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TITLE

**OPERATING MANUAL
 MODELS 5703, 5704**

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**OPERATING MANUAL
FOR
MODEL 5703, 5704
CAPACITOR CHARGING POWER SUPPLY**

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**Approval: _____
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TABLE OF CONTENTS

CAUTION 1

CAUTION (German) 2

LABELS 3

1.0 INTRODUCTION 4

2.0 ENVIRONMENTAL DATA 5

 2.1 Non-operating (transport and storage)..... 5

 2.2 Environmental Risk 5

3.0 SET-UP AND INTERFACE 6

 3.1 Mechanical Considerations 6

 3.2 Electrical Connections 6

4.0 OPERATION 12

 4.1 Power Up Sequence 12

 4.2 Power Down Sequence 12

 4.3 Cooling 12

5.0 MAINTENANCE 13

6.0 DOCUMENTATION 14

MODEL 5703, 5704

SPECIAL PRECAUTIONS

CAUTION

- Read this manual carefully before attempting to install or operate the model 5703, 5704.
- This unit contains no user serviceable parts. Manufacturer's warranty is void if field serviced.
- Proper installation is necessary to limit access to lethal voltages.

MODEL 5703, 5704

Spezielle Vorsichtsmaßnahmen

Achtung

- Lesen Sie bitte dieses Handbuch genau, bevor Sie das Modell 5703, 5704 anschließen oder in Betrieb nehmen.
- Reparaturen dürfen nur von autorisiertem Servicepersonal vorgenommen werden. Bei unbefugtem Öffnen des Gerätes erlischt die Herstellergarantie.
- Achtung: Teile können Hochspannung führen !!
Eine einwandfreie Installation ist notwendig um das unbeabsichtigte Berühren von tödlichen Hochspannungen unmöglich zu machen.

LABELS

<u>Abbreviations:</u>	A	amperes
	AC	alternating current
	°C	degrees Celsius
	CW	Continuous wave
	Hz	hertz
	IEC	International Electrotechnical Commission
	kHz	kilohertz
	kW	kilowatts
	kΩ	kiloohms
	(L)	line conductor, single phase system
	mA	milliamp
	mm	millimeter
	mV	millivolt
	(N)	neutral conductor, single phase system
	V	volts
	VAC	alternating voltage
	VDC	direct voltage
	W/°C	watts per degree Celsius
	Z	impedance
	OEM	original equipment manufacturer
	PFN	pulse forming network
	W	watts
	pk	peak
	HV	high voltage
	RTN	return
	N/C	no connection
	f/s	full scale
	Ω	ohms

Symbols:


 Protective Earth (ground) Terminal

 Local signal reference

~ Alternating Current

 Earth (ground)

=== Direct Current

 Dangerous Voltage

SECTION 1

INTRODUCTION

1.0 INTRODUCTION

The 5700 series isolated switch-mode power modules use proprietary power conversion techniques to provide the highest power density of any power module currently on the market. All models are designed to meet the isolation and leakage current requirements for UL2601-1 and IEC 601-1.

All supplies feature open circuit, short circuit, and thermal overload protection. Modules may also be paralleled to obtain higher average power. Please refer to drawing #P4705 Master/Slave Configuration for proper set-up for parallel operation of the chargers.

All supplies are available with optional active power factor correction.

The Model 5703 is a capacitor-charging module designed to repeatedly charge energy storage capacitors for pulsed solid-state laser applications.

The Model 5704 is a capacitor charging module designed to charge energy storage capacitors to a specified voltage and to maintain this output level for switched, variable pulsewidth solid-state laser applications.

SECTION 2
ENVIRONMENTAL DATA

2.0 ENVIRONMENTAL DATA

2.1 Non-operating (transport and storage)

Ambient Temperature:	-40°C to +70°C
Relative Humidity:	10% to 100%, non-condensing
Atmospheric Pressure:	500hPa to 1060hPa (7.25 to 15.37 psia)

2.2 Environmental Risk

The substances used in the product pose no known health or environmental risk associated with the disposal of the product at the end of their useful lives.

