retrospect as the tire does not protrude beyond the rim and the edge of the rim is more exposed to potential damage. I also believe that going wider than 10 in. rear wheels might result in that same rim exposure if you stick with 295 width tire, but that is speculation only and not proven."



4 BRAKES

V-Sport – FRONT – All years of V-Sport have ONLY J56 front brakes, 4 piston Brembo calipers mated to a 13.6" rotor, aka 345mm. This same caliper was provided on (1) base Camaro SS from 2016-2019 (at least), some C7 Corvette models under code J56, possibly a Buick model or two, and Cadillac CT6 models (1st gen in N.A.) as well. See [this breakdown of Vette options](#) and note that our front calipers are the same as the base Z51 Corvette Performance Package's J55 front brakes. All the calipers that look like these WILL bolt right in, however, ONLY the 345mm rotors from Camaro, CTS, or CT6 are compatible. Other rotors with a 345mm diameter from FWD or Corvette models have different rotor heights (offset, per se).



CTS (non V-3) rear rotors and calipers are the same for all models and trim levels, period, full stop.

JE2 performance lining = GM's slightly more aggressive, and mega dusty factory "performance" brake pad option.



BEWARE: the J55 option from the 3rd gen CTS uses a 12.6" rotor and 4-pot Brembo calipers that are also used on all ATS except the V. These look VERY SIMILAR to the 13.6"/J56 setup but they have flared-up bottom edge below the Cadillac script (vs ruler-straight) and double humps along the top, above the script. Photos here are of the J56 calipers.

To the right is an early V-Sport caliper with a diamond shaped, or hexagonal opening. Later models use a rectangular opening. The rectangular opening allows (1) pads with weights (which help to quell brake noise issues, though noise isn't usually an issue) AND (2) pad swaps WITHOUT removing the brake calipers. The diamond openings on the older versions of these calipers WILL NOT allow (1) OR (2). This diamond version is also superior for stiffness, but I believe that the benefit was so minimal, it wasn't worth messing with, and ALL were



changed to the rectangular opening. ONLY early V-Sports were reported to have the diamond openings, maybe 2014-2015.

Note that the ATS and base CTS use the same Brembo front caliper with a 321mm rotor. It is distinguished by the a “double bump” along the top edge as shown at right.



BBK = BIG BRAKE KIT OPTIONS

For 18" or bigger wheels - ATS-V and 2016-2019 Camaro SS 1LE 6 piston Brembo (BC-61) brakes are the same. Rotors are 14.6 inch (370MM). These fit inside factory 18" wheels.

For 19" or bigger wheels – CTS-V (V3) and 2018+ Camaro ZL1 1LE 6 piston Brembo (BZ-61) front brakes will work. These are 15.35" diameter rotors (390MM).

Factory GM vented pistons for all six pot, front Brembo calipers are as follows:

[GM Genuine Parts 23242510 Front Disc Brake Caliper Vented Piston Kit - J6M - SS 1LE](#)

[GM Genuine Parts 19207043 Front Disc Brake Caliper Vented Piston Kit - J6H/BCD - ZL1/ZL1 1LE or BCD equipped Camaro](#)

AP Racing, BAER, and Wilwood currently offer aftermarket big brake kits for the regular Camaro SS (4 piston Brembos). Some of them are larger 4 piston systems, others are 6 piston packages. These have been confirmed to bolt right on to our cars.

Many offer upgrades to the factory CTS-V and ATS-V six piston units as well but some are not well suited for street use (AP Racing in specific). These are truly competition oriented.

Larger brake systems offer a much wider pad selection. However, these systems are really not needed or helpful to 99.9 % of owners. They usually will NOT stop a car much shorter than OEM stuff. What they can do is stop it over and over and over again. They can handle the higher heat load that will quickly overwhelm puny stock bits, such as a temps endured on a track day or ultra high performance driving at unsafe speeds on public roads. IMHO, these should only be considered in two instances (1) you need increased thermal load capacity due to the driving environment, or (2) you want these brakes for cosmetic and appearance reasons.

REAR BIG BRAKE OPTIONS

Factory ATS-V or 2016+ Camaro SS rear Brembo calipers (C7-42) brakes can bolt right on to a V-Sport. These are 4 piston Brembo units with 30mm pistons that use the FMSI 1718 pad shape and combine with a 339 mm diameter rotor. These offer better brake modulation, aesthetics, come in a variety of colors, were used on C7 Z51 rears as well, shed heat far better, and offer a FAR wider pad selection. They are easily recognizable by the triangular slits between strengthening ribs in the caliper's upper casting. No other caliper in the GM family looks similar.

Factory CTS-V (V3) or 2016+ ZL1 1LE rear calipers (BC-42) also will bolt up and are larger than the units above. They are 4 piston Brembo units with staggered 28 and 32mm pistons (smaller piston toward the

leading edge), using the 1053 pad shape and a large, 14.37" or 365MM rotor. **These will fit inside of a 18" wheel.** It is a larger, more rigid rear caliper that, in its basic form, has been in use on every generation of CTS-V since year one. On V2 and later models, they updated mounting ears on the side opposite where it mounts to the hub, milling a notch to clear the parking brake.



