Ultra high speed bi-polar power supply
DOS Series

DC to 200kHz

Ultra fast response
Four-quadrant bi-polar power supply

Output voltage: ±20V to ±60V
Output power: 150W to 1200W

www.matsusada.com
DOS series is four-quadrant bi-polar power supply with ultra high-speed response of DC to 200kHz (CV mode). It shall output various waveforms including sinusoidal, triangular, saw-tooth, rectangular and more with combination with a function generator. As DOS series amplifies any waveform, it is suitable for all sorts of simulation tests. Sourcing and sinking of electrical power with four-quadrant operation as well as 2 operation modes of CV and CC is possible. Compact size of only 3U or 4U height for such various function and ultra high-speed response power supply. In addition, the features of large meters with high visibility and superior operability make the DOS series versatile four quadrant bi-polar power supply which can be used a wide variety of occasion from in laboratory to production line.

**Features**

**Ultra fast response**

Suitable for transient response test because of its ultra high-speed response DC to 200kHz and high power, 1200W.

**Four-quadrant action**

DOS Series can be used both as a high speed response DC power supply and as an electronic load.

**DC bias**

10-turn potentiometer to be used as the output setting volume when used as the DC power supply and as the bias setting dial at outputting AC waveform is equipped.

**Constant voltage (CV) / Constant current (CC)**

A single switch selects between CV and CC modes.

**Compact & light weight**

For maximum compactness and light weight, DOS Series has been improved for small footprint and handiness.

**DC output meter equipped**

3-digit digital meter displays the DC value of the output voltage and current. (The option of rms indication is available.)

**Complete protective functions**

Protective functions against over voltage/current and against output short-circuit are completely provided.

**Master-slave**

Master / Slave control (option) for more power requirement.

**Applications**

- Inductive load such as coil and transformer
- Various motor tests
- Evaluation test for solar panel related devices
- Ripple test of capacitors
- Voltage regulation tests for in-vehicle electrical component
- For surface treatment
### Lineup

*Models with voltage, current or frequencies not listed here are also available. Please contact the nearest sales office.*

