

**NEW**

Compact size / Function generator integrated

# Four-quadrant high speed bi-polar power supply

DJOPF10-5 :  $\pm 10\text{V}$  / 50W / DC to 30kHz

DJOPF20-3 :  $\pm 20\text{V}$  / 60W / DC to 30kHz

DJOPF30-2 :  $\pm 30\text{V}$  / 60W / DC to 30kHz

DJOPF60-1 :  $\pm 60\text{V}$  / 60W / DC to 30kHz

**DJOPF**  
series

- ◆ Compact design of the width 140mm and Lightweight of 3kg.
- ◆ Possible waveform generation, sequence operation and various measurements
- ◆ Corresponding to the digital interface and remote control



# DJOPF series

## High speed bi-polar power supply with function generator

DJOPF series is four-quadrant bi-polar power supply which source and sink electric power. Thanks to the original design, phenomenal light weight and compact size power supply, which is 140mm width, and weigh 3kg has been achieved, bi-polar amplifier equipped with a built-in function generator enabling its compact size and fast response. They can be used in 2-mode of a constant voltage (CV) or a constant current (CC). **They are ultra compact and high speed, driving output proportional to the input waveform such as a sine wave, triangular wave, saw wave, and square wave.** DJOPF series is most appropriate for evaluation test such as solar panels, the instruments driven by battery and the IC which control battery.



Even more high power model, DOP series, faster model, DOS series, are available. Contact to local sales office for details.

### Applications

- ▶ Suitable to evaluate battery driven equipment to use as a simulated battery
- ▶ Inductive load such as coil and transformer
- ▶ Capacitive load like capacitor
- ▶ Various motor tests
- ▶ Tests for in-vehicle electrical component
- ▶ Evaluation test for solar panel related devices
- ▶ For surface treatment

### Features

#### Response speed

Newly developed DJOPF Series is the most appropriate for transient response test with such high power and broad bandwidth.

#### Wide lineup

Select a model fitting for your applications from the lineup of various output voltage and current.

#### Built-in function generator

DJOPF includes the sequence function other than a waveform generation function.

#### DC or AC output meter

3-digit digital meter displays the DC or AC value of the output voltage and current.

#### Compact & light weight

For maximum compactness and light weight, DJOP Series has been improved for small footprint and easy carry.

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

A single switch selects between CV and CC modes.

#### Four-quadrant action

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

#### Complete protective function

Protective function against over voltage / current and protective measures against output short-circuit are completely provided.

### Lineup

★ Please consult with our sales office about the specifications except the following list.

Model	Output voltage V(rms value)	Output current A(rms value)	Output power W	Frequency bandwidth (-3dB)	Weight kg(approx.)
DJOPF10-5	±10(7)	±5(3.5)	50	DC ~ 30kHz	3.0
DJOPF20-3	±20(14)	±3(2.1)	60	DC ~ 30kHz	3.0
DJOPF30-2	±30(21)	±2(1.4)	60	DC ~ 30kHz	3.0
DJOPF60-1	±60(42)	±1(0.7)	60	DC ~ 30kHz	3.0

## Specifications

<b>Input voltage</b>	85V to 264Vac / 50/60Hz / single phase	<b>Protections</b>	Over voltage protection, over current protection, against short-circuit
<b>Input current</b>	1.5A max @100Vac input	<b>Temperature coef.</b>	0.02% / °C (CV mode), 0.04% / °C(CC mode)
<b>Waveform generation function</b>	Sine wave, Square wave, Triangular wave	<b>Output display</b>	LCD on front panel Voltage : 3-digit digital meter Current : 3-digit digital meter
<b>Setting frequency for waveform</b>	DC, 10mHz to 30kHz	<b>Output monitor accuracy</b>	DC : $\pm 1.5\%F.S \pm 1dgt$ AC : $\pm 1.5\%F.S \pm 1dgt$
<b>External control voltage (Vcon-in)</b>	-10V to +10V (With a switch, validity/invalidity of an external control can be changed.)	<b>Sequence function</b>	Program : 3 memories Step : 16 steps / program Step time : 10ms to 1999s999ms Step resolution : 1ms
<b>Output setting range</b>	DC : -100% to +100% AC : 0% to +100%	<b>Preset function</b>	10 memories
<b>Setting accuracy</b> <sup>*1</sup> <sub>*2</sub>	$\pm 0.5\%F.S$	<b>Operating temp.</b>	0°C to +40°C
<b>Ripple</b>	<CV mode> less than 0.02%rms <CC mode> less than 0.2%rms	<b>Storage temp.</b>	-20°C to +70°C
<b>Stability</b>	0.016%/Hr typ.	<b>Humidity</b>	20% to 80%RH (no condensation)
<b>Distortion factor</b> <sup>*2</sup>	<CV mode> 0.05% <CC mode> 0.5%	<b>Accessories</b>	AC input cable 2.5m (1) Instruction manual (1)
<b>Regulation</b>	Input : 0.05% (for $\pm 10\%$ input change) Load : 0.05% (for 10% to 100% load change)		

\*1 : About AC, it sets up in 1kHz and a sine wave.  
\*2 : In the rated output and a resistance load.

