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**OPERATING MANUAL
FOR
MODEL 5901

CW ARC LAMP POWER CONVERTER**

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MODEL 5901

SPECIAL PRECAUTIONS

CAUTION

- Read this manual carefully before attempting to install or operate the model 5901.
- 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.

LABELS

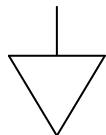
Abbreviations:

A	amperes
ac	alternating current
°C	degrees Celsius
cfm	cubic feet per minute
CW	Continuous wave
Hz	hertz
IEC	International Electrotechnical Commission
kHz	kilohertz
kW	kilowatts
(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

Symbols:



Protective Earth (ground) Terminal



Local signal reference

SECTION 1

INTRODUCTION

1.0 INTRODUCTION

The model 5901 is a highly efficient buck converter designed to deliver 6 kW of continuous power into CW short arc lamps.

Referring to the block diagram in Figure 5, 230 Vac is filtered and rectified to achieve an open circuit output of approximately 325 Vdc when the lamp is not conducting. With an appropriate lamp igniter module (such as the Model 592T and trigger transformer) and with the 5901 enabled, the lamp is struck and begins to pass current. Lamp current is sensed by the power module and controlled based upon the opto-isolated current demand. The Current Demand signal is proportional, with a 0.5-4.5 V control voltage producing 5-45 A of lamp current. The Enable is opto-isolated and requires 5 V to enable the unit.

User feedback is provided by isolated status lines for Voltage Sense and Current Sense. The scaling of the Current Sense output is the same as that for the Current Demand control input, 0.5-4.5 V represents 5-45 A of lamp current. The scaling of the Voltage Sense line is $\text{Lamp Voltage} \div 100$. An additional input is provided to inhibit the 5901 until the ac input circuit is charged. Please refer to the following sections on installation and operation of the Model 5901 for further details.

SECTION 2

SET-UP AND INTERFACE

2.0 SET-UP AND INTERFACE

2.1 Mechanical Considerations

Installation begins with mounting the module in a suitable enclosure that 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. Proper airflow must be maintained to prevent thermal shutdown. Two fans delivering 54.3 liters per second (115 cubic feet per minute) each are recommended in the position shown in Figure 6. A plenum that directs the airflow will help in extending the life of the product.

2.2 Electrical Connections

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

2.2.1 Power Input Group

The Model 5901 requires dc input of between 280 Vdc and 410 Vdc. Figure 5 shows a typical rectification circuit to produce this voltage, but power factor correction circuits can also be employed. As shown in Figure 5, the dc power is applied at E7 (+) and E5 (-). E7 and E5 are 0.25" wide quick-disconnect terminals. The screw on the side of the unit and identified with the Protective Earth Ground symbol must also be connected to the Protective Earth conductor of the system power cord.

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. The values of the fuses depend on the type of input power circuit used. Recommended values are as follows:

<u>Input Power</u>	<u>Fuse Rating</u>
230 Vac, 1 ϕ (non-power factor corrected)	60 A
230 Vac, 1 ϕ (power factor corrected)	40 A
208 Vac, 3 ϕ (rectified, filtered)	30 A

2.2.2 HV Output Group

0.25" wide quick-disconnect terminals are also used to connect the Model 5901 to an appropriate Igniter circuit (E10, E6 shown connected to AMI Model 592T in Figure 5) and to the lamp load and/or trigger transformer (E1, E2 and E8, E11 shown connected to differential trigger transformer, T1, in Figure 5).

One additional connection (J5) is required from the Model 5901 if it is to be used with an AMI Igniter Module (Model 592T or 592A). J5 is a 2-pin locking header with 0.1" pin spacing and must be connected to the Igniter module to change the state of a relay when the lamp load breaks down and goes into conduction. As shown in Figure 5, J5-1 must be connected to E17 on the Model 592T Igniter for proper operation. Contact the factory for use of the Model 5901 with other Igniter modules.

