

**NEW****DC to 200kHz** Function generator integrated

# Ultra High Speed Bipolar Power Supply

- ▶ Waveform generation, sequence operation, various measurements can be performed on a single power supply
- ▶ All settings and operations are realized only by operation on the front panel
- ▶ Available for expanding to 6kW with master/slave connection

**DOSF**  
seriesOutput voltage:  $\pm 20\text{V}$  to  $\pm 60\text{V}$ 

Output power : 150W to 2000W



# DOSF series

Ultra fast response  
Four-quadrant bipolar power supply  
with function generator



DOSF series is equipped with a built-in function generator enabling its compact size and ultra fast response. Any waveform can be programmed easily from the front panel and new features including memory setting and protection functions are now available. External control is also available (communication options). And, DOSF series can be used as ultra high-speed bipolar amplifier by inputting an external signal.

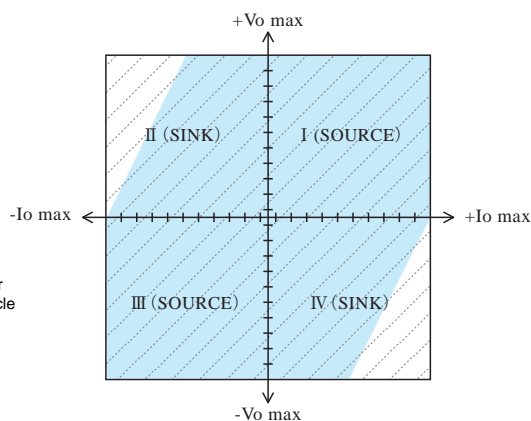
## Features

- Ultra fast response of DC to 200 kHz
- Function generator integrated
- Waveform with less distortion by DDS method (DC to 200 kHz sine wave, square wave and triangular wave)
- DC and AC output, and CV and CC mode can be programmed individually, making the unit user-friendly with its simple operation.
- External control is available with communication options. (USB, LAN, RS-232C and RS-485)
- LCD display uses high contrast white LED backlight for high legibility

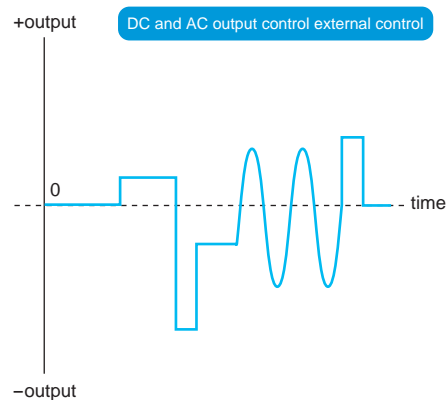
### Four-quadrant operation

$V_o$  max: rated output voltage  
 $I_o$  max: rated output current

- AC operation range (with 50 Hz or more frequency, 50% of duty cycle and without any DC bias)
- DC operation range



### DC and AC output control external control



## Typical applications

Driving capacitive load (capacitors and so on), biasing inductive loads (coils, transformers, etc.), various motor testing, power conditioners, evaluation test for solar panel related devices, surface treatment

This product is not designed for charge and discharge of battery.  
Please contact nearby sales if unit is used for charge and discharge application.

# Lineup

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

Model	Output voltage V	Output current A	Output power W	Frequency response kHz (-3 dB)		Weight kg (approx.)	Dimension (P6, 7)
				CV mode	CC mode		
DOSF20-7.5	±20	±7.5	150			11	<b>A</b>
DOSF20-15		±15	300			17	<b>A</b>
DOSF20-30		±30	600			23	<b>B</b>
DOSF20-60		±60	1200			40	<b>C</b>
DOSF20-100		±100	2000			47	<b>D</b>
DOSF25-6	±25	±6	150			11	<b>A</b>
DOSF25-12		±12	300			17	<b>A</b>
DOSF25-24		±24	600			23	<b>B</b>
DOSF25-48		±48	1200			40	<b>C</b>
DOSF25-80		±80	2000			47	<b>D</b>
DOSF45-3.3	±45	±3.3	150	DC to 200	DC to 100	12	<b>A</b>
DOSF45-6.6		±6.6	300			17	<b>A</b>
DOSF45-13.3		±13.3	600			23	<b>B</b>
DOSF45-16		±16	720			23	<b>B</b>
DOSF45-26.7		±26.7	1200			40	<b>C</b>
DOSF45-44.4	±60	±44.4	2000			47	<b>C</b>
DOSF60-2.5		±2.5	150			12	<b>A</b>
DOSF60-5		±5	300			17	<b>A</b>
DOSF60-10		±10	600			23	<b>B</b>
DOSF60-20		±20	1200			40	<b>C</b>
DOSF60-33.3		±33.3	2000			47	<b>C</b>