## Protections

### Voltage limit protection (Vlimit)

DJOPF is equipped with voltage limit protection, which protects load by limiting output with the value that was set optionally even at abnormal conditions.

### Current limit protection (Ilimit)

DJOPF is equipped with current limit protection, which protects load and power supply by limiting output with the value that was set optionally even at the time of overload.

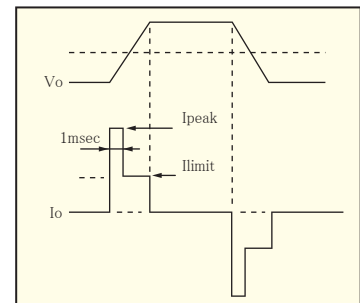
### Over voltage protection (O.V.P)

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

### High speed over current protection

DJOPF 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 1ms. Additional fast response type limited current circuit can limit pulse current of square waveforms or from capacitor at approx. 2 times more current of rating.



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


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

## Output range

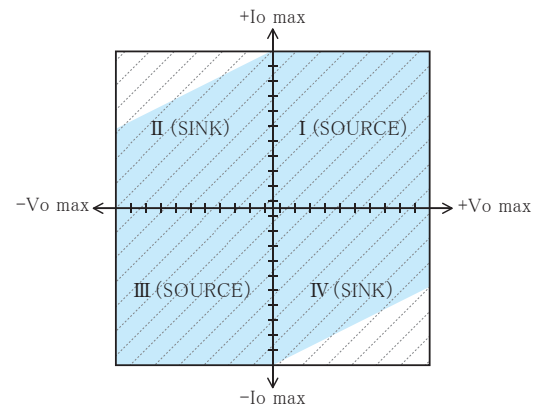
DJOPF series is a bi-polar power supply which can perform four-quadrant operation. They can supply (source) and absorb (sink) current in the field of the drawing on the right.

$V_o \text{ max}$  : rated output voltage

$I_o \text{ max}$  : rated output current

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

 Range of DC operation

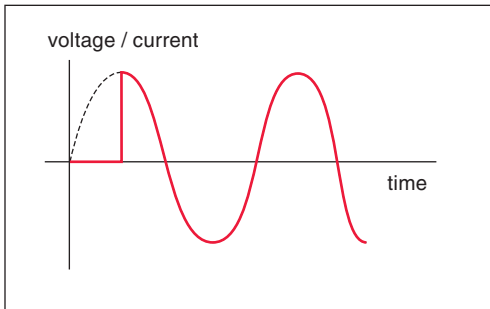


# Functions

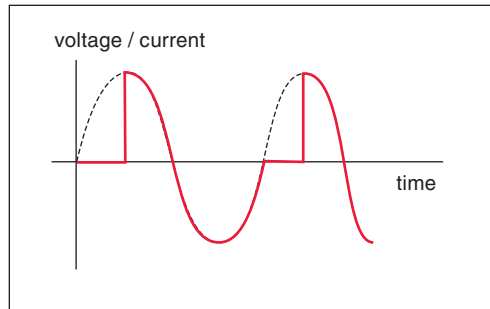
## Fundamental wave generated function

DJOPF is equipped with a built in function generator that produces sine, square, and triangle waves. Frequency range can be set between 0.01Hz and 30kHz, and easy adjustments of amplitude, initial phase(sine wave), switching/cutoff phase setting(sine wave),and duty cycle(square wave, triangular wave) are possible, making it very convenient for a variety of evaluation tests and applications.

