

Flat Towing My CMax

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Foreword

This is a living document for RV'er. Started as an information collection I gathered while preparing our 2014 Ford Energi CMax (aka; CMAX, C-Max, C-MAX) for flat towing with an RV. It is not a standalone paper as the reader will find addition papers on our web site and numerous links to other sources.

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Flat Towing my CMAX - Fact or fiction?

Prior to our CMAX Energi purchase in Oct 2014, I searched the web and spoke to other CMAX owners about flat-towing behind RVs. I learned much about the pre-towing procedure and dead batteries. Perhaps the best conclusion I could come to was there was inconsistent preparation procedures. Was this due to model year differences, and/or Hybrid vs Energi difference? I don't know. Our 2014 CMAX, is a keyless Energi with a push start/stop button. This paper presents what I have concluded for this car, along with my [project paper](#) about installing a RoadMaster Baseplate and a SMI Air Force One brake system.

In my best Don Quixote charge, I wanted to know the "impossible answers" by climbing large mountains of internet forum postings, talking to our dealer service department, and to boldly scale the Ford Customer Service phone-tree barriers, to talk to the engineering genius with pocket protectors and slide rulers...Too much??

A funny thing happened on the way. My donkey died. There is much information, much of it very similar, but each with its own twists and turns arriving at different conclusions. As an example: The Ford Support folks at the 800-392-3673 told me they do not have access to engineering information or technical support, nor a customer information escalation process. They kindly told me I have to obtain technical support from my dealer. In speaking to our dealer service department where we purchased the car, he used information from the Ford CMax owners' forum to address my difficult questions. Unfortunately, as much as he wanted and tried to help, I could only point out that the information he was reading was posted by other CMax owners.

For example, on the CMax forum, there is a very good posting summarizing the pre-flat towing procedure. It starts with the need to run the engine for 5 minutes, shifting into R, L, D & N. Five minutes. Really? Must be for a different model. Some of the postings provide year and model information and some don't.

Here are the instructions on page 183 in the manual that came with our car:

“Recreational Towing

*Note: Put your climate control system in recirculated air mode to prevent exhaust fumes from entering the vehicle. See **Climate Control** (page 105).*

Follow these guidelines if you have a need for recreational (RV) towing. An example of recreational towing would be towing your vehicle behind a motorhome. We designed these guidelines to prevent damage to your transmission.

You can tow your vehicle with all four wheels on the ground or with the front wheels off the ground by using a tow dolly. If you are using a tow dolly follow the instructions specified by the equipment provider.

If you tow your vehicle with all four wheels on the ground:

- *Tow only in the forward direction.*
- *Release the parking brake.*
- *Place the transmission in position **N**.*
- *Place the ignition in the off position. See **Starting and Stopping the Engine** (page 124).*
- *Do not exceed 70 mph (113 km/h).*
- *Place the transmission in position **P**, start the vehicle and allow it to run for one minute at the beginning of each day (you may need to press the accelerator pedal in order to start the vehicle). After allowing the vehicle to run, place the transmission back into position **N** and ignition in the **accessory position**.”*

ICE Defined

Before we move on, I want to introduce a new term, “ICE”. It stands for Internal Combustion Engine. I can start my CMax, (start the vehicle), but this does not mean the ICE is running. In order to start the CMax Energi ICE, after “starting the car” with the star/stop button, one must press the gas pedal to the floor.

By default (Ford design) I can start my car and drive around for 20 miles or so without the ICE. Now go back to the CMax procedure for flat-towing preparation. Where they say “start the vehicle and allow it to run...” The ICE is implied, I assume. You will find this common, three letter acronym frequently used on web forums without explanation.

Starting the engine/ICE is easy; keeping it running is a different matter. Do I really only run the engine for one minute per the owners' manual? So, my first questions to Ford Customer Service when I called were how long do I run the engine and how to keep the engine running that long? At first, there seemed to be confusion. I felt

like they were thinking this is a really stupid question. Or as they tried to figure out how to ask me politely, "if I knew a car engine just runs on its own after you start it, until you turn the key off." And yes, I told them it was an Energi and even provided the VIN.

