

**NEW**

Compact size/Function generator integrated

# Four-Quadrant High Speed Bipolar Power Supply

DJOPF10-5:  $\pm 10\text{V}/50\text{W}/\text{DC}$  to 30kHz  
DJOPF20-3:  $\pm 20\text{V}/60\text{W}/\text{DC}$  to 30kHz  
DJOPF30-2:  $\pm 30\text{V}/60\text{W}/\text{DC}$  to 30kHz  
DJOPF60-1:  $\pm 60\text{V}/60\text{W}/\text{DC}$  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



Light weight  
3kg

# DJOPF series

## High speed bipolar power supply with function generator



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

DJOPF series is four-quadrant bipolar power supply which source and sink electric power. Thanks to the original design, phenomenal light weight and compact size power supply, which is 140 mm width, and weigh 3 kg has been achieved, bipolar 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.

### 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

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

### 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	Maximum output voltage V	Maximum output current A	Maximum output power W	Frequency bandwidth (-3 dB)	Weight kg (approx.)
DJOPF10-5	±10	±5	50	DC to 30 kHz	3.0
DJOPF20-3	±20	±3	60	DC to 30 kHz	3.0
DJOPF30-2	±30	±2	60	DC to 30 kHz	3.0
DJOPF60-1	±60	±1	60	DC to 30 kHz	3.0

## Specifications

<b>Input voltage</b>	85 V to 264 Vac 50/60 Hz single phase	<b>Protections</b>	Over voltage protection, over current protection, against short-circuit
<b>Input current</b>	1.5 A max @100 Vac 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, 10 mHz to 30 kHz	<b>Output monitor accuracy</b>	DC: $\pm 1.5\%$ F.S $\pm 1$ dgt AC: $\pm 1.5\%$ F.S $\pm 1$ dgt
<b>External control voltage (Vcon-in)</b>	-10 V to +10 V (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: 10 ms to 1999 s 999 ms 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>	$\pm 0.5\%$ 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>Relative humidity</b>	20% to 80%, non condensing
<b>Distortion factor</b>	<CV mode> 0.05% <CC mode> 0.5%	<b>Accessories</b>	AC input cable 2.5 m (1) Instruction manual (1)
<b>Regulation</b>	Input: 0.05% (for $\pm 10\%$ input change) Load: 0.05% (for 10% to 100% load change)		

\* About AC, it sets up in 1 kHz and a sine wave.

## 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.

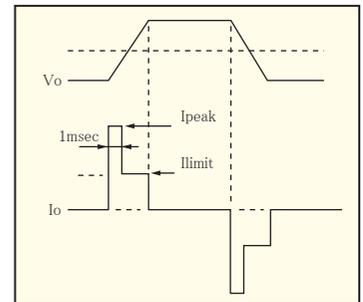
### Over voltage protection (O.V.P)

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 1 ms. 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

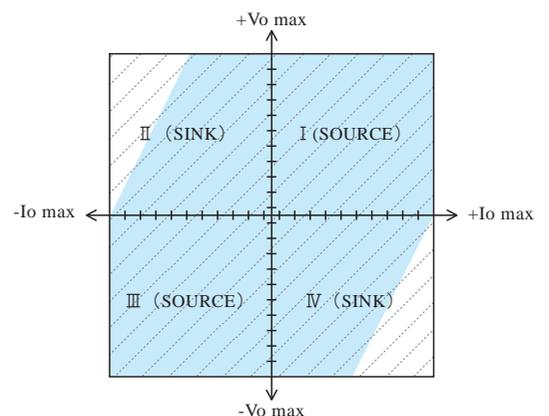
DJOPF series is a bipolar power supply which can perform four-quadrant operation. They can supply (source) and absorb (sink) current in the field of the drawing on the right.

$V_o$  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

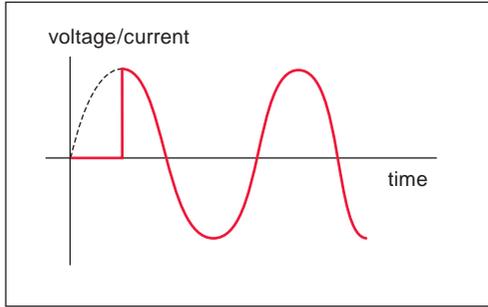


# Functions

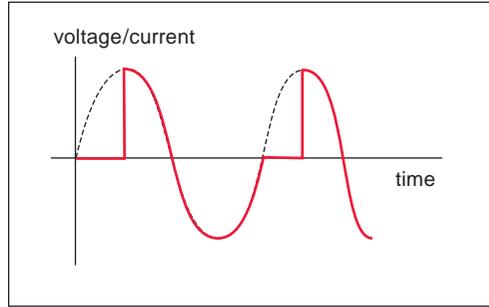
## Fundamental wave generated function

DJOPF is equipped with a built in function generator that produces sine, square, and triangle waves. Frequency range can be set between 0.01 Hz and 30 kHz, 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.