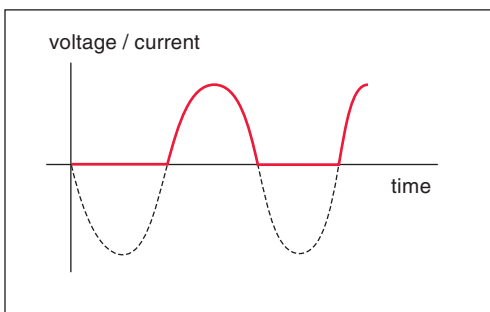
### Initial phase



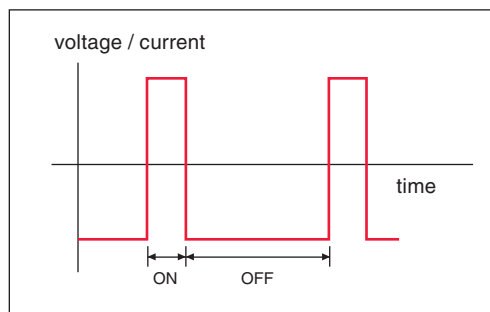
### Switching phase



### Cutoff phase



### Duty cycle

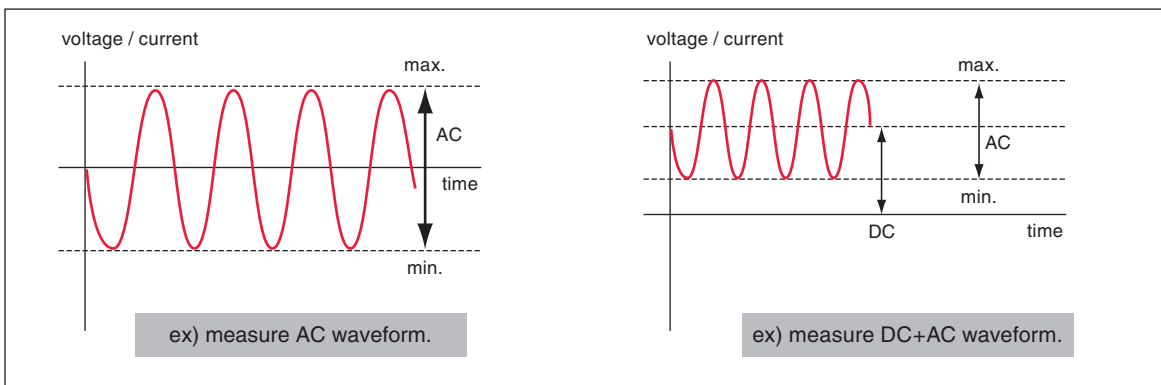


### Applications

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

## Measurement functions

DJOPF is equipped with measurement functions that measure DC value, AC value, maximum value and minimum value thus Wide frequency ranges, DC to 30kHz, can be measured automatically, and it is easy to change the setting depending on application.

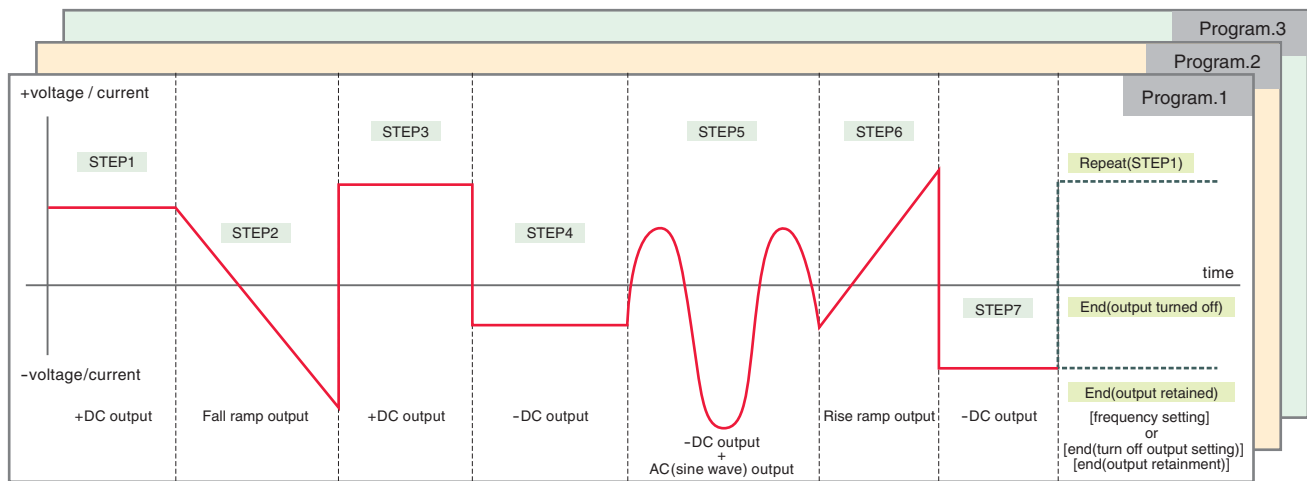


## Sequence functions

DJOPF 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.

