Neutrino Aurora Owner's Manual
App version 1.25+
6/15/17

Congratulations on your purchase of the Neutrino Aurora integrated power distribution and control system. Not only does this product represent the state of the art in power distribution and control, but offers a range of essential information. Most importantly, the system will acquire additional talents over time as updated software is made available for download.

Installation of the system is covered under the quick installation guide available on our support site, so we won't cover that again here. The purpose of this manual is to show you how to use the system to its fullest capability.

## Connection and Configuration

The first thing to do is to tell your Aurora that it's ok to communicate with your phone. To do this tap the units of measure button on the first page of the app and then tap the Neutrino Select button.Then select either one or multiple Neutrino modules and tap the connectable yes button. Once your phone and Neutrino module are communicating, configuring the system is easy and fun.
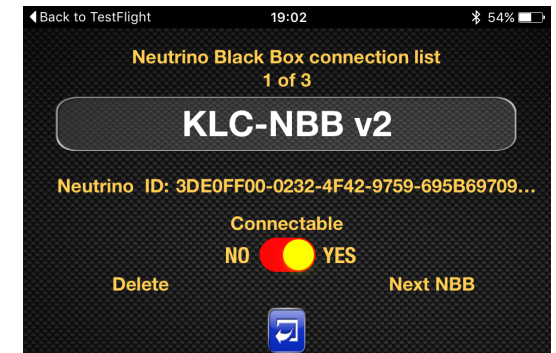
Note: your phone must be connected to Neutrino Aurora in order to program the module. Settings are saved when the ignition is shut off. If you shut down the app before the ignition, settings won't be saved.

1. **Assigning circuits.** Aurora has 6 circuits, 3 ground terminals, a relay input, and a direct battery charger input in the main wiring bundle. It's important to note that

the 6 circuits have different capacities.
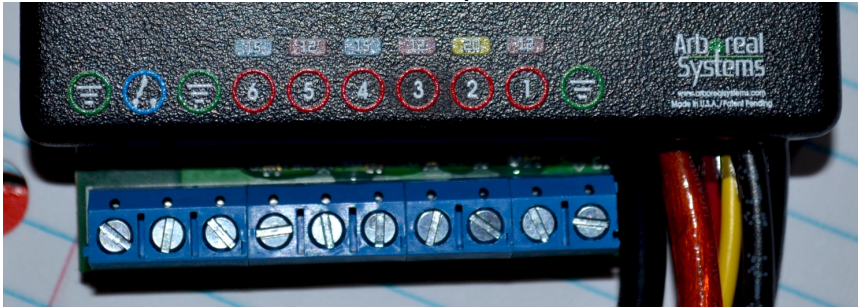
Circuits 1,3, and 5 are each rated at 12 amps, circuits 4 and 6 at 15 amps, and circuit 2 at 20 amps. This is the maximum load that each circuit can handle, and the software won't let you set a level higher than this. This is done to optimize internal electrical paths within the unit.

Circuit 2 can actually handle peaks of significantly higher than 20 amps, so is ideal for devices such as HID lights that have very high starting current requirements, but quickly drop down to more moderate levels. For hard to start halogen lights we recommend using the ramped start feature built into the 20 amp setting on circuit 2.

Note on grounding. Aurora includes a ground plane. This allows you the flexibility to take ground from either the Neutrino module or from the chassis. This not only greatly simplifies installation, but it also allows for direct connection of sensitive audio equipment without the risking ground loop issues resulting from the use of chassis ground.

There are 3 ground connections on the module, one on either end of the connector strip and a third adjacent to the relay switch input. You can use any of these 3 ground points for any of your circuits. It is permissible to double up inputs to the ground connectors as long as the maximum load for any connector is no greater than 20 amps.

The relay switch terminal, in-between the 2 ground terminals on the left will accept an input from an external switch to trigger any combination of circuits on the NBB. The Aurora app is used to configure circuits to be relay controlled. (see below)

2. Diagnostics. Now that you've got all your circuits hooked up it's time to talk about diagnostics.

First, the module includes a status LED on the backside of the board "tongue"...opposite the blue terminal strip. Normal operation is for this LED to glow green when the vehicle ignition is on and white when a phone is connected.

