TECH TIPS

Subaru Service and Technical Support Line Newsletter



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SUBARU TECHLINE HOLIDAYS & HOURS OF OPERATION

Memorial Day: (Closed) Monday, May 25, 2020 Independence Day: (Closed) Friday, July 3, 2020 Labor Day: (Closed)

Monday, September 7, 2020

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01 QMR of the Month

We are pleased to announce this month's Winner of QMR of the Month:

John Cote from Bill Kolb Jr. Subaru in Orangeburg, NY

This month's winning QMR described the diagnosis and repair of a 2020 Legacy with EVAP system DTCs P24BA and P1449. The vehicle had already had the ELCM / Canister assembly replaced during a prior visit for the same DTCs. While monitoring the PIDs for atmospheric, barometric and EVAP system pressures, John noticed the atmospheric pressure was fluctuating significantly after putting the vehicle on a lift and while opening and closing the doors. John was also able to initiate a pressure change when hitting different interior trim panels with his hand. Although wiggle testing the harness connectors starting at the ELCM and working his way forward produced no fluctuations, tapping on the harness or other places on the vehicle would initiate a change in the atmospheric pressure value he was monitoring. Further wiring harness checks led John to inspect the B42 connector behind the interior fuse box. There, he found the red wire in pin #18 with the lock tab missing resulting in a poor connection to the atmospheric pressure sensor and isolated the root cause of the DTC. After replacing the bulkhead wiring harness, all the previously monitored EVAP pressure values were now stabilized. John cleared the memory and after drive cycle testing, confirmed the successful repair with no further CEL illumination. His detailed report included detailed results of the testing performed along with a photo of the wiring diagram showing the location of the failed connector.

In appreciation for going the extra mile and sharing his experience with us, John will be receiving the following from his Field Service Engineer.

A \$500.00 Snap-On gift card.

Continued on the next page

CAUTION: VEHICLE SERVICING PERFORMED BY UNTRAINED PERSONS COULD RESULT IN SERIOUS INJURY TO THOSE PERSONS OR TO OTHERS.

The Subaru TechTIPS newsletter is intended for use by professional Technicians ONLY. Articles are written to inform those Technicians of conditions that may occur in some vehicles, or to provide information that could assist in the proper servicing of the vehicle. Properly trained Technicians have the equipment, tools, safety instructions, and know-how to do the job correctly and safely. If a condition is described, DO NOT assume that your vehicle has or will have that condition. Impreza, Legacy, Justy, Loyale, Outback, Forester, Subaru SVX, WRX, WRX STI, Baja, Tribeca, BRZ, XV Crosstrek, Ascent, Crosstrek Hybrid and "Quality Driven" are Registered Trademarks. SUBARU OF AMERICA, INC. IS ISO 14001 COMPLIANT

ISO 14001 is the international standard for excellence in Environmental Management Systems. Please recycle or dispose of automotive products in a manner that is friendly to our environment and in accordance with all local, state and federal laws and regulations.



QUALITY DRIVEN® SERVICE

We Support

01 QMR of the Month (continued)

The other Regional winners selected from QMRs submitted during January 2020 were:

- Daniel Graas-Hernandez from Premier Subaru of Freemont in Freemont, CA
- Rodney Albert from Secor Subaru in New London, CT
- Chris Walker from Williams Subaru in Charlotte, NC
- Henry Steingisser from Subaru of Little Rock in Little Rock, AR

Any Subaru Technician can participate in the QMR of the Month program. See the February 2013 and January 2016 issues of Tech TIPS for full details. You just might see your name and photo in a future issue of Tech TIPS!

01

QMR of the Month Award Presentation

As part of our "enhanced" QMR of the Month recognition program, we will include a photo (whenever available) of the recipient's award presentation in TIPS. The winner selected from QMR of the Month submissions received during January 2020 was John Cote, a Technician and shop foreman from Bill Kolb Subaru in Orangeburg, NY.



John is shown above after being presented with his \$500.00 Snap-On Gift Card by Subaru Distributors Corporation Field Service Engineer Jim Colamarino to his right. Pictured here (left to right) are: Bill Kolb Jr. Subaru's Assistant Fixed Operations Director Jessica Rolon, Jim Colamarino, January's winning Technician / Shop Foreman John Cote and Fixed Operations Director, Joe Minns, Congratulations and THANK YOU to our January 2020 QMR of the Month Award recipient!

