

Service Bulletin

TECHNICAL

Subject: Poor Engine Performance in Extremely Cold Weather Conditions for LE2 Engines, Charge Air Cooler Icing - Malfunction Indicator Lamp (MIL) Illuminated, DTC P0299, P0234, P2227, P00C7 Set

Brandi	Model:	Model Year:		VIN:		Engino	Tronomiccion
Brand:		from	to	from	to	Engine:	Transmission:
Duiek	Encore	2016	2019	_	_	1.4L (RPO LE2)	_
BUICK		2021	2022				
Chevrolet	Trax	2021	2022				

Involved Region or Country	North America
	Some customers may comment that when driving short distances and/or slow speed driving cycles, their vehicle experiences one or several of the following conditions within the first 10 to 15 minutes of vehicle operation in extremely cold weather conditions (-18°C or less / 0°F or less):
	Loss of power
	Smoke out the tail pipe
	Hesitation on acceleration
	Stalling condition
	 Burning oil odor possibly caused by oil leak
Condition	 May also notice a Malfunction Indicator Lamp illuminated
	After driving for a period of time, the driveability issues seem to diminish.
	This condition may also cause an increase in crankcase pressure, creating oil leaks at seals and gaskets.
	Technicians may find one or more of the following DTCs set:
	• P0234
	• P0299
	• P2227
	• P00C7
Cause	This condition may be caused by ice accumulation in the charge air cooler (CAC), restricting air flow to the throttle body.

	Important: The DTCs and symptoms above are not exclusively related to freezing/icing conditions. Only follow this bulletin when the condition is directly correlated with extreme cold of -18°C or less / 0°F or less. System leaks should always be ruled out first for P0299. Signs of moisture will always be present in the CAC system and are not a reliable indicator of freezing/icing.
	If any of the above conditions are present, allow time for possible ice build up in the CAC to melt by allowing the vehicle to thaw in a warm climate.
	If any of the conditions are validated to be caused by freezing/icing, verification of the following components is necessary on all U.S. and Canadian vehicles:
	Grille Winter Cover
	Modified Charge Air Cooler (CAC)
	If the vehicle has a verified icing condition associated with extreme cold, but has all the components listed above installed, perform the Intake Air Pressure and Temperature Sensor Inspection and Cleaning and CAC drain procedures below.
	If not previously performed, an oil change may be necessary to remove any moisture from the engine. Prior to the oil change, warm the engine up completely to melt any ice in the engine.
	If there is a check engine light with a P0234 or P0299 DTC during cold weather driving, refer to Intake Air Pressure and Temperature Sensor Inspection and Cleaning below.
Correction	Note: Frozen oil/water contaminant in the turbocharger wastegate regulator solenoid valve (TCV) is often concurrent with vehicle operating conditions that cause CAC freezing. If DTC P0234 is set - Turbocharger Wastegate Regulator Solenoid Valve Inspection.
	Important: For additional information on oil/moisture condensate freezing up in the turbocharger wastegate regulator solenoid valve, refer to Turbocharger Wastegate Regulator Solenoid Valve (TCV) Thermo-Wrap below.
	Important: The new ECM calibration is only applicable for MY 2018, 2019 and 2021 vehicles with LE2 engines. In MY 2020 there was no LE2 engine.
	Note: The Engine Control Module calibration should be updated. The new calibration will enable a revised transmission shift pattern during cold weather operation, which does not use overdrive as frequently. As a result, <i>some customers</i> may notice elevated engine RPMs during highway operation. This operating mode will reduce the potential for ice to build up inside the charge air cooler, and the potential for setting P0299 or P0234 diagnostic codes.
	The customer must be <i>informed</i> by dealership personnel by explaining the new engine control module calibration and its <i>effects</i> on transmission shift patterns at highway speeds during cold weather to avoid a customer return to the dealership after the programming is completed.

Important: Service agents must comply with all International, Federal, State, Provincial, and/or Local laws applicable to the activities it performs under this bulletin, including but not limited to handling, deploying, preparing, classifying, packaging, marking, labeling, and shipping dangerous goods. In the event of a conflict between the procedures set forth in this bulletin and the laws that apply to your dealership, you must follow those applicable laws.

Important: Allow time for the vehicle to thaw in a warm environment to avoid damaging or breaking parts that may be required to be re-installed.