## Specifications

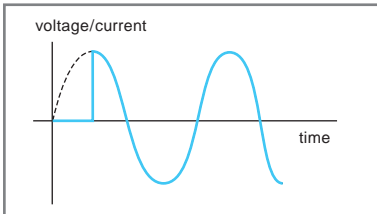
Input voltage / current	Model	Input voltage	Input current	Recommended breaker
	150 W	AC100 V to120 V ±10% Single phase	4 A	AC100 V/15 A
	300 W		7 A	
	600 W		7 A	
	720 W	AC200 V to 240 V ±10% Single phase	8 A	AC200 V/15 A
	1.2 kW		13 A	
	2 kW		20 A	
Waveform generation function	Sine wave, Rectangular wave, Triangular wave, Phase setting (Sine wave), Duty setting (Rectangular wave and Triangular wave)			
Frequency setting accuracy	≤ 0.03%			
Frequency for waveform	DC, 1 Hz to 200 kHz (at CV mode), 100 kHz (at CC mode)			
External control voltage	-10 V to +10 V (input impedance > 10 kΩ, change by a switch)			
Output setting range	DC: -100% to +100%/AC: 0% to +100%			
Ripple	0.02% rms			
Stability	0.016%/Hr typ.			
Setting accuracy	±0.5% F.S.			
Distortion factor	CV: 0.05%, CC: 0.5%			
Voltage regulation	Line: 0.05% (for ±10% input change)/Load: 0.05% (for 10% to 100% load change)			
Protections	Against over voltage, over current (variable OVP/OCP limit) and output short-circuit			
Temperature coefficient	0.02%/°C (at CV mode), 0.04%/°C (at CC mode)			
Output voltage control	-10 V to +10 V (output impedance 50 Ω)			
Output display	LCD on front panel Output voltage monitor (3-digit), output current monitor (3-digit) (AC, DC, MAX, MIN)			
Output display accuracy	DC: ±1% F.S. ±1-digit/AC: ±1% F.S. ±1-digit (at sine wave, frequency 10 Hz to 1 kHz)			
Output monitor	Output voltage, Output current: -10 V to +10 V ±1% F.S. (output impedance 1 kΩ)			
Preset function	10-memory			
Operating temperature	0°C to +40°C			
Storage temperature	-20°C to +70°C			
Relative humidity	20% to 80%, non condensing			
Accessories	Input cable 2.5 m length (1) (3-pin connector for 115 V input models, Flying lead for 230 V input models) Instruction manual (1)			

# Functions

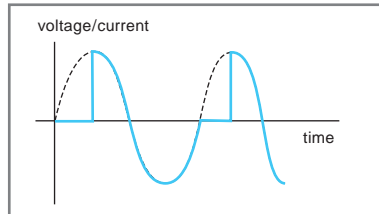
## Fundamental wave generated function

The DOSF is equipped with a built in function generator that produces sine, rectangular, and triangle waves. Frequency range can be set between 1 Hz and 200 kHz, and easy adjustments of amplitude, initial phase (sine wave), switching/cutoff phase setting (sine wave), and duty cycle (rectangular wave, triangular wave) are possible, making it very convenient for a variety of evaluation tests and applications.

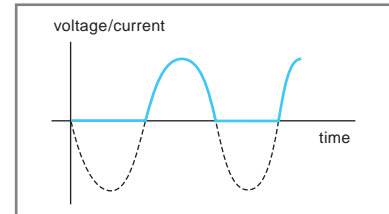
### Initial phase



### Switching phase



### Cutoff phase



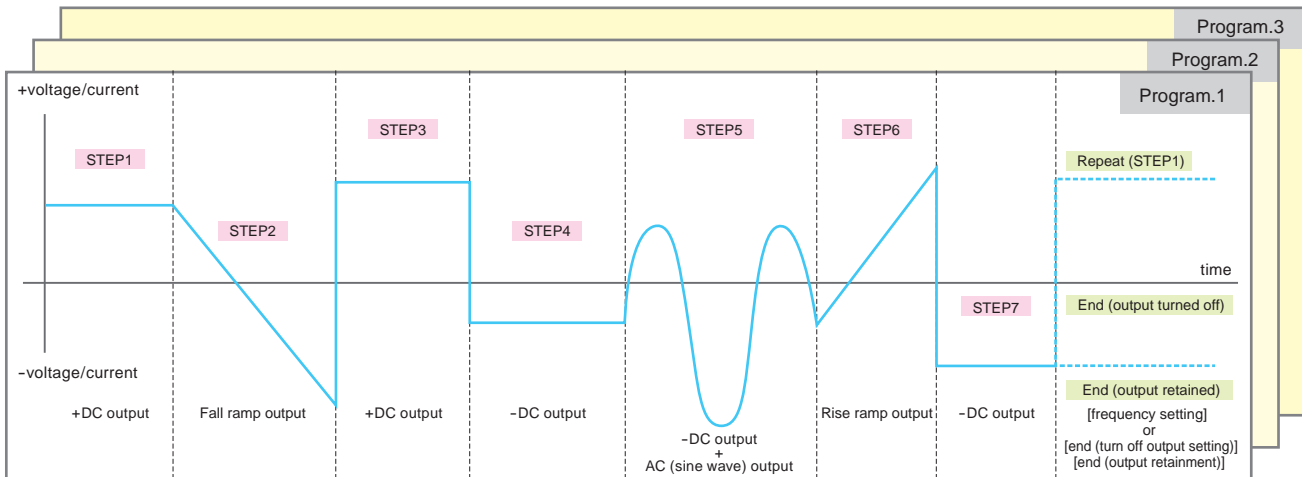
**Applications** Rush current source for rush current measurement, wave fluctuation test etc.