The system includes circuit level diagnostics both on the module and in the phone app. Let's first talk about the on-board module diagnostics.

If you look at the base of the circuit board, where it exits the case, you will see 6 LEDs. Each of these indicates the status of the corresponding circuit. If there is no light, the circuit is not energized. If there is an amber light, the circuit is energized and everything is normal. If there is a red light, however, this means that there is a short circuit.

You can also get similar information from the application. As a circuit is energized the bar will change from blue to

red. If, however, there is a short circuit, the voltage indicator will turn red....a clear indicator that something is wrong.

The good news is that the circuit breakers will immediately shut the circuit down and will stay shut down until the short is rectified.

Please note that in the event of an overload, say run a 6 amp load when the breaker is set for 3 amps, you will see a flashing red indicator.

3. Configuring circuits

In order to configure the circuits you will need to launch
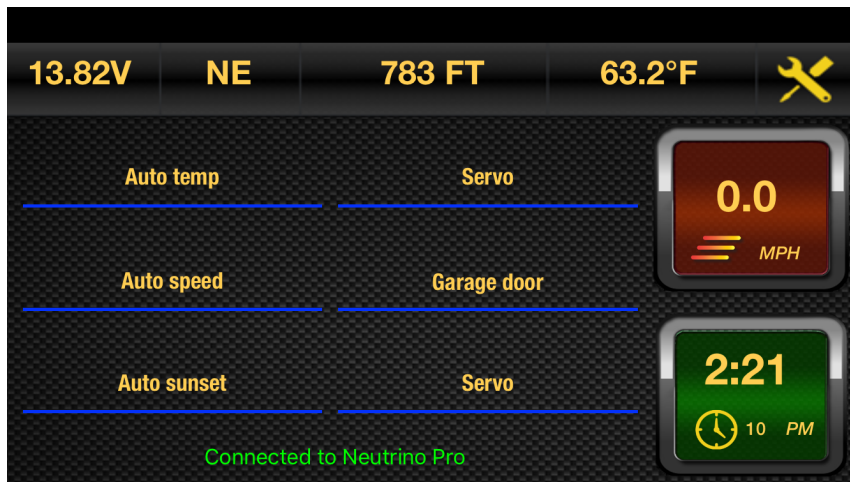
the Aurora app on your phone and make sure you are connected. In order to

make a connection the ignition system of the host vehicle must be switched on.

To get started, tap any one of the circuits and the following screen will appear.

Starting from the left, the first option is circuit memory. If set to "off" this circuit will revert to the off state after a restart. If set to the "on" this circuit will return to the state it was in when the system was last shut down. Very convenient for circuits that need to be on whenever the vehicle is on or after stopping for fuel.

The next option on this screen is a scroll wheel that offers the following choices for circuit behavior:
- variable
- switched
- momentary
- pulse +
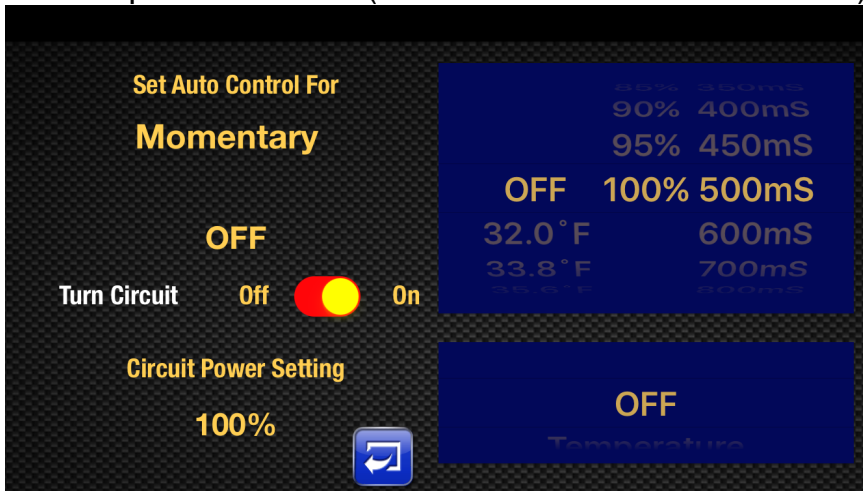- pulse -
- brake flash

These options determine what the circuit will do when activated. Variable allows for infinite gradation of circuit activation...useful for heated gear and dimming lights.