Elsewhere (not in the CMax owner's manual) I had read to turn-on your air conditioning to high, plus the rear defroster. Steps the customer rep also repeated to me. She further told me to turn on all electrical loads so as to force the engine to continue running. I don't remember how long I was told to operate the engine, but I know it was for more than a few minutes as I could not keep it running for more than about a minute prior to my call to Ford support.

I asked the Support rep "Do I shift into all gears or just N?" She answered by reading the page 183 instructions from the top again.

In my mind, the owner's manual instructions are poorly written. The first sentences are supporting information for when actually towing. They are presented before the all-encompassing important flat-towing preparation step at the end. "Hello! Why do I release the parking brake before placing the transmission in N? Won't the car roll away?" I believe this section of the manual should be reversed, or the concerns for releasing the parking brake and ensuring the transmission is in N should be warnings before towing, after the car is hitched up where it will not roll.

Towards the end of our phone call, I requested a written reference. I was told they cannot originate an email. She then told me that I could use the Ford contact us by email link at owner.ford.com to start a new conversation in which they would reply back via email, thus providing a written set of instructions.

So, I sent Ford Support an email referencing the case number of my phone call, and I received a very prompt email with the following instructions (names and courtesies have been removed):

"Our records indicate that you contacted the Ford Customer Relationship Center on 2/24/2015, and our Customer Care Representative advised you to prep the transmission for recreational towing. The vehicle has to be "out" of EV-mode, and they should create a large electrical load, generally the rear defroster and climate control (a/c on & blower on "high") should work. Set press brake pedal and start vehicle with foot on brake, shift vehicle into neutral, then press the stop button and this puts vehicle into accessory mode. This applies to any vehicle with push button start that needs to be placed in Accessory Mode. If you follow this procedure then vehicle won't accrue miles on it nor will it go dead after towing. The vehicle cannot go into accessory mode if it is not in neutral."

For the most part, these instructions are the same as the last step in my owners' manual. I did find the statement that the "vehicle won't accrue miles on it nor will it go dead after towing" enlightening. Hello Ford, are you talking to your customers and replacing batteries for a different reason? I believe the statement that you can only enter accessory mode when in neutral is incorrect. What if I want to listen to the radio when parked?

I digress here to tell you that you can play your radio without having the key blob in the car by just pressing the console on/off button. This also turns on the full display for navigation, radio, phone and environmental systems. It stays on for 10 to 15 minutes, and then shuts off to save the battery. So you press it again to listen longer. The automatic off is a great battery saver.



Anyway, back to the support call. As I am finishing up I also ask Ford Support about a web posting that stated the external transmission ATF pump and the brake vacuum assist pump on the Energi operate while flat towing in accessory mode. This is how the pumps operate when driving on electrics without the ICE running. The Ford support rep advised neither pump operates in the accessory mode.

After the support call, I confirmed this information by testing my brakes on a small hill while in accessory mode. I found I could barely stop the car after applying the brakes a third time, confirming the brake vacuum assist pump does **not** operate in accessory mode. This bit of information makes me wonder if my newly installed SMI Air Force One can stop the CMax when towing? (For more information regarding my toad preparation including the SMI brake system, see my project paper at <http://www.mangles.net/fun/projects/2014-Phaeton/docs/MyCMaxToadBrakes.pdf>)

Accessory Mode

I found the owner's manual lacks the information needed for enabling accessory mode. I believe Ford assumes you already know how, and only makes references to using accessory mode in the manual. I also combed the internet and Ford's online CMAX FAQ video help. I found the procedures posted by other owners on the Ford CMax forum. They are simple. You enable accessory mode by pushing the Start/Stop button once without your foot on the brake. You turn off accessory power by repeating the process. If you press the brake pedal while doing this, you will either "start the car". So, remember, do not push the brake pedal when using accessory mode.

Dead Battery

There is an old Chevy owners' saying about FORDs. F.O.R.D. stands for Found On Road Dead...

