American Magnetics, Inc.

P.O. Box 2509, 112 Flint Road, Oak Ridge, TN 37831-2509
Phone: (865) 482-1056 Fax: (865) 482-5472
Internet: http://www.americanmagnetics.com
E-Mail: support@americanmagnetics.com

AMI MODEL 4Q05100PS
4-QUADRANT POWER SUPPLY
INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS

I. INTRODUCTION

The AMI Model 4Q05100PS is designed to provide a compact, 4-quadrant capability for AMI power supply systems. The Model 4Q05100PS is designed to operate with the AMI Model 420 Power Supply Programmer.

II. SPECIFICATIONS

AC Input Voltage:	100-120 VAC or 200-240 VAC ±10%[1]
AC Input Frequency:	47 to 63 Hz
DC Output Current/Compliance:	See Graph 1
Power-Absorbing Mode[2] Rating:	See Graph 2
Output Overvoltage Protection:	±6 VDC (nominal)
Ambient Temperature Rating	0 to 40°C
PROGRAM IN Control Signal:	–10 to +10 VDC[3]
Output Voltage Noise:	0.6 mV RMS into 20 MHz BW (typical) 10 mV p-p into 20 MHz BW (typical) 75 mV p-p into 20 MHz BW (maximum)
Torque Limit on Current Terminals:	50 in-lbs.

[1] Input voltage range is selectable via an internal switch.

[2] The supply is in absorbing mode when the polarity of the output voltage is opposite the polarity of the current flow.

[3] Gain of 0.5 is applied to the voltage output of the unit.

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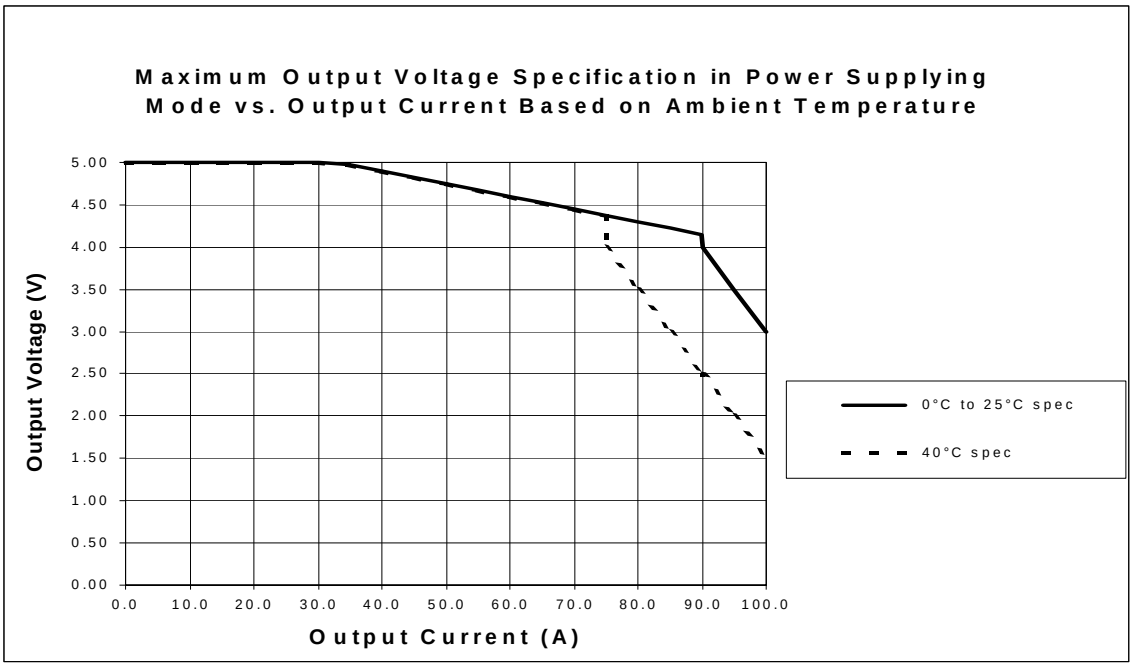
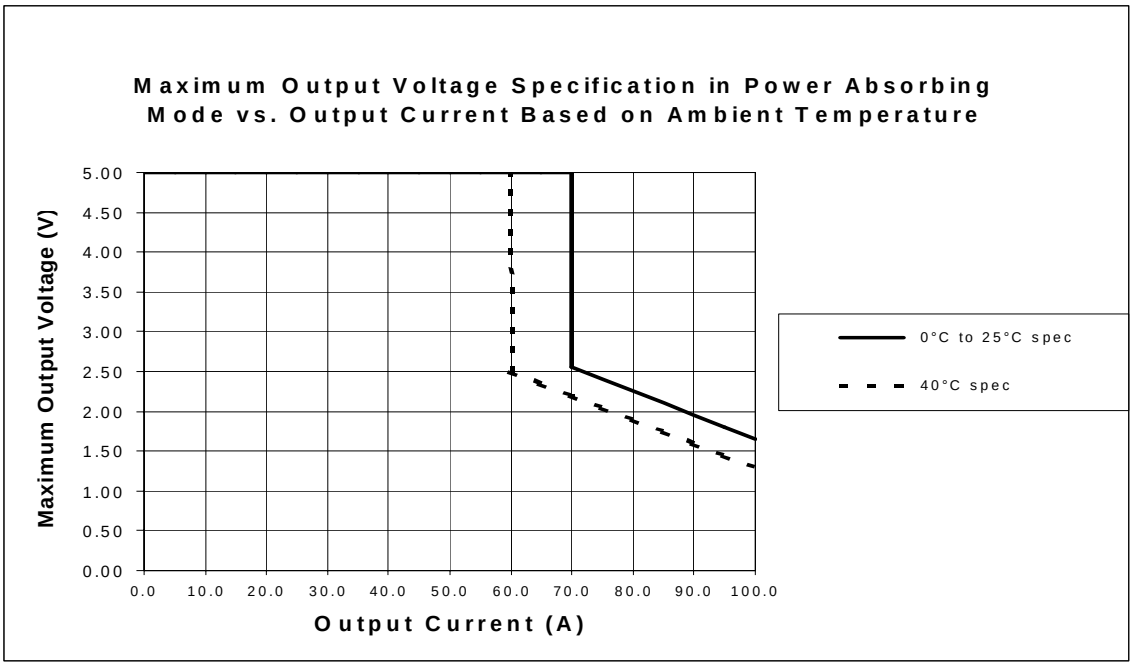