March 2020 TechTIPS



01

The SOA Technical Training Department is pleased to announce we have officially begun the Technician selection process for the 2020 U.S. National Technician Competition. The purpose of the competition will be to select the Technician

who will best represent Subaru of America, Inc. in Japan for the 2021 Subaru World Technical Competition.

The goal of the competition is to create a competitive environment that motivates Technicians to increase their knowledge and skill levels. Ultimately, everyone benefits from this experience. Technicians increase their confidence and skill levels and retailers benefit from improved customer satisfaction.

The first part of the selection process is a Pre-Selection test that will be administered through SKILS. Technicians participating in the test will be given 1 hour to complete and submit 40 questions. Only Specialist, Master and Senior-Master Technicians are eligible for this Pre-Selection test. When the test is made available in SKILS, eligible Technicians (with a valid email in their profile) will automatically receive an email notification stating the test has been assigned. **NOTE:** No action is needed to register for the test. Technicians not automatically enrolled are not eligible. The Pre-Selection test will only be open for two weeks beginning March 18th.

Technicians should consider the following before attempting the test:

- 1. If you have previously competed in the U.S. National Technician Competition you are not eligible to compete again.
- 2. You must obtain permission and support from your retailer to compete in both the Subaru World Technical Competition and the U.S. National Technician Competition. Please speak with your retailer's management team to discuss this.
- 3. You must be willing and able to travel to Japan to compete in the Subaru World Technical Competition. Travel restrictions may apply. Please visit these websites for further details:
 - a. <u>https://travel.state.gov/content/travel/en/international-travel/International-Travel-Country-Information-Pages/Japan.html</u>
 - b. http://www.immi-moj.go.jp/english/hourei/index.html
 - c. <u>http://www.immi-moj.go.jp/english/newimmiact/pdf/RefugeeRecognitionAct01.pdf</u> (Specifically, Page 4, Section 2, Article 5 (1) (iv) – at the bottom of page 4)
- 4. You must currently possess or be able to obtain a valid Passport in advance of the 2021 Subaru World Technical Competition in Japan.
- 5. You must plan to remain employed with your current retailer at the time of the 2021 Subaru World Technical Competition.

Technicians will have one opportunity to complete the test. Technicians should not begin until they are ready. We recommend the Technician is in a comfortable location with a stable internet connection and free of distractions. If for some reason the internet connection is lost during the test, the session and test will end. After the two-week testing period ends, the top 10% of scorers will be presented to Zone Directors along with ASE, FRFT and QMR information to be considered for selection as Zone Champion.

Subaru of America is proud to host this event and honored to provide recognition for the dedication, talent and professionalism found in all Subaru Technicians.

02 P0507 After Engine Service, Abnormal Idle Speed

When servicing the 2.0L turbocharged, direct-injected engine, a common mistake made by Technicians will result in an abnormal idle and may set DTC P0507 Idle control system RPM – higher than expected. When removing the timing chain cover there are two vacuum hoses that run parallel to each other and transition to a metal pipe then back to rubber hoses before connecting to the turbocharger air inlet and air bypass valve.



These hoses come from canister purge control solenoid #2 and the intake manifold. When the hose intended for CPC 2 is connected from the turbocharger air inlet to the intake manifold it causes an internal vacuum leak. Normally, this hose would be sealed from the turbocharger air inlet by the CPC 2 solenoid valve.



When the air bypass valve hose is connected to the CPC 2 solenoid the air bypass valve will not operate. The best way to avoid these costly mistakes is to mark the hoses or take photos before removal.

02 Rough Idle with AVCS DTCs

When diagnosing AVCS DTCs P0014, P0024, P000B, P000D or P0017, P0019 there is a possibility of a rough idle with the check engine light illuminated. The rough idle is due to false learning caused by a high deviation from the VVT exhaust retard angle at idle. If the VVT angle is excessively deviated from the target angle the learning will be affected and may cause a rough idle. The diagnostic method for this condition is as follows:

- **1.** Check all DTCs and record all ECM PIDs while idling and driving with the engine at operating temperature.
- 2. Clear the ECM memory.
- 3. Record another ECM data file with all PIDs selected.
- 4. Confirm the rough idle is no longer happening after clearing the ECM memory.
- 5. Refer to the appropriate trouble tree if the rough idle is gone.



