

# MATERIALS SCIENCE, INC.

Vacuum & Thin Film Technology

## DC/RF Power Supply Switches



- **Low cost method to sequentially run multiple sputtering sources using a single DC or RF power supply**
- **2, 3 or 4 output models**
- **2 power supply input models allow two power supplies (any combination of RF and DC) to be connected to a single switch. Each power supply can be switched between 1 of 2 outputs per power supply**

### Description

These modules provide an easy way to remotely switch the output or one or two power systems between two or more sputtering sources. This provides a cost-effective approach in many R&D environments. They can replace the need for multiple separate power supplies at considerable cost savings.

In the case of multiple sputtering sources using RF power, it is best that an individual impedance matching network be provided for each source, with the power switch located between the RF power generator and the impedance matching network. This ensures the individual load represented by each sputtering source can be optimized for different target materials and varied states of erosion. If the switch is located after the output of a single impedance matching network, it is likely that the network will have to be adjusted to compensate for significantly different loads (ie - metal target on one source and a dielectric target on the second source).

High quality vacuum relays are used in the switches instead of open frame relays. Vacuum relays are preferred because they are more robust and provide reliable long-term operation.

### Control

The user must provide the necessary 24 VDC (< 1 amp) signals needed to operate the relays from a PLC or computer control system. An optional 1/2 rack remote controller is available. The controller comes with a 10' control cable.

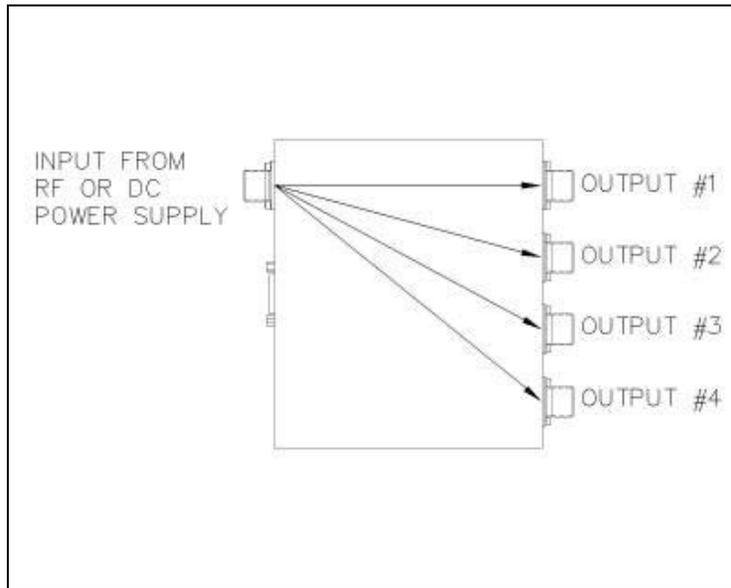


Two Input Switch

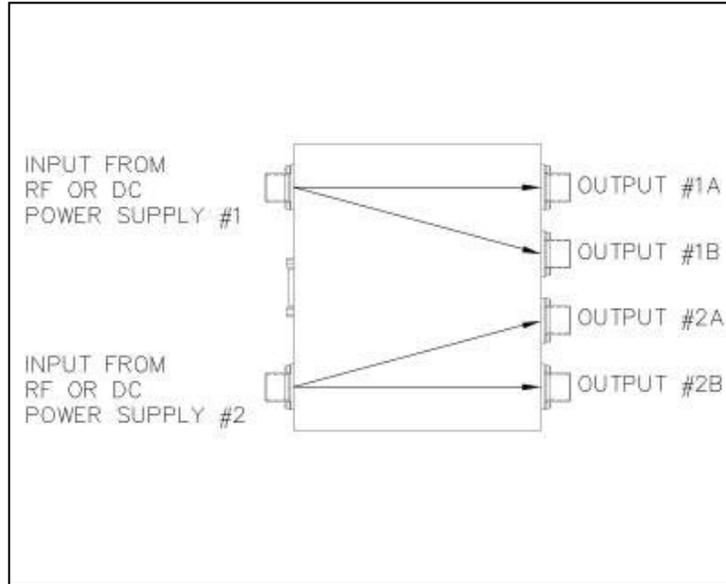


Optional Remote Controller

**One Power Supply Switched Between Up to 4 Outputs**



**One RF and One DC Power Supply (or two of each type)  
Connected to Switch Allows Two Outputs per Power Supply.  
Both Power Supplies Can be Run Simultaneously.**