While researching CMax flat-towing I read numerous stories in which the car battery went dead in a matter of hours. I also found several web posts discussing dead CMax batteries in 2013 and 2014 models that were not flat-towed. Ford has a problem. I do not know why this occurs, nor will I speculate on potential causes. What I care about is reducing the likelihood this will occur and minimizing the hassle factor if it does. Towards that objective I offer the following information: (Also see July 2017 note – See TSB 14-0173 on page 8)

Proactive Solutions

Battery Charge Lines – In my [CMax project paper](#) I wrote about extending a charge line from the RV to the toad. This is a common solution used by RV owners for years. There are various ways to add a charge line with relays, diodes and some good wiring with an inline fuse. I chose to use a [BrakeBuddy](#) 39332 Towed Vehicle Battery Maintainer. The BrakeBuddy is available on their web site for \$25 and [Amazon](#) for \$22. Read the Amazon reviews.

Fuse removal - I have seen various web postings in which the car owners remove a fuse. The Ford CMax forum also includes postings from a few owners trying this. This technique is common in many toads such as GM and Hondas. Some owners have simplified this solution by installing a battery cut-off switch. I will not try this because I wish to avoid potential warranty issues. Additionally, many of the toad braking units installed or placed in the car require a constant 12 volt power source to operate.

Reactive Approaches

Battery Jumper Cables – Heavy gauge wires that allow you to start one car from another. They are lightweight and never need recharging. The downside is you need a nearby, reachable battery, typically in another car or your RV. One must be mindful of correct polarity and potential for sparks that could lead to a fire or worst. You must be able to position the two vehicles in close proximity for the jumper cables to reach.

Portable Car Jump Starters - While I have used jumper cables for most of my 60 year life, I expect I will purchase a portable car jumper in the future. Portable car jump starters have become common. They are very affordable and portable, some weighting just a few pounds.

CMax Transmission Brake-Shift Interlock

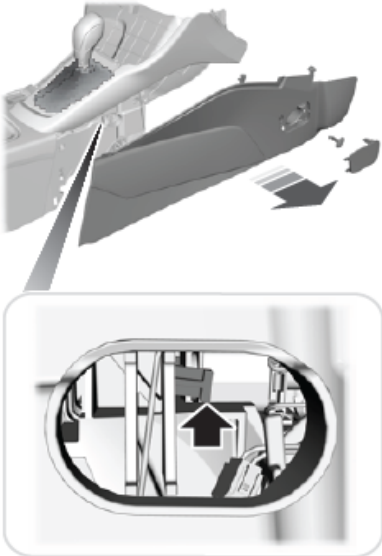
This section includes the steps to put your CMax into neutral (N) when you have a dead battery. You may need to do this so you can move your dead car. You can also use this method to place your transmission into neutral, for flat-towing, without enabling accessory mode.

Modern cars with automatic transmissions contain a brake-shift interlock that reduces accidental car movement. This interlock is the device that forces you to put your foot on the brake when shifting the transmission out of park. The brake-shift interlock does not prevent moving the shift lever into the parked position from another gear such as drive or reverse.

Some CMax owners are using this solution to avoid a dead battery while flat-towing with all electrical systems off. Please understand Ford recommends flat-towing with the ignition in the accessory power position. As previously discussed, accessory power is enabled when pressing the push to start/stop button once without pushing the brake pedal.

Use the brake shift interlock lever to move the gearshift lever from the park position in the event of an electrical malfunction or if your vehicle has a dead battery.

Apply the parking brake and turn the ignition off before performing this procedure.



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1. Remove the side panel on the right side of the gearshift lever.
2. Locate the access hole.
3. Insert the screwdriver (or similar tool) into the access hole and press the lever forward while pulling the gearshift lever out of the **P** (Park) position and into the **N** (Neutral) position.