Switched causes the circuit to act like a switch...100% on or 100% off. This is useful for circuits that need 100% power all the time. Examples would be power supplies, GPS units, radios and USB power sources.

Momentary allows for only a quick blip of circuit activation. This is designed for accessories that require

only a spike to activate...such as garage door openers. (optional garage door activator module available)

You can adjust the duration of a momentary pulse by tapping the gear icon and selecting auto circuit control. From there twirl the upper right scroll wheel to the desired pulse duration. (between 100ms and 2 seconds)

Pulse + and pulse - generate a 4 hz pulse useful for daytime lighting conspicuity. The difference between the 2 is that they are 180 degrees out of phase, so that it's possible to have multiple lights activating in an alternate pattern.

Brake flash generates a "legal" series of pulses with an underlying background level required for 3rd party brake light activation.

This covers the circuit behavior options for circuits 1,2,3 and 5.

*Circuits 4 and 6 offer 2 additional choices:*

Servo and link. Link allows you to link circuits 4 and 6 so that they activate simultaneously. This is intended to allow Aurora to power very high startup current devices such as air horns. To use this feature you configure either circuit 4 or 6 to be linked and the other is automatically linked. To take advantage of the high current plug the powered device into both circuits. Servo also uses both circuits 4 and 6, but for a different purpose. This mode is intended to allow you to control servo motor operated devices such as exhaust valves, hood lifters and wing actuators.

Holding your finger on either the reverse or forward buttons will activate the servo motor in the intended direction. (requires optional servo adapter)
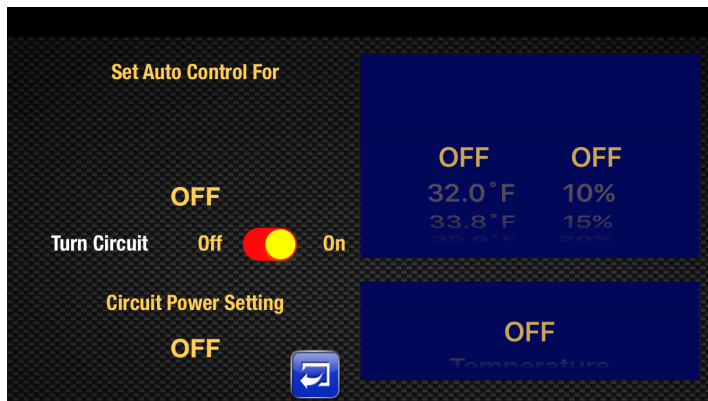
Note: For both servo and link functionality it's essential to set the circuit breaker levels to be the same on circuits 4 and 6.

Moving further to the right is the gear icon which will take you to circuit customization screen.
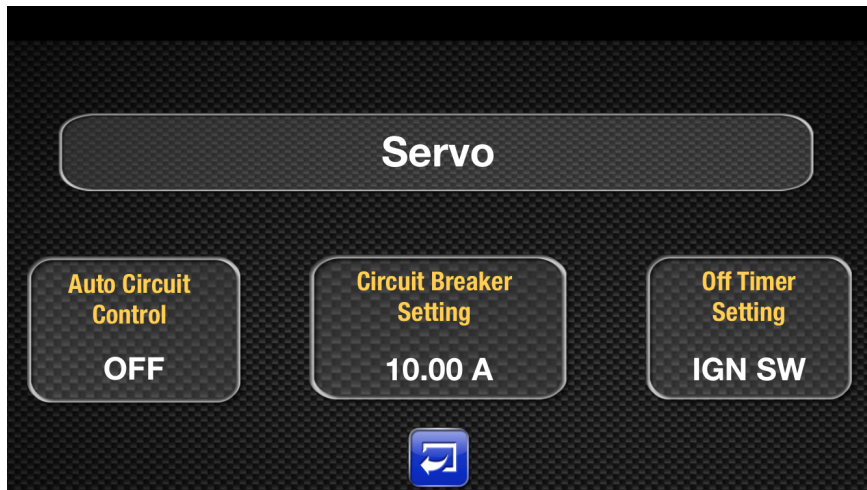
This screen allow you to name the circuit by tapping the circuit name, set the auto circuit control mechanism (if desired), set the circuit breaker limit, and set how the circuit behaves when the ignition is off.