2.2.3 Control Interface Group

Control of the Model 5901 is achieved through a locking 8-pin single row header with 0.1" pin spacing (J10). All connections at J10 are electrically isolated from ac mains. The reference figures for each signal are schematic representations of the interface, and may be found on the 5901 Interface Circuits pages. The following connections are available:

PIN	Signal Name	Description
1	CURRENT SENSE	Represents lamp current as a dc voltage through 1 k Ω of output impedance. Scaling is 0.5 to 4.5 V proportional to 5 to 45 A. (Reference Figure 1).
2	CURRENT DEMAND	0.5 to 4.5 V single ended control voltage produces 5 to 45 A of lamp output current. (Reference Figure 2).
3	ENABLE IN	Opto-isolated with internal 1 k Ω current limiting series resistor. Requires 5 V to enable. (Reference Figure 3).
4	ENABLE RETURN	Return for opto-isolated enable. (Reference Figure 3).
5	24 V INPUT	24 V power input for control circuits. Requires approximately 30 mA.
6	24 V RETURN	24 V power return. Can also be used as ground reference for other interface circuits.
7	NO CONNECTION	Reserved
8	VOLTAGE SENSE	Represents lamp voltage as a scaled dc voltage through 100 Ω . Scaling is actual lamp voltage \div 100. (Reference Figure 4).

One additional connection must be made by the user to inhibit the Model 5901 until the input power circuit has been charged. J1 is a locking 2-pin header with 0.1" pin spacing and must be connected to an external circuit as is shown in Figure 5.

INTERFACE CIRCUITS

5901

FIG.1 CURRENT SENSE

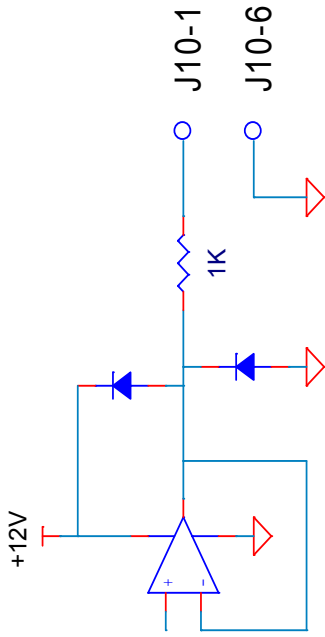


FIG.3 ENABLE

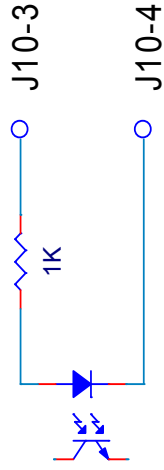


FIG.2 CURRENT DEMAND

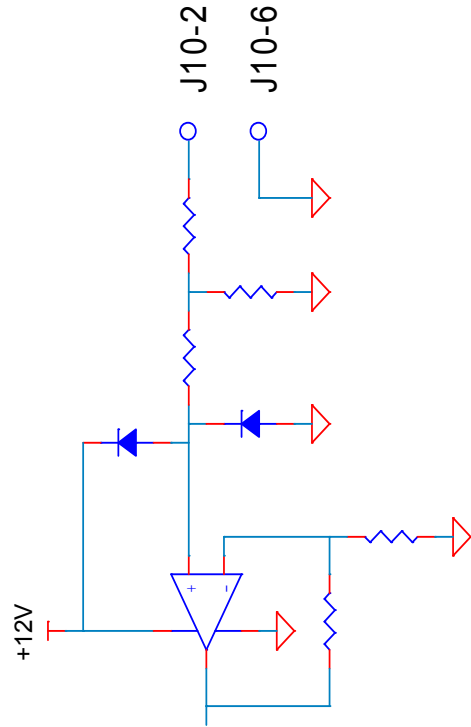
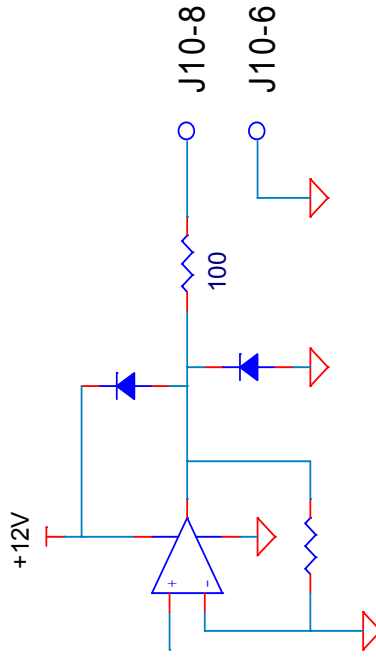


FIG.4 VOLTAGE SENSE



SECTION 3

OPERATION

3.0 OPERATION

3.1 Power Up Sequence

Care must be exercised in the power up sequence to prevent damage to the unit. The proper power up sequence is as follows:

- 1) Ensure that the Enable (J10-3) is off, the Current Demand (J10-2) is equal to 0.5 V, and an appropriate dc power input circuit (as shown in Figure 5) is connected to the 5901 but is un-energized.
- 2) Apply 24 Vdc to J10-5.
- 3) Allow the power input circuit to charge.
- 4) Once the power input circuit has charged and the customer inhibit at J1 has timed out, verify fans are blowing.
- 5) Enable the Model 5901 by applying 5 V to J10-3. The 5901 will now charge the Igniter circuit and cause the lamp to ignite. With 0.5 V applied to the Current Demand input, the lamp current should be approximately 5 A.