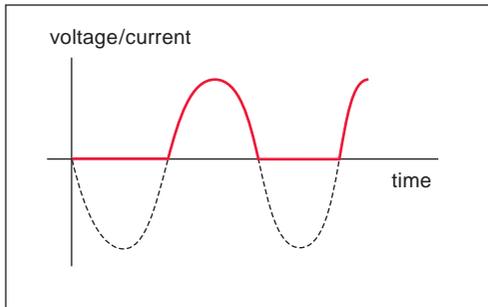
### Initial phase



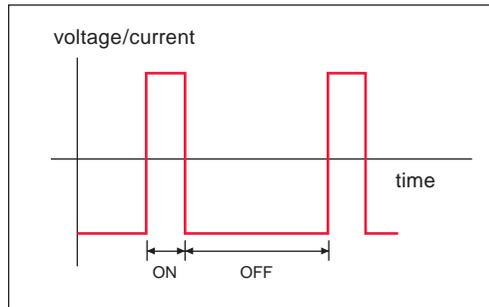
### Switching phase



### Cutoff phase



### Duty cycle

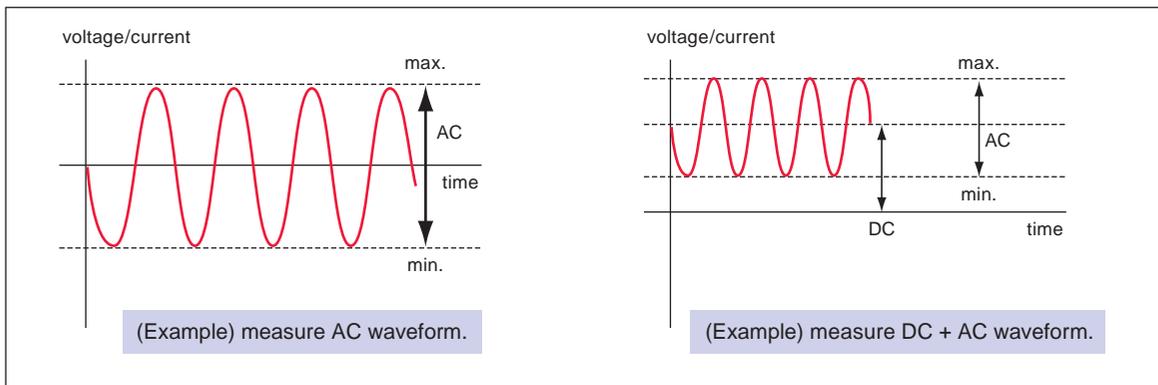


### Applications

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 30 kHz, can be measured automatically, and it is easy to change the setting depending on application.

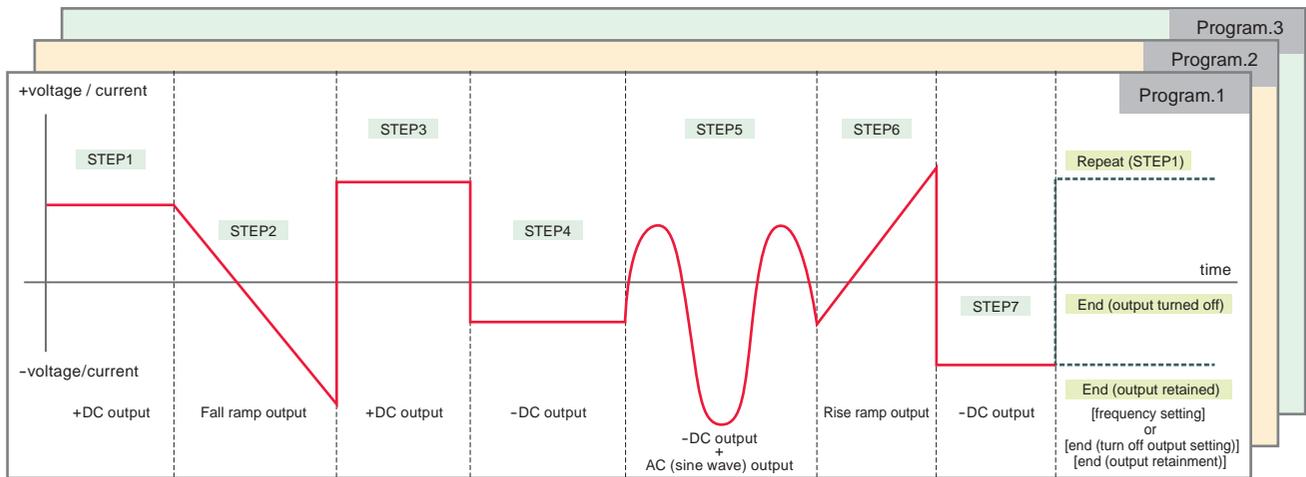


## Sequence functions

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.