Starting with auto circuit control there are a number of options. Upon tapping this button you will see a screen that looks like this.
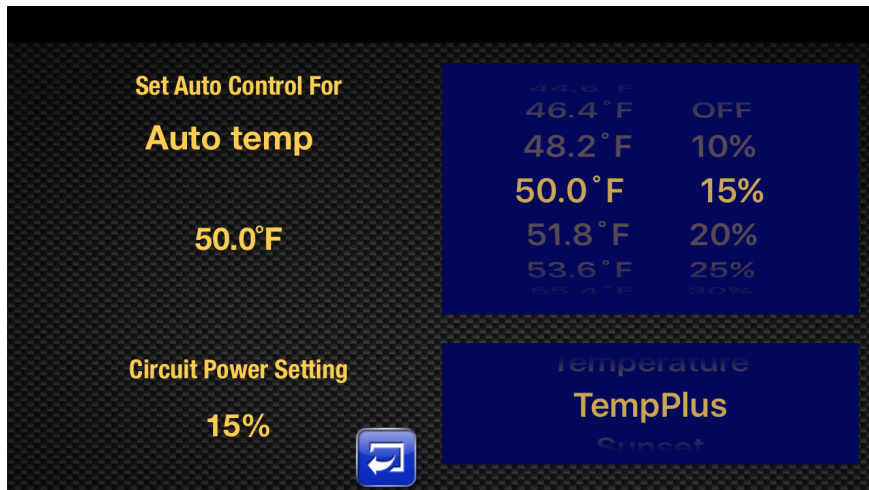

There are 3 scroll wheels and a mode switch.

The bottom scroll wheel which where you enable auto circuit control...or not. The off position simply means that you want manual control for that circuit. As you twirl the wheel down the first option is temperature.
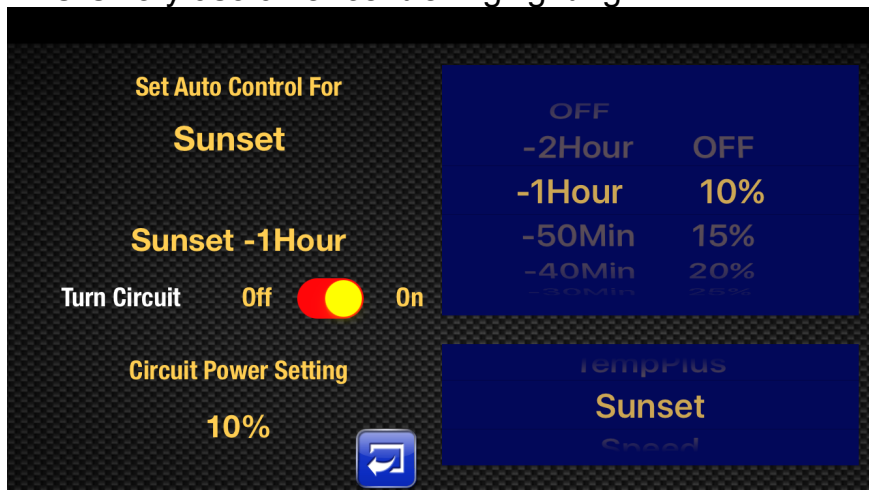
This allows you to set an ambient temperature that will cause the circuit to automatically activate or deactivate (depending on whether the sliding switch is set to on or off) at a particular temperature or below. To set this up twirl the upper left whee to the desired temperature and the upper right wheel to the percentage on. When the ambient temp drops to that level or below the circuit will activate as configured.
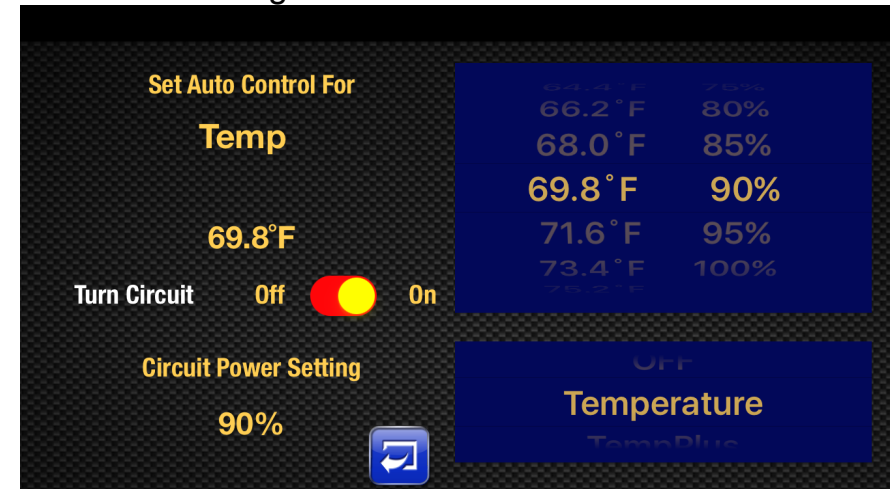
The next option on the bottom scroll wheel is temp plus which is an enhanced version of temperature. The difference is that the on percentage will automatically increase about 10% for every 2.5 degree drop in ambient temperature. This works great for heated gear and clothing, automatically increasing and decreasing the on percentage as the ambient temperature changes.