This same caliper, configured differently, is also used in Gen 5 Camaro and Chevy SS, but trails the axle and has the pistons in the opposite orientation. Unless you are comfortable disassembling, reversing, reassembling and pressure testing calipers, pass.

Use of either 4 piston option above will require trimming the rear dust shield or replacement with the part number associated with the donor car. Get out the Dremel and have appropriate bits, OR disassemble the rear axle, pull the halfshafts, and r&r with the proper dust shield.

NOTES – There was a report of some ATS-V owner who had a pucker moment. He had mixed/matched some Camaro ZL1 1LE brake parts on his car. At a track day, he applied the brakes at the normal marker while travelling about 140MPH into a slow turn when he suddenly had no brakes. Everything acted totally normal afterward. This happened again that afternoon, this time on camera. They believe this was caused by different pad compounds on two axles triggered the stability/ABS computers to think one axle was locking up. This appears to have been an isolated incident and putting matching brake compounds front and rear eliminated the problem. THIS IS MY MEMORY OF WHAT WAS READ and may be in error.

Master Cylinders and Reservoir - ATS-V and V3 use the same master cylinder piston bore as V-Sport (sometimes listed as 1" and other times 1.07"). The difference between them is the larger reservoir, GM GENUINE 84614718. It is BIG and prevents you from running out of fluid when all them pistons are extended from brake wear OR when bleeding brakes. Running out of fluid in the reservoir when bleeding brakes is a numbnuts, knucklehead, idiotic maneuver. I've done it twice. Be better than me.

DUST SHIELDS - OEM V-Sport dust shields (backing plates) will not fit on the larger rear rotors and must be trimmed or replaced with larger oem shields from a donor vehicle that matches the brakes you are installing. Not sure if the V-Sport stock front will work with big brakes but, either way, it blocks airflow which defeats the purpose of having more braking capacity (brakes convert kinetic energy into heat which is carried away by the air passing in and around the brakes). If you trim them with tin snips or a cutting wheel, leave "ears" that shield any articulating joint from heat.

- **FRONT -**

- The V3/ATS-V/SS 1LE shields:
 - Left GM 23336594 and Right GM 23336595.
 - These EASILY bolt in while you are doing the brake upgrade.
- Camaro 6 SS-1LE Track Pack (Bikini) shields. Smaller and better for cooling for those who need even more airflow.
 - GM 23385146 and 23385147



- **REAR - USE the V3/ATS-V/SS 1LE Backing Plates**



- Left 23316764, Right 23316765.
- The rears hold the rear parking brake (drum style) assembly. They easily bolt in BUT require extensive disassembly of the rear knuckle assembly to get to them including disconnecting various control arms and removing the rear axle shaft, and brakes. This takes a few hours and is the reason most people decide to trim the existing plates. You can't see them once installed so go with whatever floats your proverbial boat.
- The base Camaro or base CTS/ATS rear dust shields will NOT fit over larger rear rotors. Much of the reason for the large plates is to prevent lots of water on the rotors in wet stopping conditions. Many report no problem braking in rain with minimal dust/heat shielding but your results may vary. **Be aware of the danger and trim at your own risk.**



Parking Brakes - The parking brake setups are the same across ALL models and trims of CTS and ATS so your new rotors will work just fine. If the parking brake was a little loose prior, the new rotors may be tighter and work great as they are. Try before making adjustments.

5 FRONT SUSPENSION & STEERING –V, RWD, AND AWD DIFFERENCES

Front suspension dimensions are identical and interchangeable amongst all RWD/2WD CTS models, including the V3. The AWD struts, control arms, tie rods, and front knuckle are NOT interchangeable with 2WD and are not covered here. Trust me, they're just not.

Wheel bearings for all RWD models are:

Rear,	GM 19346062/ACDelco gold 513281
Rear, alt part number	GM 19346042/ACDelco gold 513282
2014 – 2019 Front hub/wheel bearings	GM Part # 13552403, supersedes: 13542187, 13544842, 13589554/ACDelco FW422

FOR 2WD – All models non-V models have the same part numbers for control arms, wheel bearings, knuckles, and tie rods. Strut part numbers can and will vary. Newer control arm part numbers often appear to be beefier for standard models than what was factory installed (more aluminum). All 2016-19 V3 models have their own control arms that are beefier than std stuff, have more solid rubber bushings on the trailing arms (front), spherical bushings on the lateral arms (rear), longer studs on the strut mounts to accommodate the OEM strut tower brace, and a longer strut body, all for more awesome.

Struts - Spring perches on the V3 strut are about 8mm lower, which should lower the ride height on the VS that amount. The shaft length also appears to be about 5mm longer (155mm vs 150mm sticking out) on the V3.

Strut Mounts - V3 (left) and VS (right) strut mounts are interchangeable. V3 mounts are GM part number 23164575. V3 has 2 of 3 studs extended to mount the V3 strut tower bar but fit non V cars fine and are about half price. Once installed, the rubber cone on the bottom pushes up into the top aluminum section with time and weight of the car on it.



At right is a photo of two V-Sport mounts, one new and one used. Notice the difference?



Control Arms –The lateral control arms, (rear position of front suspension) V3 arms use spherical bearings and solid rubber bushings where all other use standard rubber bushings with comfort cavities. This is a really nice upgrade that doesn't require torquing the mounting bolt at ride height. The V3 arms are beefier too, although there have been recent reports that newer versions of the standard arms have more aluminum and there are reports of older style failing without an impact or any kind of shock. One report had it break driving into their driveway at home! Part numbers for V3 are as follows.



