

# Neutrino installation guide

Congratulations on your new Neutrino intelligent device controller. This guide is intended to quickly guide you through the steps required to install the system.

## What's what

There are 7 wires coming out of the Neutrino module and here's what they are:

- One red and one black 10 AWG cables to connect to the battery
- An 18 AWG yellow wire that is used to sense the vehicle's ignition on/off state
- A black cable with heat shrink sleeving and a small black bulb on the end. This is the ambient temperature probe
- A big, fat USB cable with a dongle plugged into the USB socket. This dongle is the Bluetooth radio and the system won't operate without it being in place. If you want to use the USB socket to provide power for USB devices please use the optional USB Y cable we provide
- A short red lead with a fuse holder. This is the direct battery charger connector and can be used to connect a battery charger or to power high-startup current devices such as air horns. The module is shipped with the fuse not installed, but included in the package.

Step 1. Find a suitable location to mount the module. Since the module is waterproof you are free to locate it just about anywhere you like, but it can't be more than 2 feet from the battery.

Please note that if you decide to install the module where it is exposed to water, cover the terminals with dielectric silicone grease or silicon putty. (Macks earplugs) We also recommend that in high water environments that the module be mounted with the terminal strip facing down so that water has a tendency to fall away rather than pool.

If you need to locate the Neutrino module more than 2 feet from the battery it's ok to splice in additional 8 AWG wire. Arboreal Systems offers a three foot 8 AWG extension kit if required.

Step 2. Connect up the 10 AWG leads to the battery. Black to negative and red to positive. Make sure you don't reverse polarity as this may cause irreparable damage to the module.

Step 3. Run the ambient temperature probe out to a location that is both shielded from direct sunlight and away from sources of vehicle heat.

Step 4. Connect the yellow power sense wire to a convenient circuit that is energized when the vehicle ignition is switched on. Typically this will be a tail light wire. Please use the included Scotchlok connector or similar for this purpose. Note: the system won't turn on unless +12V is being sensed by this lead.

Step 5. Connect a battery charger (if desired) to the fused red lead coming from the main wiring bundle. Note, the NBB is shipped with the fuse not installed. If you use this input/output, please install the included 10A 5mm x 20mm glass fuse.

**IMPORTANT:** Please discharge any static electricity before sliding a device wire into the terminal block by touching both your finger and the wire being connected to a metal part on the bike. This is very important as ESD can damage your module.

Step 6. Connect up the various devices and battery charger connections to the 10 position terminal block. The terminals are clearly labeled on the top of the module.

Note: Relays, Clearwater light controllers and electric motors: as the switching transistors in the Neutrino module are capable of switching large loads there is generally no need to use relays to switch circuits. If a relay is used it is essential to use a diode-equipped relay such as the Potter Brumfield 1432790-1 which we can supply.

If Neutrino is used to directly high power (without a relay) horns (which typically have electric motors) or relay-equipped lighting, such as the Clearwater system, it is necessary to protect the Neutrino from back current/voltage by installing a diode at the terminal being used for this device. The correct diode to use is a BYV27 diode, which we can supply. The black band side of the diode is connected to the hot terminal and the other side to a ground terminal. The black band side should be insulated with heat shrink tubing.

Note. Please read our lighting compatibility/setup instructions located on our support page....this is really important.

In order to minimize loads on the host vehicle, the system starts up circuits sequentially with a delay between each. Circuit startup delays are as follow:

- Circuit 1- no delay, immediate startup
- Circuit 2- no delay, immediate startup
- Circuit 3- 5 second delay
- Circuit 4- 6 second delay
- Circuit 5- 7 second delay
- Circuit 6- 8 second delay

Circuit 2 has a special slow startup feature useful for halogen lights when set at 20 amps. For high amperage devices requiring full power at circuit initiation please set the circuit breaker at 19 amps. If slow startup is desired set the circuit breaker at 20 amps. Note: this behavior is unique to circuit 2.

**IMPORTANT:** we strongly recommend that one of the 10 AWG cables powering the Neutrino module be disconnected before adding or removing accessory devices in order to lessen the chance of short circuits. This is especially important for circuits 1 and 6, which are adjacent to ground terminals.

Here's a breakdown of what each terminal does, starting from left to right:

NOTE: It's really important to ensure correct polarity when hooking up devices. It is entirely possible to damage a 3rd party electrical accessory if polarity is reversed. Make sure to connect the -/ground wire to either the chassis or one of the 3 ground terminals on the module. Make sure to connect the +/positive wire to one of the 6 positive terminals on the module

- a. Ground. One of three terminals that may be used to obtain the ground side of the circuit from the module rather than from the vehicle. This is really handy for simplifying installation and is almost essential when connecting audio devices in order to avoid "ground loop" noise. You can also use this ground or any of the others to connect up the ground leg of your battery charger.

- b. Relay. This is a special input for the new relay circuit function. If you want to use an existing switch on your vehicle to trigger one or more circuits on the NBB, connect up the sense line from that switch here. Please see the owner's manual for more information on how to use this function.
- c. Ground. See item a.

Since circuits 3-6 have a startup delay. Devices that require immediate power upon starting the bike should be connected to circuits 1 and 2 while delayed startup devices should be connected to 3-6.

- d. Circuit 6. This is one of the six circuits you can control; maximum sustained load of 15 amps.
- e. Circuit 5. This is one of the six circuits you can control; maximum sustained load of 12 amps.
- f. Circuit 4. This is one of the six circuits you can control; maximum sustained load of 15 amps.
- g. Circuit 3. This is one of the six circuits you can control; maximum sustained load of 12 amps.
- h. Circuit 2. This is one of the six circuits you can control; maximum sustained load of 20 amps. This is the circuit to use for devices that require extreme amounts of power. At the 20 amps setting a gradual start feature is automatically activated. (1.72+ firmware)
- i. Circuit 1. This is one of the six circuits you can control; maximum sustained load of 12 amps.
- j. Ground. See item a.

Step 6. Secure the module via double stick tape, a tie wrap, a metal band, or any other way that works for you.

Step 7. Download the appropriate smart phone application from the iTunes store or the Android Marketplace. Please see our website for the current links.

Step 8. Connect your phone to the module via a Bluetooth wireless connection.

To connect via Bluetooth, make sure Bluetooth is enabled on your phone and launch the Cockpit Controller application. **It is necessary to tell your module that it's ok to talk to your phone. To do this tap the units of measure button on the opening page and then the NBB select button on next page. Select the module or modules that you want to connect, name the module(s) and press the connect yes button. It takes a few seconds, but once connected you will have full access to all Neutrino functionality.** Note: please use the optional USB Y cable to directly power USB devices from the NBB module.

Note: on iOS devices it's essential to enable Location Services in order to use heading and altitude functions. This can be accessed via Privacy>Location Services on your phone.

Note: Remember that in order to save programming information to the Neutrino module your phone must be connected to the module via Bluetooth. Settings are saved when the ignition is turned off. Killing the app before turning the ignition off will cause setting changes to be lost.

Step 9. go to [www.neutrinoblackbox.com/support](http://www.neutrinoblackbox.com/support) and read/download the Element or Aurora owner's manual, where complete system operation is explained in detail.

Congratulations. You are now ready to begin using the Neutrino power distribution and control system.

Warranty: 1 year against defects in material or workmanship

More questions? Please call us at 510-849-2601 or email us at [service@arborealsystems.com](mailto:service@arborealsystems.com)