Left column

Set Auto Control For

Auto temp

50.0°F

44.6°F
46.4°F OFF
48.2°F 10%
50.0°F **15%**
51.8°F 20%
53.6°F 25%
55.4°F 30%

Circuit Power Setting
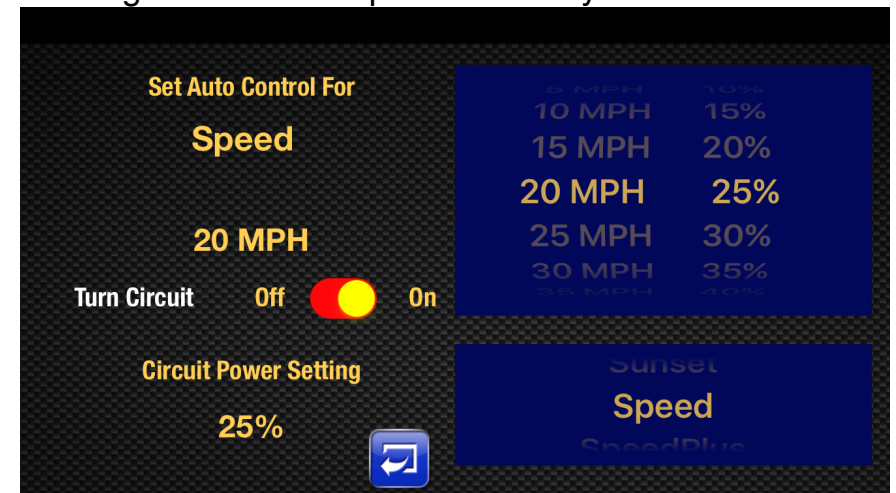
15%

Temperature
TempPlus
Sunset

The next option is sunset, which allows you to set the circuit to automatically activate based on actual sunset time plus or minus up to 2 hours on any day of the year anywhere on the planet without further intervention on your part. (Calculated using the phone's GPS engine) This is very useful for controlling lighting.

