

MyGoFlight's Dual Digital USB Charger – ACC-1079

For use in Auto & Aircraft Cigarette Lighter Sockets

After a lot of research by Dominic, one of the owners of MGF, we learned a few things.

Through about the mid to late 1980s, the cigarette lighter sockets were used for exactly that. Then they started getting used as power connections. Later, the adapters like the MGF adapter were designed to plug in to them. Beginning mostly in the nineties, additional sockets were installed in vehicles for the sole purpose of being a power supply. In that process, they also changed the standard by which they were made which also slightly affected the size, depth, and capability.

In an attached reference, a key paragraph is:

"The consequence of the fact that cigarette lighter sockets weren't actually designed to provide accessory power means that they aren't terribly well suited to the purpose. In fact, the purpose that they are suited to, which is heating a bimetallic coil until it is bright, cherry red, is basically the exact opposite from what you'd like to see out of an efficient power transfer system."

MGF has added this line to their own site's listing:

"Accessory socket is required, may not fit older cigarette lighter only ports/receptacle."

So, that's the issue. I suspect it is also an issue in older aircraft. I do not believe there is a solution since there's unlikely to be a newer design accessory socket for certified aircraft that's cost-effective and manufactured under a TSO.

We have added a couple PDFs to help explain more.

Dominic has asked to have anyone with this issue to contact them directly. Their number is: 303-364-7400

If you wish to speak with us, please contact us at the number on your invoice or other attached document.

From Car Cigarette Lighter to 12v Accessory Socket

How cigarette lighters became accessory power outlets

By **Jeremy Laukkonen** Updated on November 13, 2019

The 12V socket, also known variously as a car cigarette lighter or 12V auxiliary power outlet, is the primary method by which power is delivered to portable electronics in cars, trucks, recreational vehicles, boats, and in a handful of other contexts. While these sockets were originally designed to heat up cigarette lighters, they quickly gained popularity as a de facto automotive electrical outlet.

Today it's possible to power anything from a cutting-edge phone or tablet to a tire compressor with the same exact socket that was once used only as a car cigarette lighter.

Some vehicles come with multiple sockets for the express purpose of powering multiple accessory devices, although it is uncommon for more than one to be capable of accepting a cigarette lighter.

Accordingly, the specifications for these power sockets that are contained in ANSI/SAE J563 include two variants: one that works with cigarette lighters and one that doesn't. If you've ever tried putting a cigarette lighter into a cigarette lighter socket only for it to fall right back out, that's why.

The History of Automotive Accessory Power

When the first automobiles hit the road, the idea of an automotive electrical system didn't exist yet. In fact, the first cars didn't even include electrical systems of any kind. These cars had engines that relied on magnetos to provide a spark, just like your lawnmower probably does today, so no battery was necessary. When lighting was included at all, it was by way of gas or kerosene lamp, so no electrical system was required there either.

When automotive electrical systems finally did arrive, they used DC generators. These generators, unlike modern alternators, didn't require any voltage input to operate. They were belt-driven, just like modern alternators, and they provided the necessary DC power to run accessories like lights.

The next innovation was the addition of lead-acid batteries to store electricity and provide a source when the engine wasn't running. With this addition, it suddenly became possible to add other accessories that we take for granted today, like electric starter motors.

Although early electrical systems that included both a DC generator and a lead-acid battery technically made electrical accessories possible, the widely variable voltage produced by these generators created issues. Mechanical devices were used to regulate the voltage, but modern automotive electrical systems didn't really arrive until the introduction of alternators.

Unlike generators, the alternators found in modern cars and trucks produce alternating current, which is converted into direct current to charge the battery and provide accessory power. Although this type of electrical system still doesn't provide entirely uniform voltage, the voltage output does remain relatively steady regardless of how fast the alternator is spinning, which was a key factor in the rise of the car cigarette lighter as a de facto DC power outlet.