Graph 1



Graph 2

III. INSTALLATION

The AMI Model 4Q05100PS is designed to operate in an AMI power supply system consisting of a power supply programmer and a superconducting magnet. The following paragraphs document the procedures and interconnects necessary to use the Model 4Q05100PS.

> ***WARNING:*** *Before energizing the instrument, the earth ground of the power receptacle must be verified to be at earth potential and able to carry the rated current of the power circuit. Using extension cords should be avoided, however, if one must be used, ensure the ground conductor is intact and capable of carrying the rated current.*
>
> ***WARNING:*** *In the event that the ground path of the instrument becomes less than sufficient to carry the rated current of the power circuit, the instrument should be disconnected from power, labeled as unsafe, and removed from place of operation.*
>
> ***WARNING:*** *Do not operate this instrument in the presence of flammable gases. Doing so could result in a life-threatening explosion.*
>
> ***WARNING:*** *Do not modify this instrument in any way. If component replacement is required, return the instrument to AMI facilities as described in the Troubleshooting section of this manual.*
>
> ***WARNING:*** *If this instrument is used in a manner not specified in this manual, the protection provided by the design, manufacture and documentation of the instrument may be impaired.*

A. Carefully remove the Model 4Q05100PS from the shipping container and remove all packaging material.

> *NOTE: If there is any shipping damage, save all packaging material and contact the shipping representative to a file a damage claim. Do not return the instrument to AMI unless prior authorization has been received.*

B. If the Model 4Q05100PS is to be mounted in a rack:

1. Install horizontal support rails in the rack to support the weight of the Model 4Q05100PS. Securing the front panel alone is not adequate support for the weight of the unit.

2. Install the Model 4Q05100PS in the 19" wide instrument rack by securing the front panel to the rail in each of the four corners with mounting hardware supplied by the cabinet manufacturer.

C. Ensure the front panel power switch is in the OFF (**O**) position. Verify that the instrument is configured for the proper operating voltage by referring to the label adjacent to the power entry module on the rear panel of the instrument. If the operating voltage is correct, plug the line cord into the appropriate power receptacle.