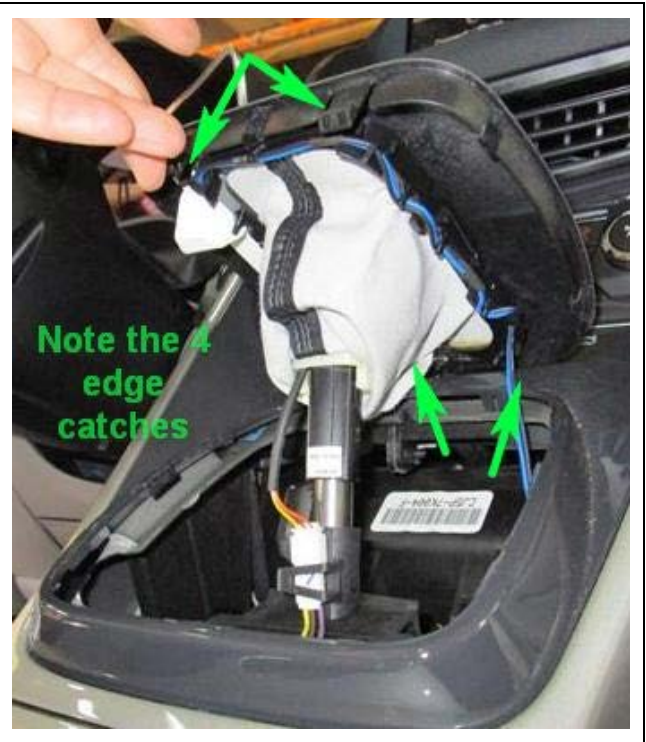
The illustration on the left is from the 2014 CMax owner's manual. It depicts the steps needed to take the transmission out of the parked position during an electrical failure. In reviewing the drawing and trying this procedure in my garage where I had ample tools and lighting, I was not successful. There is just too much side-paneling on the center console. The illustration shows removal of a small passenger side panel section. I believe this may be in error, as the fastener on the passenger side is a single use, push-in plastic retainer. Whereas the driver's side uses a reusable screw. Unfortunately, the side-paneling on the driver's side is even more significant as it wraps under the steering column, adjacent to an air bag before extending to the rear of the center console.

In reading web postings, I learned there are various alternatives, including creative ideas such as connecting a pull string to the release lever inside the center console.

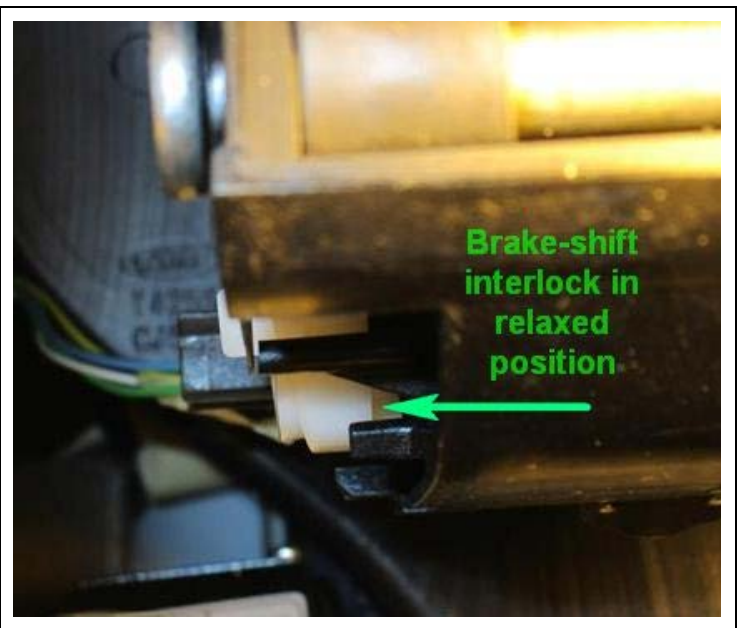
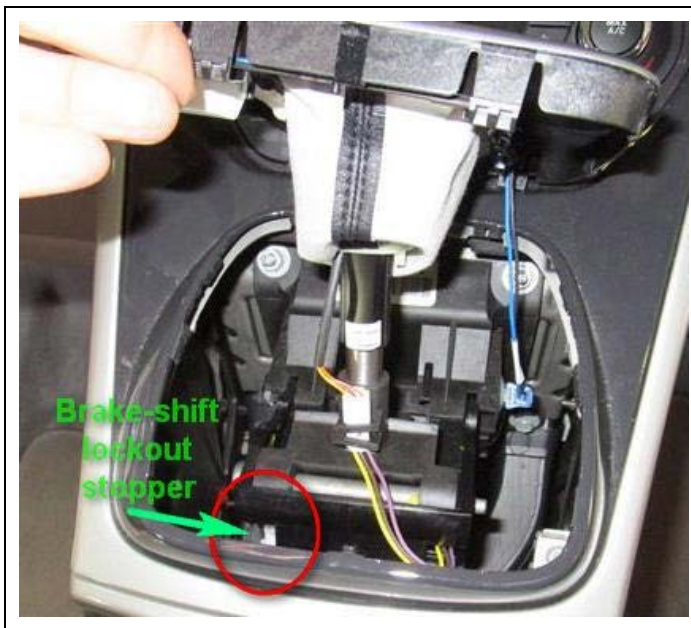
The following steps and photos show an easy method for lifting the shift tower boot to release the brake-shift interlock. Total time to release the transmission shifter is about 30 seconds.