**Ordering Information**

Part Number	Description
<a href="#">00002391-1</a>	RF/DC Switch - 1 input, 2 outputs. 3 watts to 5kW. All connectors are female HN.
<a href="#">00002391-2</a>	RF/DC Switch - 1 input, 2 outputs. 3 watts to 5kW*. All connectors are female UHF (SO 239)
<a href="#">00002391-3</a>	RF/DC Switch - 1 input, 2 outputs. 3 watts to 5kW*. All connectors are female N
<a href="#">00002383-1</a>	RF/DC Switch - 1 input, 3 outputs. 3 watts to 5kW. All connectors are female HN.
<a href="#">00002383-2</a>	RF/DC Switch - 1 input, 3 outputs. 3 watts to 5kW*. All connectors are female UHF (SO 239)
<a href="#">00002383-3</a>	RF/DC Switch - 1 input, 3 outputs. 3 watts to 5kW*. Female HN input, Female N output
<a href="#">00002392-1</a>	RF/DC Switch - 1 input, 4 outputs. 3 watts to 5kW. All connectors are female HN.
<a href="#">00002392-2</a>	RF/DC Switch - 1 input, 4 outputs. 3 watts to 5kW*. All connectors are female UHF (SO 239)
<a href="#">00002392-3</a>	RF/DC Switch - 1 input, 4 outputs. 3 watts to 5kW*. All connectors are female N.
<a href="#">00002392-4</a>	RF/DC Switch - 1 input, 4 outputs. 3 watts to 5kW*. Female HN input, Female N output
<a href="#">00002384-1</a>	RF/DC Switch - 2 inputs, 2 outputs per input. 3 watts to 5kW. All connectors are female HN.
<a href="#">00002384-2</a>	RF/DC Switch - 2 inputs, 2 outputs per input. 3 watts to 5kW*. All connectors are female UHF (SO 239)
00002555-X	Remote Controller in 19" 1/2 rack, 1U high enclosure, in 2, 3 or 4 output configurations

Note: Other connector set combinations are possible. Contact factory.

**Specifications**

Power Rating *	3 to 5000 watts when using HN connectors. See "Technical Considerations."
Input Connector(s) *	Female HN standard – Other connector types limit maximum power rating
Output Connectors *	Female HN standard – Other connector types limit maximum power rating
Size (L x W x H)	6.50" x 7.50" x 2.00" (165.10 mm x 190.50 mm x 50.80 mm)
Weight	3 pounds (1.36 kg)

## Technical Considerations

### Operation

Turn off the power supply before changing the power output selection. These switching modules are not interlocked and therefore the user will need to ensure that the relays are not "hot-switched" as extreme damage to the relays will occur.

This type of damage is not covered under warranty.

### Output Power Cable Length

We suggest that you use a maximum RG-393 cable length of 36" [915mm] when using RF power supplies. This length will limit the amount of lost RF power (as heat) and maximize the power transfer to the sputtering source.

DC magnetron power supplies should use cable lengths of 8-10' [2.5 - 3 meters].

### Coaxial Cable Types

**RF Power:** RG-393 should be used. Do not use RG-400 unless the power level is below 100 watts.

**DC Power:** RG-8/U should be used.

### Matching of Different RF Sputtering Cathode Impedance

Each user will require a somewhat different RF matching configuration based upon cable lengths, target materials and overall process conditions. A typical single sputtering source/impedance matching network combination is optimized to match just the connected source. If the user changes target materials (i.e. sputtering a metal and then changing to a dielectric), then the matching network may require adjustment of the series inductor (changing the tap setting) or in some cases the addition of fixed shunt capacitance. Always refer to the matching network instruction manual for specific information relating to setting up the match.

### \* Limits on Maximum Power Rating Due to Connector Types

The vacuum relays used in the switch are conservatively rated for 5kW service. However, of the three most common connectors used (HN, UHF and N), only HN connectors have a sufficiently high voltage rating (5000V Peak) to guarantee the 5kW rating. Depending upon where switches with UHF (500V Peak) or N (1500V Peak) connectors are located (at the output side of the matching network or in-between the power generator and the matching network) in RF systems or simply the connector type when used just with DC power supplies, the maximum power rating will be lower. Consult the factory for your specific situation.

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