SECTION 1
INTRODUCING THE DCS SERIES SYSTEM SUPPLY

1.1 Description

The DCS Series System Supplies are 3000 watt supplies designed to provide highly stable, continuously variable output voltage and current for a broad range of development, system, and burn-in applications. The DCS Series employs high frequency switching regulator technology to achieve high power density and small package size.

The series consists of several models designated by the DCS prefix, followed by their output voltage and current ratings. For example, the model number DCS 60-50 indicates that the unit is rated at 0-60 Vdc and 0-50 Amps.

1.2 Features

- Four models with voltage ranges from 0-8 Vdc to 0-150 Vdc and current outputs from 20A to 350A.
- Input voltage 190-250 Vac, Three Phase, 47-63 Hz or 200-250 Vac, Single Phase, 47-63 Hz.
- Simultaneous digital display of both DC output voltage and current.
- Ten-turn potentiometer voltage and current controls permit high resolution setting of the output voltage and current from zero to the model-rated output.
- Front panel push button control of Output Standby Mode, OVP reset, Remote/Local Programming Mode selection, and preview of voltage, current, or OVP setpoints.
- Current or Voltage Mode operation with Automatic Mode Crossover to respond to varying load requirements.
- Flexible output configuration where multiple units can be connected in series or in parallel to provide increased voltage or increased current.
• Remote Sensing to compensate for losses in power leads up to 1V per lead.
• Adjustable Over Voltage Protection (OVP).
• External Shutdown using AC, DC, or TTL compatible signals (positive or negative logic).
• Remote Voltage, Current Limit, and OVP Programming with selectable programming ranges.
• Optional IEEE-488 (GPIB) interface for complete digital remote programming and readback capability.

1.3 Specifications

1.3.1 Electrical Specifications

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<tr>
<td>Output Ratings</td>
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<td></td>
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<tr>
<td>Output Voltage</td>
<td>0-8V</td>
<td>0-12V</td>
<td>0-20V</td>
<td>0-40V</td>
<td>0-55V</td>
<td>0-60V</td>
<td>0-80V</td>
<td>0-150V</td>
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<tr>
<td>Output Current</td>
<td>0-350A</td>
<td>0-250A</td>
<td>0-150A</td>
<td>0-75A</td>
<td>0-55A</td>
<td>0-50A</td>
<td>0-37A</td>
<td>0-20A</td>
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<tr>
<td>Output Power</td>
<td>2800W</td>
<td>3000W</td>
<td>3000W</td>
<td>3000W</td>
<td>3025W</td>
<td>3000W</td>
<td>2960W</td>
<td>3000W</td>
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<tr>
<td>Line Regulation</td>
<td>8 mV</td>
<td>12 mV</td>
<td>20 mV</td>
<td>40 mV</td>
<td>55 mV</td>
<td>60 mV</td>
<td>80 mV</td>
<td>150 mV</td>
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<tr>
<td>Voltage Current</td>
<td>350 mA</td>
<td>250 mA</td>
<td>150 mA</td>
<td>75 mA</td>
<td>55 mA</td>
<td>50 mA</td>
<td>37 mA</td>
<td>20 mA</td>
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<tr>
<td>Load Regulation</td>
<td>8 mV</td>
<td>12 mV</td>
<td>20 mV</td>
<td>40 mV</td>
<td>55 mV</td>
<td>60 mV</td>
<td>80 mV</td>
<td>150 mV</td>
</tr>
<tr>
<td>Voltage Current</td>
<td>350 mA</td>
<td>250 mA</td>
<td>150 mA</td>
<td>75 mA</td>
<td>55 mA</td>
<td>50 mA</td>
<td>37 mA</td>
<td>20 mA</td>
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<tr>
<td>Meter Accuracy</td>
<td>0.09V</td>
<td>0.13V</td>
<td>0.2V</td>
<td>0.5V</td>
<td>0.65V</td>
<td>0.7V</td>
<td>0.9V</td>
<td>1.6V</td>
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<tr>
<td>Voltage Current</td>
<td>4.5A</td>
<td>3.5A</td>
<td>1.6A</td>
<td>0.85A</td>
<td>0.65A</td>
<td>0.6A</td>
<td>0.47A</td>
<td>0.30A</td>
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<tr>
<td>OVP Adjustment</td>
<td>0.4-8.8V</td>
<td>0.6-13.2V</td>
<td>1-22V</td>
<td>2-44V</td>
<td>2.75-60.5V</td>
<td>3-66V</td>
<td>4-88V</td>
<td>7.5-165V</td>
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<tr>
<td>Output Noise and</td>
<td>10 mV</td>
<td>10 mV</td>
<td>10 mV</td>
<td>20 mV</td>
<td>20 mV</td>
<td>20 mV</td>
<td>20 mV</td>
<td>30 mV</td>
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<tr>
<td>Ripple (V) Rms</td>
<td>100 mV</td>
<td>100 mV</td>
<td>100 mV</td>
<td>100 mV</td>
<td>100 mV</td>
<td>100 mV</td>
<td>100 mV</td>
<td>200 mV</td>
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<tr>
<td>p-p (20 Hz – 20 MHz)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Analog Programming</td>
<td>80 mV</td>
<td>120 mV</td>
<td>200 mV</td>
<td>400 mV</td>
<td>550 mV</td>
<td>600 mV</td>
<td>800 mV</td>
<td>1.5V</td>
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<tr>
<td>Linearity Voltage</td>
<td>3500 mA</td>
<td>2500 mA</td>
<td>1500 mA</td>
<td>750 mA</td>
<td>550 mA</td>
<td>500 mA</td>
<td>370 mA</td>
<td>200 mA</td>
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</table>

1 Specifications are warranted over a temperature range of 0–50°C with default local sensing. From 50–70°C, derate 2% per °C.
2 For input voltage variation over the AC input voltage range, with constant rated load.
3 For 0-100% load variation, with constant nominal line voltage.