## Sequence functions \*

DOSF is equipped with a sequence function that can program step length, step amplitude, ramp, CV/CC mode, sequence-ending setting, AC superposition, step jump, number of jump, etc. Any desired wave form can be generated making it useful for various experiment, evaluation, and validation applications.

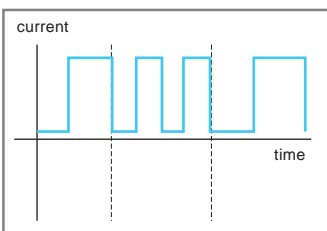
- Setting length: 10 ms to 1999 s 999 ms (resolution: 1 ms), Ramp and AC wave form is 50 ms
- Up to 16 steps can be set and saved plus three programs per program.
- Can be set CV/CC mode per program
- Frequency: Infinite, 1 to 999

### Program image

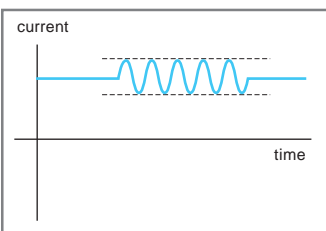


Complicated wave forms such as below can be easily generated just by using the sequence function.

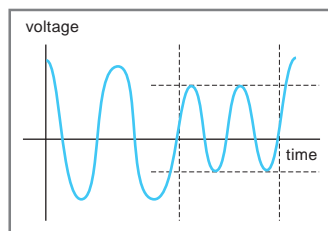
### Pulse current variation



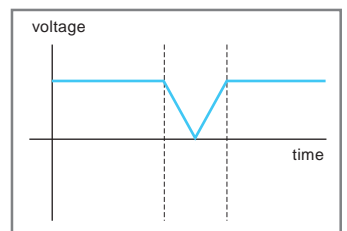
### Ripple current superposition



### AC voltage/frequency variation



### DC voltage interruption

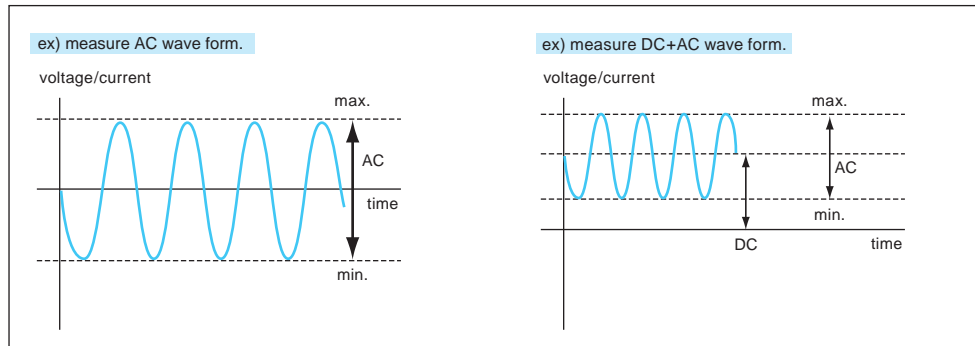


**Applications** Motor testing, pulse power supplies, or various evaluation equipment, etc

\* If amplifier's output cuts off while it is running a sequence program half-way-through, the leftover sequence will not run but it is re-activated from the beginning of the original sequence.

## Measurement functions

DOSF is equipped with measurement functions that measure DC value, AC RMS value, Max value, and Min. value. thus Wide frequency ranges, DC to 200 kHz, can be measured automatically, and it is easy to change the setting depending on application.



## Memory function

DOSF is equipped with both preset and set-up memory.

During fundamental wave operation, output voltage (at CV mode), Output current (at CC mode), CV/CC setting, and waveform setting can be saved to 10 set-up memories. Also, sequence programs can be saved in up to 3 programs. Data changes can be saved and data called out very easily.

**DOSF is equipped with a**

**[protection function], [key-lock function], and [CV/CC crossover], as standard options.**

## Operability

DOSF series has numerous functions, it is user-friendly, and will contribute to minimizing tact time as well as improving efficiency of operation.

