T&C
Power Conversion

0113M
RF POWER MODULE

T&C POWER CONVERSION

120 Watts RF Power at 13.56 MHz for Industrial and Laboratory Applications

FEATURING:

- **13.56 MHz up to 120 Watts in peak power**
- **Low harmonic level at 100W, better than –50 dBc any harmonic**
- **Measuring forward, reflected, and load power simultaneously**
- **DB-25 Interface Control & Monitoring of all RF Power Module functions.**
- **AGC Power Leveling: Output Power Control to better than ±1.5W of set value**
- **Pulse operation in MGC/Burst mode**

RF Power Module

RF Power Module 0113M is a robust source of RF power for laser modulation, plasma generation, general laboratory and general industrial applications.

Featuring leading edge solid state design for all generator stages and a built-in signal source, it provides everything for a complete and reliable, controlled RF power delivery system. It reflects the T&C ongoing commitment to provide RF power products of the highest quality, incorporating the current requirements for complete remote control and data acquisition features.

GENERAL

T&C generators are designed to be reliable, compact and light in weight. The use of conservatively rated components ensures high reliability and eliminates the need for periodic retuning.

OPERATION

The 0113M produces 120W of RF power at a frequency of 13.56 MHz, with low harmonic distortion. Power meters are calibrated into a 50 Ohm Load and they are accurate when unit operates into matched load. Outside of matched condition, the model 0113M's power measurement system provides an accurate reading of VSWR. High level VSWR is also monitored for protection of output stage and is set for 50W limit.

OUTPUT PROTECTION

0113M is protected by its internal monitoring system for 120 Watts of total Forward Power and 50W of Reflected Power. This will protect the RF power module output stage from extreme mismatch at the output.

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Safety

Labels

Labels are provided to alert operating and service personnel to conditions that may cause personal injury or damage to the equipment from misuse or abuse. Please read the labels and understand their meaning.

Important Operating or Maintenance Caution

Definition: Attention, consult accompanying document

The exclamation point within a triangle is to alert the user, operator or service personnel to the presence of important operating and/or maintenance instructions in the User's Manual.

Shock Hazard Warning

Definition: Caution, risk of electric shock

The lighting bolt within a triangle is to alert the user, operator or service personnel to the presence of unprotected voltage points within the enclosure of sufficient magnitude to cause dangerous electrical shock.

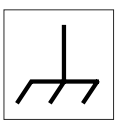
Only authorised service personnel with the schematic diagram and knowledge of the voltages within the equipment shall remove covers or panels bearing this symbol.

CAUTION WARNING

Do not operate this RF Power Source with the cover removed. Lethal voltages are present beneath the cover. The cover protects against **electrical shock** due to AC line voltage, high RF potential in the hundreds of Volts at the output transformer, coupler and output connections.

The cover is an integral part of the air ducting system that keeps components cool. Without the cover in place, insufficient air flows between and around will cause overheating of the internal components.

Always connect the load to the RF output connector before connecting the RF input to the amplifier. This will ensure that high voltage at the center pin of the output N connector will not be exposed. Take care not to interchange the input and output cables.



Chassis Terminal

Be sure the chassis is grounded to a reliable earth ground using the grounding stud provided on the rear panel.

0113M RF Power Source Specifications

Class Of Operation
Class B

Frequency Of Operation
13.56 MHz

Frequency Stability
0.005% or better

RF Power Output
120 Watts into 50 Ohm nominal

Internal RF Source
Crystal oscillator at 13.56 MHz

Input and Output Impedance
50 Ohm

IN / OUT VSWR
1.2:1 max - input
3:1 max - output

Output VSWR Protection
50 Watts max reflected power limit. Automatic, limits typically within 0.5 ms after reverse power reaches 50 Watts or power amplifier current preset limit.

Harmonic Level @ 100W
Better than -50 dBc for any harmonic.

Spurious Output
- 55 dBm equivalent noise level generated by internal circuits

Output Blanking/Pulsing
For pulsed applications, T&C amplifiers and generators offer blanking of the output signal for minimum noise RF spectrum. Less then 1µs Rise/Fall time

Dynamic Power Range
1 to 120W, settings within +/- 2W
Note: 0 to more than 120W

Output Control Interfaces (Communications)
SubD 25 Analog and Digital I/O

Power Monitor Scale Selection
User selectable levels down to 1 watt (in three (3) Scales) within tenths of watt accuracy.
Available scales:
1V=100W
5V=full power (default)
10V=full power

Pulse Specifications
Pulse Width from 2 µs to continues, user defined.

