Matsusada Precision

Sequence Function Installed
Bipolar Power Supplies

DOKF Series

High Speed Four-Quadrant Bipolar Power Supplies

DOKF series

DOKF20-20	Voltage: ± 20V	Current: ± 20A	Output Power: 400W
DOKF40-10	Voltage: ± 40V	Current: ± 10A	Output Power: 400W
DOKF60-6.7	Voltage: ± 60V	Current: ± 6.7A	Output Power: 400W
DOKF80-5	Voltage: ± 80V	Current: ± 5A	Output Power: 400W

- High speed response of DC to 120kHz
- Extremely sophisticated quality to output programmed wave
- Ultimate in accurate sequence operation

MADE IN JAPAN

www.matsusada.com

DOKF series

Ultra High Accuracy
High Performance
Bipolar Power Supplies

Four-quadrant bipolar power supplies are developed up to followings.

- High speed response of DC to 120kHz
- Programmed wave is to output in high quality
- Highly accurate sequence operation

DOKF series are four-quadrant power supplies possible to source and sink current.
They can be applied widely according to the usage from transient response test to various evaluation tests as they realize high speed response of DC to 120 kHz (at constant voltage mode) and can generate basic waves such as sine wave, rectangular wave and programmed waves by embedded function generator.
And, as they provide also the high resolution sequence function as standard, you can program output patterns in detail.
Moreover, as their generation of wave and setting sequence can be made all with the simplified operation on the front panel, you can make full use of various functions easily.

Major Applications

- To drive capacitive loads such as capacitor.
- To drive inducible loads such as coils and transformers.
- Tests of various motors.
- Evaluation of solar cell panel related equipments such as power conditioners.
- Voltage fluctuation tests for automotive electrical components. ETC.

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

We can manufacture other specified voltage, current and frequency band written as followings.

Model	Maximum output voltage [V]	Maximum output current [A]	Maximum output power [W]	Frequency Bandwidth [kHz (-3 dB)]		Weight [kg (approx.)]
				At CV mode	At CC mode	
DOKF20-20	±20	±20	400	DC to 120	DC to 60	20
DOKF40-10	±40	±10				
DOKF60-6.7(*)	±60	±6.7			DC to 50	
DOKF80-5(*)	±80	±5				

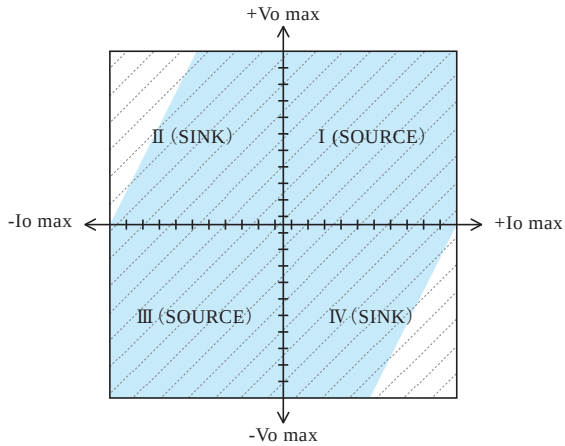
(*): They are available in the near future. Please contact our sales staff for detail.

Features

- Superior visibility and operability by using color liquid crystal display.
- High speed of DC to 120 kHz is realized.
- Four-quadrant behavior able to source and sink current.
- It is possible to generate non-distortional wave such as sine wave, rectangular wave.
- It is possible to set and operate high performance sequence in 1024 steps.
- There are 2 modes of DC and AC+DC and each of them can be set individually.
- 2 modes operation of constant voltage (CV) and constant current (CC) are applicable.
- It is possible to connect maximum 3 power supplies in parallel (synchronized trigger) by coinciding accuracy of frequency (synchronized clock) in synchronized operation.
- GPIB, USB and RS-232C interface are equipped as standard.
- It is possible to output voltage/current in 16 bits and programmed waves of resolution of 1024 in one cycle. (optional control software)

Four-quadrant Behavior

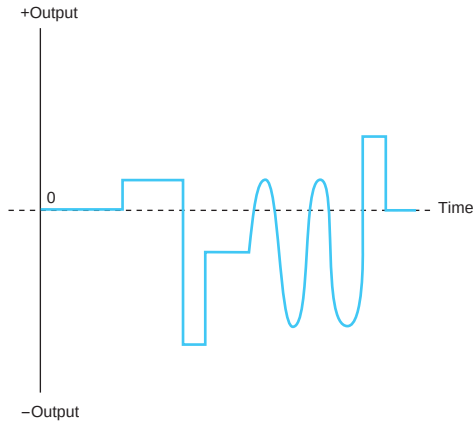
Vo max: Rated output voltage
Io max : Rated output current