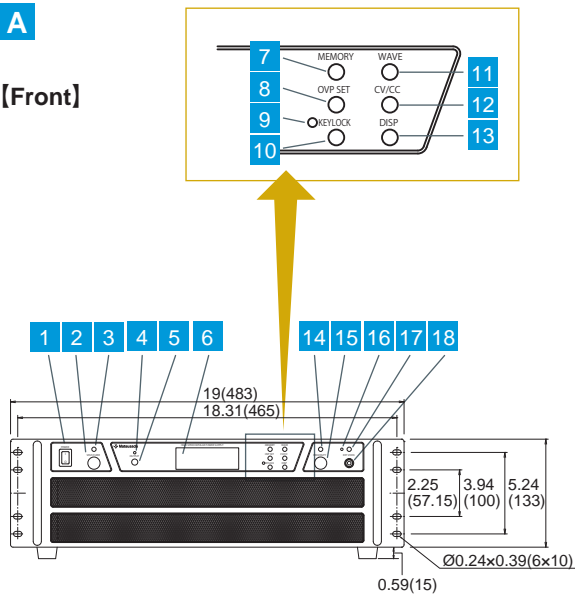


- |  |   |
|--|---|
| 1 Power switch                               | : This has priority over all operations for safety reason.                |
| 2 Amplitude setting switch                   | : DC and AC amplitude changeover (voltage or current)                     |
| 3 Amplitude adjustment rotary encoder        | : It is used as amplitude setting, each setting change, sequence editing  |
| 4 Output switch                              | : Turn Output ON/OFF  |
| 5 Display                                    | : Display each setting, monitor value                                     |
| 6 Memory switch                              | : Call up and save set-up memory  |
| 7 Wave switch                                | : Fundamental wave changeover   |
| 8 OVP setting switch                         | : Set OVP, OCP protection function setting and measurement setting        |
| 9 CV/CC changeover switch                    | : CV/CC changeover  |
| 10 Key-lock switch                           | : Set key-lock  |
| 11 Display switch                            | : Change display  |
| 12 Frequency setting switch                  | : Change waveform setting (frequency, phase, duty cycle, etc)             |
| 13 Frequency adjustment rotary encoder       | : Set wave setting value  |
| 14 External control voltage effective switch | : Integrated function generator and external voltage operation changeover |