RF Power Margin
(Open Loop Max Power/Rated Power)-1)*100
>50 %

Rear Panel RF Connectors
OUTPUT N Female

DC Power Connection
Terminal Block

DC Circuit Protection
Internally fused on the main DC Power Supply, 7A.

DC Input Current
RF Out 120W:
48V DC - max. I = 6.0 A

NOTE! Module requires external 48VDC power supply.

Cooling
Forced air, temperature controlled, heatsink temperature monitored for equipment safety at 70C limit.

Dimensions
Case: H 89mm x W 200mm x L 292mm
(3.50” x 7.88” x 11.50”)

W/ connectors: H 89mm x W 200mm x L 316mm
(3.50” x 7.88” x 12.45”)

Weight
3.0 kg, 6.5 lbs.

Case
Aluminum Covers and Chassis.
Chassis designed to meet EMI RFI shielding requirements.

Mounting
Half Rack, 2U high. Mounting Kit included.

Environmental conditions
Temp.: 10° to 40° C ambient
Humidity: 80%
Equipment intended for ISM applications in laboratory and light industrial environment.

Analog Communication Port DB-25 Connection:

Pin #	Name of Signal	Signal Description
1	REV LIMIT - This output indicates that output power level was automatically reduced under load mismatch conditions.	TTL Compatible Hi = RF Out Limit, Lo = Normal operating condition at low VSWR. Signal Direction: **OUT**
2	REVERSE POWER	Linear voltage output, 5 Vdc = 120W scale (default, analog) Signal Direction: **OUT** **NOTE:** scale depends on pin4 and pin17
3	FORWARD POWER	Linear voltage output, 5 Vdc = 120W scale (default, analog) Signal Direction: **OUT** **NOTE:** scale depends on pin4 and pin17
4, 17	POWER MONITOR SCALE	5 Vdc = 120 W, Pin 4=Lo, Pin 17=Lo, (default setting, analog port) Signal Direction: **IN** **NOTE:** contact factory for other settings.
5	RF PWR REF	Linear voltage input, 5 Vdc = 120W scale - (default, analog). (Per selection on Pin 4 & 17, 1Vdc = 100W or 10 Vdc = 120W) Signal Direction: **IN** Part of AGC in default setting. Part of BURST if Pin 16 is Hi .
8	GENERATOR ENABLE / DISABLE **(RF ON/OFF)**	TTL Compatible; Hi = RF Output on, Lo = RF Output off, Signal Direction: **IN** **NOTE!** By default unit operates in AGC Mode.
9	HEAT SENSE - This output indicates that the unit has become too hot.	TTL Compatible; Hi = Fault/Amp disable, Lo = amplifier enabled Signal Direction: **OUT**
11	POWER ON: DC power applied to control circuit; indirect meaning AC is ON.	TTL Compatible Hi = Power ON, Lo = Power OFF Signal Direction: **OUT**
12	TEMPERATURE MONITORING	20 mV/C Signal Direction: **OUT**
14	BLANKING SIGNAL	TTL Compatible Hi = interrupts RF at output connector, Lo = uninterrupted operation. Signal Direction: **IN**
15	EXTERNAL BURST - Defines Pulse Time and Width input.	TTL compatible input: Hi - Burst RF Output Lo - Burst RF Off
16	EXTERNAL BURST CONTROL SELECT	TTL compatible input: Hi - RF External Burst Ready Lo - No Signal or Burst Off **NOTE!** when selected Pin 5 - RF PWR REF switches from AGC mode to MGC and defines the amplitude of output Burst.
20	POWER LOAD MODE ENABLE	TTL compatible input: Hi - Power Load Mode Enable Lo - Power Load Mode Off Signal Direction: **IN** NOTE: optional on special request.
18, 19, 21	ANALOG GROUND (BLANKING AND BURST RETURN)	Return for pin 14, 15 and 16
22	SOURCE	TTL Compatible; Lo (or nothing connected) - internal signal source Hi = external signal source selected Signal Direction: **IN**
24	POWER LOAD METER	Linear voltage output, 5 Vdc = 120W scale (default, analog) Signal Direction: **OUT** NOTE: optional on special request.
25	INTERFACE POWER	5 V dc (250 mA limited by electronic protection) Other levels of 10V and 12 V available! Please contact factory. Signal Direction: **OUT**