



Sorensen

SGWC Series Liquid-Cooled DC Power Supplies

Operation Manual Addendum

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Product Family: SGWC Series Liquid-Cooled DC Power Supplies

Warranty Period: 18 Months

WARRANTY TERMS

AMETEK Programmable Power, Inc. ("AMETEK"), provides this written warranty covering the Product stated above, and if the Buyer discovers and notifies AMETEK in writing of any defect in material or workmanship within the applicable warranty period stated above, then AMETEK may, at its option: repair or replace the Product; or issue a credit note for the defective Product; or provide the Buyer with replacement parts for the Product.

The Buyer will, at its expense, return the defective Product or parts thereof to AMETEK in accordance with the return procedure specified below. AMETEK will, at its expense, deliver the repaired or replaced Product or parts to the Buyer. Any warranty of AMETEK will not apply if the Buyer is in default under the Purchase Order Agreement or where the Product or any part thereof:

- is damaged by misuse, accident, negligence or failure to maintain the same as specified or required by AMETEK;
- is damaged by modifications, alterations or attachments thereto which are not authorized by AMETEK;
- is installed or operated contrary to the instructions of AMETEK;
- is opened, modified or disassembled in any way without AMETEK's consent; or
- is used in combination with items, articles or materials not authorized by AMETEK.

The Buyer may not assert any claim that the Products are not in conformity with any warranty until the Buyer has made all payments to AMETEK provided for in the Purchase Order Agreement.

PRODUCT RETURN PROCEDURE

1. Request a Return Material Authorization (RMA) number from the repair facility (**must be done in the country in which it was purchased**):
 - **In the USA**, contact the AMETEK Repair Department prior to the return of the product to AMETEK for repair:
Telephone: 800-733-5427, ext. 2295 or ext. 2463 (toll free North America)
858-450-0085, ext. 2295 or ext. 2463 (direct)
 - **Outside the United States**, contact the nearest Authorized Service Center (ASC). A full listing can be found either through your local distributor or our website, www.programmablepower.com, by clicking Support and going to the Service Centers tab.
2. When requesting an RMA, have the following information ready:
 - Model number
 - Serial number
 - Description of the problem

NOTE: Unauthorized returns will not be accepted and will be returned at the shipper's expense.

NOTE: A returned product found upon inspection by AMETEK, to be in specification is subject to an evaluation fee and applicable freight charges.

IMPORTANT SAFETY INSTRUCTIONS

Before applying power to the system, verify that your product is configured properly for your particular application.

 WARNING	Hazardous voltages may be present when covers are removed. Qualified personnel must use extreme caution when servicing this equipment. Circuit boards, test points, and output voltages also may be floating above (below) chassis ground.
 WARNING	The equipment used contains ESD sensitive ports. When installing equipment, follow ESD Safety Procedures. Electrostatic discharges might cause damage to the equipment.

Only *qualified personnel* who deal with attendant hazards in power supplies, are allowed to perform installation and servicing.

Ensure that the AC power line ground is connected properly to the Power Rack input connector or chassis. Similarly, other power ground lines including those to application and maintenance equipment *must* be grounded properly for both personnel and equipment safety.

Always ensure that facility AC input power is de-energized prior to connecting or disconnecting any cable.

In normal operation, the operator does not have access to hazardous voltages within the chassis. However, depending on the user's application configuration, **HIGH VOLTAGES HAZARDOUS TO HUMAN SAFETY** may be normally generated on the output terminals. The customer/user must ensure that the output power lines are labeled properly as to the safety hazards and that any inadvertent contact with hazardous voltages is eliminated.

Guard against risks of electrical shock during open cover checks by not touching any portion of the electrical circuits. Even when power is off, capacitors may retain an electrical charge. Use safety glasses during open cover checks to avoid personal injury by any sudden component failure.