## Function/Dimensions inch (mm)

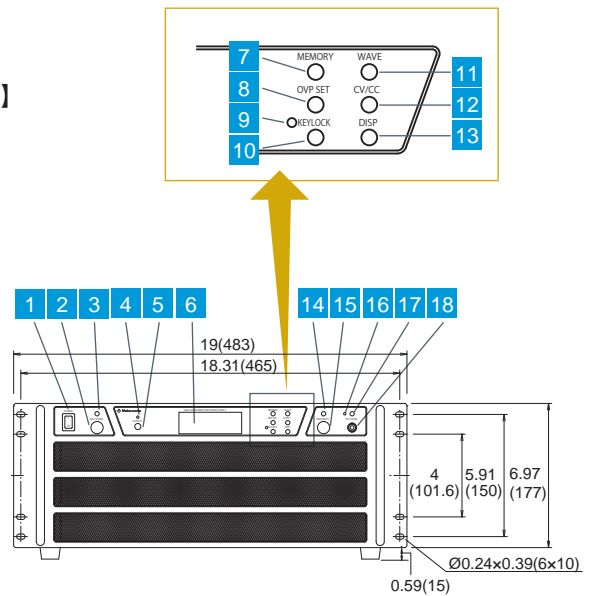
**A**

**[Front]**

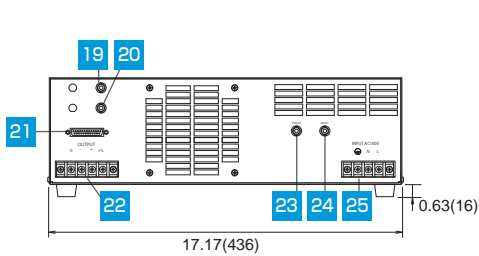


**B**

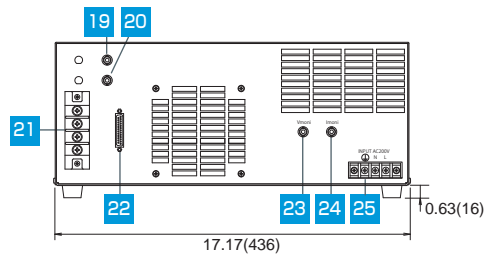
**[Front]**



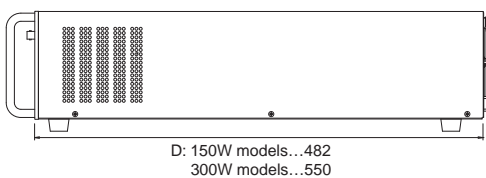
**[Rear]**



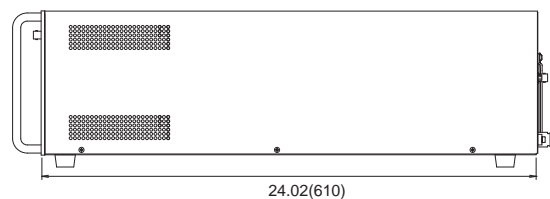
**[Rear]**



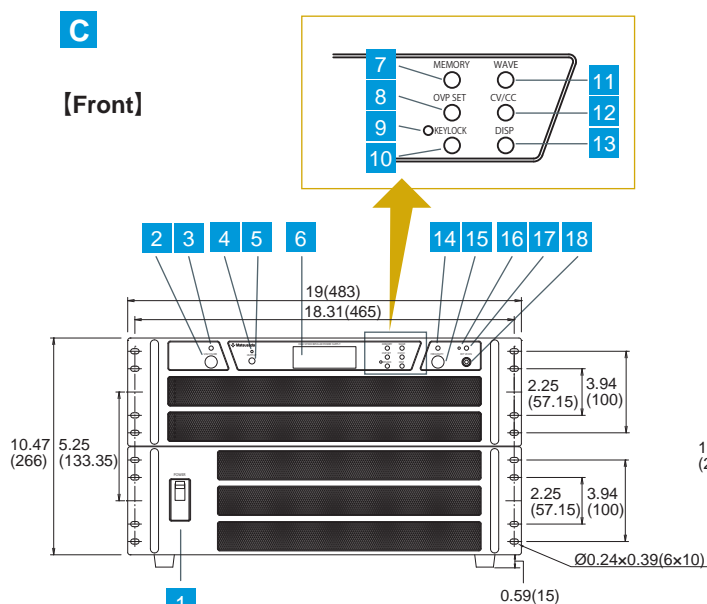
**[Side]**



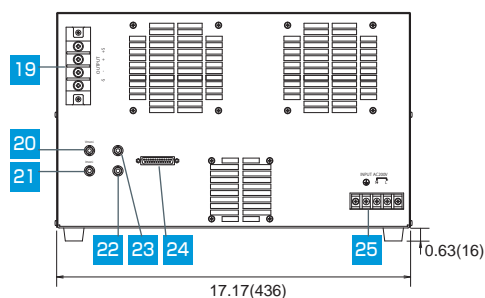
**[Side]**



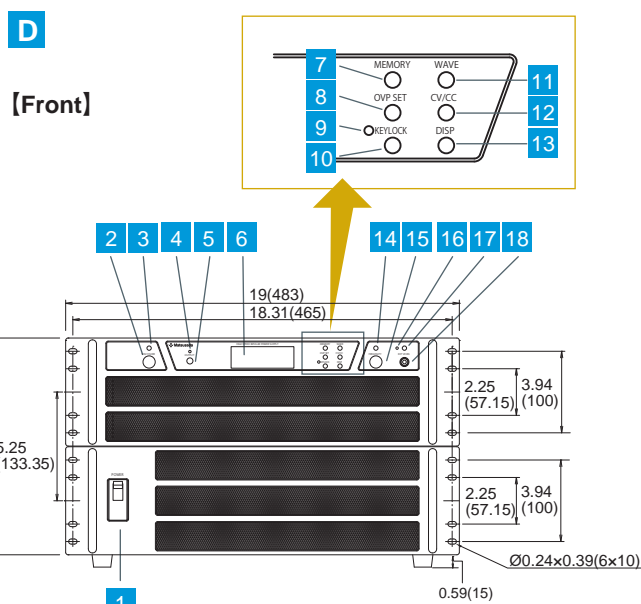
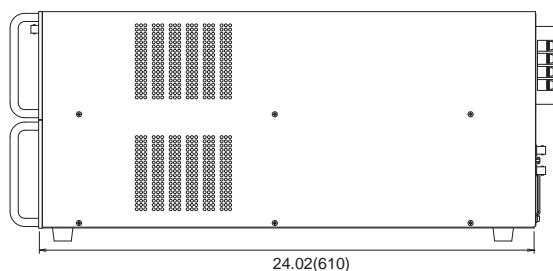
- |                             |  |  |
|-----------------------------|--|--|
| 1 Power ON/OFF switch       | 9 Key lock indicate LED                    | 19 Interlock (option)                  |
| 2 Amp./Bias setting encoder | 10 Key lock switch                         | 20 Remote switch ON/OFF (option)       |
| 3 Amp./Bias change switch   | 11 Waveform change switch                  | 21 Connector for Master/slave (option) |
| 4 OUTPUT indication LED     | 12 CV/CC change switch                     | 22 Output terminal                     |
| 5 OUTPUT ON/OFF switch      | 13 Display change switch                   | 23 Output voltage monitor terminal     |
| 6 Display                   | 14 Frequency/Duty change switch            | 24 Output current monitor terminal     |
| 7 Memory setting switch     | 15 Frequency/Duty setting encoder          | 25 AC Input terminal                   |
| 8 OVP setting switch        | 16 External control voltage indicate LED   |  |
|                             | 17 External control voltage switch         |  |
|                             | 18 External control voltage input terminal |  |