SECTION 3

SET-UP AND INTERFACE

3.0 SET-UP AND INTERFACE

3.1 Mechanical Considerations

Installation begins with mounting the module in a suitable enclosure which complies with the following criteria:

- A. Enclosure must provide protection against possible human contact with live parts.
- B. Enclosure must be adequately grounded to protective earth to ensure operator safety, or constructed entirely of a non-conductive material. In the latter case, all internal exposed metal parts must be grounded to protective earth.
- C. Enclosure must provide forced air cooling, 110 CFM minimum, through the module.

3.2 Electrical Connections

Electrical connections are made in three groups; the power input, HV output, and control interface groups. These groups are terminated in three different connectors.

3.2.1 Power Input Group

The power-input connector is a Molex 19-09-1039, using Molex 02-09-1104 terminals. The mating connector is a Molex 19-09-2039, using Molex 02-09-2103 terminals.

IEC 601-1 requires that both line and neutral be fused. Therefore, fuses should be installed in series with both the high and low sides of the mains. Recommended values for each version of the supply are listed below:

Four power input options exist:

	<u>Part Number Suffix</u>	<u>Fuse Rating</u>
115VAC (full wave rectified)	-PFC-C	15A
230VAC (full wave rectified)	-PFC-D	15A
325VDC (rectified, filtered 230VAC)	-NPFC-D	10A
380-415VAC (full wave rectified 3 ϕ)	-PFC-E	5A

Input power requirements for the modules are typically 2150W for the 5704, and 1850W for the 5703.

3.2.2 HV Output Group

The HV output connector is a Molex 19-09-1032, using Molex 02-09-1104 terminals. The mating connector is a Molex 19-09-2032, using Molex 02-09-2103 terminals

The HV output (red wire) should connect to the load capacitor bank. The HV RTN (black wire) should connect to the flashlamp common star ground.

Typical output power for the modules is 1750W for the 5704(-PFC), and 1500W for the 5703(-PFC). Power output will decline for any charger that is not operated at its full output voltage. Please refer to the output power charts for reduction of output power with reduction of output voltage.

3.2.3 Control Interface Group

The Control Interface connector is a standard 2X8 DIN header. The 3M part # is 929836-01-08.

Please refer to drawing #P4705 Master/Slave Configuration in the back of the manual for proper connection of I/O for parallel operation of the chargers.

The reference figures for each signal are schematic representations of the interface, and may be found on the 5703/5704 Interface Circuits pages.

The following standard (-1) connections are available:

PIN	Signal Name	Description
1	TEMPERATURE TEST POINT	Represents charger temperature as a DC voltage through 4.7k Ω of output impedance (reference figure 1). Refer to temperature test point data chart. Shutdown occurs at approximately 72°C.
2	PROGRAM RETURN	0 to 10V control differential input return (reference Figure 2).
3	PROGRAM VOLTAGE	0 to 10V control differential input (reference Figure 2).
4	SIGNAL RETURN	Used for low current signal output, and input returns.
5	24V RETURN	Main 24V power return
6	24V RETURN	Main 24V power return
7	PRIMARY INHIBIT	3.5 to 30V input to inhibit charger. 10k Ω load impedance (reference Figure 3).
8	N/C RESERVED	Pin 8 is removed so that connector can be keyed for proper orientation.
9	24 VOLT INPUT	24V at 250mA required to power control board.
10	24 VOLT INPUT	24V at 250mA required to power control board.

- | | | |
|----|-------------------|---|
| 11 | +5V REFERENCE | 5V reference with 100 Ω source impedance. 10mA maximum current draw. Overload on this line could interfere with normal charger operation (reference Figure 4). |
| 12 | N/C RESERVED | NO CONNECTION |
| 13 | OVERTEMP OUT | (16V maximum) Open collector output rated to 16V and capable of sinking up to 15mA. Fault indicated by low output signal (reference Figure 5). |
| 14 | N/C RESERVED | NO CONNECTION |
| 15 | END OF CHARGE | Diode isolated output of 15.5V capable of sourcing up to 15mA. Charge complete indicated by high output signal (reference Figure 3). |
| 16 | SECONDARY INHIBIT | Connected to end of charge line for master slave operation. Independent or master units cannot be connected in this manner (reference Figure 3). |