<table>
<thead>
<tr>
<th>Model</th>
<th>Output voltage V( rms)</th>
<th>DC to 200</th>
<th>DC to 100</th>
<th>Size inch (mm)</th>
<th>Weight kg (typ.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOS20-7.5</td>
<td>±20(14)</td>
<td>±7.5(5.3)</td>
<td>±20(14)</td>
<td>19x5.24x18.98</td>
<td>11</td>
</tr>
<tr>
<td>DOS20-15</td>
<td>±20(14)</td>
<td>±15(10.5)</td>
<td>±20(14)</td>
<td>19x5.24x21.65</td>
<td>17</td>
</tr>
<tr>
<td>DOS20-30</td>
<td>±20(14)</td>
<td>±30(21)</td>
<td>±20(14)</td>
<td>19x6.97x24.02</td>
<td>23</td>
</tr>
<tr>
<td>DOS20-60</td>
<td>±20(14)</td>
<td>±60(42)</td>
<td>±20(14)</td>
<td>19x10.47x24.02</td>
<td>40</td>
</tr>
<tr>
<td>DOS25-6</td>
<td>±25(17.6)</td>
<td>±6(4.2)</td>
<td>±25(17.6)</td>
<td>19x5.24x18.98</td>
<td>11</td>
</tr>
<tr>
<td>DOS25-12</td>
<td>±25(17.6)</td>
<td>±12(8.6)</td>
<td>±25(17.6)</td>
<td>19x5.24x21.65</td>
<td>17</td>
</tr>
<tr>
<td>DOS25-24</td>
<td>±25(17.6)</td>
<td>±24(17.1)</td>
<td>±25(17.6)</td>
<td>19x6.97x24.02</td>
<td>23</td>
</tr>
<tr>
<td>DOS25-48</td>
<td>±25(17.6)</td>
<td>±48(34)</td>
<td>±25(17.6)</td>
<td>19x10.47x24.02</td>
<td>40</td>
</tr>
<tr>
<td>DOS45-3.3</td>
<td>±45(32)</td>
<td>±3.3(2.4)</td>
<td>±45(32)</td>
<td>19x5.24x18.98</td>
<td>12</td>
</tr>
<tr>
<td>DOS45-6.6</td>
<td>±45(32)</td>
<td>±6.6(4.7)</td>
<td>±45(32)</td>
<td>19x5.24x21.65</td>
<td>17</td>
</tr>
<tr>
<td>DOS45-13.3</td>
<td>±45(32)</td>
<td>±13.3(9.5)</td>
<td>±45(32)</td>
<td>19x6.97x24.02</td>
<td>23</td>
</tr>
<tr>
<td>DOS45-16</td>
<td>±45(32)</td>
<td>±16(11.3)</td>
<td>±45(32)</td>
<td>19x6.97x24.02</td>
<td>23</td>
</tr>
<tr>
<td>DOS45-26.7</td>
<td>±45(32)</td>
<td>±26.7(18.9)</td>
<td>±45(32)</td>
<td>19x10.47x24.02</td>
<td>40</td>
</tr>
<tr>
<td>DOS60-2.5</td>
<td>±60(42)</td>
<td>±2.5(1.75)</td>
<td>±60(42)</td>
<td>19x5.24x18.98</td>
<td>12</td>
</tr>
<tr>
<td>DOS60-5</td>
<td>±60(42)</td>
<td>±5(3.5)</td>
<td>±60(42)</td>
<td>19x5.24x21.65</td>
<td>17</td>
</tr>
<tr>
<td>DOS60-10</td>
<td>±60(42)</td>
<td>±10(7)</td>
<td>±60(42)</td>
<td>19x6.97x24.02</td>
<td>23</td>
</tr>
<tr>
<td>DOS60-20</td>
<td>±60(42)</td>
<td>±20(14)</td>
<td>±60(42)</td>
<td>19x10.47x24.02</td>
<td>40</td>
</tr>
</tbody>
</table>

### Specifications

**Input voltage**

<table>
<thead>
<tr>
<th>Model</th>
<th>Input voltage ±10% AC50/60Hz</th>
<th>Input current</th>
<th>Recommended breaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>150W</td>
<td>115V</td>
<td>4A</td>
<td>115VAC/15A</td>
</tr>
<tr>
<td>300W</td>
<td>115V</td>
<td>7A</td>
<td></td>
</tr>
<tr>
<td>600W</td>
<td>230V</td>
<td>7A</td>
<td>230VAC/15A</td>
</tr>
<tr>
<td>1.2kW</td>
<td>230V</td>
<td>13A</td>
<td>230VAC/20A</td>
</tr>
</tbody>
</table>

**External control voltage(Vcon-in)**

−10V to +10V
(Input impedance is 10 kΩ or more.)

**Output indication (DC value indication)**

Output voltage 3-digit digital meter ±999
Output current 3-digit digital meter ±999

**DC bias**

10-turn potentiometer enables setting between −100% and +100%.

**Ripple**

Less than 0.02% rms

**Stability**

0.016% / Hr typ.

**Setting accuracy**

±0.5% F.S

**Distortion factor**

CV: 0.05%  CC: 0.5%

**Regulation**

Line: 0.05% (for ±10% input change)
Load: 0.05% (for 0 to 100% load change)

200ppm/°C

**Temperature coefficient**

Output monitor

Output voltage ∈ 10V to +10V±1% F.S
Output current ∈ 10V to +10V±1% F.S
Outlet impedance 1kΩ

Protection against output short-circuit, overvoltage, overcurrent
Blackout protection (can be canceled with −LN option)

**Operating temp.**

0°C to 40°C

**Storage temp.**

−40°C to +85°C

**Humidity**

20% to 80% RH (no condensation)