- Front Passenger Side Rear Lower Control Link - GM 84518607 (**\$60 on ebay**)
 - Supersedes 23120813 and 23377062. (\$96 Amazon)
- Front Passenger Side Forward Lower Control Link - GM 23120810. (**\$76 Amazon**)
 - About \$200 ebay. \$107 GMPartsDirect.
- Front Driver Side Rear Lower Control Arm 84518605. About **\$78 GMPartsDirect**
 - Supersedes 23120812, 23377061
- Front Driver Side forward Lower Control Link - GM 23120809 **\$107 GMPartsDirect**
 - About \$150-155 on ebay and other, \$136 Amazon.
- Driver's Side V3 Strut – GM 84427201 or ACDelco 580-1122
- Passenger Side V3 Strut – GM 84427202 or 580-1123
- Strut bolt 11547494 (two per side)

Part	Part No.	GMPartsGiant	Ebay	Amazon	RockAuto	WC Cadillac	Done??
V3 strut mount	23164575	35.37	\$77.87	n/a	58.79		
Upper spring insulator	84190337	9.92	\$11.23	n/a	6.42 closeout		
Lower spring insulator	23164573	14.03	\$30	26.23	13.01		
Strut bolts	11547494	2.75	\$7.50	n/a			
Drivers's side forward arm	GM 23120809	101.29	123.21	137.64	97.79	115	
Pass side forward arm	GM 23120810	111.04	189.72	106.13	99.89 (out of stock)	115	

Driver's side rearward arm	GM 84518605 (sprsds 23120812 or 23377061)	82.22	105.82	n/a			
Pass side rearward arm	GM 84518607* (sprsds 23120813 or 23377062)	79.45	59.82	n/a			
Rear arm bolt	GM 11611268	3.47	7.46	n/a			
Fwd arm bolt	GM 11610915	3.50	5.40	n/a			
V-Sport pass strut V-Sport left strut	GM 84427196/22332593 GM 84427195 23450539, 23142942, 23247464	AC Delco 580-1073 AC Delco 580-1072		262.17			
V-Sport pass shock V-Sport left shock	GM 84230452 GM 84230451 RA says = V3				\$315.79 \$315.79 (11/8/23)		
V3 Driver's side STRUT	84427201 or ACDelco 580-1122	399.60	447.45 (ACDelco search)	n/a	346.79		
V3 Pass side STRUT	84427202 or ACDelco 580-1123	413.58	299.95 (GM or ACDelco)	n/a	\$365.79 (ov '23)		

- Strut Mount for V3 (with extended studs for strut tower brace) GM 84639574 or 23164575
- Strut Bellows for V3 GM 23130668



(A1LL) leave space on 1 side of the cavity. The inserts **may** be harder durometer.

Sway bar end links - V3 uses a steel instead of the composite/plastic VS end links. They're the same length and clocking and feel pretty close on weight. Both use spherical ends. Just buy whichever is available/cheaper.

Sway Bars – Stock is fine and work fairly well. Aftermarket options are limited. All ATS-V and CTS-V rear choices are interchangeable on those. CTS-V front sway bars have an extra kink to fit around the LT4 engine. V-Sport's LF3 engine doesn't require this and has a straighter but thinner bar. The ATS-V front bar options will mount up on a CTS that is RWD, though they are reportedly narrower (end to end) by about an inch Rennick/Refined Performance, a long time Cadillac performance parts vendor, says they sell the same exact kit for both. The ATS-V and CTS-V rear bar is the same part number and is larger than the V-Sport bar which dials out some understeer.

Note: factory front bars have the bar's bushings molded on and come included with a new part. The aftermarket options usually use poly bushings and are separate pieces that you have to grease like the old days.

2017 ATS-V front bar GM 84458200 (\$120 as of 08/23) (formerly 23103299)

2017 ATS-V rear bar – GM **84008631** (\$104.61 as of Aug 2023)

2016 CTS-V front bar – GM 84458201 (\$120 as of 8/2023) (formerly 23115030)

2016 CTS-V rear bar – GM **84008631** (\$104.61 as of 8/23)

Tension Struts –(left) A.K.A. radius arms, forward lower control arms, etc... appear identical in appearance with exception of the bushings inserts. V3 inserts (some labeled A1LL-V) fill up the bushing cavity nearly completely; the VS inserts

2015 CTS V-Sport front bar – GM 20887082 (\$74.27)
2015 CTS V-Sport rear bar – GM 20755791 (\$77.40 as of 8/23)



6 ELECTRONIC SUSPENSION CONTROL MODULE

OPTIONS

- 6.1 CTS-V models have a clearly firmer calibration for the magnetic ride. Even in tour, a V3's FE4 suspension allows the car to follow the road much more solidly, even over mild dips/rises, is MUCH less Cadillac wallowy, and they handle substantially better.

