16 kJ/s Capacitor Charging HVPS

Key Features
- Capacitor Charging High Voltage Supply
- 16 kJ/sec Average Charging Rate
- Output: + or – 25 kV
- Input 3 Phase 400 VAC, 50/60Hz
- Encapsulated, NO OIL
- Optimized Charging Cycle (OCC)
- Front Panel Display and Control
- Remote Controlled
- Rep Rate up to 1000 pps
- Compact, Lightweight
- Low Stored Energy

Description
The model GH2516 is a state-of-the-art power conversion unit utilizing IGBT switches operating at high frequency in a series resonance topology. This air-cooled unit contains no oil or other dielectric fluids, so the unit is significantly lighter and more reliable than comparable units.

The advanced Optimized Charging Cycle (OCC) reduces the peak power consumption from the line. This feature enables charging of large capacitor banks without exceeding the allowed average power. At the beginning of the charge cycle the unit operates in a current limit mode, which remains in effect until the output voltage reaches about 33% of the maximum rated voltage of the power supply. Thereafter, the unit delivers a controlled average energy rate to the load capacitor, thus the ratio of peak power to average power of the power supply is very low.

The unit provides “Power On”, “Ready” (End Of Charge) signal, “Charging”, “Interlock” and Sum Fault” indication on the remote control connector and via LED on the front panel.

Optimized Charging Cycle (OCC)

Applications
- PFN Charging
- Magnetron Systems
- Laser Charging
- Capacitors Bank
- Modulators
Typical Specifications (GH2516)

AC Input: 400Vac 3 phase 50/60Hz
Output Voltage: + or - 25 kV
Avg. Charging Rate: 16 kJ/sec
Peak Charging Rate: 23 kJ/sec
Repeatability: ± 0.1% @ 400Hz
Efficiency: 87% typical
Power Factor: 0.85 or better
Size: 19" W x 12.5" H x 26" D
Weight: 150 lbs.
Cooling: Forced air
Temperature: -25 to +85 °C storage
0 to +50 °C operating

Interface
HV output: Contact Factory
AC Input Connector: VDE, UL, CSA approved
Remote Control: 25 pin D-type

Front Panel Controls
- OEM version

Front Panel Display
- LED's display for: Charging, Ready (EOC), Over Load Fault, Over Temp, Sum Fault

Safety & Protections
- User interlock
- No-load, Short Circuit, Arc protection
- Over Voltage, Over Temperature protection
- UL, VDE, CSA safety approval (pending)

Options
- Operation to 1000 pps
- 208/400/480VAC Line Voltage
- Positive or Negative Polarity
- Parallel operation

This datasheet is for reference only, contact factory for full specifications.
25 kJ/s Capacitor Charging HVPS

Key Features
- Capacitor Charging High Voltage Supply
- 25 kJ/sec Average Charging Rate
- Output: +/- 25 kV
- Input 3 Phase 400 VAC, 50/60Hz
- No Dielectric fluids
- Optimized Charging Cycle (OCC)
- Front Panel Display
- Remote Controlled
- Rep Rate up to 400 pps
- Compact
- Low Stored Energy

Description
The model GH2525-M1 is a state-of-the-art power conversion unit utilizing IGBT switches operating at high frequency in a series resonance topology. This water cooled unit contains a silicon oil dielectric and is significantly more reliable than comparable units.

The advanced Optimized Charging Cycle (OCC) reduces the peak power consumption from the line. This feature enables charging of large capacitor banks without exceeding the allowed average power. At the beginning of the charge cycle the unit operates in a current limit mode, which remains in effect until the output voltage reaches about 33% of the maximum rated voltage of the power supply. Thereafter, the unit delivers a controlled average energy rate to the load capacitor, thus the ratio of peak power to average power of the power supply is very low.

The unit provides “Power On”, “Ready” (End Of Charge) signal, “Charging”, “Interlock” and Sum Fault” indication on the remote control connector and via LED on the front panel.

Optimized Charging Cycle (OCC)

Applications
- PFN Charging
- Magnetron Systems
- Laser Charging
- Capacitors Bank
- Modulators
**Typical Specifications (GH2525)**

- **AC Input:** 400 Vac 3 phase 50/60 Hz
- **Output Voltage:** + / – 25 kV
- **Avg. Charging Rate:** 25 kJ/sec
- **Peak Charging Rate:** 30 kJ/sec
- **Repeatability:** ± 0.1% @ 400 Hz
- **Efficiency:** 87% typical
- **Power Factor:** 0.85 or better
- **Size:** 19” W x 12.5” H x 26” D
- **Weight:** 200 lbs.
- **Cooling:** 2 gpm water 40 deg C or less
- **Temperature:** -25 to +85 °C storage
  0 to +50 °C operating