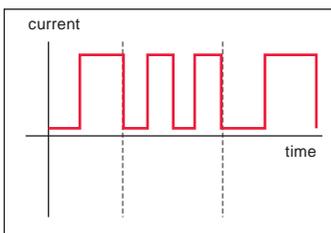
- Setting length: 10 ms to 1999 s 999 ms (minimum setting length: 1 ms)
- Up to 16 steps can be set and saved plus 3 programs per program.
- Can be set CV/CC mode per program
- Frequency: Infinite, 1 to 999
- DC voltage/current lamp operation, AC voltage/current sweep operation and AC frequency sweep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

### Program image

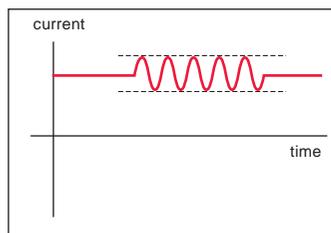


Complicated waveforms such as below can be easily generated just by using the sequence function.

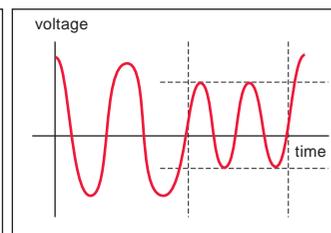
#### Pulse current variation



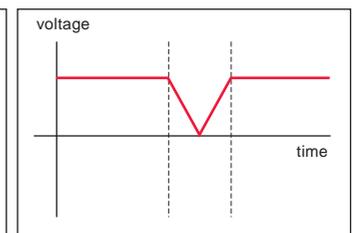
#### Ripple current superposition



#### AC voltage variation



#### DC voltage interruption



#### Applications

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

## Memory function

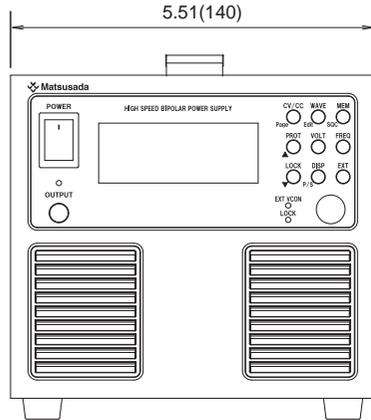
DJOPF is equipped with both preset and set-up memory.

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.

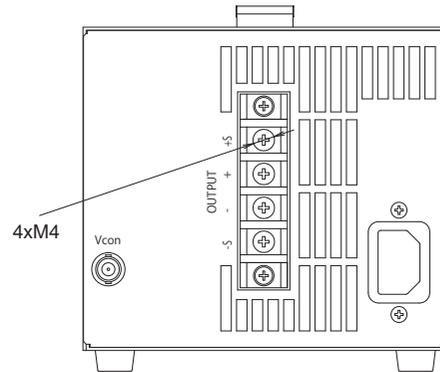
DJOPF is equipped with a **[Protection function]**, **[Key-lock function]**, and **[CV/CC crossover]**, as standard functions.