AC Input: 200-250 Vac at 20 Arms Single Phase or 190-250 Vac at 14 Arms Three Phase
(Output power limited to 2500W for single phase input)

Maximum Voltage Differential from output to safety ground: 400 Vdc
**Additional Characteristics**

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<tbody>
<tr>
<td>Stability(^4) Voltage Current</td>
<td>4 mV 175 mA</td>
<td>6 mV 125 mA</td>
<td>10 mV 75 mA</td>
<td>20 mV 37.5 mA</td>
<td>27.5 mV 27.5 mA</td>
<td>30 mV 25 mA</td>
<td>40 mV 18.5 mA</td>
<td>75 mV 10 mA</td>
</tr>
<tr>
<td>Temperature Coefficient(^5) Voltage Current</td>
<td>1.6 mV/°C 105 mA/°C</td>
<td>2.4 mV/°C 75 mA/°C</td>
<td>4 mV/°C 45 mA/°C</td>
<td>8 mV/°C 22.5 mA/°C</td>
<td>11 mV/°C 16.5 mA/°C</td>
<td>12 mV/°C 15 mA/°C</td>
<td>16 mV/°C 11.1 mA/°C</td>
<td>30 mV/°C 6.0 mA/°C</td>
</tr>
<tr>
<td>Maximum Remote Sense Line Drop Compensation</td>
<td>1V/line</td>
<td>1V/line</td>
<td>1V/line</td>
<td>1V/line</td>
<td>1V/line</td>
<td>1V/line</td>
<td>1V/line</td>
<td>1V/line</td>
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</tbody>
</table>

\(^4\) Maximum drift over 8 hours with constant line, load, and temperature, after 90 minute warmup.

\(^5\) Change in input per °C change in ambient temperature with constant and load.

**Operating Ambient Temperature:**
0 - 50°C No derating. From 50 - 70°C, derate output 2% per °C

**Storage Temperature Range:** -55 to +85°C

**Humidity Range:** 0 - 80 % Non-condensing

**Time Delay from power on until output stable:** 5 seconds maximum

**Switching Frequency:** Nominal 30 kHz (60 kHz output ripple)

**Voltage Mode Transient Response Time:**
1 mS recovery to 1% band for 30% step load change from 70% to 100% or 100% to 70%

**Remote Start/Stop and Interlock:**
TTL Compatible Input, Contact Closure, 12 – 250 Vac or 12 – 130 Vdc

**Remote Analog Programming (Full Scale Input)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Resistance</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>0 - 5k</td>
<td>0 - 5V, 0 - 10V</td>
<td>0 - 1 mA</td>
</tr>
<tr>
<td>Current</td>
<td>0 - 5k</td>
<td>0 - 5V, 0 - 10V</td>
<td>0 - 1 mA</td>
</tr>
<tr>
<td>OVP</td>
<td>—</td>
<td>0 - 5V, 0 - 10V</td>
<td>—</td>
</tr>
</tbody>
</table>

**1.3.2 Mechanical Specifications**

**Size:** 87.6 mm H x 482.6 mm W x 508 mm D (3.45 in H x 19 in W x 20 in D)

**Weight:** 16 kg (35 lbs) (approx.)

**Output Connector:**
Nickel-plated copper bus bars: 2.25" x 1.0" x 0.125" (2.25" x 1.0" x 0.25" for 8V & 12V models)

Bus bar load wiring mounting holes:
  - One 0.332" diameter hole; ¼" hardware (⅛" hardware for 8V and 12V models)
  - Two 0.190" diameter holes on 0.5" centres; #10 hardware

**Input Connector:**
Chassis-Mounted Part: Housing AMP 641685-1; Contact pins AMP 350821-1
Mating Connector Parts: Housing AMP 643267-2; Contact pins AMP 350821-1
**WARNING**

DO NOT OPERATE POWER SUPPLY AT SIGNIFICANTLY INVERTED OR INVERSE INPUT VOLTAGE OR CURRENT. THIS SYSTEM MAY NOT BE COMPATIBLE WITH THE RESULTING GROUND CURRENTS.

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**Figure 1-2**

DCS Series (3kW) Supply Rear Panel Connectors and Terminals (including optional internal GPIB interface)

- **J7 User Signal Connector (P1)**
  - J7-1: External / IEL Shutdown
  - J7-2: Polarity (V/SET-K)
  - J7-3: Isolation / Off
  - J7-4: Fault
  - J7-5: External Vcc Max (8V)
  - J7-6: External Ground and Shutdown Return

- **Remote LED (REM)**
  Indicates that the unit is in remote programming mode and will accept commands over the serial link. Set by switch 1-3. See also local LEDout.

- **Error LED (ERR)**
  Indicates that a programming error has occurred. Clear with query command or next error-free command.

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**Screen Section 1-488 Port**

Use 488-488 compatible connectors and cables to ensure safety and maintain warranty.

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**Switch SW1**

- 1-1: Remote/Local Operation Selection
- 1-2: Power On Service Request Open (D7) Enable/Disable
- 1-3: Not Used
- 1-4
- 1-5
- 1-6
- 1-7
- 1-8: Primary Addressing