**Interface**

- **HV output:** Contact Factory
- **AC Input Connector:** VDE, UL, CSA approved
- **Remote Control:** 25 pin D-type

**Dimensions**

**Front Panel Controls**
- OEM version

**Front Panel Display**
- LED’s display for: Charging, Ready (EOC), Over Load Fault, Over Temp, Sum Fault

**Safety & Protections**
- User interlock
- No-load, Short Circuit, Arc protection
- Over Voltage, Over Temperature protection
- UL, VDE, CSA safety approval (pending)

**Options**
- Operation to 1000 pps
- 208/400/480VAC Line Voltage
- Positive or Negative Polarity
- Parallel operation

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*This datasheet is preliminary, mechanical parameters will change, contact factory for full specifications.*
16 kJ/s Capacitor Charging HVPS

Key Features
- Capacitor Charging High Voltage Supply
- 16 kJ/sec Average Charging Rate
- Output: 0 – 50 kV
- Input 3 Phase 400 VAC, 50/60Hz
- Silicon Oil Insulated HV section
- Optimized Charging Cycle (OCC)
- Front Panel Display
- Remote Controlled
- Rep Rate up to 400 pps
- Compact
- Low Stored Energy

Description
The model GH5016 is a state-of-the-art power conversion unit utilizing IGBT switches operating at high frequency in a series resonance topology. This water cooled unit contains a silicon oil dielectric and is significantly more reliable than comparable units.

The advanced Optimized Charging Cycle (OCC) reduces the peak power consumption from the line. This feature enables charging of large capacitor banks without exceeding the allowed average power. At the beginning of the charge cycle the unit operates in a current limit mode, which remains in effect until the output voltage reaches about 33% of the maximum rated voltage of the power supply. Thereafter, the unit delivers a controlled average energy rate to the load capacitor, thus the ratio of peak power to average power of the power supply is very low.

The unit provides “Power On”, “Ready” (End Of Charge) signal, “Charging”, “Interlock” and “Sum Fault” indication on the remote control connector and via LED on the front panel.

Applications
- PFN Charging
- Magnetron Systems
- Laser Charging
- Capacitors Bank
- Modulators
Typical Specifications (GH5016)

AC Input: 400Vac 3 phase 50/60Hz
Output Voltage: 0 – 50 kV
Avg. Charging Rate: 16 kJ/sec
Peak Charging Rate: 23 kJ/sec
Repeatability: ± 0.1% @ 400Hz
Efficiency: 87% typical
Power Factor: 0.85 or better
Size: 19” W x 12.25” H x 26” D
Weight: 200 lbs.
Cooling: 2 gpm water 40 deg C or less
Temperature: -25 to +85 °C storage
0 to +50 °C operating

Interface
HV output: Contact Factory
AC Input Connector: VDE, UL, CSA approved
Remote Control: 25 pin D-type