Affected vehicles:

2017MY+ Impreza 2018MY+ Crosstrek 2019MY+ Ascent 2019MY+ Forester 2020MY+ Legacy and Outback

07 Flashing Lights on Rain Sensor Equipped Vehicles

Technicians have reported after installing a BIU or Rain Sensor, the vehicles parking lights will flash when the key is in the on position. This is due to the Rain Sensor not being initialized. This initialization is memorized in the BIU. Since many states have laws requiring headlights to be on when driving through rain, the Rain Sensor communicates this to the BIU for the Automatic Light and Wiper and Wiper Link. Since this initialization is unknown, the vehicle will react in a light cycling fashion. Simply reinitialize the rain sensor to resolve the concern.

Body & Electrical/WIRING SYSTEM -> Glass/Windows/Mirrors -> Rain Sensor -> Inspection

07 Heated Seat Operation

Techline has received several calls regarding heated seat operation. When diagnosing a concern, be sure to gather as much detail from the customer as possible. This should include if the seat had been sitting in direct sunlight for an extended period of time and temperatures the customer is operating the seat. **NOTE:** Due to the seat material, leather vs. cloth, seats will heat and cool at faster rates. A collection of previous TIPS articles for heated seat operation is provided below. **NOTE**: 2015MY+ Legacy & Outback and & 2019MY+ Ascent are all capable of monitoring heated seat operation through PIDS in the SSM. Always refer to STIS for the proper inspection procedure.

FEATURED NOVEMBER 2013 ON PAGE 3

2014 FORESTER SEAT HEATER OPERATION AND SWITCH FUNCTIONS

Subaru vehicles 2013MY and prior equipped with seat heaters generally have an operating range of 86 degrees F to 104 degrees F. See the March, 2003 issue of TechTIPS for information on older style seat heaters. The 2014 Forester seat heaters have a different operating range. The 2014 Forester seat heaters come on at 98.6 degrees F. and shut down at 109.4 Degrees F. Depending upon conditions such as interior cabin temperature, seat fabric and thickness, these temperature ranges are target ranges and may feel or read slightly different when checked by a technician.

The system uses seven (7) contact points on the seat cushion and four (4) contact points on the seat back to keep the system within this operating range by utilizing two thermostats located within the seat elements. They are positioned so the customer cannot feel them when seated. See the attached illustration below for thermostat locations. The switch functions are not a high and low type system like those used in previous models. When the seat heater switch is put in the high position, the elements heat up and into the operating range as fast as possible. When the switch is placed in the low position, the same amount of heat is generated but at a slower rate to reach maximum temperature. Once the maximum temperature is reached, the elements shut off until they cool below operating range then cycle back on again. The switch stays illuminated whenever the system is in use.

07 Heated Seat Operation (Continued)

2014 FORESTER SEAT HEATER OPERATION AND SWITCH FUNCTIONS (Continued)



Switch testing can be performed as follows:

Inspect for continuity between the seat heater switch terminals.

Connector & Terminal

| HI | LOW | | |
|-------------|-------------|--|--|
| No 4- No 5 | No 4 – No 5 | | |
| No 4 – No 3 | No 4 – No 6 | | |
| No 4 – No 6 | | | |

If no continuity exists, replace the seat heater switch with a new part.

For other models equipped with seat heaters, use the appropriate Service Manual for diagnostics as there are differences between systems and testing procedures differ between model years.