Set Auto Control For

Sunset

Sunset -1Hour

OFF
-2Hour OFF
-1Hour **10%**
-50Min 15%
-40Min 20%
-30Min 25%

Turn Circuit   Off   On

Circuit Power Setting

10%
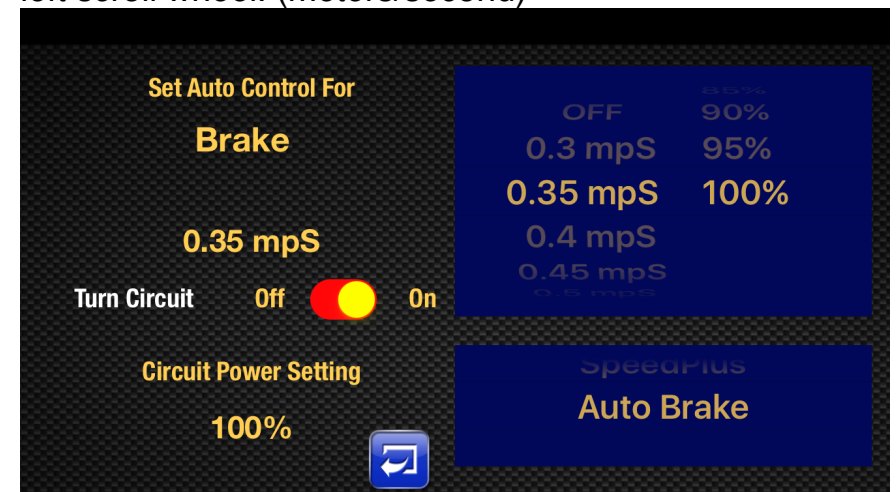
TempPlus
Sunset
Speed

The next option are speed and speed plus, which are similar to temp/temp plus but instead use vehicle speed. This is useful for automatically activating or deactivating devices when the vehicle is moving and Auroraviding a

Right column

warning of excessive speed....and myriad other uses.

Set Auto Control For

Speed

20 MPH

5 MPH 10%
10 MPH 15%
15 MPH 20%
20 MPH **25%**
25 MPH 30%
30 MPH 35%
35 MPH 40%

Turn Circuit   Off   On

Circuit Power Setting

25%

Sunset
Speed
SpeedPlus

The next option is auto brake, which uses deceleration to automatically activate the circuit. Deceleration is calculated based on GPS speed so this function relies on a good GPS signal. This is useful for 3rd party brake lights. When auto brake is selected on the lower scroll wheel, you can now fine tune the rate of deceleration to set the deceleration threshold you prefer on the upper left scroll wheel. (meters/second)

Set Auto Control For

Brake

0.35 mpS

85%
OFF 90%
0.3 mpS 95%
0.35 mpS **100%**
0.4 mpS
0.45 mpS
0.5 mpS

Turn Circuit   Off   On

Circuit Power Setting

100%

SpeedPlus
Auto Brake

The final option is relay. Relay acts by sensing voltage (or lack of voltage) at the relay switch input terminal between the 2 grounds on the left side of the terminal strip. There are 3 options to choose from in the upper left scroll wheel. Ground, open, and 12V. The circuit will activate to the percent on level set in the right scroll wheel when it senses one of the 3 conditions set by the left scroll wheel. For example, if you set the wheel to ground, the circuit will be activated when ground is sensed on the input. For open the circuit will activate when neither ground nor +12V is sensed, and for +12V the circuit will activate when sensing positive voltage.

As these variable can be set differently for each circuit this provides enormous flexibility in using Aurora to manage your electrical devices. If you were to tap into the high beam switch you could use this input to activate a set of auxiliary lights on one circuit while simultaneously deactivating another set on a different circuit. The possibilities are nearly limitless.
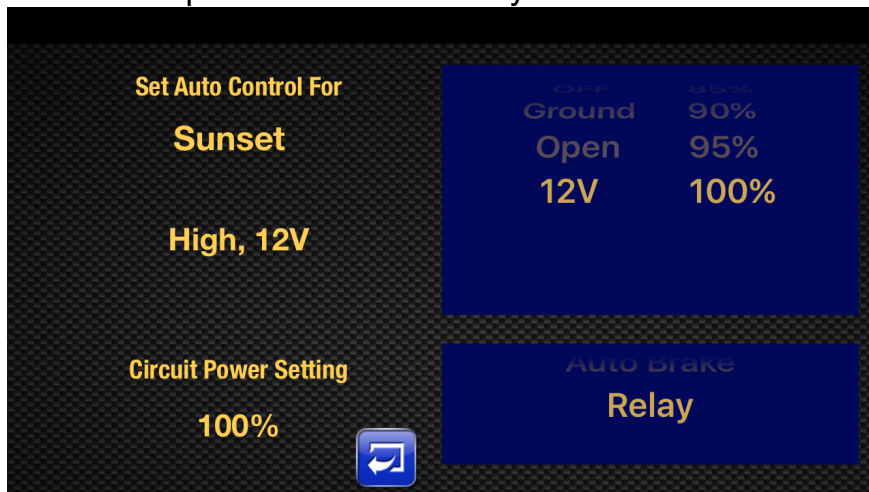
Going back to the previous screen, the next option is circuit breaker level. Tapping this button will bring up a scroll wheel that allows you to disable the circuit or change the breaker level from 2 amps up to the maximum for that circuit.