The Smoking Gun

Although people had been powering accessory devices with their automotive electrical systems ever since automotive electrical systems were first invented, accessories had to be wired in manually. The appearance of a 12V automotive electrical socket was almost accidental, as it was co-opted from a completely different initial purpose.

Cigarette lighters, along with lights and radios, were among the first accessories to take advantage of early automotive electrical systems, and they started to appear as OEM options by about 1925.

These early cigarette lighters used a "coil and reel" system, but it was the so-called "wireless" cigarette lighter that would eventually become the de facto automotive and marine power socket.

These "wireless" car cigarette lighters consist of two parts: a cylindrical receptacle that's typically located in the dash of a car and a removable plug. The receptacle is connected to power and ground, and the plug contains a coiled, bi-metallic strip.

When the plug is pushed into the receptacle, the coiled strip completes an electrical circuit and subsequently becomes red hot. When the plug is removed from the receptacle, the red-hot coil can be used to light a cigar or cigarette.

Introducing the 12V Socket

Although they weren't originally designed with the purpose of supplying power to accessories, car cigarette lighters provided an opportunity that was simply too good to pass up. Since the actual lighter portion was removable once the coil-and-reel version fell out of use, the receptacle itself provided easy access to power and ground.

That easy access to power and ground allowed for the development of a power plug that could be inserted and removed with no need to permanently wire an accessory into the electrical system of a car.

The ANSI/SAE J563 specification was developed to ensure compatibility between cigarette lighter receptacles and 12V power plugs made by different manufacturers. According to the specification, the cylinder portion of a 12V socket has to be connected to battery negative, which is ground in most automotive systems, while the center contact point is connected to battery positive.

With the ANSI/SAE standard in place, third parties were able to design and introduce a massive range of devices, from tire pumps to hairdryers, that were designed to draw power from cigarette lighter sockets.

Problems with Using an Automotive 12v Socket

Since car cigarette lighters weren't originally intended for use as accessory sockets, there are a few inherent issues with using them in that capacity. Accordingly, devices that are designed to use a 12V socket have to be capable of working around these shortcomings.

The biggest issue with using a car cigarette lighter receptacle as a 12V socket is the inner diameter and depth of the receptacle itself. Since there is some variation in the size of these receptacles, which are sometimes referred to as cans, 12V power plugs typically have spring-loaded contacts.

By using spring-loaded contacts instead of fixed contacts, 12V power plugs are able to maintain electrical contact within a fairly generous range of tolerances. However, it also means that this type of plug may lose electrical contact from time to time.

Another issue with using an automotive 12V socket is related to the way that automotive electrical systems work. Although modern alternators are capable of maintaining a relatively uniform voltage output, the normal operation does allow for a range of output voltages.

With that in mind, all automotive electrical accessories have to be capable of running on roughly 9-14V DC. In many cases, a built-in DC-to-DC converter is used to convert the variable input voltage to a steady output voltage on the fly.

Could the Car Cigarette Lighter Be Replaced?

Although smoking isn't as popular as it once was, car cigarette lighters are unlikely to go anywhere anytime soon. Some cars have shipped over the years without cigarette lighters, and others have included an accessory socket with a blank plug instead of a lighter, but the idea of ditching the car cigarette lighter altogether still hasn't caught on.

The issue is that even if people aren't using car cigarette lighters for the purpose that they were originally designed, far too many portable devices rely on the technology as a de facto power source to ditch it altogether.

USB may prove an acceptable replacement because so many portable devices use USB for data and power. It's feasible that USB ports could eventually overtake cigarette lighter and accessory sockets in cars, but it's so easy to simply plug a USB charger into a car cigarette lighter that automotive manufacturers may hesitate to fully embrace that type of change.

How Are Cigarette Lighters and Accessory Sockets Different?

Does the difference really matter?

By **Jeremy Laukkonen** Updated on November 13, 2019

There was a time, not so long ago, when a barrel-shaped socket located anywhere in the vicinity of a car's dashboard was invariably a cigarette lighter. Sure, you could use that cigarette lighter socket to power your electronics, but that didn't change what it was. Then dedicated accessory sockets showed up on the scene, and all of that went out the window. These 12V accessory sockets look like cigarette lighter sockets, but they aren't, and the differences are pretty important.