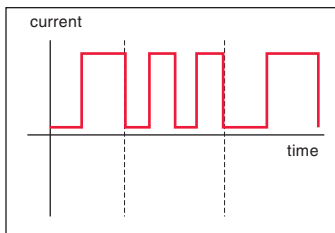
- Setting length : 10ms to 1999s999ms(minimum setting length:1ms)
- Up to 16 steps can be set and saved plus 3 programs per program.
- Can be set CV / CC mode per program
- Frequency : Infinite, 1 to 999
- DC voltage / current lamp operation, AC voltage / current sweep operation and AC frequency sweep operation are available.

### Program image

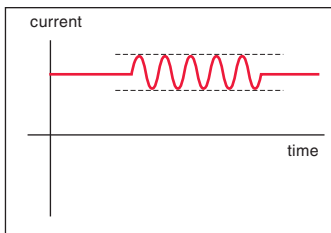


Complicated waveforms such as below can be easily generated just by using the sequence function.

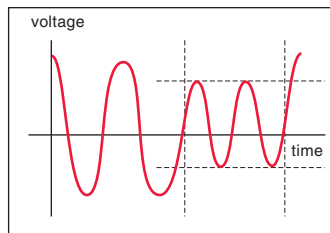
#### Pulse current variation



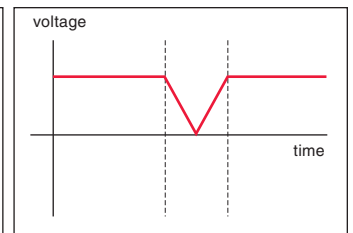
#### Ripple current superposition



#### AC voltage variation



#### DC voltage interruption



#### Applications

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

## Memory function

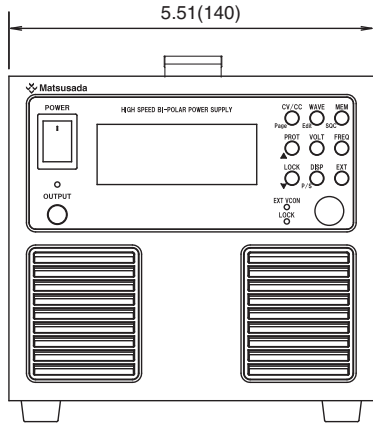
DJOPF is equipped with both preset and set-up memory.

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.

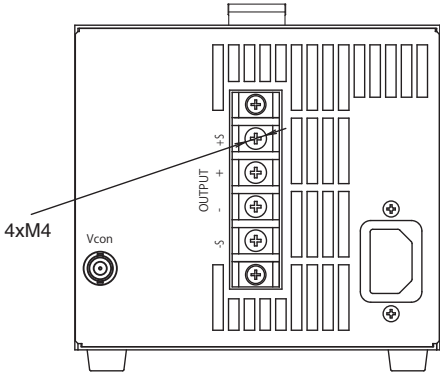
**DJOPF is equipped with a [ Protection function ] , [ Key-lock function ] , and [ CV / CC crossover ] , as standard functions.**

Dimensions inch(mm)