<table>
<thead>
<tr>
<th>Pin</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AUX OUTPUT</td>
<td>12 VDC/100 MA OUTPUT</td>
</tr>
<tr>
<td>2</td>
<td>RING FAULT IN</td>
<td>MASTER FAULT FROM SLAVES</td>
</tr>
<tr>
<td>3</td>
<td>RING FAULT EMITTER</td>
<td>SLAVE FAULT GND TO MASTER</td>
</tr>
<tr>
<td>4</td>
<td>EOC READY EMITTER</td>
<td>END OF CHARGE REMOTE GND</td>
</tr>
<tr>
<td>5</td>
<td>SUMMARY FAULT</td>
<td>SUMMARY OF ALL FAULTS</td>
</tr>
<tr>
<td>6</td>
<td>NEGATIVE KV DET</td>
<td>INDICATOR OF NEG OUTPUT</td>
</tr>
<tr>
<td>7</td>
<td>HV IS ON</td>
<td>INDICATES HV ENABLE IS ON</td>
</tr>
<tr>
<td>8</td>
<td>REMOTE +24 VOLTS</td>
<td>24 SUPPLY FOR DIGITAL INPUTS</td>
</tr>
<tr>
<td>9</td>
<td>HV ENABLE</td>
<td>OPTICALLY ISOLATED HV ON</td>
</tr>
<tr>
<td>10</td>
<td>INTERLOCK REMOTE</td>
<td>PROVISION FOR EXTERNAL INTLK</td>
</tr>
<tr>
<td>11</td>
<td>SLAVE V PROGRAM</td>
<td>MASTER V PROGRAM OUT TO SLAVES</td>
</tr>
<tr>
<td>12</td>
<td>V MONITOR PEAK</td>
<td>OUTPUT OF V MAX</td>
</tr>
<tr>
<td>13</td>
<td>V PROGRAM IN</td>
<td>DIFF V PROGRAM 10V-25KV</td>
</tr>
<tr>
<td>14</td>
<td>DIGITAL GND</td>
<td>DIGITALS SIGNALS GND</td>
</tr>
<tr>
<td>15</td>
<td>RING FAULT COLLECT</td>
<td>SLAVE FAULT TO MASTER</td>
</tr>
<tr>
<td>16</td>
<td>EOC READY COLLECT</td>
<td>END OF CHARGE ISOLATED SIGNAL</td>
</tr>
<tr>
<td>17</td>
<td>UNUSED</td>
<td>NC</td>
</tr>
<tr>
<td>18</td>
<td>POSITIVE KV DET</td>
<td>INDICATOR OF POSITIVE OUTPUT</td>
</tr>
<tr>
<td>19</td>
<td>PS CHARGING</td>
<td>INDICATE HVPS IS CHARGING</td>
</tr>
<tr>
<td>20</td>
<td>RESET IN</td>
<td>INPUT TO RESET LATCHED FAULTS</td>
</tr>
<tr>
<td>21</td>
<td>FAST INHIBIT IN</td>
<td>INPUT TO TURN OFF CHARGING</td>
</tr>
<tr>
<td>22</td>
<td>INTERLOCK REMOTE 1</td>
<td>PROVISION FOR REMOTE INTERLOCK</td>
</tr>
<tr>
<td>23</td>
<td>+10V REFERENCE</td>
<td>OUTPUT FROM 10V REFERENCE</td>
</tr>
<tr>
<td>24</td>
<td>GROUND</td>
<td>ANALOG SIGNAL GND</td>
</tr>
<tr>
<td>25</td>
<td>V PROGRAM RET</td>
<td>RETURN FOR SIGNAL PIN 13</td>
</tr>
</tbody>
</table>

Dimensions

Front Panel Controls
- OEM version

Front Panel Display
- LED’s display for: Charging, Ready (EOC), Over Load Fault, Over Temp, Sum Fault

Safety & Protections
- User interlock
- No-load, Short Circuit, Arc protection
- Over Voltage, Over Temperature protection
- UL, VDE, CSA safety approval (pending)

Options
- Operation to 1000 pps
- 208/400/480VAC Line Voltage
- Positive or Negative Polarity
- Parallel operation

This datasheet is preliminary, mechanical parameters will change, contact factory for full specifications.
110 kJ/s Capacitor Charging HVPS System

Key Features
- Capacitor Charging High Voltage Supply
- 110 kJ/sec Average Charging Rate
- Output: 12kV
- Input 3 Phase 400 VAC, 50/60Hz
- No oil or dielectric fluids
- Optimized Charging Cycle (OCC)
- Front Panel Display
- Remote Controlled
- Rep Rate up to 1000 pps
- Low Stored Energy

Description
The model SIHV-12110-M1 is a state-of-the-art power conversion unit utilizing multiple separate SIHV power supplies operating in parallel to provide expanded power ranges with redundant reliability. This rack is configured with three thirty eight (38 kJ/S) SIHV power supplies capable of delivering 110 kilowatts (kJ/sec) of continuous power at 12 kV. A power distribution chassis and HV daisy chaining chassis in each rack allows for easy paralleling of these racks into even higher power systems. Each SIHV power supply uses IGBT switches operating at high frequency in a series resonance topology. This water-cooled unit contains no oil, so the unit is significantly lighter and more reliable than comparable units.

The SI advanced Optimized Charging Cycle (OCC) topology reduces the peak power consumption from the line. This feature enables charging of large capacitor banks without exceeding the allowed average power. At the beginning of the charge cycle the unit operates in a current limit mode, which remains in effect until the output voltage reaches about 33% of the maximum rated voltage of the power supply. Thereafter, the unit delivers a controlled average energy rate to the load capacitor, thus the ratio of peak power to average power of the power supply is very low.

The unit provides “Power On”, “HV On”, EOC (End of Charge), “Charging” and “Summary Fault” indication on the remote control connector and via LED on the front panel.