Turbocharger Wastegate Regulator Solenoid Valve (TCV) Thermo-Wrap



3686945

- Remove the turbocharger wastegate regulator solenoid valve (1). Refer to *Turbocharger Wastegate Regulator Solenoid Valve Replacement* in the Service Manual.
- Drain the turbocharger wastegate regulator solenoid valve (TCV) by turning the valve upside down.

Note: Check port #2 to assure the spring gets lifted off the seat. This will be determined by the compressed air not dead heading when applied to port #2. When applying air to this port a small amount of air should be observed at port #3 and even less air will be noticed at port #1. If this does not happen, the TCV plunger may have hardened deposits from hot operating conditions which will impede TCV plunger movement, and the turbocharger wastegate regulator solenoid valve should be replaced.





- 3. Using clean shop air regulated to 80-100 PSI, blow through all three ports (1, 2 & 3) for 5 seconds each.
 - \Rightarrow Repeat step 3 twice.



6055077

4. Prior to reinstalling the TCV, pre-position the thermal wrap. This will aid in installation of the wrap once the TCV is reinstalled.



6046314

Note: The end result of the wrap, will surround the TCV as shown in the graphic above.

5. Install the TCV. Refer to *Turbocharger Wastegate Regulator Solenoid Valve Replacement* in the Service Manual.



6046334

- 6. Once the mounting bolt and hoses are properly installed, pull the lower portion of the wrap upward, and snap it into position.
- 7. Clear all DTCs using GDS and evaluate.

Grille Winter Cover Installation

Warning: Remove grille cover during temperatures above 32°F/0°C to prevent engine and transmission overheating. Remove grille cover before towing a trailer of any size. Failure to do so will decrease transmission cooling efficiency and possibly cause damage to the drivetrain. **Note:** The cover may appear to be undersized. The vinyl used may stretch during installation to ensure a tight fit. It is highly recommended that the cover be installed in a warm shop environment.



5197596

1. Using care, orientate the fascia winter cover to the bumper fascia.



- 2. Attach the cover to the fascia by pushing the hooks through the grille openings.
- 3. Validate that all the hooks are engaged and the cover is a tight fit.

Intake Air Pressure and Temperature Sensor Inspection and Cleaning

Important: Only perform steps 1-5 if DTC P0299 is set.



1. Remove the turbocharger air pressure sensor (3). Refer to *Intake Air Temperature Sensor Replacement* in SI.



Important: Due to the sensitivity of the sensor, **Do Not** use any chemical cleaners including water and **Do Not** use compressed air to remove contaminates.

2. Inspect the sensor for any contaminates.



- 3. Allow time for any ice build-up to melt by placing the sensor port down.
- 4. Clean the sensor with a clean towel.
- 5. Install the sensor.

Service Procedure



2851444

1. Install the CAC (2). Refer to Charge Air Cooler Replacement in SI.

Important: Do Not perform an oil change if the oil change was recently done.

- If the oil change was recently done and no signs of moisture have been confirmed, Do Not proceed with procedure.
- If the oil change was not previously done or moisture has been found in the oil, proceed with procedure.
- 2. If required, perform an oil change. Refer to *Engine Oil and Oil Filter Replacement* in the Service Manual.

Engine Control Module Programming

Important: Updated Engine Control Module calibration: The updated calibration will enable a revised transmission shift pattern during cold weather operation, which does not use overdrive as frequently. As a result, the customer may notice elevated engine RPMs during highway operation. This operating mode will reduce the potential for ice to build up inside the charge air cooler, and the potential for setting P0299 or P0234 diagnostic codes.

Caution: Before downloading the update files, be sure the computer is connected to the internet through a network cable (hardwired). DO NOT DOWNLOAD or

install the files wirelessly. If there is an interruption during programming, programming failure or control module damage may occur.

- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. Install a GM Authorized Programming Support Tool to maintain system voltage. Refer to <u>www.gmdesolutions.com</u> for further information. If not available, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Follow the on-screen prompts regarding ignition power mode, but ensure that anything that drains excessive power (exterior lights, HVAC blower motor, etc) is off.
- Please verify that the radio time and date are set correctly before inserting USB drive into vehicle for programming, otherwise an error will result.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Important: The service technician always needs to verify that the VIN displayed in the TLC left side drop down menu and the top center window match the VIN plate of the vehicle to be programmed prior to using Service Programming System 2 (SPS2) for programming or reprogramming a module.

