Evolv DNA 100C

100 Watt Variable Power Module with Temperature Protection and USB

The DNA 100C is a power regulated digital switch-mode DC-DC converter for personal vaporizers. It features Evolv's patented Wattage Control, Temperature Protection, Preheat, Full Color TFT Screen, Reverse Polarity Protection, onboard programmable multicolor LED, waterproof onboard buttons and a real-time clock. The USB-C port, Evolv's EScribe software and Theme Designer software can be used to fully customize all aspects of the interface or monitor the user experience. The DNA 100C runs from a single lithium polymer or lithium ion battery, and features battery monitoring and integrated 3A charger.

Specifications

	Minimum	Typical	Max
Output Power	1 Watt		100 Watts
Output Voltage	.2 Volt		9.0 Volts
Output Current, continuous			40.0 Amps
Output Current, instantaneous peak			45.0 Amps
Atomizer Resistance, temperature sensing wire, cold	See Graph	.15 Ohm	See Graph
Atomizer Resistance, Kanthal wire	See Graph	.25 Ohm	See Graph
Temperature Limit	200°F	450°F	600°F
Input Voltage	3.0 Volts	3.7 Volts	4.2 Volts
Input Current	.5 Amps	15.0 Amps	30.0 Amps
Input Current, pulse			35.0 Amps
Screen On Current		50mA	
Quiescent Current		30mA	
Power Down Current			1uA
Efficiency		93%	
Weight		15.2g	
Footprint	.71” x 2.60”		18mm x 66mm
Thickness		.32”	
Screen size		80 x 160 px	Color TFT

Contents

Temperature Protection

The DNA 100C directly measures and limits the temperature of the heating coil during operation. By preventing the coil from becoming too hot regardless of fluid, wicking or airflow, a variety of undesirable situations can be prevented. For example, appropriate temperature settings will prevent the wicking material from charring, which compromises taste and introduces unintended chemicals into the vapor. Appropriate temperature settings will also reduce the breakdown of flavoring and base liquid components, which could impact taste or safety.

Evolv's Temperature Protection Technology requires a heating coil made from Nickel 200 alloy or other materials with a well-defined temperature coefficient of resistance, rather than Nickel Chromium or Kanthal alloys. If the temperature reaches the maximum value, the wattage applied to the atomizer coil is reduced to prevent overheating. Please note that the temperature reading is the average temperature of the atomizer coil, and care should be taken to construct the heating coil so that the temperature is uniform, without hot or cold spots.

Because wattage, not temperature controls vapor volume, large vapor volumes can be produced without unnecessarily high temperatures. Temperature Protection is most helpful if the atomizer begins to dry out, the user pauses during a puff, the beginning or end of the puff, or if the wattage setting is inappropriate for the attached atomizer.

In normal operation, when the device is not firing the maximum temperature setting is displayed on the screen.

By default, the Temperature Protection setting is 450° Fahrenheit. To change the limit

1) Navigate to the Temperature setting by pressing the up or down buttons.
2) Once the temperature setting is highlighted press the Select button.
3) Use the UP and DOWN buttons to adjust the maximum temperature
4) When the display shows the desired maximum temperature, press the Select button to confirm the desired temperature

The maximum temperature is adjustable between 200° Fahrenheit and 600° Fahrenheit. To disable the temperature protection entirely, choose a non-Temperature Protection capable material on the main screen such as Kanthal, Nichrome, or Watts to operate in Power Regulation mode.

To switch to Celsius temperature, navigate through the main screen to Settings > System. Highlight the Units option and press the Select button to toggle between Fahrenheit and Celsius.

Preheat

When the DNA 100C is used with a temperature sensing atomizer, an additional feature called Preheat is activated. No vapor is produced when the temperature is below the boiling point of the liquid. Preheat applies extra power until the heating coil is up to operating temperature to shorten the delay between pressing the fire button and generating vapor. Because preheat is temperature based, it will not overheat or burn the vapor.

Attaching a New Atomizer

The DNA 100C uses the resistance of the atomizer to calculate the temperature of the heating coil. It continually looks to see whether a new or changed atomizer has been connected. If you are using temperature protection, be careful to only attach new atomizers that have cooled to room temperature. If a new atomizer is attached to the DNA 100C before it has cooled down, the temperature may read and protect incorrectly until the new atomizer cools.