Accessory Sockets Aren't Cigarette Lighters

After decades of cigarette lighter sockets that play double duty as accessory sockets, it's only natural to wonder what, if any, difference there is between these two components. While this might seem complex, it's actually not. In basic terms, cigarette lighter sockets are accessory sockets, but accessory sockets aren't necessarily cigarette lighter sockets. It's like how all squares are rectangles, but not all rectangles are squares.

Digging in a little deeper, the issue is that there are two slightly different standards for these sockets. And while they both work with 12V plugs, receptacles that meet the newer of the two standards will not accept cigarette lighters.

Further clouding the issue is that some vehicles ship from the factory with a plug in the cigarette lighter socket. That may seem to indicate that it isn't a cigarette lighter at all, but that isn't the case. When one of these sockets is located in the dash, and there isn't a second one clearly marked as an accessory socket then, chances are it's probably just a cigarette lighter socket that didn't come with the lighter portion.

Cigarette Lighters vs. Accessory Sockets

The crux of the issue here is that cigarette lighters weren't originally designed to provide power to accessories. In fact, the very first cigarette lighters in cars really weren't suited to that purpose at all. These early lighters used a "coil and reel" system, and it wasn't until so-called "wireless" lighters hit the market that cigarette lighters gained the dual purpose that they enjoy today.

The consequence of the fact that cigarette lighter sockets weren't actually designed to provide accessory power means that they aren't terribly well suited to the purpose. In fact, the purpose

that they *are* suited to, which is heating a bimetallic coil until it is bright, cherry red, is basically the exact opposite from what you'd like to see out of an efficient power transfer system.

The upshot is that since cigarette lighters are designed to get incredibly hot, it doesn't really matter that their basic design provides a less-than-ideal electrical connection.

When Cigarette Lighter Sockets Became Something More

There are a handful of different cigarette lighter standards in the world, but the one used in the United States is ANSI/SAE J563. Since this standard describes measurements like the diameter of the receptacle, accessory manufacturers are able to make power plugs that have a relatively snug fit, and the slack is taken up by spring-loaded contacts.

However, the standard also includes a *second* set of measurements that automakers can use for dedicated accessory sockets. Sockets that conform to this standard are slightly different, in that they won't accept cigarette lighters, but they will accept 12v power plugs from chargers, [inverters](#), and other devices.

Is It a Cigarette Lighter Socket or 12V Accessory Socket?

Unless you want to look up the specs and get out a micrometer, the best way to find out whether you're dealing with a cigarette lighter socket or an accessory socket is to check your owner's manual or contact the dealership. The two do look slightly different, but it's a difference measured in millimeters.

You also can't tell whether or not a socket is designed to work with a cigarette lighter simply based on the fact that it didn't come with one. While most dash-mounted sockets are still designed to accept cigarette lighters, you shouldn't just assume that it does.

The general rule of thumb is that if your dash has multiple sockets, one of them will usually be a cigarette lighter, and the others will probably be accessory sockets. In that same vein, additional sockets located under the dash, in the center console, and elsewhere in the vehicle, are usually dedicated accessory sockets. However, it's a bad idea to just stick a cigarette lighter into any old receptacle based on a rule of thumb. The only way to know for certain is to check with your local dealer or the manufacturer.

Does the Difference Really Matter?

In terms of powering accessories and devices, like your cell phone, there is functionally no difference between cigarette lighter sockets and accessory sockets. If you aren't sure which one you're dealing with, you should feel free to plug into any or all of them to suit your power requirements.

The only important difference is that you can't, or at least shouldn't, plug a cigarette lighter into an accessory socket. In the best-case scenario, nothing will happen at all. In a worst-case scenario, the lighter will heat up, but the socket won't be able to withstand the extreme heat of the lighter.