- For the TLC application, service technicians need to always ensure that the power mode (ignition) is "ON" before reading the VIN from the vehicle's VIN master module and that they do not select a VIN that is already in the TLC application memory from a previous vehicle.
- If the VIN that shows up in the TLC top center window after correctly reading the VIN from the vehicle does not match the VIN plate of the vehicle, manually type in the VIN characters from the vehicle VIN plate into the TLC top center window and use these for programming or reprogramming the subject module with the correct vehicle VIN and software and/or calibrations.
- The Engine Control Module (ECM) is the master module (for VIP vehicles) that TLC reads to determine the VIN of the vehicle. If the VIN read from the vehicle by TLC does not match the VIN plate of the vehicle, the ECM also needs to be reprogrammed with the correct VIN, software and calibrations that match the vehicle's VIN plate.
- The Body Control Module (BCM) is the master module (for GEM vehicles) that TLC reads to determine the VIN of the vehicle. If the VIN read from the vehicle by TLC does not match the VIN plate of the vehicle, the BCM also needs to be reprogrammed with the correct VIN, software and calibrations that match the vehicle's VIN plate.

Caution: Be sure the VIN selected in the drop down menu (1) is the same as the vehicle connected (2) before beginning programming.

= t. A. dered	3	
witering Danace		
The models of the till search	Support + 14/2 +	
	Address of the second sec	
(1)k	- Degreed a coll tracy	
Treat.	The state of sets strength at	
one sate /		
- 2100 0000		
Jacob Vallante Britts Vallante Antonio 1.48 Auto Antonio Anton	and (makes the spans)	0
And An And And And And And And And And A		

Important: If the vehicle VIN DOES NOT match, the message below will be shown.



5877000

			0	Support 1	(\$P2. T	
Tead-advert	1 (A & A)	Prosperior ins 	Lagran and Annual Annua		i tera w	
1.9943	44 1				10-	Alexandra (
ine Progra	er ning bysom	-	3	unusary		
Cate 84	 H) Chattern akrtaras akrtaras akrtaras akrtaras akrtaras akrtaras akrtaras akrtaras akrtaras 	Salested A Derseres Derseres Derseres Deterseres Deterse	Salarang Summ Sular at demonstra K in contrase Career	Intervery Discussions Intervery and with the agrice solution of Star U Star	-	- 6

Page 11

Important: Techline Connect and TIS2WEB screens shown above.

Important: If the same calibration/software warning is noted on the TLC or SPS Summary screen, select OK and follow screen instructions. After a successful programming event, the WCC is located in the Service Programming System dialogue box of the SPS Summary screen. Document the WCC on the job card. No further action is required. Refer to the Warranty Information section of this bulletin.

1. Reprogram the ECM. Refer to *K20 Engine Control Module: Programming and Setup* in the Service Manual.

		I see start to a Statement	ma	
Techine Correct	10-14 million	alber in Berterne	2 9	2
the terms of the second		Councer - RPC	-	- G
nikon -				*
	and the second second			
Magnation age Chargines.	-			
APA-D-16-17-0-3 PA-	(1)			
Nervery Duel Cale, 1815 State		- Warran Charles Indexes		-
Warmany C. 2017. Control property Villa and call pairs to control and Economic top costs a prior services of an anticest of prior address.	Stringt, "Schlaps" at Striven and			
No. Presented in Last a Name				
fobs b force and to be and wre.				
If here we can be derived by an inder some a service of the P	100 a di a - 116 a di 16			



Note: The screenshots above are an example of module programming and may not be indicative of the specific module that is being programmed. Module selection and VIN information have been blacked out.

Important: To avoid warranty transaction rejections, you **MUST** record the warranty claim code provided on the SPS Warranty Claim Code (WCC) screen shown above on the job card. Refer to callout 1 above for the location of the WCC on the SPS screen.