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SAFETY SYMBOLS



WARNING
Risk of Electrical Shock



CAUTION
Refer to Accompanying Documents



Off (Supply)



Direct Current (DC)



Standby (Supply)



Alternating Current (AC)



On (Supply)



Three-Phase Alternating Current



Protective Conductor Terminal



Earth (Ground) Terminal



Fuse



Chassis Ground

ABOUT THIS MANUAL AND REGULATORY COMPLIANCE

This manual has been written for the Sorensen SGA Series of liquid-cooled power supplies, which have been designed and certified to meet the Low Voltage and Electromagnetic Compatibility Directive Requirements of the European Community.

These models have been designed and tested to meet the Electromagnetic Compatibility directive (European Council directive 2004/108/EC; generally referred to as the EMC directive) and to the requirements of the Low Voltage directive (European Council directive 2006/95/EC, 93/68/EEC, dated 22 July 1993). In addition these models have been found compliant with FCC 47 CFR Part 15, Subpart B107(e) Class A, 109(g) Class A.

Since the low voltage directive is to ensure the safety of the equipment operator, universal graphic symbols have been used both on the unit itself and in this manual to warn the operator of potentially hazardous situations (see safety instruction page).

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1 OVERVIEW

1.1 ADDENDUM SCOPE

This addendum presents differences in features, specifications, and operating characteristics between the SGA40W250D-1DAABG and SGA60W250D-1DAABG models, and the standard SGA models.

1.2 REFERENCE DOCUMENT

Standard SG Operating Manual, M550129-01

1.3 GENERAL DESCRIPTION

The Sorensen SGWC models, SGA40W250D-1DAABG and SGA60W250D-1DAABG, are general-purpose power supplies that utilize an integral coldplate/heat-exchanger assembly for liquid cooling that eliminates the necessity for supplying airflow through the unit, as required with forced-convection air cooling. This simplifies installation by eliminating the need for clearance to intake/exhaust air grilles, and reduces local facilities cooling requirements by lowering the heat load presented by the power supplies. Also, since external ambient air is not drawn into the chassis, the power supplies are protected in demanding environments from internal contamination caused by ingestion of air-borne particulates.

1.4 SPECIFICATIONS

The following subsections provide environmental, electrical, and physical characteristics for the SGWC Series liquid-cooled power supplies.

Note: Specifications are subject to change without notice.

1.4.1 ENVIRONMENTAL CHARACTERISTICS

1.4.1.1 LIQUID COOLING

The coolant is limited to water or a water/ethylene-glycol mixture compatible with cooling assembly components comprised of copper and brass materials. Use of ethylene glycol as an additive is permitted (automotive antifreeze is not allowed), but will reduce the cooling

effectiveness due to the lower heat capacity of the mixture; a concentration limit of 30% by weight is recommended. No airflow for cooling is required through the unit or over the exterior of the chassis.

1.4.1.2 INLET COOLANT TEMPERATURE

30°C, maximum operating temperature at full-rated output power; internal temperature sensors protect against overtemperature, and will shut down individual power modules if their internal temperature limits are exceeded; after overtemperature shutdown, the unit must be allowed to cool down, and reset (e.g. cycling AC input power), before normal operation could be resumed.

The operating temperature of the coolant must ensure that freezing does not occur, and that the temperature of the coolant is above the dew point in order to prevent condensation. The minimum allowed operating temperature, 0 °C, would require the use of an ethylene/glycol mixture to prevent freezing. Freezing could result in permanent damage to the cooling assembly because of the resulting mechanical stresses.

Storage temperatures at 0°C and below will require an ethylene/glycol mixture to prevent freezing. With the recommended 30% mixture (by weight), the temperature must be greater than -15°C.

1.4.1.3 COOLANT FLOW RATE

1.25 GPM, minimum, and 2 GPM, maximum, with water coolant; water/ethylene-glycol mixtures will require higher flow rates to compensate for the lower heat capacity of the coolant.