> ***WARNING:*** *The Model 4Q05100PS operates on 50-60 Hz power and may be configured for 100-120 or 200-240 VAC. The power requirement for each instrument is marked on the rear panel of the instrument adjacent to the power entry module. Be sure your instrument is configured for your power source prior to plugging in the line cord. Do not fail to connect the input ground terminal securely to an external earth ground.*

If the instrument operating voltage needs to be changed, the unit must be returned to AMI.

D. Install the power supply in the superconducting magnet system. The figure on the following page illustrates the interconnects for an AMI Model 4Q05100PS power supply.

Connect the cabling in the following manner:

> ***CAUTION:*** *Do not overtighten the nuts on the current lugs of the Model 4Q05100PS (maximum torque is 50 in-lbs).Overtightening can result in damage to the terminals.*

> ***CAUTION:*** *Do not overtighten the nuts on Model 420. See Model 420 manual for torque specifications.*

1. Connect the positive (+) power supply terminal (1) to the positive vapor-cooled current lead (2) using 1/4-20 or similar hardware.

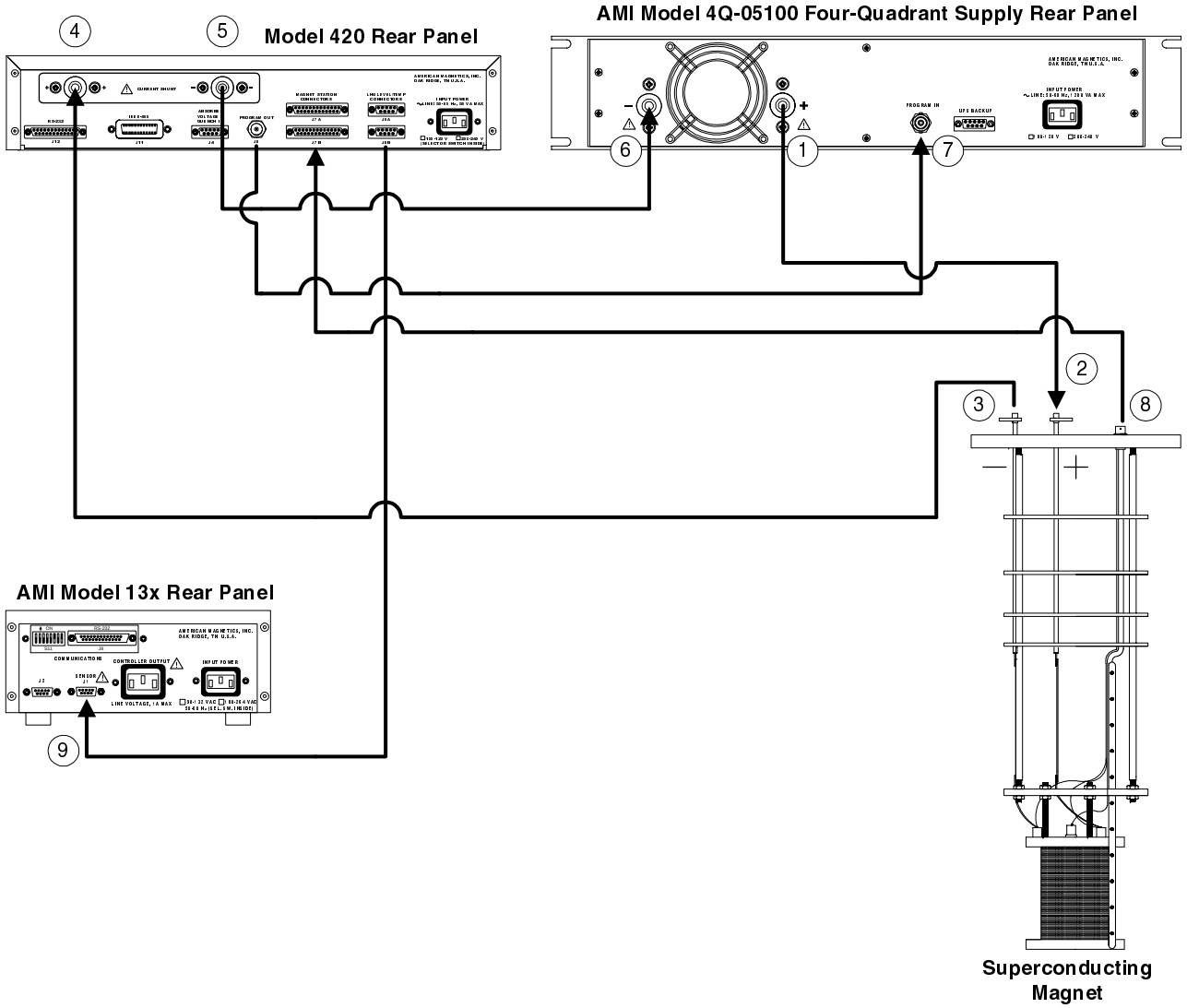
   > ***NOTE****: The use of locking hardware is recommended for all high current connections.*