FEATURED DECEMBER 2018 ON PAGE 5

2 2015MY LEGACY / OUTBACK SEAT HEATER OPERATION OVERVIEW

The front seat heater system used in the 2015MY Legacy / Outback is a new design compared to prior systems. It utilizes a thermistor sensor which allows the front seats to remain at warmer temperatures more consistently than the prior system. The new system is very different due to the change in sensors. The seat heater system on 2014MY and prior Legacy / Outback is a thermostat sensor-based system which makes the front seats heat up periodically and then cool down until the sensor indicates a need to turn the element on again. When this sensor-based system is operating, the temperature increases until the sensor determines the heating element has reached approximately 50 degrees C (roughly 122 degrees F). At that point, the element is switched off until the sensor reads approximately 40 degrees C (104 degrees F). At that temperature reading, the element is turned back on again to re-heat the seat resulting in an approximate 18-degree range. This cycle continues as long as the seat heater switch is on in either the low or high position.

In comparison, the thermistor sensor used in the new system also cycles on and off but, the operating range (temperature difference) is much smaller with a slightly lower upper limit temperature. The new system turns on the element until the thermistor sensor determines approximately 38 degrees C (roughly 100 degrees F) then cycles the element off until the temperature (at the thermister) reaches approximately 37 degrees C (roughly 98 degrees F) before the element cycles on again, yielding only an approximate 2-degree range. As you can see, the upper and lower temperature range on the new system is significantly reduced. However, this is an apples and oranges comparison as the actual seat temperature felt is very similar. As you can see on the chart below, the average surface temperature of the front seat for each system ends up being very close. The RED line on the graph shows the temperature on front seat surface of the new 2015MY Legacy / Outback while the GREEN line represents the previous model year. You can see the fluctuations of the previous system have been virtually eliminated and the temperature stability enhancement the new system provides.

12 2015MY LEGACY / OUTBACK SEAT HEATER OPERATION OVERVIEW (Continued) Average Seat Surface Temperatures University of the seat of the s

There are three levels of front seat heating available for 2015MY Legacy and Outback, HIGH (1), MID (2) and LOW (3). The difference among these modes is an upper limit temperature change of about 2 to 4 degrees C. Similar to the older system the speed at which the seat actually heats up varies with the level settings. The high setting will heat the seat the quickest, mid will increase the temperature more gradually and low will increase it at the slowest rate.

In contrast, the rear seat heater system used on 2015MY Legacy / Outback is a similar design as the previous model year but, the cycle and surface temperatures for those seats are lower than the front seats on previous model by a few degrees C.

Another operational difference between the old and new seat heater systems is how each functions in higher ambient temperatures conditions. Naturally, ambient temperatures which are at or above the upper limit of either system's sensor function may keep the seat heater from operating. Simply stated, if the ambient temperature inside the car is higher than the upper cycle limit for that sensor, the system will not allow the element to heat. This is not a malfunction; the seat heater system is operating as designed.

Should you receive a customer concern stating their seat heaters do not work, start your diagnosis by first confirming the conditions under which the system was reported to be inoperative. If the ambient temperatures were close to or higher than the seat heater sensor's upper limit (remember, inside vehicle temperatures will be higher than outside ambient temperature in most cases), the concern may be a normal operating characteristic of the system. If this is not the case, diagnose the system using the applicable Service Manual. On the 2015 Legacy and Outback, temperatures of the thermistor sensor can be viewed using the SSMIII as shown in the screen shot below.

This data may be used to check if the sensor is functioning correctly or not. **NOTE:** Temperatures shown on SSMIII are not the actual temperatures felt on the seat surface. Actual seat surface temperatures will be higher than those shown for the thermistor sensor on the SSMIII data.

| | 1 | | | | |
|--|--------|------|---------|---------|---------|
| Item | Value | Unit | Maximum | Minimum | Average |
| ☑ In-vehicle Sensor Temperature | 89.47 | *F | 89.64 | 89.04 | 89.44 |
| A/C Pressure Sensor | 0.98 | MPa | 1.02 | 0.95 | 0.98 |
| Seat Heater operation steps(Driver's) | 3 | | 3 | 3 | 3 |
| Seat Heater operation steps(Passenger's) | 3 | | 3 | 3 | 3 |
| ☑ Seat Heater Temp.(Driver's) | 102.24 | °F | 103.24 | 98.56 | 101.03 |
| ☑ Seat Heater Temp.(Passenger's) | 103.05 | ۴F | 103.05 | 98.56 | 101.26 |
| | | | | | |

12 Ascent Wind Rushing Noise

The Techline has received a few calls with customer concerns of a wind rushing noise while driving at speed. In some cases, this noise will fluctuate when the HVAC mode is changed from recirc to fresh air. During the Technician's diagnosis, the cowl area should be inspected. There have been isolated cases where some of the body plugs were missing or not installed.