Step 1: **Set your parking brake.** Next, unsnap/lift the shifter boot base cover. It has two catches at the top and two at the bottom. I found grasping the lower right corner and gently pulling up would release the lower right catch.

Step 2: Pull the cover up far enough to see the mechanical assembly at the base of the gear shift. Watch the wires on the right.



Step 3: Identify and locate the interlock. In my car it is a small white plastic arm located at the left rear corner of the shifter mechanical unit. This 1" tall white interlock is hinged at the top. The bottom of the interlock is in its forward, relaxed position when the brake pedal is not pushed and the car is running. **This is also the normal position with the ignition off and/or a dead battery.** This relaxed position prevents gear shifter movement out of the parked position, but does not prevent shifter movement between other gear positions and back into park.



Step 4: Blow, the left picture shows the white interlock extended when the brake pedal is pressed while the car is on. In this extended position the shifter is free to move out of the locked position in park. The picture below on the right shows me using my left hand while sitting in the driver's seat. I am using an extended forefinger to

gently pull the lower end of the interlock back about one-half inch. Doing so allows me to use my right hand to shift the car out of park and into neutral. Moving the interlock position requires no effort, so don't force it. Once the car is out of park, the boot cover snaps back into place. It's that simple.



This last picture is with the car in accessory mode after the above steps. Note the gear position indicator with the N lighted and the left display showing the "Shift to Park" message you should see before flat-towing.



June/July 2017 Update:

We have owned our CMAX for nearly three years now. We recently returned from Memphis, Tennessee, after a 11 week trip that included 5,200 RV miles towing the CMax, plus another 4,000 plus miles driving the CMax as we explored the likes of Big Bend, New Orleans, Natchez, etc., Total actual CMax miles was nearly 10,000 while the odometer clocked only the mileage driven under its own power of about 4,000.

I have spoken to many CMax owners; all like us have used a CMax toad for a rather short period of time. All have experienced a learning curve with contradictory towing information from Ford. I don't know why Ford was unable to provide a common procedure. And I am not sure the mixed information matters for placing the

ignition in accessory mode or leaving the ignition in the off position.

I have now towed with both settings and have found it makes little difference with one exception. When I tow starting with the accessory mode on, after a full day the battery mileage indicator can show upwards of a 38 mile range. While I will not rely on this excessive range indication, this tells me the CMAX regen battery charging process occurs while towing. Otherwise I have not observed any difference. Note: The Ford maximum PHEV battery range is 22 miles for the “Big Battery” and about 5 miles for the “Small Battery”. These should not be confused with the traditional 12 volt service battery.

Brake Lockup Problem

On August 30, 2017 we moved this topic to a separate document as there was so much information including links to additional documents collected while researching this issue.

Here’s the opening paragraph:

In June, 2017 I learned that a fellow C-Max Energi owner had his toad brakes lock up while flat towing. By mid-July I had found a half-dozen web postings from other C-Max owners who experienced the same thing. Luckily, none reported a toad break-away. Some reported destroyed tires; one reported a bent front frame with associated damage. The reporting owners were using various RV-to-toad braking systems, with the C-Max Energi & Hybrid.