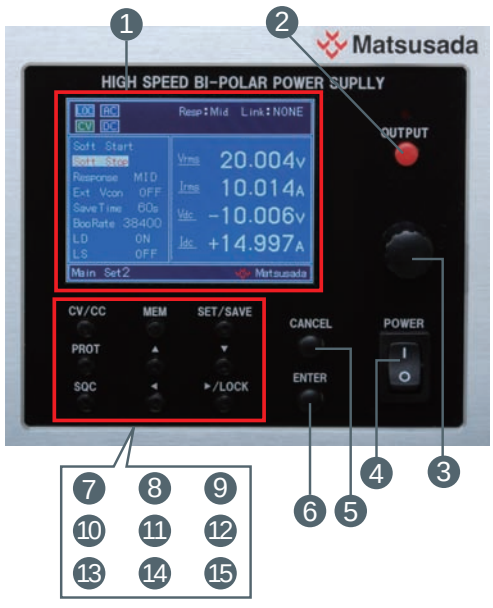
AC operation range (with 50 Hz or more frequency, 50% of duty cycle and without any DC bias)

DC operation range

Output control by remote control with communication



Operability

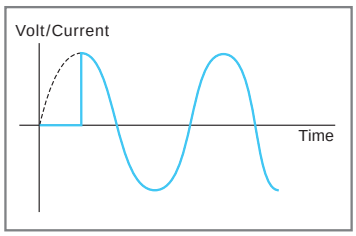


❶	Display	: Display various settings and measurements.
❷	OUTPUT switch	: ON/OFF for output
❸	Rotary encoder	: Change value
❹	POWER switch	: ON/OFF for main power
❺	CANCEL switch	: Cancel settings
❻	ENTER switch	: To confirm and key in
❼	CV/CCswitch	: Switchover CV/CC mode
❽	Memory switch	: Switchover memory screen
❾	Setting/Storage switch	: Make to setting change menu, store memory
❿	Protection switch	: To switch protection setting menu
⓫	Shift up switch	: Shift up each setting items
⓬	Shift down switch	: Shift down each setting items
⓭	Sequence switch	: Use for switchover of sequence screen or interrupt or restart of sequence operation
⓮	Shifting left switch	: Shift digits of settings to left
⓯	Shifting right/LOCK switch	: Shift digits of settings to right and also use key lock function

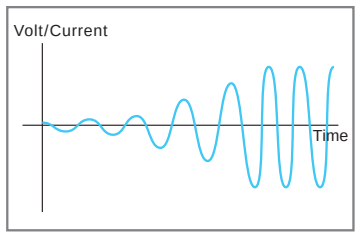
Basic Wave Generation Function

DOKF is equipped with a built in function generator that produces basic waves such as sine, rectangular and triangle waves. Frequency range can be set between 0.01 Hz and 120 kHz. Easy adjustments/edition of amplitude, initial phase (for sine wave), phase shift (for sine wave), and duty ratio (for rectangular/triange wave) are possible. DOKF has special feature of “soft start” and “soft stop” which enable to program initial rise and fall characteristics of the output.

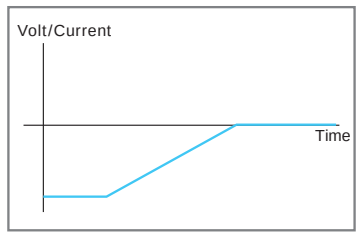
■ Staring phase



■ Soft start AC volt/current sweep, frequency sweep



■ Soft stop DC volt/current ramp



■ Applications: Power activation test, various start-up tests of motor, etc, fluctuation test of wave shape and so on.

