



Woodruff Scientific Inc

4000 Aurora Ave N,

Suites 5 & 6, Seattle, WA 98103

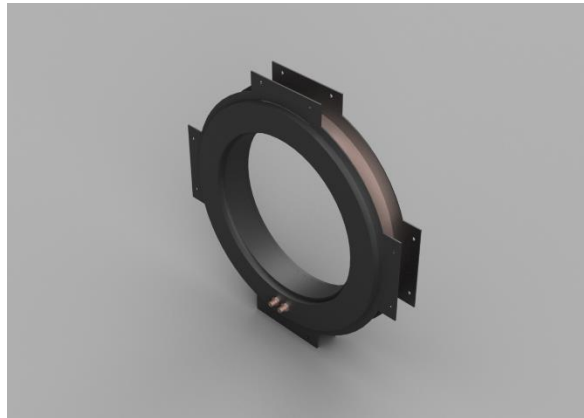
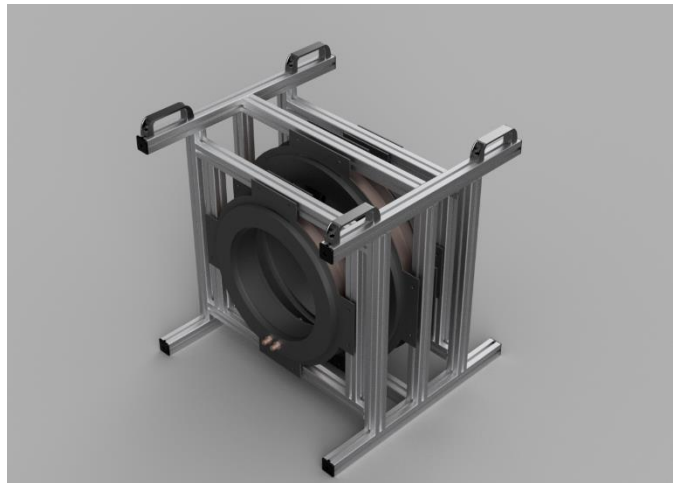
(206) 905 9477 8am to 5pm Pacific

[sales@woodruffscientific.com](mailto:sales@woodruffscientific.com)

<http://www.woodruffscientific.com>

**Model number(s):** MC-Air-WC

**Descriptive name:** Maxwell Coil set, water cooled for use in air



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### Features:

- Maxwell coil set mounted on Aluminum form and frame
- Custom field strength and duty-cycle options
- Water Cooled for extended continuous use (48 hours)
- Full water cooling system including chiller, pump, fittings, etc.
- Thermal monitoring connected to safety shutoff
- Designed to be used in air
- Custom sizing, spacing and materials based on customer specifications
- Custom harnessing
- Demountable assembly allows for repositioning of coils (variable distances)

### Operational ratings:

Temperature:  $\leq 150\text{C}$  (set by polyimide coating on wires)  
Field strength:  $\leq 10\text{ T}$  (set by fuse limit in wire)

### Options:

- Additional Coils  
Additional coils can be added to extend or shape the field.
- Water Cooling                      Included / Not-included  
Applications not requiring cooling can be provided.
- Electronics:                      Static / time-varying  
Power supplies can be provided to program waveforms of almost arbitrary functions, from continuous operation to low duty-cycle operations. Computer control can be provided as well as thermal monitoring.