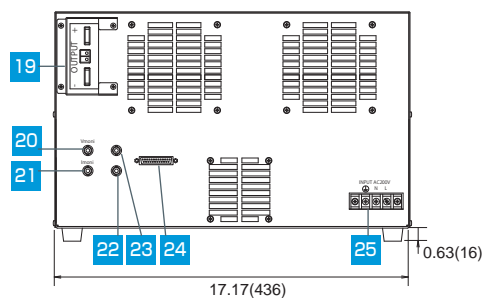
**[Rear]**



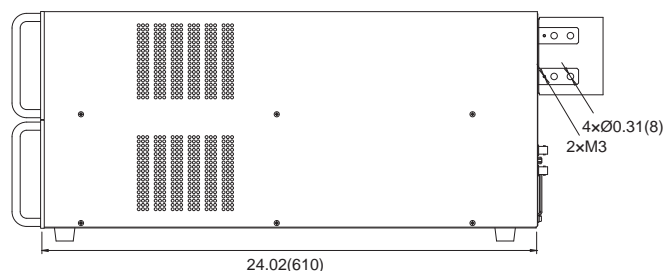
**[Side]**



**[Rear]**



**[Side]**



- 1 Power ON/OFF switch
- 2 Amp./Bias setting encoder
- 3 Amp./Bias change switch
- 4 OUTPUT indication LED
- 5 OUTPUT ON/OFF switch
- 6 Display
- 7 Memory setting switch
- 8 OVP setting switch

- 9 Key lock indicate LED
- 10 Key lock switch
- 11 Waveform change switch
- 12 CV/CC change switch
- 13 Display change switch
- 14 Frequency/Duty change switch
- 15 Frequency/Duty setting encoder
- 16 External control voltage indicate LED
- 17 External control voltage switch
- 18 External control voltage input terminal

- 19 Output terminal
- 20 Output voltage monitor terminal
- 21 Output current monitor terminal
- 22 Remote switch ON/OFF (option)
- 23 Interlock (option)
- 24 Connector for Master/slave (option)
- 25 AC Input terminal

## Options \*These options cannot be selected together.

**-LU1** ...USB interface board\*  
Digital control via USB

### [Control items]

Output ON/OFF, Voltage/Current setting (AC and DC), Switch of Constant Voltage/Constant Current, Frequency setting, Waveform setting (sine wave, square wave, and triangular wave), phase setting (sine wave), Duty setting (square wave and triangular wave)

**-LEt** ...Ethernet interface board\*  
Digital control via Ethernet (Ethernet is a registered trademark of Xerox Corporation.)

### [Control items]

Output ON/OFF, Voltage/Current setting (AC and DC), Switch of Constant Voltage/Constant Current, Frequency setting, Waveform setting (sine wave, square wave, and triangular wave), phase setting (sine wave), Duty setting (square wave and triangular wave)

**-LGob** ...Optical interface board\*

-LGob : Optical interface board + optical cable 2 m  
-LGob (Fc5) : Optical interface board + optical cable 5 m  
-LGob (Fc10): Optical interface board + optical cable 10 m  
-LGob (Fc20): Optical interface board + optical cable 20 m  
-LGob (Fc40): Optical interface board + optical cable 40 m

Optical communication offers insulation control. It is to prevent malfunction such as transient phenomenon by surge, lightning induction, and exogenous noise.

### [Control items]

Output ON/OFF, Voltage/Current setting (AC and DC), Switch of Constant Voltage/Constant Current, Frequency setting, Waveform setting (sine wave, square wave, and triangular wave), phase setting (sine wave), Duty setting (square wave and triangular wave)

**-L(220V)** ...200 Vac to 240 Vac  $\pm 10\%$  single phase, 50/60 Hz input (150 W and 300 W models only)

When ordering, suffix the following option mark to the model number.

<Example> DOSF60-20-LDFM<sub>s</sub>LMsmSU<sub>s</sub>1 DOSF20-100-LDFGob(FC20)LMssS (Interface and input voltage order)

**-LS** ...Remote switch (output ON/OFF)

**-LD** ...Inter lock

**-LMsm** ...Master/slave control

"-LMsm" for Master unit, or "-LMss" for slave 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.

Maximum 3 units including master unit can be connected.

**-LF** ...Floating ground (Withstanding voltage of 200 Vdc)

The negative terminal of the output can be floatable up to 200 V. However, please take note that external control signal source (such as function wave generator) and the common for the measuring device that connects to amplifier's monitor terminal will also become floating potential in this case.

**-L(200V)** ...Input voltage change  
200 Vac to 240 Vac  $\pm 10\%$  single phase, 50/60 Hz input. (150 W and 300 W models only)

## 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) Fc (Hz) is generally acquired by " $tr \approx 0.35 / fc$ ".

Fall time  $t_f$  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 an amplifier with a frequency bandwidth, which is higher than the required operating frequency. In the case of using sine waves, 3 times to 5 times more frequency bandwidth is required, whereas with square waves, around 10 times more frequency bandwidth is needed. Inadequate bandwidth can cause a decrease in output amplitude and a difference between input and output phases. Operating the product (load) while monitoring the actual output waveforms is recommended.

### Capacitive load

Capacitive load may cause oscillation.