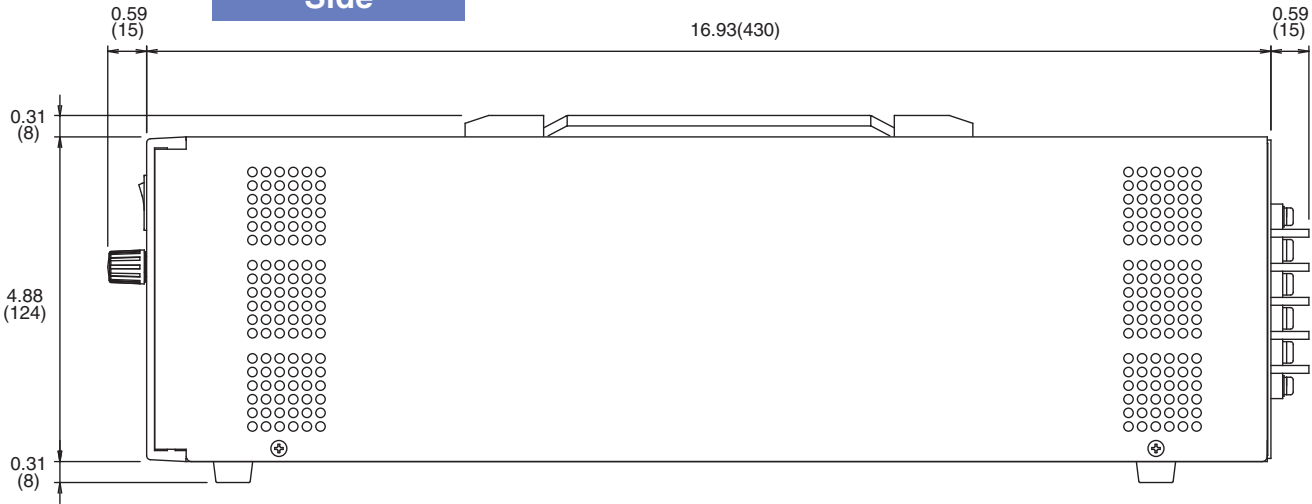
**Front**



**Rear**



**Side**



AC input cable

<b>CABLE TYPE 1</b> 125V / 10A (Standard)	<b>CABLE TYPE 3</b> 250V / 10A (Separately)	<b>CABLE TYPE 4</b> 250V / 10A (Separately)

## Options

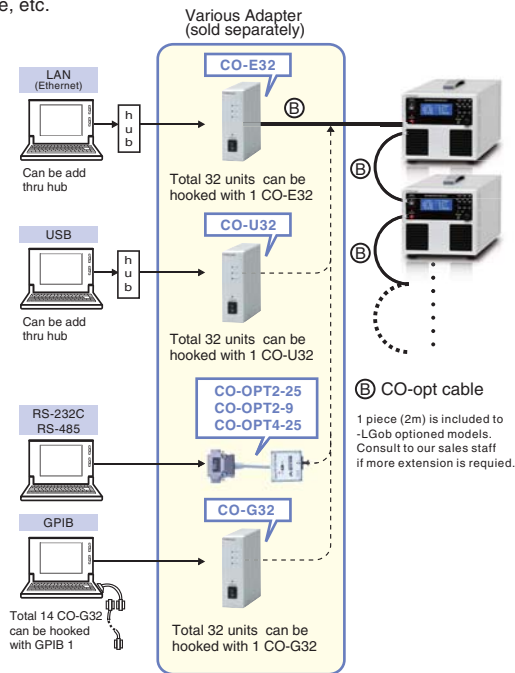
\* : These options cannot be selected together. Only one of each can be selected.

### -LGoB \*

Optical interface board - For isolated control with optical communication

-LGoB	Optical Interface board + Optical cable 2m
-LGoB (Fc5)	Optical Interface board + Optical cable 5m
-LGoB (Fc10)	Optical Interface board + Optical cable 10m
-LGoB (Fc20)	Optical Interface board + Optical cable 20m
-LGoB (Fc40)	Optical Interface board + Optical cable 40m

Insulation control is made with optical communication. As perfect insulation is made by optical fiber it is able to forestall miss operation as transient phenomenon caused by surge, dielectric thunder or foreign noise, etc.



- ★ When use them under following conditions, select -LGoB always.
- Noisy environment as in a factory. (Ex. A motor or a coil is used near to load or power supply)
  - Used in high voltage floating. (250V and higher)
  - Our power supply and controller (PC or PLC) can not be installed within 2m.

### -LU1 \*

USB interface board - Digital control via USB

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

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) (Ethernet is a registered trademark of Xerox Corporation.)

### -LS

Remote Switch (OUTPUT ON / OFF)

### -LNh

No handle

The handle for carrying will not be equipped.

When ordering, suffix the following option mark to the model number.  
**<e.g> DJOPF60-1-LNhSUs1, DJOPF10-5-LGoB(Fc5)NhS**

## 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 " $t_r \approx 0.35/f_c$ ."

Fall time  $t_f$  is the same as  $t_r$ .

Frequency bandwidth

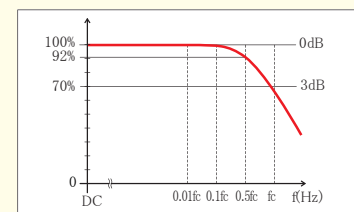
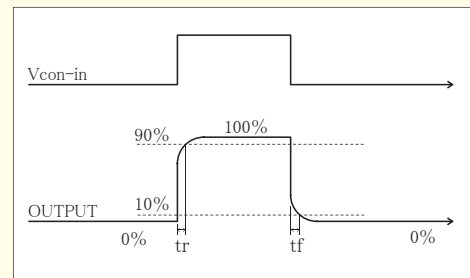
- : at 30kHz or lower,  $t_r = t_f =$  around 12  $\mu$ s
- : at 20kHz or lower,  $t_r = t_f =$  around 18  $\mu$ s

### 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

Capacitive 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 capacitive 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.