2017-2019 ATS,= (ALL models) 84214670

2017-2019 CTS (ALL models) 84214669

2016 ATS-V 23201897 (supersedes 22934271

**2014 - 2016 CTS (ALL models) 23201896, discontinued
(superseded 22907795, 23108997)**

- 6.1.1 It is worth noting that the rear shock part numbers between FE3/V-Sport and FE4/V3 are the exact same. The front struts are different part numbers for the V3's FE4 suspension versus the V-Sport's FE3, and they have a slightly longer strut rod and lower spring perch (lowering ride height about 8mm if used in a V-Sport or standard CTS). It is believed that the software/calibration is the difference here.
- 6.1.2 A 2016 V3's FE4 suspension control module bolts right in to a 2014-2016 V-Sport and worked perfectly. Seemed to make the car ride more well controlled and no christmas tree was observed.

7 REAR SUSPENSION / CONTROL ARMS / SUBFRAME

All 3rd generation Cadillac CTS models have the same rear (1) suspension dimensions, (2) rear subframe mounting points, and (3) rear control arms. I believe the rear subframes themselves are the same too.

As of early 2023, we attempted installing a BMR Camaro subframe lockout kit on a CTS V-Sport. The kit did NOT fit properly. Revelry Racing developed a kit for this application, the RK002.

CTS-V has it's own subframe bushing on the rear positions. Revelry's kit RK001 fits that application.

Lockout kits shore up +80% of the subframe movement that leads to "sway" on these vehicles. No one else offers a kit. This is the FIRST step towards improving rear suspension performance on these cars. Start here!

As of mid-2022, a brief search on GMPartsDirect.com showed all rear control arms and toe links were the same part number for every trim level (even the mighty V3). ATS-V part numbers were also the same. The factory stamped steel parts are fairly robust when stressed in a linear fashion but have nice, pillowy, luxuriously soft rubber bushings, which leave much to be desired as far as control is concerned, especially when power and traction levels are high. There are five links to each rear suspension corner. The lower and main control arms are where the lower coil spring mounts are. I have not seen aftermarket options for these as of yet. The other links which I see aftermarket for are the two trailing arms (one is known as the upper trailing arm, the rear camber arm, and the toe link). The factory units are all fixed length. Aftermarket options are sometimes fixed and others are adjustable. Some have poly(urethane) bushings and others have heim joint/spherical bearing joints. The latter locates the suspension more positively for performance but comes at a cost of NVH. Of course some will say “I didn’t notice it.” Do not believe the B.S. It is a noticeable difference to anyone paying attention. If you don’t care, that’s another matter entirely. Poly will be harsher than OEM, but softer than all metal, and likely the best choice for the street. All that said even the metal bushing options mount into the rubber bushing that is installed in the rear spindle/hub assembly, so they are tolerable to so long as you aren’t on really bad roads.



Amongst vendors out there are:

- [Godspeed Project](#) which lists a la carte arm pairs for ATS and CTS totaling about \$670 at time of writing. They only offer metal bushings and adjustable arms. These are good looking arms, no doubt, probably some of the nicest looking options out there, but dark red in finish.
- [BMR Suspension](#) arms were formerly known as Carlyle. They offer rear trailing arms, upper control arms, and toe links with heim joints, offering them in red or hammertone gray. They are often being sold with a 15" rear wheel conversion kit designed for V3 models, which puts on small, drag racing focused, smaller brakes. I hear it is still available and see it listed with 15" rear brake conversion sets. Smaller rear brakes to run 15" rear wheels with drag tires. The arms can be purchased separately, are hammertone gray, look high quality and have a fancy pants V logo plasma-cut into the arms in places. These also run \$800 ish.
- [Megan Racing](#) – who also lists a la carte arm pairs, also with all metal bushings for around \$600-650. Recently, I saw them [for \\$552 at coiloverdepot](#). They only offer blue from what I’ve seen. Replacement bearings run \$65 each (prices as of April 2023).
- [ZZP Performance](#) – Also offers CTS/ATS sets. These are tubular, non-adjustable trailing arms and rear toe links only, with free-floating poly bushings and are greaseable. They run about \$500 retail. I think these work well and are a great alternative for most.

8 ENGINE COOLING MODS –

The V-Sport is a great road car. However, putting in duty for road course use is a bit beyond her capability stock. First is to address the issue of brakes, addressed above, moving to 370/339 ATS-V units or the mighty 390/365 CTS-V units. Once you are able to put down more and for longer, and braking deeper and more consistently, this car begins to heat soak hard, ending up with overheating. We have seen engine coolant temps redline, transmission temps hit 260F, and we have no idea what the engine oil temp was as there’s no readout we are away of.

We historically run Amsoil 5W-30 signature series on the Hella V, with 10k mile oil changes even when including track days, and she takes it like a champ. Oil analysis says we could continue using the oil but we figure 10k is good. Back to temperature. . . on road course, the ECU cuts power when engine maxes out in ECT, this severely tries to keep you from screwing yourself and the car all up and blowing the motor. Many people think that this power is being cut due to intercooler temps maxing out.



Data pulls showed we are hitting higherish IAT of 180F momentarily on track, but that the number dropped to 135F at the end of a long straight away, so the car was continuing to make good power from that standpoint. However, coolant redlined and we were boiling over once pulling into the pits and having to add coolant in between sessions.

We desperately need more cooling options explored on the platform.

Cadillac ATS-V, CTS-V and many V8 Camaro units are two row units and those cars all have more/larger front air intakes, some add hood venting.