1.4.1.4 STATIC PRESSURE

80 PSI, maximum

1.4.1.5 STATIC PRESSURE DIFFERENTIAL

8 PSI, typical, at 1.5 GPM, inlet to outlet pressure difference with water coolant

1.4.1.6 COOLANT TEMPERATURE RISE

5.7 °C, typical, based on 87% efficiency at 15kW, and water coolant at 23°C and 1.5 GPM flow rate

1.4.1.7 COOLANT QUALITY

The water quality should be controlled to preclude corrosion from high oxygen content, chlorides, sulfates or bicarbonates, and excessive pH, and scaling from deposition of minerals such as calcium or magnesium. An inlet filter is recommended to eliminate particles that could clog coolant passages. Water with very low resistance (e.g., with high dissolved salt content) or very high resistance (e.g., de-ionized water without corrosion inhibitor) is not allowed because of degradation resulting from corrosion.

1.4.1.8 CONDENSATION

Internal condensation must be prevented by ensuring that the temperature of the coolant is sufficiently high compared with the ambient air. The critical temperature is the dew point, and is dependent on the air temperature and its relative humidity.

**WARNING**

The temperature of the inlet water must be above the dew point to prevent internal condensation.

1.4.1.9 CHASSIS COOLANT CONNECTION

Chassis inlet and outlet: 3/8" FNPT brass bulkhead fittings, double-D with 1.25" outer diameter and 1.125" across flats

Quick-Disconnect Option:

Chassis adapter fitting: Swagelok # B-6-AT-6

Chassis quick-disconnect plug: SMC # KKA4P-03M

Mating quick-disconnect socket: SMC # KKA4S-03M

1.4.2 ELECTRICAL CHARACTERISTICS**1.4.2.1 AC INPUT POWER FACTOR**

0.95%, typical, at full-rated load and nominal AC input voltage

1.4.2.2 AC INPUT CURRENT

32AAC, maximum, at 342VAC input, full-rated load, 87% efficiency, 0.95 power factor

1.4.3 PHYSICAL CHARACTERISTICS**1.4.3.1 DIMENSIONS****EIA-310 3U chassis size:**

Width: 19.00 in (48.3 cm), front panel

Depth: 25.95 in (65.9 cm), rear of front panel to rear panel, with additional protrusion from rear panel of 1.48 in (3.76 cm) to output busbars and 2.50 in to plastic busbar cover

Height: 5.22 in (13.3 cm), front panel

1.4.3.2 WEIGHT

10kW unit: 85 lb (38.6 kg); 15kW unit: 97 lb (44.0 kg)

1.4.4 SAFETY AGENCY APPROVAL

This product has been designed and manufactured to industry standards that ensure appropriate levels of protection for operator safety. It is designed to meet the requirements of the CE Mark as specified per safety standard EN 61010-1. This page intentionally left blank.

2 INSTALLATION

2.1 COOLANT CONNECTIONS

The inlet and outlet coolant connections are made at the rear panel of the chassis. Bulkhead fittings (3/8" FNPT, double-d with 1.25" outer diameter and 1.125" across flats) are provided for both inlet and outlet connections, which allows adaptation to specific installation plumbing using user-installed adapter fittings.

The adapter fittings should be suitably tightened for 3/8" pipe thread. In general, the fitting should be tightened to 2-3 turns from finger tight. The bulkhead fitting must be held stationary (using a 1 1/8" wrench) while the adapter fitting is tightened. Suitable thread sealant, such as Teflon tape or pipe joint compound, should be used to prevent leaks. If Teflon tape is used, tightly wind 1 1/2 turns in a clockwise direction (when viewed looking towards the threaded end).

2.2 CHASSIS RACK MOUNTING

The chassis could be mounted with rack slides or L-brackets. Refer to the standard SG Operating Manual, M550129-01, for rack mount assembly instructions. The chassis has seven 8-32 PEM nuts on the sides for mounting to slides. As shipped, 5/16" SEMS screws are installed in these locations to sealed the holes from air ingress. These screws should be retained if the PEM nuts are not used for installation.