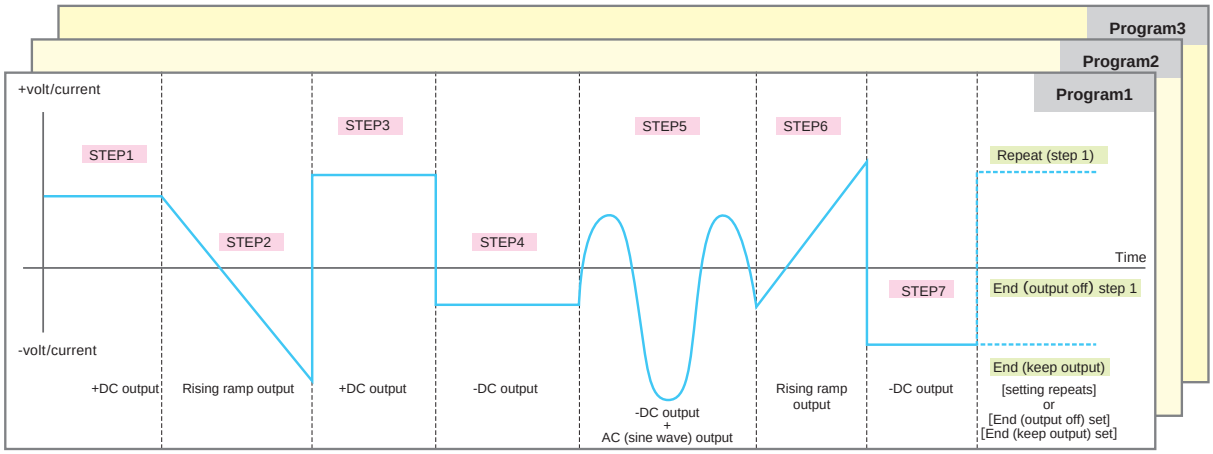
Sequence Function

DOKF is equipped with sequence function that can program parameters such as step length, step amplitude ramp, DC voltage and current ramping, AC voltage and current ramping, frequency sweep, AC superposition, step jump, and jump times. These useful functions help to program the desired waves in very flexible manner, resulting to support efficient laboratory and research works.

Complex sequence can be created easily with the intelligible display.

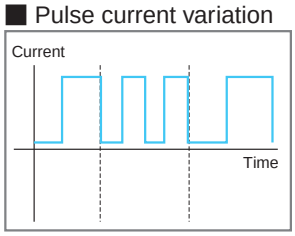
- Step setting length 0.1 ms to 1000 h (resolution of 0.1 ms)
- Maximum 1,024 steps per program.
- Maximum 64 programs can be stored in memory for each CC/CV operation
- Program repeat can be set by “endless repeat” or “1 to 10,000 times”
- Multiple programs can be converted to activate

■ Image of Program

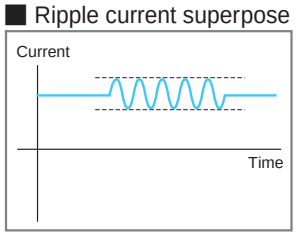


Sequence functions help to create complicated waves like below to be simply and easily edited.

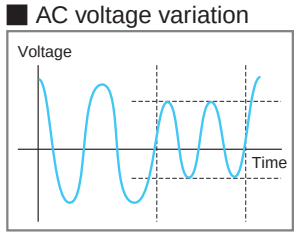
■ Pulse current variation



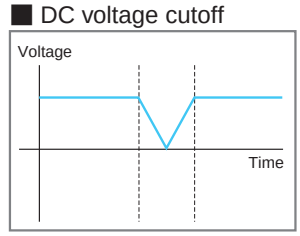
■ Ripple current superpose



■ AC voltage variation



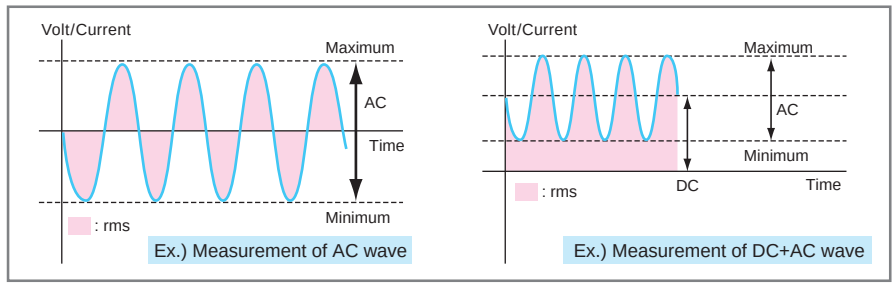
■ DC voltage cutoff



■Applications: Test for motors, pulse power supply and various evaluation.

Measurement Function

DOKF is equipped with measurement function that can measure DC value, AC RMS value, and Max/Min value, likewise, it is possible to automatically measure wide range bandwidth from DC to 120 kHz. There are 4 parameters which are simultaneously displayable, each of these parameters are individually programmable.
As this measurement is standard feature, no option needs to be purchased.
This sophisticated feature will reduce time for editing output waves and bring up work efficiency.



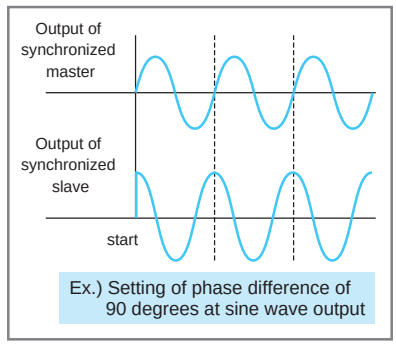
Synchronized Operation

The following DOKF operations are available for up to three units.