CAUTION: The Model 5901 should not be operated at less than 5 A.

- 6) Raise the Current Demand to the desired level.

3.2 Power Down Sequence

- 1) Lower Current Demand to 0.5 V.
- 2) Remove 5 V from Enable.
- 3) Remove power input from unit (de-energize power input circuit).

CAUTION: The Model 5901 has input capacitors that must be discharged externally before touching the unit or electric shock may result.

- 4) Remove 24 V from J10-5.

3.3 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 the power module. Two fans each with a minimum airflow of 115 cfm are recommended.

Ducting should be fabricated to ensure the maximum airflow through the power module. The large heatsinks to which the switching IGBTs are mounted should be oriented towards the cooler air.

CAUTION: ALL CONNECTIONS TO THE MODEL 5901 EXCEPT J10 ARE AT ac MAINS POTENTIAL RELATIVE TO EARTH GROUND.

The power module is rated at 6 kW. For a 133 V lamp this implies 45 A maximum. For higher voltage lamps the current must be reduced proportionally.

CAUTION: LAMP CONNECTIONS ARE AT ac MAINS POTENTIAL RELATIVE TO EARTH GROUND

Ambient operating temperatures must be limited to between 0°C and 40°C for safe operation. Output power of 6 kW is guaranteed up to 40°C.