The V-Sport is hobbled with a one row radiator unit. Unfortunately, the part number for the V-Sport is shared with no other GM model (or other brand vehicle, from our research) therefore there is no option to dive into the parts bin for larger, two row alternatives. With the front of a factory car, there are numerous panels, deflectors, radiator support sheet metal, mounts, auxiliary cooling lines such as transmission, that all need to line up or require great modification. Additionally, the condenser and turbocharger circuit's heat exchanger (W2A intercooler) is also stacked immediately in front of the radiator. We are not willing to cobble together something that will be poorly fitting and work or look like a clapped out pile of shit, cutting factory plastic, etc. It would end up with a radiator that does not have air properly channeled to it and not end up using the entire radiator surface anyway, plus to fit to ATS-V or CTS-V radiators, it would require janky connections on bottom mounts, new subframe, or new radiator support structure. . . all model and trim particular (this would make little economic sense.).

We are aggressively pursuing larger, higher capacity radiator options.

Options considered.

1. Big Radiator - The ATS-V has a dual row radiator, as does the CTS-V, and both have a wider radiator, wider lower mounting provisions, a wider set of mounting tabs on the aluminum engine-cradle subframe, unique body work and ducting for each model, and part-number specific subframes that appear to be engine specific. In other words, there are no parts bin options we are aware of that will bolt in to the V-Sport. Further, no one makes a two row V-Sport radiator at this time (though Revelry Racing is working on this as of 1/17/2025).
 - a. V-Sport OEM main GM Genuine 21846 (\$193 as of Jan. 2025)
 - i. H 19.35, W 21.69, T 1.06, I/O 34.15 or 1.34
 - ii. Koyorad 13597 (A13597). H 18.875, W 21.625,
 - iii. AGILITY 8013597 H 19, W 22.
 - iv. TYC 13589 H 19.13, W 20.63, T 1.02
 - b. ATS-V Koyorad 13598 W 22 5/8", H 20 1/4", 5/16" hoses? 1 7/16 thick.

2. Oil Cooler - GM already uses some stupid “oil cooler” that actually seems more like an oil warmer, mostly designed to get the oil up to temp by sharing engine heat that is generated into coolant faster than the oil. . . . for emissions mostly, and to minimize cold temp wear I support. Heats oil in a cold Michigan winter more than cools oil on a California track day. To that end, LT4 folks and those in other brands often remove the factory “oil cooler” or “divorce” them. We are currently exploring this option for a V-Sport.
 - a. Possible place to pull off oil lines is from the engine oil filter adapter. Engine Oil Filter Adapter - GM (12658649) fit all 2014-2019 LF3 CTS V-Sport and all 2016-2019 ATS-V LF4.
 - b. CT4V-BW unit is part 12675709 which replaced 12670429. Unsure if those would be more well suited.
 - c. Oil filter sandwich plates that have a thermostat, then connecting it's -10 AN lines to an external cooler to be fitted up front. Will likely add a quart to the oiling system as well, FWIW.



9 INTERCOOLER LOOP MODS –

There are several opinions out there, but they are all beholden to the facts that the LF3 in the V-Sport tends to have air in the intercooler loop that causes even a stock car to stumble and fall at WOT. For this reason, you have to get the system serviced at the dealer with a several \$k machine that vacuums it all out and removes air pockets OR go with a tap-out style bleeding procedure, as was well highlighted on Jet Fuel Only's youtube channel. When an air pocket hits the intake bricks, the intake air temp (IAT) skyrocket and the engine cuts fuel and timing to protect from damage. Stock cars get head soaked pretty easily which also cuts power, even without air bubbles. So, the cure is to make a huge intercooler system that self bleeds. The problem is that we don't have unlimited space, even though these are large vehicles. So, for bleeding, a small reservoir that allows the intercooler loop to dump into it and then draw from the bottom is a cure. It automatically removes air bubbles by design and lets us keep all the pep the car was designed for. Most seem to be using an Edelbrock square shaped reservoir, a bent I-shaped flat steel bracket, and various hoses. I have seen the following hoses listed for this. Dayco 88425 and 88398. I have also seen the following from Magnuson superchargers.



2020-2023 GM Engine

SEQ Figure 1* ARABIC
2Magnuson type



Coolant Hose 85510534 |



GMPartsDirect.com 2014-2019 Cadillac XTS Turbocharger Coolant Feed Pipe Plug 12659911 | GMPartsDirect.com 2016-2023 GM Engine Coolant Reservoir Cap 13436090 | GMPartsDirect.com 2017-2023 Chevrolet Radiator Surge Tank 42439124 | GMPartsDirect.com



10 INTERIOR MODS –

Rear Console is interchangeable throughout the years. Only premium models had rear seat climate controls (did they control radio too? I can't recall). I attempted to connect this into my standard '14 V-Sport but the wiring harness for this option was not installed on my car. I do not know if it hacking another harness or a intermediate harness is available, nor if it would be plug and play. Questions re the same have had conflicting answers.



See my youtube video to install factory rear twin USB sockets to replace the ashtray/12 power port. <https://youtu.be/PG0ka6vTqE8>!