Build Date Information

In the brake lockup discussion we learned that car build-dates can be important. Additionally, recalls and other updates may be useful to a CMax owner. The build-date is listed on the window sticker, on a label in the front of the driver’s door hinge column, and at Ford. Use the the FordEtis (Online Technical Information and Services) web site at <http://www.etis.ford.com/> to obtain this build-date, recalls and car options information by entering your VIN. The FordEtis does not require registration.

Battery Information

In talking with CMax owners I have noted some “battery” confusion that requires clarification. The Ford CMax has two batteries. A traditional 12 volt, wet cell car battery and a high voltage battery (HVB) Lithium-ion battery operating around 300 volts.

The HVB battery comes in two sizes; 1.4 kiloWatt-hours (kWh) in the hybrid, and 7.6 kWh capacity in the Energi Plug-in Hybrid. Furthermore, the Energi HV battery has two logical sections called the “small” battery and the “large” battery. The small battery is typically associated with regenerative (regen) charging that occurs when pressing the brakes when you are slowing the vehicle down. The large battery is typically associated with the plug-in feature from a 110/220 vac external source. This latter method is referred to as a Plug-in Hybrid Electric Vehicle (PHEV). As I mentioned, the HVB is one battery and the CMax software manages the battery use(s) and charging state.

As an FYI, the CMax does not have a traditional 12 vdc starter. Rather the engine is “started” by the electric motor starter-generator which runs off of the HVB. I have read the 12 volt battery powers traditional 12 volt car components and addition to a 12 volt relay that allows the HVB to start the ICE (gas engine).

Ford CMAX Forums

Ford operates two CMAX forums; one for Hybrid owners <http://fordCMaxhybridforum.com/> and another for Energi owners <http://fordCMaxenergiforum.com/>. You can read content in both without registering, but will be

unable to post comment or view attachments unless you register, which is free. Additionally you will find useful information in both forums applicable to the CMAX Energi.

TSB 14-0173 & New Flat Towing Procedure

TSB 14-0173 DISCHARGED 12-VOLT BATTERY OR SERVICE ADVANCETRAC CLUSTER MESSAGE AFTER FOUR WHEEL FLAT TOWING BEHIND RV - BUILT ON OR BEFORE 7/22/2014

This Ford service bulletin was issued to address the dead 12 Volt service battery and the service AdvanceTrac dash error message problem for 2013 and 2014 CMAXs. The TSB included a powertrain control module (PCM) and instrument panel cluster (IPC) updates.

Ford also provided a Towing procedure update that is included below. In reading the new towing procedure, take noticed that:

1. Recreation towing (flat towing) no longer requires you to shift through the gears each day during the "transmission lubrication" preparation.
2. Recreation towing no longer requires you to leave the ignition on or in the accessory on position.

TOWING THE VEHICLE ON FOUR WHEELS**Emergency Towing**

In the event your vehicle becomes disabled (without access to wheel dollies, car-hauling trailer, or flatbed transport vehicle), it can be flat-towed (all wheels on the ground, regardless of the powertrain/transmission configuration) under the following conditions:

- The vehicle is facing forward so that it is towed in a forward direction.
- The transmission is placed in position N. If the transmission gearshift lever cannot be moved to position N, it may need to be overridden. See Automatic Transmission section of Owner's Manual.
- Maximum speed is 35 mph (56 km/h).
- Maximum distance is 50 miles (80 kilometers).

Recreational Towing

Note: Put your climate control system in recirculated air mode to prevent exhaust fumes from entering the vehicle. See Climate Control section of Owner's Manual.

Follow these guidelines if you have a need for recreational (RV) towing. An example of recreational towing would be towing your vehicle behind a motorhome. We designed these guidelines to prevent damage to your transmission. You can tow your vehicle with all four wheels on the ground or with the front wheels off the ground by using a tow dolly. If you are using a tow dolly follow the instructions specified by the equipment provider.