## Dimensions inch (mm)

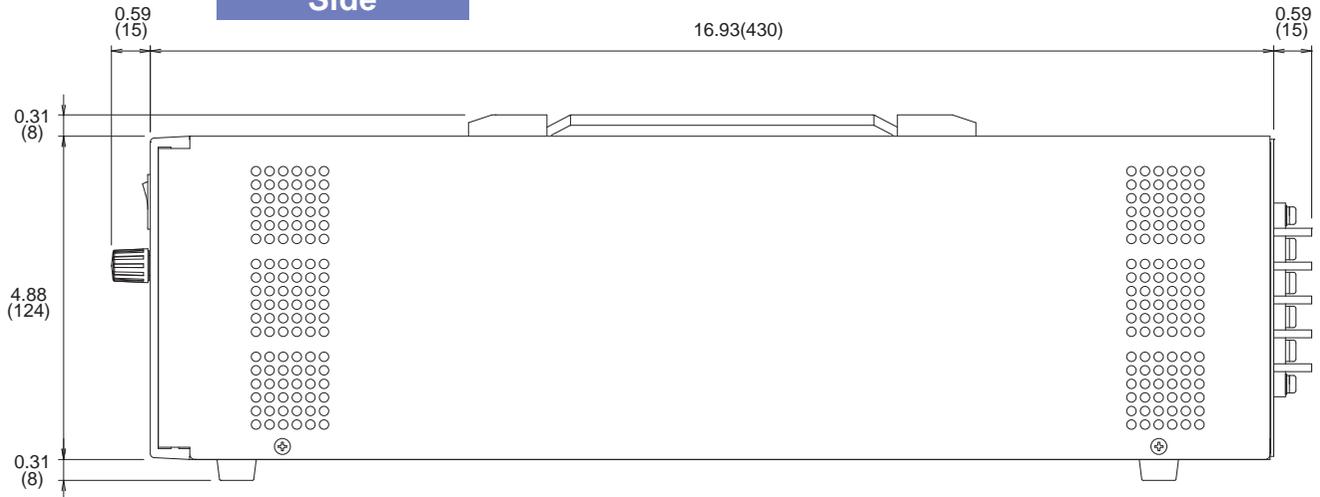
Front



Rear



Side



## AC input cable

CABLE TYPE 1 125 V/10 A (Standard)	CABLE TYPE 3 250 V/10 A (Sold separately)	CABLE TYPE 4 250 V/10 A (Sold separately)

## Options

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

### -LEt \*

LAN interface board - Digital control via LAN

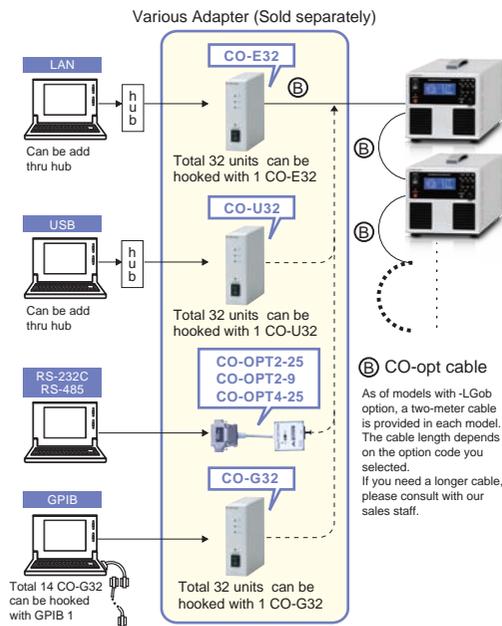
Output ON/OFF, Voltage/Current setting (AC and DC), Switch of Constant Voltage/Constant Current, Frequency setting, Waveform setting (sine wave, square wave, and triangular wave), phase setting (sine wave), Duty setting (square wave and triangular wave)

### -LGob \*

Optical interface board - For isolated control with optical communication

-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

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 external noise, etc.



(\*) When use them under following conditions, select -LGob always.

- Noisy environment as in a factory. (Example: A motor or a coil is used near to load or power supply)
- Used in high voltage floating, (250 V and higher)
- Our power supply and controller (PC or PLC) can not be installed within 2 m.

### -LNh

No handle

The handle for carrying will not be equipped.

### -LS

Remote Switch (OUTPUT ON/OFF)

It is impossible to select -LGob, -LUs1, and -LEt (Digital interface board) at the same time.

### -LUs1 \*

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)

When ordering, add Option No. to Model No.  
in alphabetical order followed by the input voltage.

<Example> DJOPF60-1-LNhSU1, 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).

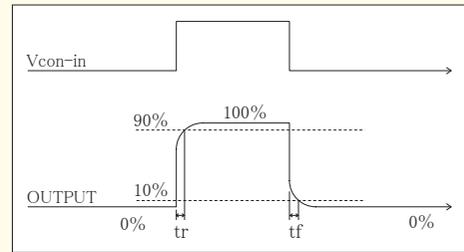
The rise time of an amplifier at a response speed of (=frequency bandwidth) Fc (Hz) is generally acquired by " $tr \doteq 0.35/fc$ ."

Fall time tf is the same as tr.

Frequency bandwidth

: at 30 kHz or lower,  $tr=tf$ =around 12  $\mu$ s

: at 20 kHz or lower,  $tr=tf$ =around 18  $\mu$ s



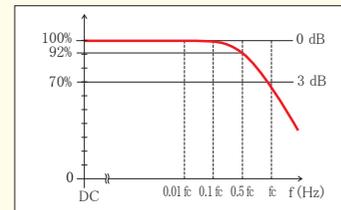
### Response speed

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 10times 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.

# Contact us for various kinds of Power supplies

As a pioneer of power supply manufacturing, Matsusada Precision offers solutions to meet various needs with its expertise through direct sales. Please visit our website and contact us for more information.

Contact Us [www.matsusada.com](http://www.matsusada.com)

## Contact with phone or fax



USA	Other country or region
North Carolina office <b>TEL(704)496-2644</b> FAX(704)496-2643	International office in Japan <b>TEL+81-6-6150-5088</b> FAX+81-6-6150-5089

### 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.

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