2. Connect the negative vapor-cooled current lead (3) to the positive (+) shunt terminal (4) on the back of the Model 420.

3. Connect the negative (–) shunt terminal (5) on the back of the Model 420 to the negative (–) power supply terminal (6).

4. Connect the coaxial cable from the **PROGRAM OUT** connector on the back of the Model 420 to the **PROGRAM IN** connector (7) on the rear of the power supply.

5. Install an instrumentation cable between the magnet support stand top plate connector (8) and the magnet station connector J7A or J7B of the Model 420.



System interconnect diagram for the AMI Model 4Q-05100 power supply.

6. Install an instrumentation cable between the LHe/Temp connectors J8A and/or J8B on the rear of the Model 420 and the Model 13x Liquid Helium Level Instrument and/or temperature instrument (9).

7. Remote communications via IEEE-488 and/or RS-232 (or optional RS-422) can be accomplished by connecting suitable cabling to J11 and/or J12 of the Model 420, respectively.

IV. OPERATION

A. During normal operation of the Model 4Q05100PS, no operator intervention is required.

B. The Model 4Q05100PS is operating if the **POWER** switch is in the ON (**I**) position. The output voltage may be monitored via the **Vs** display (commanded supply voltage) of the Model 420.

C. Control of the Model 4Q05100PS is achieved by using the AMI Model 420 Power Supply Programmer ramping functions.

The Model 4Q05100PS **PROGRAM IN** is a –10 to +10 VDC input, which controls the output voltage of the unit using a gain factor of 0.5.

WARNING: *Exercise caution near the supply output terminals on the rear of the unit when operating a magnet. Metallic objects shorted across the terminals may conduct large DC currents which are capable of melting the object and causing severe burns.*

D. The **OUTPUT INHIBIT** switch functions as an emergency override. The output of the Model 4Q05100PS is forced to zero volts by activating the switch. If the switch is deactivated, the **PROGRAM IN** signal controls the output voltage of the Model 4Q05100PS.

Turning off the AC mains is not recommended during non-persistent magnet operation since the overvoltage protection of the Model 4Q05100PS will activate and discharge the magnet at ±6 VDC. The **OUTPUT INHIBIT** switch is the preferred alternative in the event of a system malfunction.

NOTE*: Once the* **OUTPUT INHIBIT** *switch has been activated, the Model 420 will no longer have control of the magnet system current. Before attempting to recharge the magnet, cycle the Model 420 power (to*

first clear any states resulting from the open-loop configuration) and then deactivate the **OUTPUT INHIBIT** *switch of the Model 4Q05100PS.*

V. MAINTENANCE

The only routine maintenance required is to keep the exterior surfaces of the instrument clean by gently wiping with a damp cloth moistened with a mild detergent. The front and rear panel vents of the Model 4Q05100PS should also be kept free of obstructions or excessive dust to allow for proper cooling of the unit.

VI. WARRANTY

All products manufactured by AMI are warranted to be free of defects in materials and workmanship and to perform as specified for a period of one year from date of shipment. In the event of a failure occurring during normal use, AMI, at its option, will repair or replace all products or components that fail under warranty, and such repair or replacement shall constitute a fulfillment of all AMI liabilities with respect to its products. All warranty repairs are F.O.B. Oak Ridge, Tennessee, USA.

VII. RETURN AUTHORIZATION

Items to be returned to AMI for repair (warranty or otherwise) require a return authorization number to ensure your order will receive the proper attention. Please call an AMI representative at (865) 482-1056 for a return authorization before shipping any item back to AMI.