**Accessories**

Input cable ... 2.5 m (1)
(3-pin connector for 115V model, Flying lead for 230V model)

Instruction manual (1)
150W, 300W, 600W output models

[ Front ]

1. Bias ON/OFF switch
2. Bias setting dial
3. POWER ON/OFF switch
4. OUTPUT indication LED
5. OUTPUT ON/OFF switch
6. Voltage meter
7. Current meter
8. Output voltage limiter (option)
9. Output current limiter (option)
10. CV/CC select switch
11. Vcon-in terminal
12. Door switch (option)
13. REMOTE switch ON/OFF (option)
14. Connector for Master-slave
15. OUTPUT terminal
16. GROUND internal
17. Voltage monitor terminal
18. Current monitor terminal
19. AC input terminal

[ Rear ]

Use of BIAS
When the "BIAS ON/OFF switch" is flipped to ON, bias output can be changed with the "BIAS setting dial." Bias voltage can be set when CV control mode, and Bias current can be set when CC control mode.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Max(-)</th>
<th>Max(+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>000(mV)</td>
<td>Max(-)</td>
<td>Max(+)</td>
</tr>
<tr>
<td>500</td>
<td>0V</td>
<td>0A</td>
</tr>
<tr>
<td>1000(mV)</td>
<td>Max(+)</td>
<td>Max(+)</td>
</tr>
</tbody>
</table>

CV/CC setting selection
Inputting voltage via Vcon-in enables the control of output voltage V when CV control mode and output current A when CC control mode.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Max(-)</th>
<th>Max(+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10V</td>
<td>Max(-)</td>
<td>Max(+)</td>
</tr>
<tr>
<td>0V</td>
<td>0V</td>
<td>0A</td>
</tr>
<tr>
<td>+10V</td>
<td>Max(+)</td>
<td>Max(+)</td>
</tr>
</tbody>
</table>
1200W output models

[ Front ]

1. Bias ON/OFF switch
2. Bias setting dial
3. OUTPUT indication LED
4. OUTPUT ON/OFF switch
5. Voltage meter
6. Current meter
7. Output voltage limiter (option)

[ Rear ]

8. Output current limiter (option)
9. CV/CC select switch
10. Vcon-in terminal
11. POWER ON/OFF switch
12. OUTPUT terminal
13. Voltage monitor terminal
14. Current monitor terminal
15. REMOTE switch ON/OFF (option)
16. Door switch (option)
17. Connector for Master-slave
18. GROUND internal
19. AC input terminal

Use of BIAS

When the "BIAS ON/OFF switch" is flipped to ON, bias output can be changed with the "BIAS setting dial." Bias voltage can be set when CV control mode, and Bias current can be set when CC control mode.

CV/CC setting selection

Inputting voltage via Vcon-in enables the control of output voltage V when CV control mode and output current A when CC control mode.
Protective functions

**Over voltage protection (O.V.P)**

DOS series is equipped with over voltage protection, which protects load by limiting voltage up to 120 % of the rated output voltage even at abnormal conditions.

**Over current protection (O.C.P)**

DOS series is also equipped with over current protection, which protects power supplies and load by limiting current up to 120 % of the rated output current.

**High speed over current protection**

DOS series is provided with 2 types of over current protections, high speed over current protection to limit the pulse current, and standard over current protection to limit the static current.

The standard over current protection limits the static current, responding at around 1 ms.

Additional high speed over current protection can limit pulse current of square waveforms or from capacitor at approximately 2 times more current of rating.

**Output range**

DOS series is a bi-polar power supply which can perform four-quadrant operation. They can supply (source) and absorb (sink) current in the field of the drawing on the right.