Remember to check the upper part of the cowl under the windshield. These plugs are smaller and can easily be overlooked. There are four located on this model and examples are found below.



Continued on the next page

12 Ascent Wind Rushing Noise (Continued)



Technicians can refer to the **Body & Electrical/WIRING SYSTEM** -> **Body Structure** -> **Plug/ Grommet Sheet** section for proper plug / grommet location and types. In all cases where any are found missing, a QMR should be submitted.

15 Remote Engine Start (RES) Run Time

The Techline often receives inquiries regarding the time-out function of the Remote Engine Start (RES) system. When utilizing the RES feature, the system will automatically shut the engine off after 15 minutes of initial run time. 15 minutes is the default setting but, instructions are supplied with the system to customize this setting and allow owners to stay compliant with their specific state and local laws. Using the default 15-minute parameter, if the vehicle is restarted using the RES without the system seeing an ignition "ON" signal (from the vehicle's mechanical or "smart" key) to "reset" it, the engine will only run for an additional 5 minutes for a 20-minute maximum total run-time. The 20-minute total run-time is fixed (not adjustable), regardless of what the initial time-out setting is. For example, if the initial setting is changed from the default 15 minutes to 5 minutes, the RES can be used to start the car 4 times (20 minutes total) without the system seeing an ignition "ON" signal to reset (see TechTIPS edition February 2017.) It is also important to note, the audio head unit (H/U) will stay powered up for an additional 3 minutes after the ignition is switched off UNLESS there is an active Bluetooth phone call in process. In that case, the additional 3 minutes of H/U on-time will be extended to a maximum of 10 minutes after the ignition is switched off.

Starting with the 2015 Legacy/Outback Remote Engine Start systems there is now an optional Selectable Run Time option. This information is in the *Remote Start Quick Reference Guide*. It also can be found in the OIK or on STIS > Owner's Manual and TechTIPS edition March 2015. There is also a Trouble Shooting Guide for this system on STIS under Online Reference tab, Publication Type "Troubleshooting Guides". Before determining any RES issues, verify the Run Time has not been changed from the factory default setting of 15 minutes.

The remote engine start module is equipped with a diagnostic mode to help Technicians with troubleshooting abnormal shut down conditions. The diagnostic mode saves the last abnormal shut down in memory. This is particularly helpful in determining a past failure when the system may not be currently exhibiting the observed failure mode. Normal shutdowns will not be included in the diagnostic table. Normal shutdowns include run time expiration, shut down or failure to start when the vehicle door is opened, shut down via RES transmitter and failure to start when the service mode is active.

See chart below for details on how to access these two modes:

NOTE: The difference between these modes is the amount of key cycles "on and off." RES runtime mode is 4 cycles; RES Diagnostic mode is 6 cycles.

Remote Engine Start Run Time Selection

The system is preprogrammed to run for fifteen (15) minutes before automatically stopping. The programmed run period can be changed to alternate times using the following procedure.

- 1. Enter the vehicle and close all vehicle doors, trunk or rear gate.
- 2. Verify that the transmission shifter is in the "park" position.
- Turn the ignition to the "on" position and leave on for approximately 2 seconds then "off", "on" then "off", "on" then "off", then back "on" and leave on throughout the programming process. (Four ignition key cycles ending in "on", total duration from point of first ignition "on" cycle must not exceed eight (8) seconds).
- 4. The system will honk the horn the number of times corresponding to the current run time setting.
- 5. Open and close the driver's door to advance to the next run time setting. The system will honk the horn the number of times corresponding to the new run time setting.
- 6. Run time selection mode will exit via turning the ignition key off or thirty (30) seconds of inactivity. Upon exit the current run time selection will be stored.