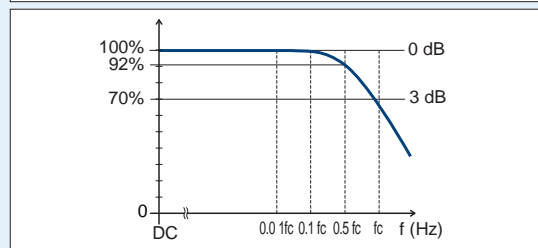
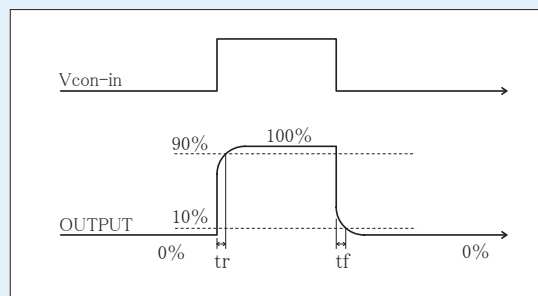
In such cases, place a resistor in series with the output.

Be careful to not limit the frequency bandwidth by using a resistor in series that is too large.

### 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.



# PSS2en

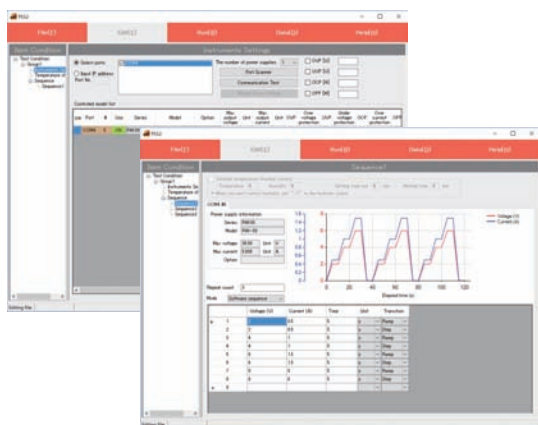
The sequence software for power supplies and electronic loads

PSS2 is the dedicated software which can actuate various power supplies, electronic loads and digital controller for power supplies manufactured by Matsusada Precision Inc. with simple set up. It is the perfect for the aging test, the burn-in test and the withstand voltage test for electronic parts, and for the endurance test, intermittent / continuous operation test or various simulation test for electric component of automobile.

## FEATURE

- Set-up of various sequences with simple action only inputting voltage, current and time is possible.
- Logging data can be saved in real time with the monitoring function.
- Collective control or individual sequence operation of up to 512 power supplies and electric loads is possible.
- Test continuously changing environment load of temperature or humidity in coupled operation with thermostatic chamber manufactured by ESPEC Corp. is possible.
- Packaged control in one application soft is possible if power supplies or electronic loads applied in combination with PSS2 are of many different types.
- Communication is possible using LAN port, USB (TMC) port, RS-485port in addition to RS-232C port  
(Only for models mounted Multi digital interface option (-LMI))
- Direct control of output voltage and current value of the power supplies is possible.  
(Only for models included in PSS2-DCPS and PSS2-GP)

## EXAMPLES FOR OPERATION OF PSS2en



# 1

### Set-up test condition

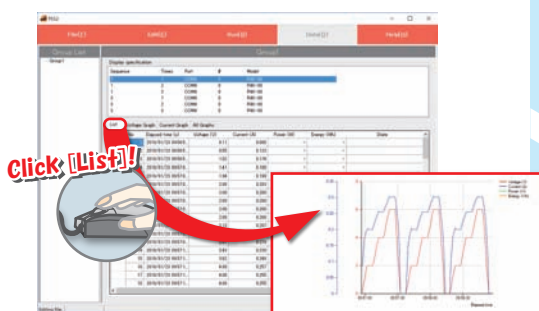
Make-up test conditions like as setting the power supplies or action sequence and so on.  
Number of settable sequence pattern is max.16, it is possible to set various test conditions fitted the target like as selection of the action mode and setting of any protection function, etc.



# 2

### Execution of Test

It is possible to test each group setup.  
On the operation display, it is possible to monitor on the one screen required information like as sequence, the status of the thermostatic chamber and the power supply, and voltage / current at testing. Also when execute in parallel plural group, it is possible to monitor these status together.



# 3

### Confirmation of Measured Data

It is possible to check the test data completed.  
It is possible to confirm values of each sequence, the individual graph or the packaged graph. Also it is possible to output measured data with CSV style and then to sum up or analyze them with the spreadsheet software.

## Low voltage type High-speed bipolar power supplies

Function generator built-in type

### DOPF series



Output voltage :  $\pm 5\text{ V}$  to  $\pm 300\text{ V}$   
Output power : 150 W to 2 kW  
Frequency bandwidth: DC to maximum 30 kHz

- DOPF series can be used for various applications by fast response and built-in function generator.

Wide lineup type

### DOP series



Output voltage :  $\pm 5\text{ V}$  to  $\pm 300\text{ V}$   
Output power : 150 W to 2 kW  
Frequency bandwidth: DC to maximum 30 kHz

- The model which is most suitable for your application can be selected from wide lineup.