5703/5704 INTERFACE CIRCUITS

FIG. 1 TEMPERATURE TEST POINT

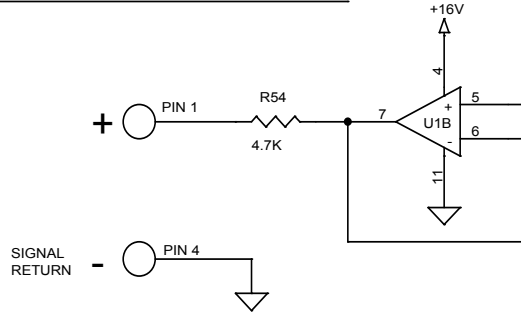
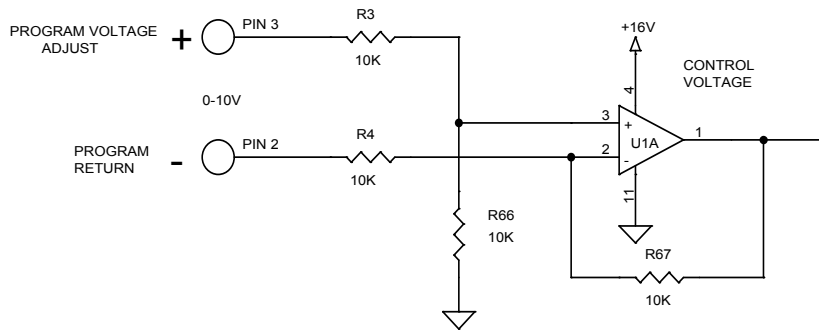
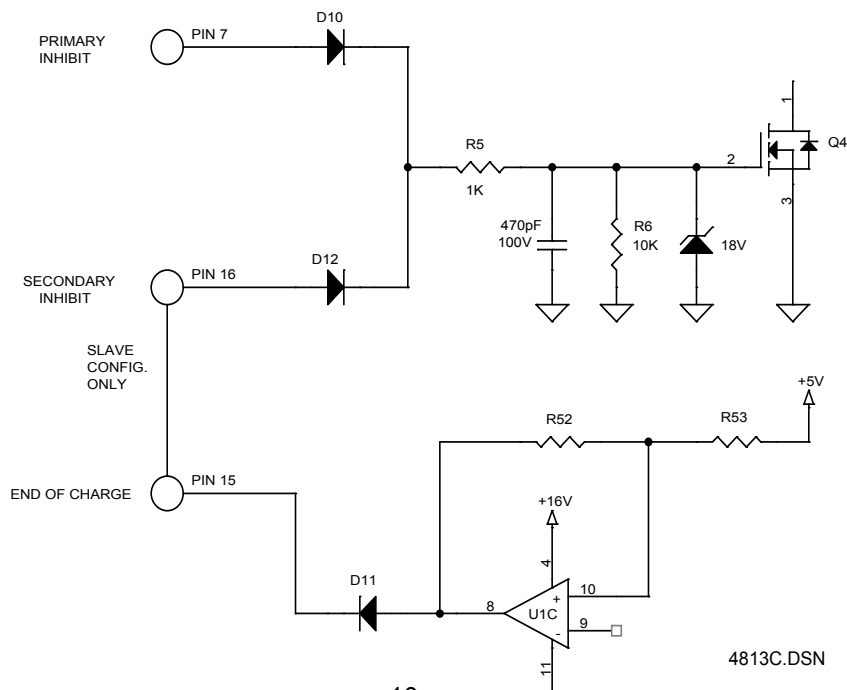