The slides of Ametek kit, P/N K550212-01, must be modified to be used with the SGWC chassis. The slides must be drilled with an alternate hole pattern for three 8-32 mounting screws, per Figure 2-1. When the slide is mounted on the right-side of the chassis (as viewed from the front), the second screw from the rear is not used.



WARNING

To prevent the possibility of a shock hazard, the chassis protective ground stud must be connected to the utility service safety ground.

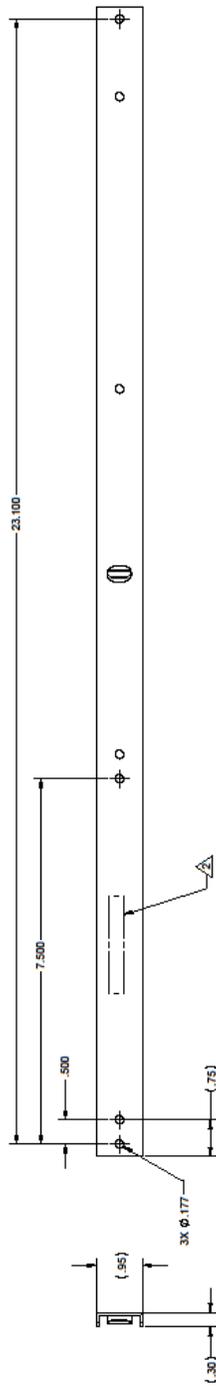


Figure 2-1. SGWC Rack Slide Modification

2.3 INSTALLATION DRAWINGS

Figure 2-2 shows the outline drawing and the overall dimensions of the 3U models.

Figure 2-3 and Figure 2-4 show information on the rear panel and front panel connections and controls, respectively.