When you connect a new atomizer or disconnect and reconnect your existing atomizer, the DNA 100C will prompt you to confirm this change. When you fire for the first time, before activating the DNA 100C will prompt "Did you connect a X.XXXΩ coil?". When you see this prompt, if you have attached a new atomizer, navigate to the Yes option and press Select to confirm. If you have disconnected and reconnected the same atomizer, navigate to "No, use old settings" to retain your previously used resistance. If you would like to confirm that your atomizer resistance reading is stable you may select "Measure Again" to take another resistance measurement. This is helpful if your atomizer was not completely cool before connecting it, or the prompt was displayed before your atomizer was firmly attached.

Operation

Basic operation of the DNA 100C is as follows. To wake the device from power off state, tap the Fire button. To generate vapor, press the Fire button. To change the wattage setting for more or less vapor, navigate to the wattage setting, highlight it with the Select button, adjust it with the Up and Down buttons, and press Select again to confirm.

Pressing the fire button five times with less than .7 seconds between presses will cause the device to enter Locked mode. In Locked mode, the device will not fire and the output power will not adjust accidentally. While in Locked mode, the screen will be off, except that pressing a button will show "Locked, Click 5X". To exit Locked mode, press the fire button 5 times.

Display

The DNA 100C has a full color 80 x 160 px TFT screen. The screen is attached to the main board by a flexible cable, allowing freedom in the design of your device. The screen's default position is on top of the board, between the fire and adjust buttons. This allows for easy assembly. The screen connects to the board with a ZIF connector, so alternate placement is possible. Please use caution when handling the screen and design the device so that the cable will be secured or strain relieved in operation. The two notches along each side of the PCB are designed to accommodate a screen holder. A 3d Model is available to 3d print or injection mold screen holders for the DNA 100C.

Watt setting: The power level currently set on the DNA 100C.

Battery indicator: The current state of charge of the battery.

Temperature display: When not firing, the maximum heating coil temperature setting. While firing, the actual temperature of the heating coil is displayed.

Ohms display: The resistance of the atomizer attached to the device. When using a temperature sensing coil, this is the normalized resistance of the coil at 70°F

Modes

Locked mode: Pressing the fire button five times with less than .7 seconds between presses will cause the device to enter Locked mode. In Locked mode, the device will not fire and the output power will not adjust accidentally. While in Locked mode, the screen will be off, except that pressing a button will show "Locked, Click 5X". To exit Locked mode, press the fire button 5 times.

Profiles

The DNA 100C allows you to save and select between eight groups of output settings. Each group of output settings is called a Profile. On the Default DNA 100C interface each profile is named for the material used, or to indicate it is a power regulation only profile.

To switch between profiles in the Default interface, navigate to the coil material name at the top of the main screen. Highlight the option with the Select button, and use the up and down buttons to cycle through the profiles. Press the Select button again to confirm your profile setting.

Each profile contains an output power, preheat, and a maximum temperature setting if applicable. These can be adjusted on the device, and will be saved when a different profile is selected. Profiles can also be modified to suit a specific theme using EScribe. To adjust your profile specific settings while using the device navigate from the main menu to Settings > Atomizer.

Coil Materials

The DNA100C uses a Material Repository that can be modified via EScribe to add or remove materials to the repository. Once the materials are in the repository they can be moved on or off the device and selected for use with the various profiles. In the Default DNA 100C interface each material is linked to a corresponding profile. All aspects of the Profiles and Coil Material choices can be modified through EScribe using the Theme Designer.

Error Messages

The DNA 100C will indicate a variety of error states.

Check Atomizer: The DNA does not detect an atomizer, the atomizer has shorted out, or the atomizer resistance is incorrect for the power setting.

Shorted: The atomizer or wiring are short circuited.

Weak Battery: The battery needs to be charged, or a higher amp rated battery needs to be used. If this happens, the DNA 100C will continue to fire the atomizer, but will not be able to provide the desired wattage. The Weak Battery message will continue to display for a few seconds after the end of the puff.

Check Battery: The battery is deeply discharged and needs to be charged, or is damaged. If this happens, the DNA 100C will not fire the atomizer. The Check Battery message will continue to display for a few seconds after attempting to fire the device. User should remove and replace the battery.