11 BODY AND TRIM – EMBLEMS, LOGOS, CRESTS AND BADGES

2014 stock rear badge and trunk “applique” are distinct to all other 3rd gen CTS years (below)

2015-2019 rear applique is GM 23197402 in Galvano Silver (satin silver) WITH rear camera (w/o video mirror)

2015-2019 rear crest (modern, without wreath) is GM 23236084.

2015-2019 Front Grille – Galvano Silver GM 84124873, Black Chrome 84124872. Will work in any 2014-2019.



12 AFTERMARKET SPEAKER OPTIONS WITH FACTORY BOSE SYSTEMS

The CTS, as most factory sound systems, has 2-ohm speakers used throughout. Ohms are a measurement of electrical resistance. Aftermarket speakers for automotive use are usually 4-ohm

speakers. With the same power applied, a 4 ohm speaker will usually put out half the sound an otherwise identical 2 ohm speaker will. While aftermarket speakers have the advantage of often handling much greater power, the advantage is not realized when using factory amplifiers and head units to power the speakers. The CTS system is fairly involved and complex. While stereo shops can set something up that will sound spectacular, including subwoofer enclosures and large amplifiers, many of us want a simple speaker upgrade. There are limited options for this to-date.



PowerBassUSA.com are the only 2ohm (factory impedance) aftermarket speakers known as of 12/7/2022. For the 3rd gen CTS, they confusingly list the following on their website:

1. Front Door	OE275-GM	\$39.99	Notes, 6x9 in frt door, different tooling
2. Rear Door	OE652-GM	\$109.99	
3. Dash	OE275-GM	SAA	Also in front door and rear deck
4. Rear Deck	OE692-GM	\$129.99	At Crutchfield
5. Front Pillar & rear doors:	n/a		

13 DRAIN PLUG OPTIONS

Drain plugs on the V-Sport are 12x1.75 thread pitch, which is kind of an odd-ball pitch/size.

Magnetic drain plugs are a great idea. They help collect ferrous wear metals that are suspended in engine oil and are too small for the oil filter to remove. That said, people go hundreds of thousands of miles without using these, so it's just a "because it feels good" kind of thing. These are available at many, many places, including amazon and e-bay, usually for less than \$10.

Quick Change drain plugs: There are two quick change types of plugs available for quick change, lever action or screw on valves. They are equally reliable (very) and easy to use. Lever styles of [EZ- Oil Drain](#) and [Fumoto](#), and screw on valve styles such as [ValvoMax](#) or [Stahlbus](#).

[Votex](#) is an American made brand that has both magnetic and quick change (screw on) styles.



Valvomax [M12-1.75 Quick Twist Valve with Stainless Drain Tube Knob](#) \$44.99 (left)

FUMOTO F137S: SHORT NIPPLE OIL DRAIN VALVE WITH M12-1.75 \$29.95 (right)



14 TIMING CHAIN ISSUES — KITS

Timing chains stretch on these platforms. No one is sure why but there are extensive hypothesis. Most are down to running an engine low on oil (even if the low end of the crosshatch marks on the dipstick)

allowing increased heat, wear, and stretch. This trips two major codes which are the kiss of death and require chain replacement. Dealerships usually charge about \$3,500-5,500 for the work. Private shops sometimes less. Most suggest OEM or nothing at all.

Timken has the following kit

<https://vehicleaftermarket.skf.com/us/en/products/VKML710041N>

List price is \$327.49 as of Sep '23.



15 TRIFECTA TUNING NOTES FOR SPARK PLUGS, ETC.

Regarding the plugs, and gap, heres a bit of info on that (Keep in mind the factory recommends OE ATS-V plugs for the VSport now, so this ATS-V related info absolutely applies):

The plugs we recommend are:

<https://www.rockauto.com/en/parts/ngk,95605,spark+plug,7212>

They are made of Ruthenium instead of Iridium, and are better suited to our application. Here's more info from NGK:

Stock plugs (Laser Iridium):



ILTR7E9

Product Information

Part Number: ILTR7E9

Product Description: NGK Laser Iridium Spark Plug

Marketing Description: NGK Spark Plugs (U.S.A.), Inc. is the largest OE supplier and manufacturer of spark plugs for domestic and import vehicles in North America. Its OE legacy, unsurpassed quality and leading vehicles in operation coverage reinforces NGK as The Ignition Specialist™. With over 80 years of automotive expertise NGK has built a reputation for quality and reliability; manufacturing spark plugs for virtually every automotive, motorcycle, marine and small engine application. We are committed to be the premier partner with our customers, while maintaining original equipment standards for the highest durability and operational performance. With state-of-the-art manufacturing, inventory and distribution facilities in North America and across the globe, NGK is dedicated to providing customers with world-class products and services.

Extended Description: NGK Laser Iridium spark plugs offer the best combination of performance and longevity. Actual OE or equivalent replacement spark plug.

Caption: Laser Iridium plugs are tested to the highest standards to ensure quality and durability. Engineered specifically for OE applications.

Features and Benefits: Iridium tipped center electrode provides durability six times harder than platinum. NGK's high-grade pure alumina ceramic and 98% pure copper core prevents the spark plug from overheating while providing reliable starts.