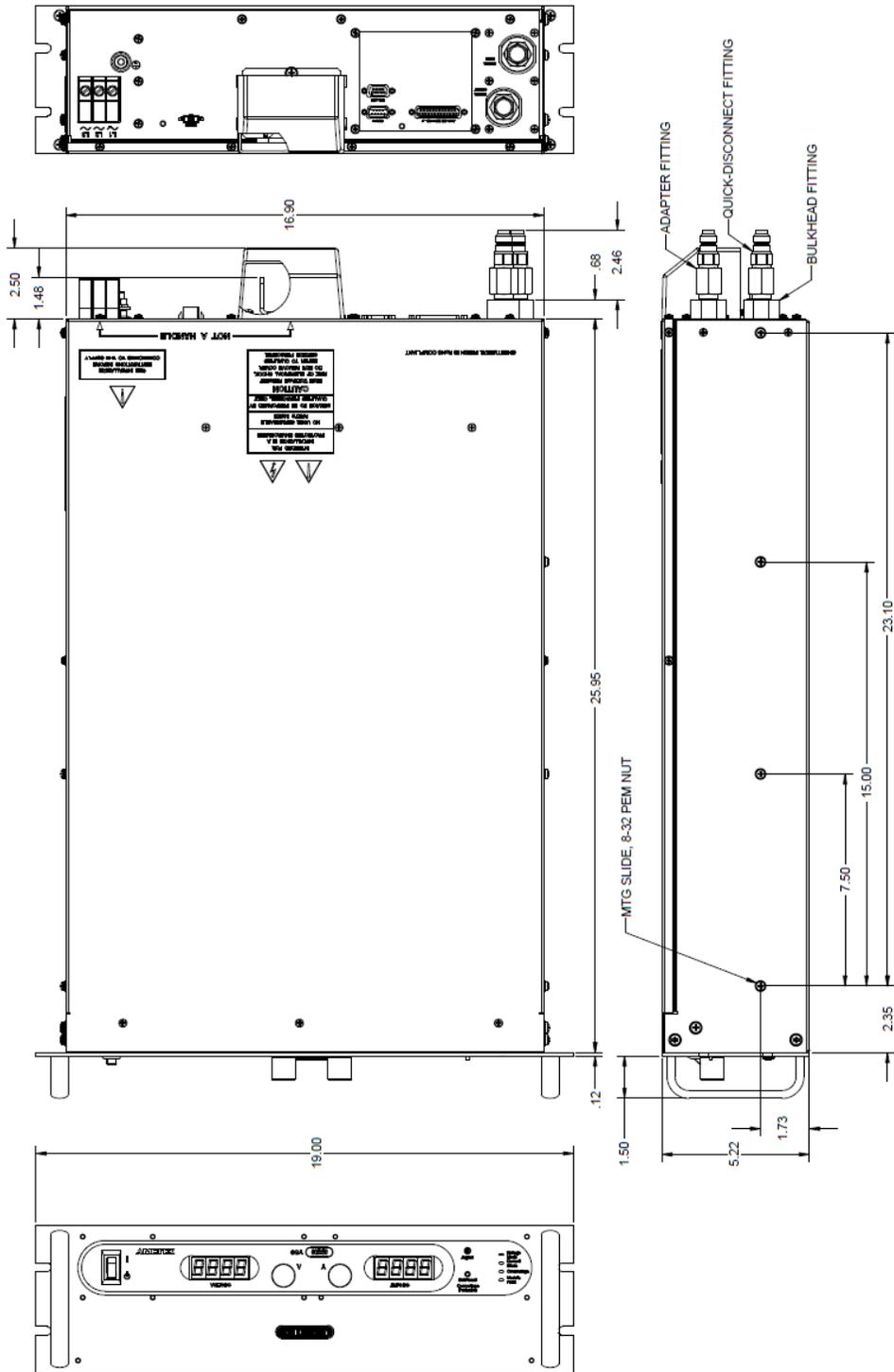
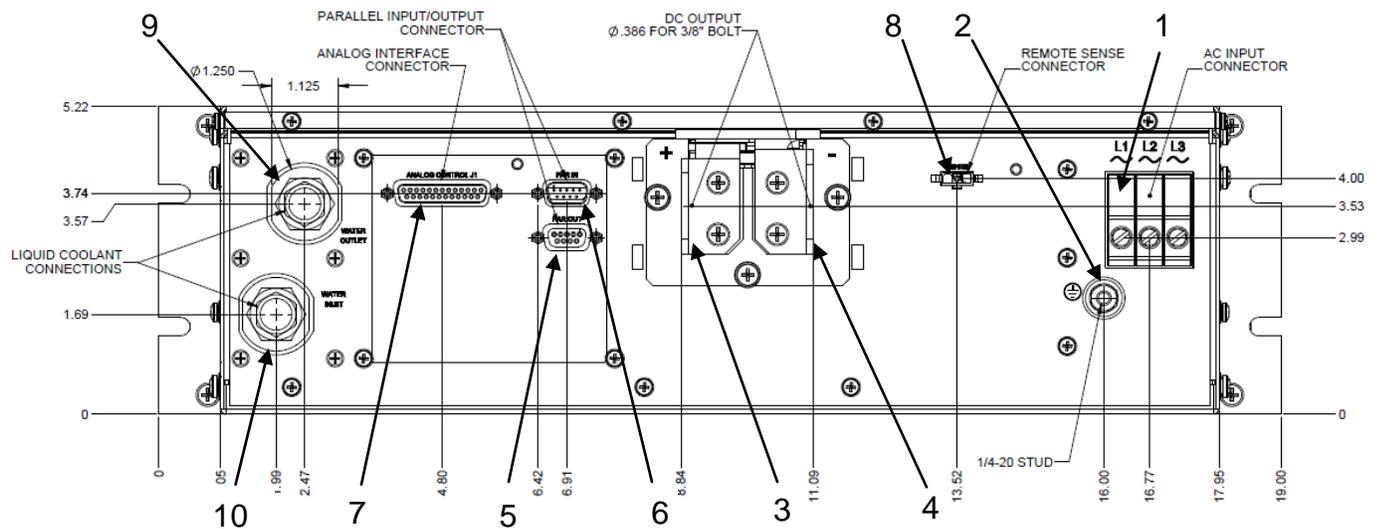
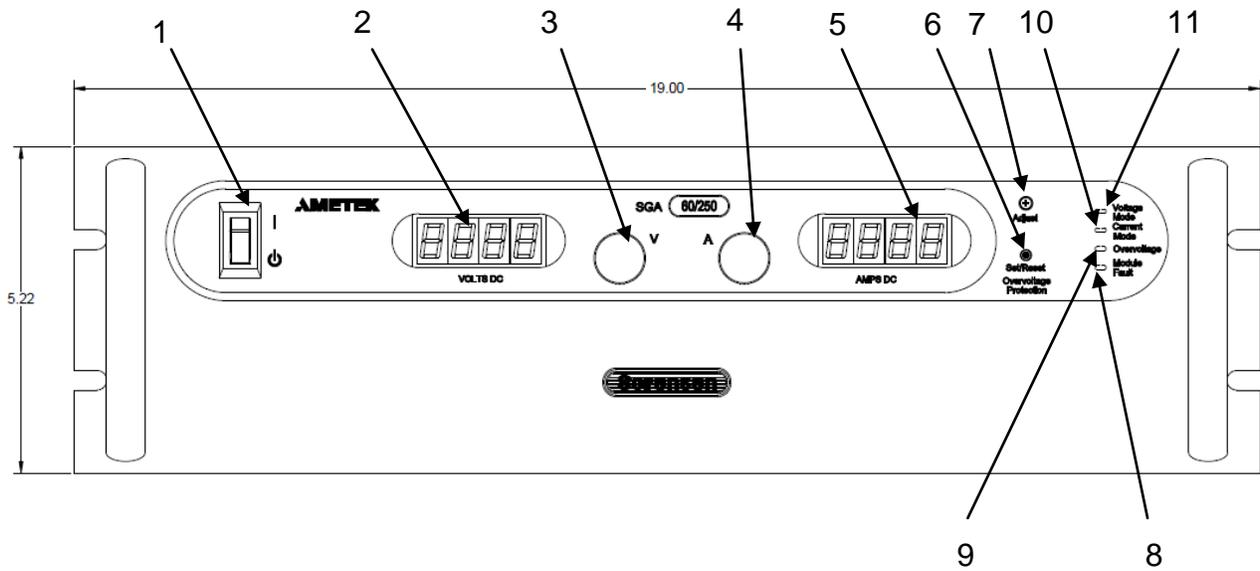