The third option on the gear screen is off timer setting. This is where you can set the circuit to remain on after the vehicle has been shut down. The choices are for up to 4 hours or voltage dependent, which will keep that circuit on until the battery voltage drops below that level.
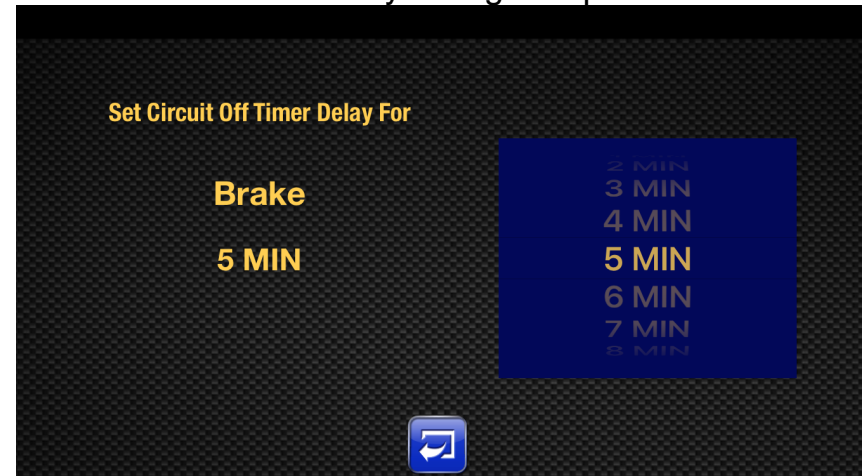
These are the basics of circuit setup. Please note that each circuit is independent and all the parameters set for that circuit will be unique to that circuit.

4. **Global settings.**
Units of measure. If you tab back to the first page you will see an icon at the upper right of the screen that will allow you to set units of measure.
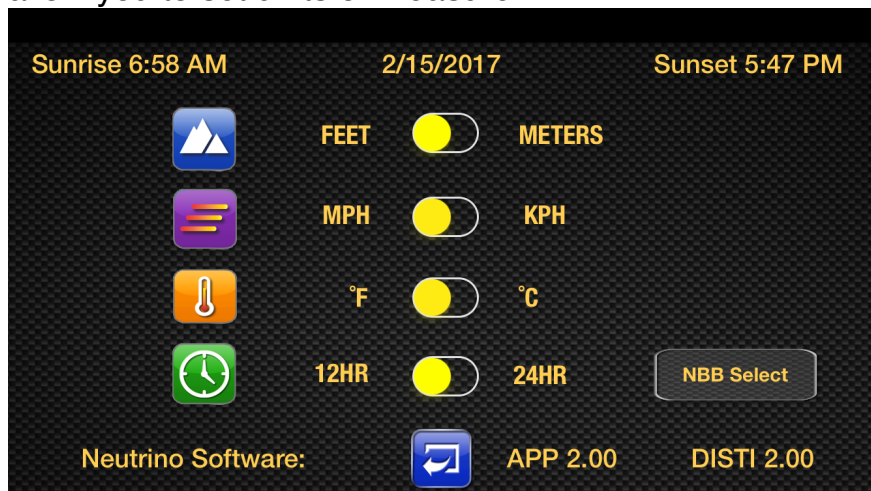
Here you can choose between feet and meters, miles per hour or kilometers per hour, temperature in fahrenheit or centigrade, and time in either 12 or 24 hour format. You are free to mix and match any of these to your preference.

This page also shows calculated sunrise and sunset times plus the application and module software levels.

Global electrical settings. To access these tap the voltage indicator on the first page and you will be presented with a grid view of the entire electrical system.

Here you can see the realtime status of each circuit, the current amperage draw by circuit, total amperage draw. You can also adjust the alarm voltage.

To do this, tap the alarm voltage button on the lower left of the screen and you will get a scroll wheel where you can set a voltage at which you want the system to let you know that the vehicle voltage is below what you deem to be a safe level. This will also cause the automatic shutdown voltage to be set at 1 volt lower than the alarm setting. As discussed earlier, this shutdown voltage will be used to shut down a circuit where you have designated it as being voltage-dependent.

Now that the system is all set up the way you want it, it's time to use it to actually control circuits. Here's how it works.