Product Attributes

Center Electrode Core Material: Copper Core

Center Electrode Tip Material: Iridium

Ground Configuration: Standard

Ground Electrode Core Material: Nickel Core

Ground Electrode Quantity: 1

Ground Electrode Tip Design: Standard

Hex Size: 5/8"

Insulator Height: 53.00 mm

Manufacturer Heat Range: 7

Pre-Gap Size: 0.032 in

Reach: 25.00 mm

Resistance: 5000 Ohms

Seat Type: Tapered

Thread Diameter: 14.00 mm

Previous-best Iridium plug:



LTR7IX-11

Product Information

Part Number: LTR7IX-11

Product Description: NGK Iridium IX Spark Plug

Marketing Description: NGK Spark Plugs (U.S.A.), Inc. is the largest OE supplier and manufacturer of spark plugs for domestic and import vehicles in North America. Its OE legacy, unsurpassed quality and leading vehicles in operation coverage reinforces NGK as The Ignition Specialist™. With over 80 years of automotive expertise NGK has built a reputation for quality and reliability; manufacturing spark plugs for virtually every automotive, motorcycle, marine and small engine application. We are committed to be the premier partner with our customers, while maintaining original equipment standards for the highest durability and operational performance. With state-of-the-art manufacturing, inventory and distribution facilities in North America and across the globe, NGK is dedicated to providing customers with world-class products and services.

Extended Description: NGK Iridium IX spark plugs are specifically designed for the performance enthusiast. Iridium IX provides outstanding acceleration, high fuel efficiency and durability.

Caption: NGK Iridium IX plugs offer extreme ignitability and exceptional anti-fouling. Tapered cut ground electrode provides improved starting, idling and throttle response.

Features and Benefits: The Iridium fine wire center electrode's durability is six times harder than platinum. Iridium alloys extremely high melting point is perfect for today's engines. For even greater performance consider upgrading to a NGK RUTHENIUM HX™ plug.

Product Attributes

Center Electrode Core Material: Copper Core

Center Electrode Tip Material: Iridium

Ground Configuration: Standard

Ground Electrode Core Material: Nickel Core

Ground Electrode Quantity: 1

Ground Electrode Tip Design: Taper Cut

Hex Size: 5/8"

Insulator Height: 53.00 mm

Manufacturer Heat Range: 7

Pre-Gap Size: 0.044 in

Reach: 25.00 mm

Resistance: 5000 Ohms

Seat Type: Tapered

Thread Diameter: 14.00 mm

Ruthenium plugs:



LTR7BHX

Product Information

Part Number: LTR7BHX

Product Description: NGK Ruthenium HX Spark Plug

Marketing Description: NGK Spark Plugs (U.S.A.), Inc. is the largest OE supplier and manufacturer of spark plugs for domestic and import vehicles in North America. Its OE legacy, unsurpassed quality and leading vehicles in operation coverage reinforces NGK as The Ignition Specialist™. With over 80 years of automotive expertise NGK has built a reputation for quality and reliability; manufacturing spark plugs for virtually every automotive, motorcycle, marine and small engine application. We are committed to be the premier partner with our customers, while maintaining original equipment standards for the highest durability and operational performance. With state-of-the-art manufacturing, inventory and distribution facilities in North America and across the globe, NGK is dedicated to providing customers with world-class products and services.

Extended Description: NGK Ruthenium HX™ spark plugs are the best in class plug on the market for today's modern vehicles. NGK's patented Ruthenium technology offers the highest performance and life expectancy of any Aftermarket spark plug line.

Caption: Created from advanced OE technology as a high ignitability plug. RUTHENIUM HX™ spark plugs come with patented specialized OEM DFE and PSPE® tip designs to meet the demands of modern engines.

Features and Benefits: NGK RUTHENIUM HX™ spark plugs provide unparalleled durability and a more complete fuel burn resulting in a quicker throttle response, smoother idle and better cold starts. Trivalent metal plating eliminates need for anti-seize.

Product Attributes

Center Electrode Core Material: Copper Core

Center Electrode Tip Material: Ruthenium

Ground Configuration: Standard

Ground Electrode Core Material: Copper Core

Ground Electrode Quantity: 1

Ground Electrode Tip Design: PSPE

Hex Size: 5/8"