- **Vo max**: rated output voltage
- **Io max**: rated output current

- Range of AC operation (with 50 Hz or more frequency and 50 % of duty and without any DC bias)
- Range of DC operation
**Options**

- **LD** …Door switch  
- **LS** …Remote switch  
- **LN** …No protection against blackout  
- **LF** …Floating ground (Resistant to pressure 200 Vdc)  
- **LMS( )** …Master-slave control*  
- **LPr** …rms display  
- **LVI** …Output voltage limit  
  Variable from 0 to approx. 110% with front panel dial  
- **LLI** …Output current limit  
  Variable from 0 to approx. 110% with front panel dial

When ordering, suffix the following option mark to the model number.  
*e.g.* DOS25-48-LDFIImmNPrSvI (Alphabetical order)

*( ) shall be "m" for Master unit, or "s" for Slave unit.  
-LMsm for Master, LMss for Slave.  
Order required quantity for each unit. Master unit or slave unit are to be set at the factory, and if master to slave change is required after shipment, adjustment at the factory will be needed. Slave unit will not operate by itself. Maximum 3 units including master unit can be connected.

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**Characteristic of amplifier**

**Rise time**  
(Stepping time): The response time is sometimes described by the rise time (as shown in the drawing on the right).  
The rise time of an amplifier at a response speed of (= frequency bandwidth) \( F_c \) (Hz) is generally acquired by \( \text{tr} = 0.35/F_c \).  
Fall time \( tf \) is the same as \( tr \).  
Frequency bandwidth  
: at 200 kHz or lower, \( tr = tf \) = around 1.8 \( \mu \)s  
: at 100 kHz or lower, \( tr = tf \) = around 3.5 \( \mu \)s

**Response speed**  
When accurate output waveforms are required, select a amplifier with a frequency bandwidth higher enough than the operating frequency.  
In case of using sine waves, 3 to 5 times more frequency bandwidth is required, and around 10-times more in case of square waves in general. Inadequate bandwidth causes not only decrease in the output amplitude but much difference between the input and output phases. Therefore operating the product while monitoring the actual output waveforms is recommended.

**Capacitive load**  
Capacitative load may cause oscillation.  
In such cases, placed a power resistance in series with the output.  
Be careful that the frequency bandwidth is limited depending on the resistance and capacitance placed in series when capacitative load.

**Inductive load**  
Some inductance of inductive load may cause resonance in CC mode.  
In such cases, connect a C-R series circuit between output terminals to prevent resonance.
Customer Inquiry Sheet (DOS series)

Please copy this page and above fax number after filling out form below.

☐ I would like
☐ A quotation ☐ An explanation of product ☐ A demonstration ☐ To purchase
☐ Other ( )

☐ Give us your requirement / comment

☐ Please fill in below.

Address:

Company:

Dept.: Title:

Name:

Tel: Fax:

E-mail:

Warranty

We warrant that products contained in this catalog (hereinafter, the “Products”) are free from defects in material and workmanship under normal use for a period of one (1) year from the date of shipment thereof. However, the warranty period for X-ray detectors and X-ray source shall be either one (1) year from the date of shipment or 1,000 hours, whichever shorter. The above warranty shall not apply to any Product which, at our sole judgment, has been:i) Repaired or altered by persons unauthorized by us; or ii) Connected, installed, adjusted or used otherwise than in accordance with the instructions furnished by us (including being used in an inappropriate installation environment, such as in corrosive gas, high temperature and humidity). We are not liable for any loss, damage or failure of the Products after the shipment thereof caused by external factors such as disasters. If any Product is shown to be defective as satisfactory to us, we, at our sole discretion, repair or replace such defective Products at no cost to the purchaser. We assume no liability to the purchaser or any third party for special, incidental, consequential, or other damages resulting from a breach of the foregoing warranty. This warranty excludes any and all other warranties not set forth herein, express or implied, including without limitation the implied warranties of merchantability or fitness for a particular purpose. The Products are not designed and produced for such applications as requiring extremely high reliability and safety, or involving human lives (such as nuclear power, aerospace, social infrastructure facility, medical equipment, etc.). The use under such environment is not covered by this warranty and may require additional design and manufacturing processes.