5. Using the system.

There are several different ways to use Aurora.
First, there's manual control. Any combination of circuits can be set up to be purely manually controlled. This means that it takes just a finger moving on the screen to turn a circuit on, turn the temperature up...whatever you wish.

Of course you may have circuits set to automatically activate when the system starts up, and these can be manually overridden as desired. If desired one can configure Aurora to perform basic power distribution functions without connection to a smart phone.

Then there's relay control;. In this scenario an input is taken from a horn or high beam or any other vehicle circuit and fed into the relay switch input terminal on the Neutrino module.

It's then a simple matter to configure any number of circuits to automatically activate or deactivate based on sensing voltage (or lack of voltage) at the relay switch input terminal.

It's entirely possible to have several circuits set to always activate when the ignition is energized while several others are manually controlled, while a couple more are activated based on the status of an external circuit.

Finally, there are many fully automated circuit activation options with Aurora. Circuits can be set to activate based on temperature, speed and sunset time. They can even activate based on deceleration.
Aurora offers a wide range on control options with total circuit independence, allowing you extreme flexibility in how you configure your system.

Warnings:

1. Don't reverse polarity! As noted in the quick setup guide shipped with the Aurora module, it's critically important that you don't reverse polarity when you connect the module to the battery. If you do, you may cause irreparable damage to the Aurora module that cannot be repaired and will not be covered under the warranty

2. The battery charger input in the main wiring bundle is shipped without a an installed fuse. Since the battery charger input runs directly from the charger to the battery it's critically important that you make sure to install a fuse (included in the box) in the fuse holder.

3. While we know this is motherhood and apple pie stuff, please don't make circuit adjustments and the like unless it's completely safe to do so. Operating a motor vehicle while distracted is extremely dangerous to you and every creature around you, so please be careful. We strongly recommend that circuit adjustments only be made when on the open road, far away from other vehicles, with flat terrain, and with minimal chance of animal interactions. Better yet, stop the vehicle and make the adjustments.

4. Don't connect relays to Aurora without installing a diode to block reverse current flows. Since Aurora can switch big loads without relays there is little need, but sometimes they can't be avoided. An example of this is the Clearwater lighting control system which includes non-diode relays in its circuitry. While Aurora is an excellent source of power for Clearwater lights you must install a diode between ground and the terminal powering the Clearwater system in order to prevent voltage/current spikes from affecting Aurora. Please contact us for more information on this.

5. While the Aurora module is completely waterproof, if you mount it where water can get to the powered accessory connections it's important that you waterproof these connections. We recommend the use of silicone grease for this purpose as it's easily applied, easily removed, and will definitely keep water from affecting the circuit connections. We also recommend mounting it with the terminal strip facing down so that water can't pool.

6. While we've gone to lengths to minimize the risk of damaging the NBB via electro static discharge, as with all microprocessor-controlled devices, if you zap it with enough voltage it's possible to damage the unit. This can easily be avoided by simply touching your finger to a metal part on the vehicle and doing the same with any wire you are about to insert into a NBB terminal before interacting with the terminals on the NBB.

Specifications:

Aurora is .9" thick, 3" wide, and 2" deep, exclusive of wires and connector strip.
Epoxy encapsulated and waterproof.
Weight 12 oz.

Electrical:
Total capacity is 60 amps at 12.5 volts.
Individual circuit capacities:
20 amps x 1
15 amps x 2
12 amps x 3

Parasitic losses:
Running w zero circuits on 29mA
Additional load per circuit activated is 16mA
Drain when unit is shut down is 1.1mA
Trigger wire drain is .2mA

Connectivity:
Data: USB socket on pigtail accepting USB> BTLE adapter.

Terminal connections: 10 screw terminals capable of up to 14 AWG wire. Includes 3 ground connections, 6 power outputs and 1 relay input.

Wire Inputs:
Direct battery charger input connections.
Remote thermosensor.

Ignition status sensor.

Just in case:
In the unlikely event of a software lockup please disconnect the positive lead from the Aurora module to the battery momentarily. This should reset the module to normal operation.

Warranty: one year (or longer)

Please download the Aurora install guide at:

 http://media.wix.com/ugd/
d44451_eca6e02deb7142ecbe71612c97a0384d.pdf

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