Insulator Height: 52.50 mm

Manufacturer Heat Range: 7

Pre-Gap Size: 0.040 in

Reach: 25.00 mm

Resistance: 5000 Ohms

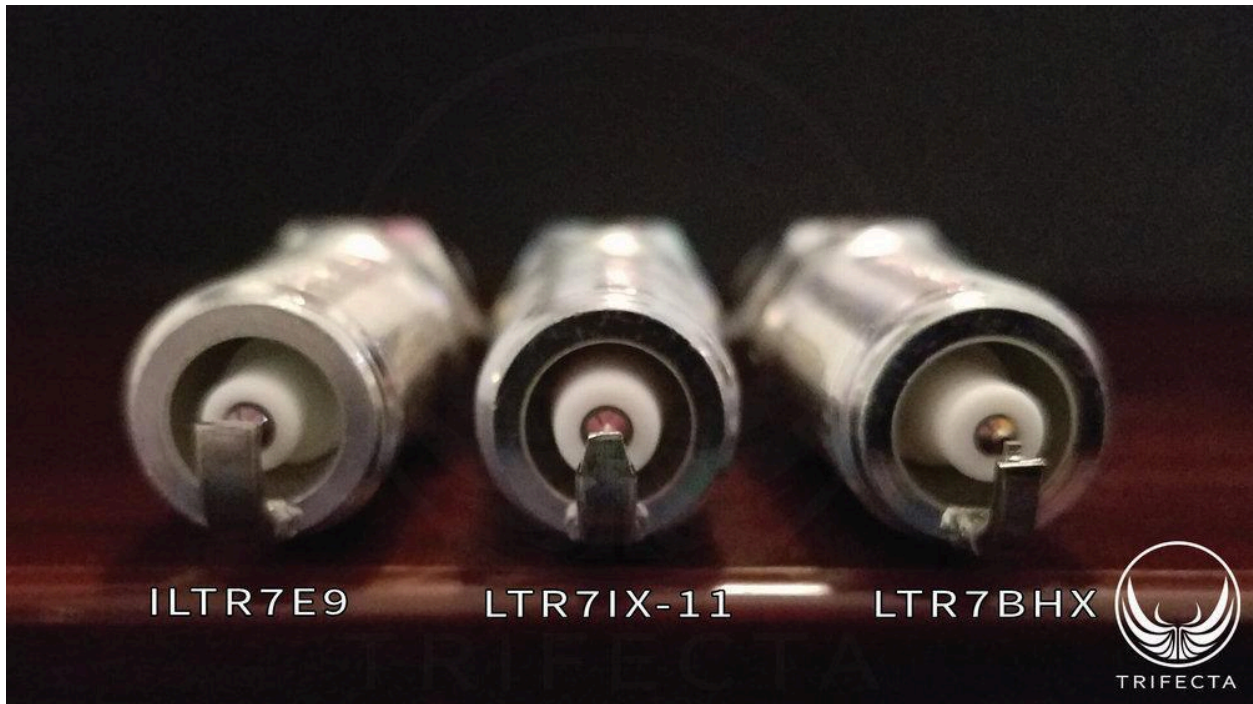
Seat Type: Tapered

Thread Diameter: 14.00 mm

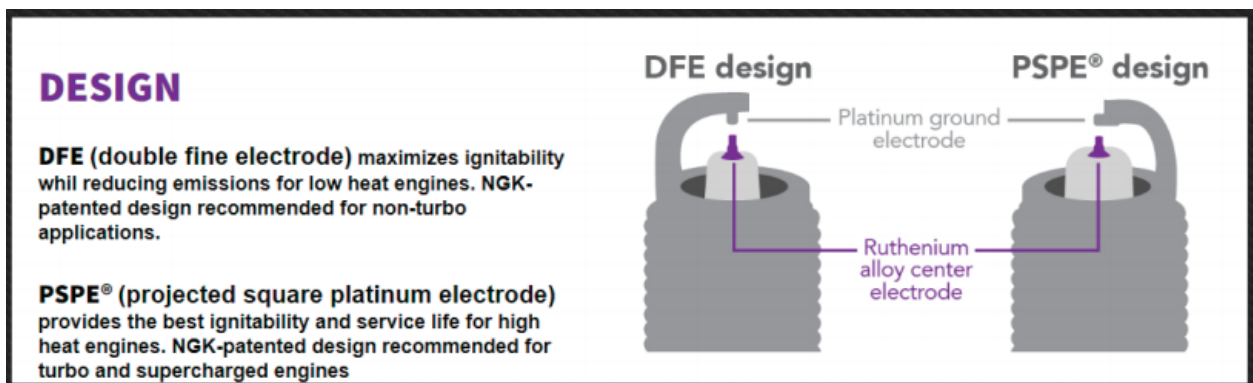
and here's a quick comparison of them all together:



AC Delco 41-147 and NGK ILTR7E9 are a cross reference of the same plug



Note the electrode design. Stock is squared, Iridium IX is a bit tapered, and Ruthenium uses a PSPE design with a fine tip.



We recommend gapping these plugs to 0.027, and most come out of the box already set to this, so its really a matter of verifying rather than actually gapping them.

As for the intercooler loop, the turbochargers are cooled by a water-to-air coolant loop which needs periodic service to ensure proper operation. When this system runs dry, or low

on coolant, it can directly affect engine performance including making less boost than it normally would.

There are two ways to service the charge air cooler ("CAC") system.

You can either try it yourself using this method:



<https://www.cadillacforums.com/threads/how-to-bleed-and-fill-the-intercooler-coolant-system.1081492/>

Or you can take the car to the dealer or a full service mechanic and request that they vacuum-fill the system. The tool they use is known as "Vac-n-fill", and looks like this:



They will use an air compressor to fill a vacuum tank via venturi effect. Then they attach a fitting to the CAC fill port, and use the vacuum tank to simultaneously suck all of the air out of the system and replace it with fluid (in this case dex cool 50/50). When both sides of the tool are filled with coolant, and no more air bubbles can be sucked out of the system, the service is complete.

You can buy this tool online, but it is pricey:

<https://gmtoolsandequipment.com/en-US/Pages/ItemDetail.aspx?SKU=GE-47716>

<https://gmtoolsandequipment.com/en-US/Pages/ItemDetail.aspx?SKU=GE-47716-30A>

When the intercooler system is working as it should you should see full power MUCH greater consistency than with a system that hasn't been serviced in years.

I would definitely look into servicing this system either annually or bi-annually depending on whether you notice performance degrade or not.