2. Record the SPS Warranty Claim Code on the job card for warranty transaction submission.

Parts Information

Description	Model Year	Part Number	Qty
Coolor	2016-2020	42574036	1
Charge Air	2021	Installed in Production	_
	2016	42697326	1
Cover, Grille Winter	2021– 2022 (Trax)	42697331	1
vvinter	2017-2022 (Encore)	42697332	1
Filter, Oil	2016 2021	Refer to the Electronic Parts	
Oil	2010-2021	Catalog	J (EPC).
Wrap, Thermal	All	25205589	1

Warranty Information

Important: Warranty coverage code E2 applies for this module programming event. ECM reprogramming is covered for 8 years/80,000 miles (U.S.) or 8 years/130,000 km (Canada).

Note: Warranty Coverage Codes E, E1 apply to Labor Operation 4081728.

For vehicles repaired under the Powertrain coverage, use the following labor operation. Reference the Applicable Warranties section of Investigate Vehicle History (IVH) for coverage information.

Labor Operation	Description	Labor Time		
4081728*	Charge Air Cooler Replacement	1.1 hrs		
Add	IAPT Inspection	0.2 hr		
0580398*	Winter Grille Cover Installation	0.2 hr		
Add	Oil Change	0.3 hr		
4088298*	Removal of Condensation from Turbocharger Wastegate Regulator Solenoid Valve and Install Thermal Wrap	0.3 hr		
2888358*	Engine Control Module Re- programming with SPS for Encore/Trax	0.3 hr		
*This is a unique Labor Operation for bulletin use only.				
 Important: To avoid warranty transaction rejections, carefully read and follow the instructions below: The Warranty Claim Code must be accurately entered in the "SPS Warranty Claim Code" field of the transaction. 				

 When more than one Warranty Claim Code is generated for a programming event, it is required to document all Warranty Claim Codes in the "Correction" field on the job card. Dealers must also enter one of the codes in the "SPS Warranty Claim Code" field of the transaction, otherwise the transaction will reject. It is best practice to enter the FINAL code provided by SPS/SPS2.

Warranty Claim Code Information Retrieval

If the SPS Warranty Claim Code was not recorded on the Job Card, the code can be retrieved in the SPS system as follows:

- 1. Open TLC/TIS on the computer used to program the vehicle.
- 2. Select and start SPS/SPS2.
- 3. Select Settings.
- 4. Select the Warranty Claim Code tab.

The VIN, Warranty Claim Code and Date/Time will be listed on a roster of recent programming events. If the code is retrievable, dealers should resubmit the transaction making sure to include the code in the SPS Warranty Claim Code field.

Version	12
	Revised August 14, 2017 – Added engine RPO to Subject.
	Revised April 12, 2018 – Updated to 2018 model year and added breakpoint and IAPT information.
	Revised February 01, 2019 – Added the 2019 Model Year, an Important statement at beginning of bulletin, Grille Winter Cover Installation procedure and parts information, changed Intake Air Pressure and Temperature Sensor Inspection title to Turbocharger Air Pressure Sensor Inspection and updated Warranty Information.
	Revised April 09, 2019 – Added 2019 to the Model Years for the charge air cooler in the Parts Information.
	Revised February 12, 2021 – Added the 2020-2021 Model Years to Encore, added the Trax Model, removed the breakpoint date and updated the Model Years in Parts Information table.
Modified	Revised August 05, 2021 – Added the 2022 Model Year, TVC information to the Correction section, Important statement to refer to PIP5812A under Turbocharger Wastegate Regulator Solenoid Valve Inspection section and Emission Warranty coverage statement to Warranty Information.
mounicu	Revised December 20, 2021 – Added a Note and Important in the Correction section, an Engine Control Module Programming section and ECM Programming Warranty Information.
	Revised January 14, 2022 – Updated information referencing PIP5812C in Correction section, updated the Warranty coverage Important statement and changed ECM Reprogramming to Bulletin Only Labor Operation.
	Revised May 27, 2022 – Removed PIP5812C information, added Information to Correction section, added first Important statement under Correction, added Turbocharger Wastegate Regulator Solenoid Valve (TCV) Thermo-Wrap section, added Thermal Wrap Part Number to Parts Information and Added TCV and Wrap Installation Labor Operation.
	Revised August 11, 2022 – Added a graphic to Step 3 under Turbocharger Wastegate Regulator Solenoid Valve (TCV) Thermo-Wrap section and a Note under Warranty Information.
	Revised September 28, 2022 – Replaced P0236 with P0234 and updated the Correction section information.