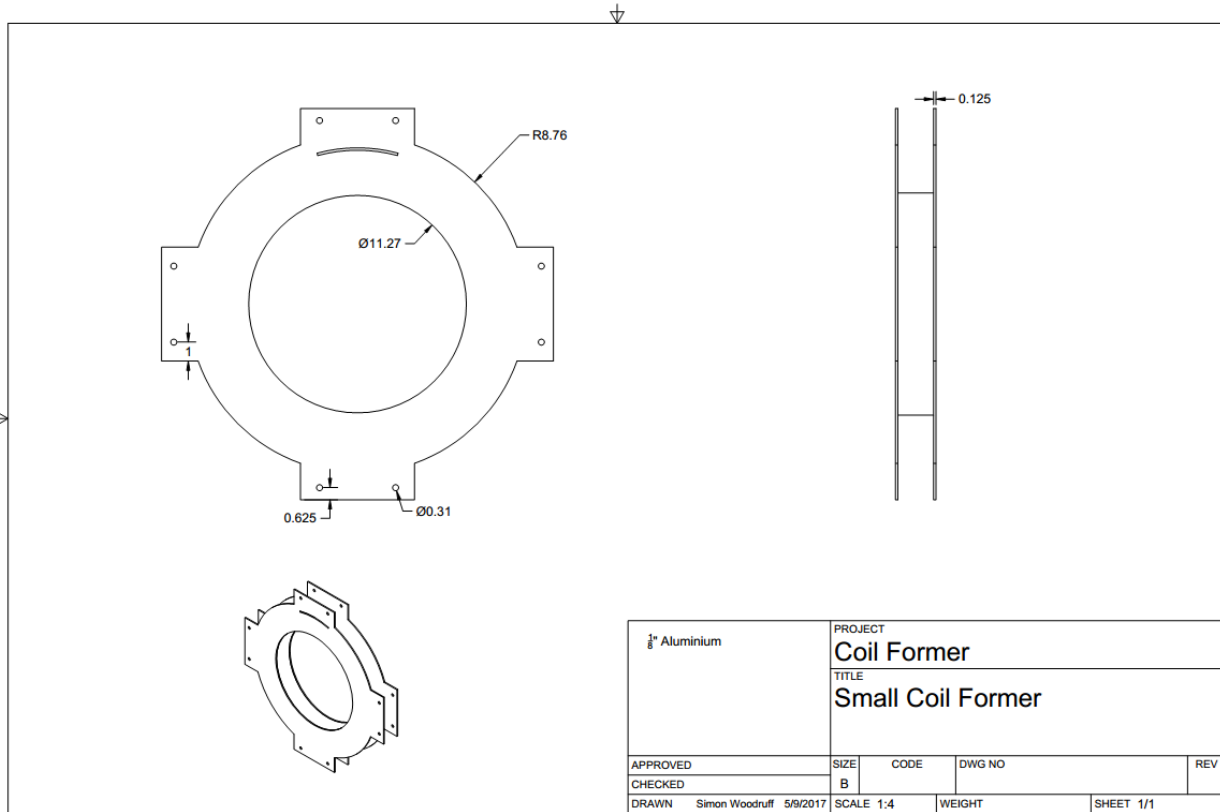


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**Engineering drawing:**



$\frac{1}{8}$ " Aluminium APPROVED CHECKED DRAWN Simon Woodruff 5/9/2017	PROJECT			
	Coil Former			
TITLE				
Small Coil Former				
SIZE	CODE	DWG NO	REV	
B				
SCALE 1:4		WEIGHT	SHEET 1/1	

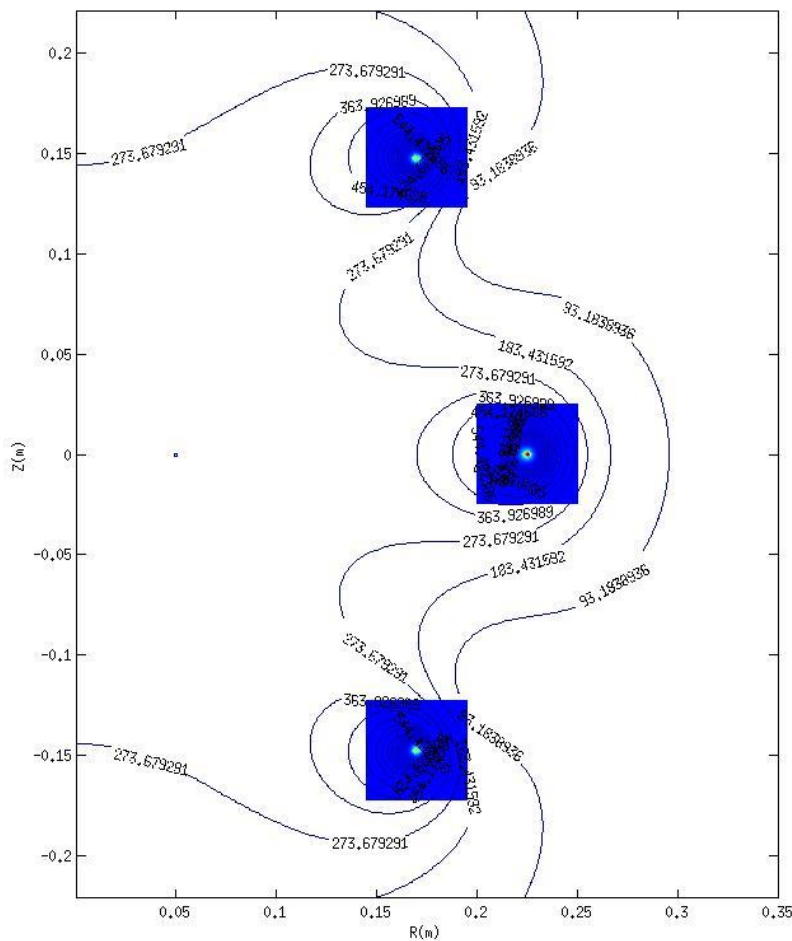


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### Flux plots





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## Thermal analysis

### Single Pulse HH

Coil current,	I = 12.50 A
Coil radius,	r = 0.10 m
Turns per coil,	n = 225.00
Max B,	B = 0.02 T
Max B,	B = 241.50 G
Radius of wire,	rw = 0.08 cm
Time,	t = 3.60e+03 s
Length of wire,	Lw = 282.69 m
Resistance,	R = 2.34 Ohms
Ohmic heating,	E = 1316628.68 J
Volume of Wire,	Vw = 568.38 cm <sup>3</sup>
Mass of Wire,	Mw = 4888.08 g
Temp. change,	dT = 699.62 C

### Multi-Pulse HH

Duty cycle,	duty = 1.00e+00
Cooling power,	P*duty = 365.73 W

Table 1. Thermal analysis (assuming no heat conduction).

## Customization:

In addition to the options listed previously, the Maxwell coil can be customized in many different ways. For example, if the application is for pulsed operation with timescales short relative to the resistive diffusion time through the coil form, then an insulating break can be provided in the coil form itself. Other customizations can include form materials selection, wire selection, harnessing, shroud, orientation (two axis systems) and so forth.