Remote Engine Start Diagnostic Mode

Accessing diagnostic mode:

- 1. Enter the vehicle and close all vehicle doors, trunk or rear gate.
- 2. Verify that the transmission shifter is in the "park" position.
- 3. Turn the ignition to the "on" and leave on for approximately 2 seconds then "off", "on" then "off", then back "on" and leave on throughout the programming process. (Six ignition key cycles ending in "on", total duration from point of second ignition "on" cycle must not exceed eight (8) seconds)

Refer to the appropriate troubleshooting guide for the horn honk diagnostic table for honk definitions.

WUM-98 Supplier and Date Codes

NOTE: This information applies ONLY to vehicles within the range of the WUM campaign. Similar lot numbers may be found on vehicles outside the range, but those do not require replacement.

When performing the Occupant Detection Wiring Harness Inspection campaign many technicians are unclear if they should replace the harness, or just inspect. All harnesses that qualify for replacement will have the supplier code "6578." If the supplier code is 6577, 2239, or 0444, the harness does not require replacement; submit the claim for inspection only. Additionally, if the date code is greater than "18074" the harness does not qualify for replacement and the inspection only claim should be submitted. All affected harnesses will have the supplier code "6578" <u>AND</u> A DATE CODE LOWER THAN "18074.

| Horn Honks | Run Time |
|------------|---|
| 1 | Three (3) Minutes |
| 2 | Five (5) Minutes |
| 3 | Ten (10) Minutes |
| 4 | Fifteen (15) Minutes (Default Setting) |

00 STIS new releases

| ITEM CODE | ITEM TYPE | TITLE | CREATED DATE |
|-----------------------|----------------------------------|--------------------------------|-----------------|
| 07-75-13R | Technical Service Bulletin | DTC P0606 after Vehicle Batter | 10-Mar-20 |
| 15-261-20 | Technical Service Bulletin | Reprogramming File Availabilit | 10-Mar-20 |
| TIPS_NTC_SE_ Mar20 | TechTIPS NewsLetter | 2020 TechTIPS National Technic | 9-Mar-20 |
| 07-171-20 | Technical Service Bulletin | Battery Sensor Removal and Ins | 6-Mar-20 |
| WUT-05R | Subaru Product/Campaign Bulletin | Forester Rear Coil Springs | 6-Mar-20 |
| WRA-20R | Subaru Product/Campaign Bulletin | Rear Seat Belt Webbing Locking | 5-Mar-20 |
| TIPS_QMR_SE_ Feb20 | TechTIPS NewsLetter | 2020 TechTIPS QMR Special Edit | 5-Mar-20 |
| 12-279-20R | Technical Service Bulletin | Outer Door Handles- Chrome Fin | 4-Mar-20 |
| 03-84-20 | Technical Service Bulletin | Rear Differential Side Gear- D | 4-Mar-20 |
| 18-199-20 | Service Manual Correction | Service Manual Corrections | 4-Mar-20 |
| 18-198-20 | Service Manual Correction | Service Manual Corrections | 3-Mar-20 |
| WUM-98R | Subaru Product/Campaign Bulletin | Occupant Detection Wiring Harn | 2-Mar-20 |
| 15-205-16R | Technical Service Bulletin | Reprogramming File Availabilit | 27-Feb-20 |
| MSA5M2007A | Owner Manual | 2020MY Crosstrek Owner's Manua | 27-Feb-20 |
| MSA5M2001A | Owner Manual | 2020MY Impreza Owner's Manual | 27-Feb-20 |
| MSA5M2035B | Owner Manual | 2020 WRX/STI Owner's Manual | 27-Feb-20 |
| 11-200-20R | Technical Service Bulletin | Reprogramming File Availabilit | 27-Feb-20 |

All revised publications are highlighted in yellow.

*** Now you can e-mail your TechTIPS input and suggestions to: tech@subaru.com ***

| This is your chance to offer suggestions for use in future issues of TechTIPS! Make sure that if you e-mail us, you place in the subject line of your e-mail "For TechTIPS Newslet-ter". Thank you! |
|---|
| Model: |
| Year: |
| VIN: |
| Description of situation encountered: |
| |
| Your suggestion for repair procedure, product improvements, etc.: |
| |
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Monday – Thursday 8:30 am to 7:30 pm Friday 10:30 am to 5 pm and Saturday 9 am to 3 pm