If you tow your vehicle with all four wheels on the ground:

- Tow only in the forward direction.
- Release the parking brake.
- Do not exceed 70 mph (113 km/h).
- Place the transmission in position P, start the vehicle, and allow the engine to run for one minute at the beginning of each day (you may need to press the accelerator pedal in order to start the engine). After allowing the vehicle to run, place the transmission back into position N and the ignition in the off position.

Keyless Start

- Start vehicle: fully press the brake pedal. Press the start/stop button until the vehicle starts.
- Press the brake pedal and place the transmission in position N.
- Turn vehicle off: press the start/stop button once to turn off the vehicle. (Trip Summary will appear in left cluster screen if vehicle is off.)
- Key fob may be removed from vehicle, if desired.

Ignition Key Start

- Start vehicle: fully press the brake pedal. Turn the key to position III (see below) to start the vehicle. Release the key when the vehicle starts.
- Press the brake pedal and place the transmission in position N.
- Turn vehicle off: turn the ignition key past the Accessory position to turn the vehicle off. Key will be in between position 0 (off) and I (accessory) ignition position (see below). (Trip Summary will appear in left cluster screen if vehicle is off).



Note: the key cannot be removed from the ignition while the transmission is in N and the vehicle is shut off.

Note: a SHIFT TO PARK or TRANSMISSION NOT IN PARK message may appear in the information display when the transmission is in position N and the ignition is in the off position.

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ScanGauge

Recently I purchased a ScanGauge to troubleshoot the brake lockup issue. My hope was to observe the braking transition from Regen to service brakes applying caliper pressure. While that was not successful, I am still very much in a learning mode.

I have found the ScanGauge provides useful car status information that Ford chose not to provide the driver. For example, remaining oil life, engine RPM, engine water temperature, and tire pressures. And for our Energi advance readings such as high voltage battery voltage, State of Charge (SOC), high voltage battery temperature, generator/motor RPM, traction motor RPM, high voltage battery age, etc.

All and all there are many ICE and PHEV parameters worthy of watching to better understand vehicle health. I for one will NOT take my cars into a service center when I get a generic "Service Alert" dash message. Most are informational only and can easily be cleared with an OBDII adapter or reader. Since a ScanGauge really is just a smart OBDII device with proactive readings, I am better informed, which I appreciate when traveling away from home.

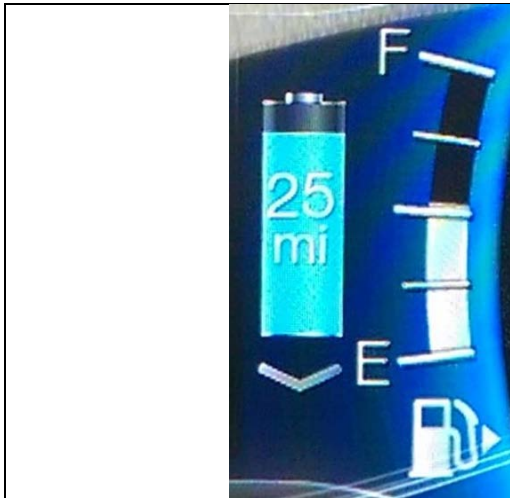
Below are a few pictures.



ScanGauge picture while driving on electrics at 42 MPH.

Notice the high voltage battery State of Charge (SoC) is 80.1%. It is very readable whereas the Ford display showing 22 miles of range is difficult to read on the left next to the fuel level display.

The HBV reading on the lower right is the PHEV battery voltage (HBV) - 319 vdc.



Here's a close-up picture of the Ford display showing 25 miles of range taken after the previous photo after I stopped. It is not unusual for a range increase after the battery rests or cools for a few minutes after driving.

FYI, Ford claims a 22 mile range for the PHEV battery. I have observed a reading as high as 38 miles after a long day of flat towing.

Document History

March 2015 - Original publication

Updates:

June 20 - Brake lockup problem while towing using RVi brake controller.

July 16, 2017 – Addition of: Table of contents, battery information, TSB 14-173, CMax forums.

July 19, 2017 – Added new brake lockup info from a retired Ford Service Manager, and ScanGauge intro.

Aug 30, 2017 – Moved the brake lockup information to a separate document plus added links for various supporting documents.