Ultra-fast response type

### DOS series



Output voltage :  $\pm 20\text{ V}$  to  $\pm 60\text{ V}$   
Output power : 150 W to 2 kW  
Frequency bandwidth: DC to maximum 200 kHz

- Ultra-fast response is achieved in compact size.

High voltage type

### DOC series



Output voltage :  $\pm 500\text{ V}$ ,  $\pm 1000\text{ V}$   
Output power : 50 W, 100 W  
Frequency bandwidth: DC to maximum 10 kHz

- High voltage output (maximum  $\pm 1\text{ kV}$ ) and fast response.

Function generator built-in type

### DJOPF series



Output voltage :  $\pm 10\text{ V}$  to  $\pm 60\text{ V}$   
Output power : 50 W, 60 W  
Frequency bandwidth: DC to maximum 30 kHz

- DJOPF series has a built-in function generator in its light and compact size of only 140 mm width.

Compact and high power type

### DHOP series



Output voltage :  $\pm 20\text{ V}$ ,  $\pm 45\text{ V}$   
Output power : 240 W  
Frequency bandwidth: DC to maximum 100 kHz

- High power and fast response are achieved in compact half-rack size.

## High voltage type High-speed Amplifier

Ultra-high speed type

### AMP series



Output voltage:  $\pm 600$  V to  $\pm 40$  kV  
Output power : 100 W to 1.2 kW  
Slew rate : 300 V/ $\mu$ s to 700 V/ $\mu$ s

- Slew rate with actual load is as high as 700 V/ $\mu$ s.
- Peak current output of 3 times of rated output current is available.
- Various protections such as over current/voltage protection and output short circuit are available.
- Suitable for Solar battery panel evaluations, Beam deflection, Corona discharge, and so on.

Large current / high speed type

### AMPS series



Output voltage:  $\pm 400$  V to  $\pm 20$  kV  
Output power : 400 W to 1.2 kW  
Slew rate : 400 V/ $\mu$ s to 1200 V/ $\mu$ s

- Maximum peak current is 4 A. ( $\pm 600$  V model)
- Frequency bandwidth with actual load is as high as 100 kHz.
- Various protections such as over current protection and output short circuit are available.
- Suitable for laser modulation and Ion/Electron beam deflection.

High speed type

### AMS/AMT series



Output voltage:  $\pm 600$  V to  $\pm 20$  kV  
Output power : 20 W to 200 W  
Slew rate : 30 V/ $\mu$ s (AMS) 250 V/ $\mu$ s or 360 V/ $\mu$ s (AMT)

- Wide lineup of output voltage.
- Quick response as fast as 100 kHz enables to output according to input wave forms.
- Various protections such as over current protection, arc and output short circuit are available.
- Suitable for Beam deflection, Corona discharge, Electrophotography process, and so on.

Ultra compact type

### AMJ series



Output voltage:  $\pm 500$  V to  $\pm 4$  kV  
Output power : 20 W to 40 W  
Slew rate : 150 V/ $\mu$ s

- Ultra compact size and fast response.
- Output of any wave forms according to input wave forms is available.
- Various protections such as over current protection, arc and output short circuit are available.
- Suitable for Beam deflection, Corona discharge, Electrophotography process, and so on.



**USA/Canada : ☎1-888-652-8651**

other countries : ☎81-6-6150-5089

## Customer Inquiry Sheet (DOSF 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:	

### Manufacturer warranty

We warrant the specification, unless otherwise specified, at max. rated output after warm up, and scope of application is between 10% and 100% of max. rated output. 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. We will not inspect, adjust or repair any of our power supply products in the field or at any customer site. If you suspect that there has been a power supply failure in the field, please inspect your whole unit by yourself in an effort to determine that the problem is, in fact, arising out of our power supply products. If it is found that the problem is arising out of such power supply product after inspection, please contact your local sales office for additional troubleshooting. A "Return Merchandise Authorization" is required in case the power supply must be sent back to the factory in Japan for inspection and repair. 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. No modification or supplement of this warranty shall be binding unless in writing and signed by a duly authorized officer of Matsusada. Matsusada reserves the right to make any changes in the contents of catalogs or specifications at any time without advance notice. Due to compelling reason such as unavailability of components used, products might be un available or unable to repair. The products specified in catalogs or specifications are designed for use by the person who has enough expertise or under the control of such person, and not for general consumers. Schematics of products shall not be submitted to users. Test result or test data for the products shall be available upon request with charge.

Make sure you read the specification in the latest catalog before you order. Contact nearby sales office for the latest catalog.

PLEASE SEE THE LINK BELOW FOR THE COMPLETE WARRANTY TERMS

<https://www.matsusada.com/site/warranty.html>

Copyright © 2019 Matsusada Precision Inc. All rights reserved.



# Matsusada Precision Inc.

**Headquarters / Factory :** 745 Aoji-cho Kusatsu Shiga 525-0041 Japan

## Contact Us

➤ [www.matsusada.com](http://www.matsusada.com)