



Plasmasonic® 1.0 Musical Tesla Coil

Introduction

The Plasmasonic® 1.0 is an advanced solid state Tesla Coil that produces artificial lightning at lengths up to five (5) feet¹. When operated with its handheld controller, it can create a variety of different lightning and sound effects including polyphonic music reproduction using its built-in MIDI interface. In other words, the user has the ability to create music through the output arcs of the Plasmasonic® 1.0 from any high quality MIDI source, including a keyboard, guitar, laptop, or other compatible MIDI instrument, and reproduce up to two tones simultaneously.

Background

Tesla Coils by their nature, are incredibly awesome devices. Ever since Nikola Tesla demonstrated the first Tesla Coil in the late 1900's, the ability to create artificial lightning has never ceased to amaze people watching them in action. With the Plasmasonic® 1.0 you can impress your students or fellow colleagues by making music with the plasma, or simply impress them by creating a spectacular show demonstrating the awesomeness of artificial lightning! You can also light up fluorescent and different colored neon tubes and demonstrate the principles of wireless energy transfer.

Features:

- Lightweight and easily transportable
- Operates from 115VAC 50/60Hz
- 230VAC 50/60Hz (optional)
- Designed for high reliability
- Nominal output arc length: 4 feet
- Fully modular design
- Polycarbonate Enclosure
- Advanced Handheld controller

- Polyphonic MIDI playback
- Passive Capacitor Bleed system
- Active Capacitor Crowbar circuit
- RGB Illumination System (optional)

Technical Specifications

- Nom. Arc Length (@ 115VAC): 4 feet
- Max. Arc Length (@ 140VAC): 5 feet
- Cooling: Two (2) 115VAC muffin fans
- Input Voltage: 115VAC 50/60Hz
- Input Voltage: 230VAC 50/60Hz (optional)
- Max. Input Voltage: 120VAC 50/60Hz
- Max. Input Voltage: 240VAC 50/60Hz (optional)
- Max. Input Current: 10A @ 115VAC
- Max. Input Current: 5A @ 230VAC
- Max. Input Power: 1.15kW
- Dimensions: 15" x 15" x 36"
- Weight: 45 lbs

Technical Performance

Out of the box, the Plasmasonic® 1.0 is designed for a nominal output arc length of 4 feet. This output arc length is specified at nominal input voltage conditions of 115VAC 50/60Hz. Longer output arc lengths are possible by increasing the input voltage to the system, but this operation is outside the advertised nominal operational capability of this Tesla Coil. Testing at input voltages of 140VAC-170VAC have produced output arc lengths exceeding five feet in length. Please see the User Modification section below for more information.

Input Connections

The following external connections are required for proper operation of the Plasmasonic® 1.0 system.

Pin	Function
Power Cord	115VAC (15A) 50/60Hz 230VAC (15A) 50/60Hz
Power Cord	Neutral
Power Cord	Earth GND

Whats Included?

Both the high-level kit and completed units including the following components:

- Plasmasonic® 1.0 base unit
- 18" x 4.5" seamless aluminum toroid
- Epoxy coated secondary coil assembly
- Handheld MIDI controller unit
- Fiber optic communication cable
- Heavy duty power cable
- Break-out point for toroid
- Instruction manual (printed or PDF)

¹ Operated at 140VAC, 60Hz input

Operational Duty Cycle

The Plasmasonic® 1.0 system is designed for light demonstration use which includes classroom and commercial use, museum installations, and general demonstration use. It is not intended or designed for performance or event use in which the coil would be operated continuously for long periods of time.



Advanced Tesla Coil Control Module

Advanced Tesla Coil Control Module

This controller provides the intelligent control necessary to drive the high power IGBT based half-bridge circuit as well as the fault processing necessary to ensure safe, reliable operation of the system. It includes both a peak current limiting circuit and a gate drive voltage UVLO (under voltage lock-out) circuit which are employed to maintain high reliability of the system. Indicator LEDs show the status of the system during operation.



Handheld MIDI Controller

Handheld MIDI Controller

The handheld controller provides the drive signal to the Advanced Tesla Coil Control Module necessary to control and operate the Plasmasonic® 1.0. It is connected via a fiber optic cable which is necessary for both high voltage and noise isolation. The handheld controller includes both a polyphonic MID interface which can convert MIDI signals from either a keyboard, guitar, computer, or other compatible instrument, and can create up to two-note polyphonic playback of music through the Tesla Coil. There is also a standard interrupter mode which allows the user to vary both pulsewidth and pulse repetition frequency (PRF) during

operation. The controller can be customized by the end user, and also provides a number of hardware implemented fault protection schemes including pulsewidth limiting.

Safety Features

There are two primary safety features implemented into the Plasmasonic® 1.0:

- **Passive Bleeder system** – Bleed resistors are installed across each of the two (2) high voltage DC bus capacitors. These ensure that the energy stored in these capacitors is safely and quickly discharged to ensure safe handling of the system after power is disconnected. A discharge time of 5 minutes is required to ensure that the passive bleeder system will discharge energy in the DC bus capacitors to a safe level.
- **Active Crowbar system** – An active crowbar system is utilized to quickly discharge the energy in the two (2) high voltage DC bus capacitors as soon as power is disconnected from the system. The active crowbar system will discharge the DC bus capacitors in less than 5 seconds. In the event that the crowbar system fails, the passive bleeder system is available as a backup.

Options Available

The following options are available when specifying your Plasmasonic® 1.0 for when ordering:

Description	Options
Input Power	115VAC 50/60Hz (standard) 230VAC 50/60Hz
Power Cord Length	15 Foot (standard) 25 Foot 50 Foot (custom lengths also available)
Fiber Cable Length	5 Meter (standard) 10 Meter 15 Meter
Illumination	RGB onboard ctrl RGB wireless ctrl No illumination (standard)
Primary Coil Shield	None (standard) Polycarbonate shield
Instruction Manual	Digital PDF version (standard) Printed version
Warranty	Limited 1 year (standard) Extended, Limited Extended, Full Coverage

User Modification

As advertised, the Plasmasonic® 1.0 is designed for a nominal output arc length of 4 feet. This output arc length is specified at nominal input voltage conditions of 115VAC 50/60Hz. However, we do recognize that users may wish to experiment with the performance of the Tesla Coil and maximize the performance of their Plasmasonic® 1.0 system. There are several parameters which can be modified to increase the performance of the Plasmasonic® 1.0 system which include, but are not limited to:

- Increasing input voltage up to 170VAC.
- Increasing PW range on handheld controller
- Increasing PRF range on handheld controller
- Adjusting primary tuning
- Changing primary MMC capacitor value
- Changing topload configuration

During our prototype testing, we have achieved output arcs approach six (6) feet by increasing input voltage, modifying tuning, and increasing the PW and PRF range of the handheld modulator.

However, it is important to note that any modification to the Plasmasonic® 1.0 system will void any warranty and support agreements and also decrease the reliability of the system.

Warranty

A limited 1 year warranty is included on all Plasmasonic® 1.0 systems which covers any failure due to defective components or workmanship. Extended warranties are available. Please contact us for additional information regarding warranties for our Plasmasonic® Musical Tesla Coil systems.

Ordering / Quotes

Please contact the sales department at Eastern Voltage Research using the email address below for a custom quote or if you have any questions regarding the Plasmasonic® 1.0 system. Our sales team is available 24/7 to answer any questions you may have.

Sales Department
sales@eastervoltageresearch.com