Temperature Protected: The heating coil reached the maximum allowed temperature during the puff. If this happens, the DNA 100C will continue to fire, but will not be able to provide the desired wattage.

Ohms Too High: The resistance of the atomizer coil is too high for the current wattage setting. If this happens, the DNA 100C will continue to fire, but will not be able to provide the desired wattage. The Ohms Too High message will continue to display for a few seconds after the end of puff.

Ohms Too Low: The resistance of the atomizer coil is too low for the current wattage setting. If this happens, the DNA 100C will continue to fire, but will not be able to provide the desired wattage. The Ohms Too Low message will continue to display for a few seconds after the end of puff.

Too Hot: The DNA 100C has onboard temperature sensing. It will shut down and display this message if the internal board temperature becomes excessive.

Auto power down

The screen will be at full brightness while firing. After 10 seconds with no button presses, the screen will dim. 30 seconds after the last button press, the screen will fade out and the device will go into sleep mode. To wake the device, press the fire button.

Charger

The DNA 100C has a built in 3A USB-C charger. It automatically detects the type of USB power supply it is connected to, so it can be plugged into standard PC USB ports or higher power USB-C chargers.

Battery monitoring

The DNA 100C contains a full battery management system that continuously monitors the state and health of the battery both under load and while idle.

Escribe

EScribe is a software package used to configure, monitor and modify the operation of your DNA 100C. It installs on a Windows PC and connects to your DNA 100C using the USB port. Escribe has a separate manual and tutorials which can be found on Evolv's site. In addition the EScribe install includes a complete Theme Designer software allowing each manufacturer or advanced user to create a Theme to suit their needs with complete control over the interface and user experience.

Wiring

The atomizer is connected to the OUT pad. If the DNA 100C is not being grounded through the mounting screws, the GND pad should connect to the negative side of the connector. The battery is connected to the B+ and B- terminals. It is important to use appropriately sized wire when using the DNA. Too small wire will not perform well, and significantly undersized wire can burn out. The output wires should be silicone or Teflon insulated only, and at least 14 gauge. The input wire carries less current, and can be as small as 20 gauge wire if silicone or Teflon insulated.

Recommended wire sizes

	Minimum size	Recommended size	Maximum size
Battery, silicone insulated	20 gauge	18 gauge	16 gauge
Battery, PVC Insulated	18 gauge	16 gauge	14 gauge
Output, silicone insulated	16 gauge	14 gauge	12 gauge
Switches, if used	28 gauge	24 gauge	22 gauge

Reverse Polarity Protection

The DNA 100C includes built in Reverse Polarity Protection to protect the user, board, device, and battery in the event that a battery is inserted backwards.

External component recommendations

The DNA 100C is a self-contained power regulator which does not require external components for its user interface. However, it does support the use of external interface components if desired.

Fire button:

Use a momentary on, normally open type switch or button. A standard pushbutton switch is appropriate. The switch is a logic function – all power switching is handled with transistors inside the DNA module, so the switch does not need to be rated for power. A waterproof or processed sealed switch is recommended. Please use caution, as the positive side of the fire button connects directly to positive battery voltage.

Up/Select/Down buttons:

The small onboard buttons allow the user to navigate the interface and modify device settings. Alternatively, remote normally open type switches or buttons can be attached to the UP, SELECT and DOWN mounting holes for customization.

Battery:

The DNA 100C runs from a single lithium polymer type battery pack or round lithium ion 21700/18650 type battery. The DNA 100C can use multiple cells in a parallel type wiring configuration as long as the maximum input voltage is 4.2v.

Mounting

The DNA 100C has onboard switches for adjusting the power level, navigating the interface and activating the output. Each of these functions also has optional through-hole pads for using remote buttons.

The DNA 100C has three mounting holes on the PCB. These holes are designed for #0 screws. There is an extended mounting pad of .125” diameter around each. These holes are electrically connected to each other and to ground. With careful design, the mounting pads can be used to ground the chassis to the DNA 100C, and pass the output current through chassis to the connector. However, if using this method, ensure that the PCB remains in good contact with the board at all times. Split lock washers and a RoHS chromate conversion coating on the chassis are recommended.