FIG. 2 PROGRAM VOLTAGE



0-10V CONTROL R66,67 = 10K
 0-5V CONTROL R66,67 = 20K

FIG. 3 INHIBIT / END OF CHARGE



4813C.DSN

5703/5704 INTERFACE CIRCUITS

FIG. 4 +5V REFERENCE

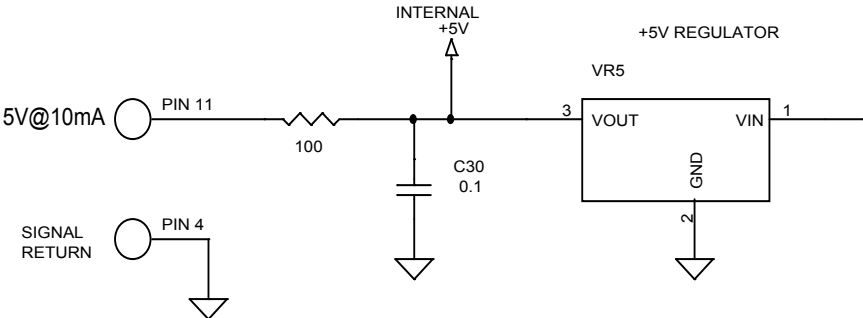
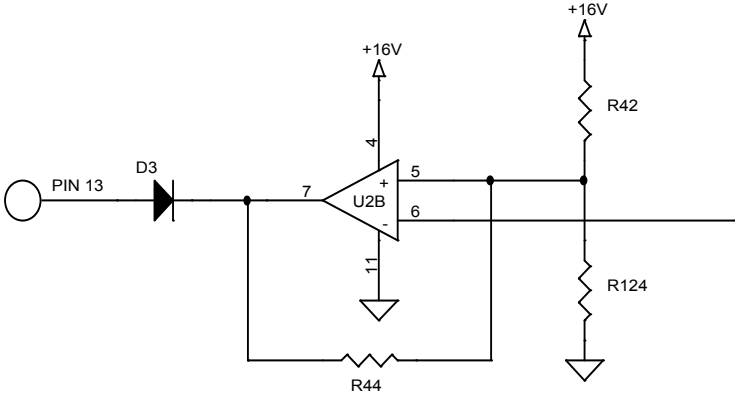


FIG. 5 OVER TEMP STATUS



SECTION 4

OPERATION

4.0 OPERATION

4.1 Power Up Sequence

Care must be exercised in the power up sequence. This is especially true with a microprocessor-controlled system. The proper power up sequence is as follows:

All external control circuitry should be powered up and stable before applying 24V to the power module. Fan(s) should also be running. Inhibit should be high and Program voltage should be 0V. Once these conditions are true, the 24V may be applied by the mains power input.

4.2 Power Down Sequence

Inhibit should be raised high and program voltage should be set to 0V. The 24V and mains power may then be removed.

4.3 Cooling

Adequate cooling must be maintained at all times the power module has power applied to it. An inadequate airflow will result in the temporary shutdown of one or more power modules. A fan with a minimum airflow of 110CFM (180m³/h) is recommended.

Ducting should be fabricated to ensure the maximum airflow through the power module. The switching FET heat sinks, which are visible on the end with the I/O connector, should be oriented toward the cooler air.

SECTION 5
MAINTENANCE

5.0 MAINTENANCE

No maintenance is required.

CAUTION

To prevent electric shock, do not remove screws. There are no user serviceable parts inside. Refer all servicing to factory qualified service personnel.

SECTION 6
DOCUMENTATION

6.0 DOCUMENTATION

Temperature Test Point Data

Power Declination Curves

Master – Slave Configuration (Dwg. 4705)

Declaration of Conformity

International Representatives

TEMPERATURE TEST POINT DATA

TEMPERATURE IN CENTIGRADE	TEST POINT VOLTAGE	TEMPERATURE IN CENTIGRADE	TEST POINT VOLTAGE
25°	5.28V	50°	7.23V
26°	5.38V	51°	7.29V
27°	5.48V	52°	7.34V
28°	5.57V	53°	7.39V
29°	5.66V	54°	7.44V
30°	5.76V	55°	7.49V
31°	5.85V	56°	7.55V
32°	5.94V	57°	7.58V
33°	6.03V	58°	7.62V
34°	6.11V	59°	7.67V
35°	6.20V	60°	7.71V
36°	6.29V	61°	7.75V
37°	6.36V	62°	7.79V
38°	6.44V	63°	7.82V
39°	6.51V	64°	7.85V
40°	6.59V	65°	7.89V
41°	6.67V	66°	7.92V
42°	6.74V	67°	7.95V
43°	6.81V	68°	7.99V
44°	6.88V	69°	8.02V
45°	6.94V	70°	8.05V
46°	7.00V	71°	8.07V
47°	7.06V	72°	8.10V
48°	7.12V	73°	8.13V
49°	7.17V	74°	8.15V