Figure 2-2. SGWC Chassis Dimensions



1. AC Input Connector, Phoenix Contact P/N HDFKV 16-VP, Ametek P/N 893-100-02
2. Chassis Protective Ground, 1/4-20 stud
3. Output Busbar, Positive Terminal, with hole for 3/8-16 bolt
4. Output Busbar, Negative (Return) Terminal, with hole for 3/8-16 bolt
5. Paralleling Input Connector, 9 Pin, D-Subminiature
6. Paralleling Output Connector, 9 Socket, D-Subminiature
7. Analog Interface Connector, 25 Socket, D-Subminiature
8. Remote Sense Connector, 3 Pin, Molex P/N 39-01-4033, Ametek P/N 09-070-000-04
9. Water Outlet, 3/8" FNPT bulkhead fitting (1 1/8" across flats)
10. Water Inlet, 3/8" FNPT bulkhead fitting (1 1/8" across flats)

Figure 2-3. Rear Panel Connections



1. ON/OFF AC Power Switch
2. Voltage Display
3. Voltage Control Knob
4. Current Control Knob
5. Current Display
6. OVP Set/Reset Button
7. OVP Adjust Potentiometer
8. Module Fault LED
9. Overvoltage (OVP) LED
10. Current Mode LED
11. Voltage Mode LED

Figure 2-4. Front Panel Controls

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