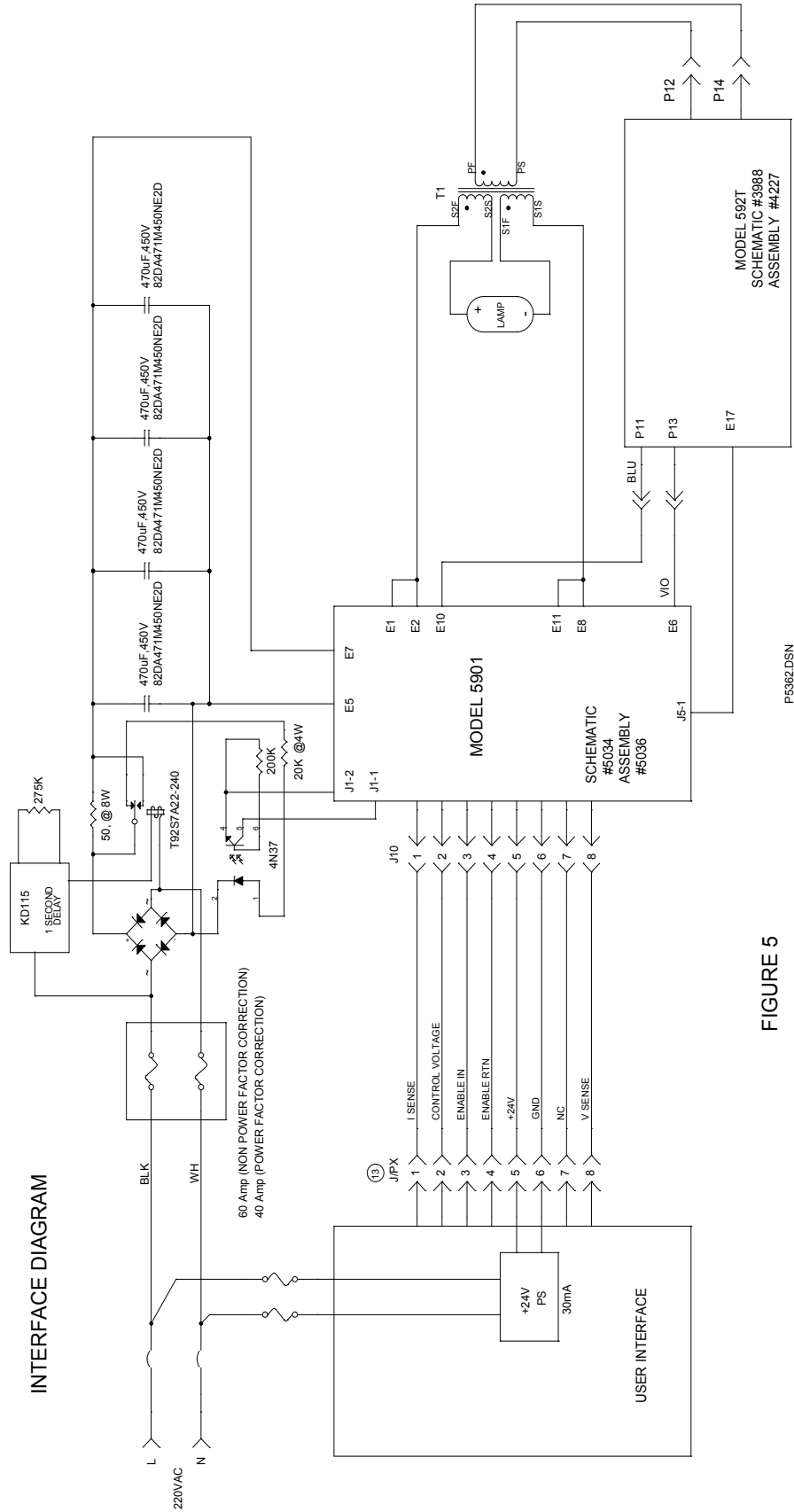


FIGURE 5

PS362 DSN

RECOMMENDED AIRFLOW & ELECTRICAL CONNECTIONS

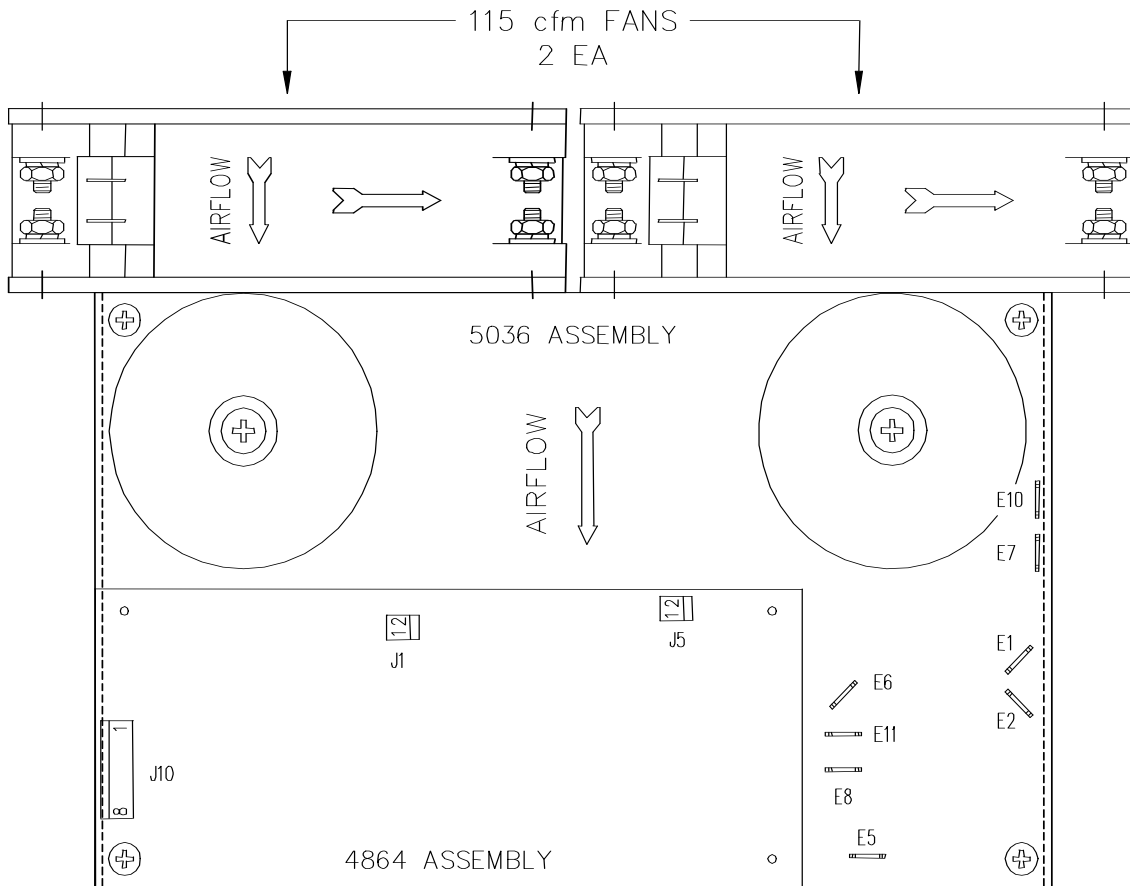


FIGURE 6

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