Optimized Charging Cycle (OCC)

Applications
- PFN Charging
- Magnetron Systems
- Laser Charging
- Capacitors Bank
- Modulators
Typical Specifications (SIHV-12110)

- **AC Input:** 400 VAC 3 phase 50/60Hz
- **Output Voltage:** 12 kV
- **Avg. Charging Rate:** 110 kJ/sec
- **Peak Charging Rate:** 160 kJ/sec
- **Repeatability:** ± 0.1% @ 400 Hz
- **Efficiency:** 87% typical
- **Power Factor:** 0.85 or better
- **Size:** 24" W x 65" H x 34" D
- **Weight:** 300 lbs.
- **Cooling:** water
- **Temperature:** -25 to +85 °C storage
  0 to +50 °C operating

**Interface**
- **HV output:** Contact Factory
- **AC Input Connector:** VDE, UL, CSA approved
- **Remote Control:** 25 pin D-type

**Dimensions**
see attached drawing 731-SIHV-5016-M1.pdf

**Front Panel Display**
- LED's display for: Power On, HV On, Charging, EOC (Ready), Interlock, Sum Fault

**Safety & Protections**
- User interlock
- No-load, Short Circuit, Arc protection
- Over Voltage, Over Temperature protection
- UL, VDE, CSA safety approval (pending)

**Options**
- 3½ digits peak charging KV display
- Operation to 1000 pps
- Positive or Negative Polarity
- Parallel operation

This datasheet is for reference only, contact factory for full specifications

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL NAME</th>
<th>I/O</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+15V</td>
<td>OUTPUT</td>
<td>+15V at 125mA max</td>
</tr>
<tr>
<td>2</td>
<td>SUMMARY FAULT</td>
<td>OUTPUT</td>
<td>Summary fault condition</td>
</tr>
<tr>
<td>3</td>
<td>INHIBIT FAULT</td>
<td>OUTPUT</td>
<td>PS is receiving an inhibit input</td>
</tr>
<tr>
<td>4</td>
<td>EOC LED</td>
<td>OUTPUT</td>
<td>PS has reached end of charge</td>
</tr>
<tr>
<td>5</td>
<td>EXCESS REVERSAL</td>
<td>OUTPUT</td>
<td>Reversal in output circuit</td>
</tr>
<tr>
<td>6</td>
<td>WARNING LED</td>
<td>OUTPUT</td>
<td>Cooling fan fault</td>
</tr>
<tr>
<td>7</td>
<td>OVER VOLTAGE</td>
<td>OUTPUT</td>
<td>Over voltage at the output</td>
</tr>
<tr>
<td>8</td>
<td>ARC LED</td>
<td>OUTPUT</td>
<td>Arcing in the HV section</td>
</tr>
<tr>
<td>9</td>
<td>V PROG SHIELD</td>
<td>INPUT</td>
<td>Shield from the V PROGRAM Cable</td>
</tr>
<tr>
<td>10</td>
<td>ENABLE/RESET</td>
<td>INPUT</td>
<td>15V = High Voltage On, Gnd off</td>
</tr>
<tr>
<td>11</td>
<td>V PROGRAM +</td>
<td>INPUT</td>
<td>0-10V = 0 to 100%</td>
</tr>
<tr>
<td>12</td>
<td>V PROGRAM -</td>
<td>INPUT</td>
<td>Signal Return (V PROGRAM)</td>
</tr>
<tr>
<td>13</td>
<td>V ANALOG +</td>
<td>OUTPUT</td>
<td>0-10V analog of output voltage</td>
</tr>
<tr>
<td>14</td>
<td>V ANALOG -</td>
<td>OUTPUT</td>
<td>Signal Return (V ANALOG)</td>
</tr>
<tr>
<td>15</td>
<td>V ANALOG SHIELD</td>
<td>OUTPUT</td>
<td>Shield from the V ANALOG Cable</td>
</tr>
<tr>
<td>16</td>
<td>HV ON LED</td>
<td>OUTPUT</td>
<td>HV is ON</td>
</tr>
<tr>
<td>17</td>
<td>LOAD FAULT LED</td>
<td>OUTPUT</td>
<td>output current exceeded max</td>
</tr>
<tr>
<td>18</td>
<td>INPUT POWER FAULT LED</td>
<td>OUTPUT</td>
<td>Low ac line or phase loss</td>
</tr>
<tr>
<td>19</td>
<td>O/T FAULT LED</td>
<td>OUTPUT</td>
<td>Over temperature</td>
</tr>
<tr>
<td>20</td>
<td>INTERLOCK LED</td>
<td>OUTPUT</td>
<td>Interlock is open</td>
</tr>
<tr>
<td>21</td>
<td>DIGITAL GROUND</td>
<td>OUTPUT</td>
<td>Common Ground Digital Circuits</td>
</tr>
<tr>
<td>22</td>
<td>INHIBIT GATE</td>
<td>INPUT</td>
<td>&gt; 3V Inhibits the unit operation.</td>
</tr>
<tr>
<td>23</td>
<td>ANALOG GROUND</td>
<td>INPUT</td>
<td>Analog and chassis ground</td>
</tr>
<tr>
<td>24</td>
<td>+24 VDC Input (3a)</td>
<td>INPUT</td>
<td>+24 Vdc to keep PS active if external contactor is activated</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>