【Synchronous Trigger】
Through a single operation of the master unit, it is possible to match the output timing of ON/OFF in one or two slave units. In turning the output on, the output starting gap between the master and the slave is less than 0.5 µs
*To use this function, please purchase “Dedicated cable for synchronous trigger” of 2 meters separately.

【Synchronous Clock】
By providing the clock input of 10 MHz, the individual difference between the oscillators installed on each unit is removed (In the case of this, there are a few ppm up to several tens ppm in general). What is more, frequency accuracy and sequence-step time are completely unified through the operation.

Moreover, the product is also available for setting the phase shift difference for sine wave toward each unit.
(*Please prepare the coaxial cable on both ends of BNC connectors which is not included but required for synchronous clock.)

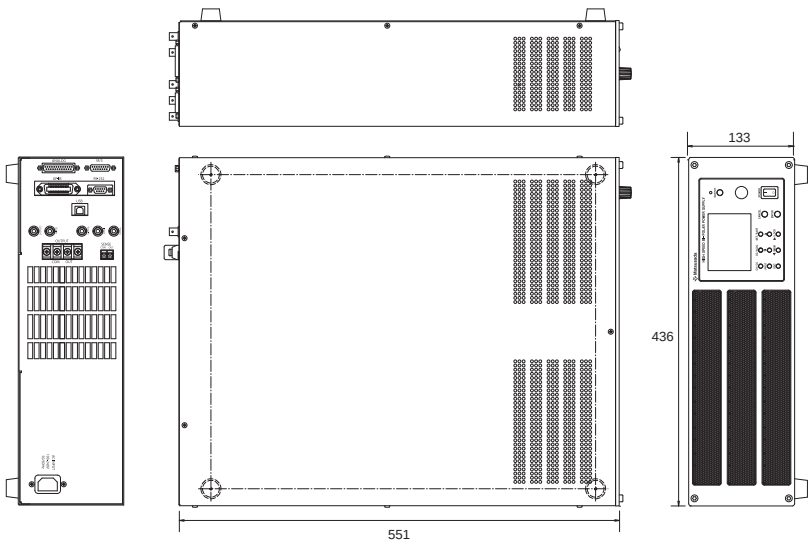


*When the slave unit is required to synchronize in accordance with the waveform set by the master unit, -LMs option must be taken (in master/slave control).
Note that the time synchronized operation is not available if using the master/slave control.

Other functions:

Protection Function (Cut-off, Individually Settable Limiter Protection), Key Lock Function, Switching CV/CC and Memory function (up to 99) are installed as standard.

DIMENSIONS inch (mm)

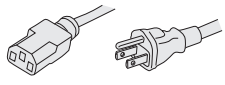


Specifications

*1: At ambient temperature 23 ±5°C, rated load, 1 kHz in sine wave at AC *2: For 10% to 100% load change

Models			DOKF20-20	DOKF40-10	DOKF60-6.7	DOKF80-5
Input		Voltage	AC85 V to 250 V			
		Frequency	50/60 Hz			
		Current	13 A @100 V			
		Shape of input	Inlet			
Output	CV mode	Setting range of voltage	-21 V to +21 V	-42 V to +42 V	-63 V to +63 V	-84 V to +84 V
		Setting resolution of DC voltage	0.001 V (5 digits)			
		Setting accuracy of DC voltage *1	± (0.05% of setting +0.05% of rating)			
		Setting resolution of AC voltage	0.1 V (3 digits)			
		Setting accuracy of AC voltage *1	± (0.5% of rating)			
		Setting range of frequency	0.01 Hz to 120 kHz			
		Setting resolution of frequency	0.01 Hz			
		Frequency characteristics (-3 dB)	120 kHz			
		Temperature coefficiency	±100 ppm/°C			
		Ripple	2 mV (typ.)	4 mV (typ.)		
		Load variation *2	± (0.005% of setting +1 mV)			
	CC mode	Setting range of current	-21 A to +21 A	-10.5 A to +10.5 A	-7.035 A to +7.035 A	-5.25 A to +5.25 A
		Setting resolution of DC current	-0.001 A (5 digits)			
		Setting accuracy of DC current *1	± (0.3% of rating)			
		Setting resolution of AC current	0.1 A			
		Setting accuracy of AC current *1	± (0.5% of rating)			
		Setting range of frequency	0.01 Hz to 120 kHz			
		Setting resolution of frequency	0.01 Hz			
		Frequency characteristics (-3 dB)	60 kHz		50 kHz	
		Temperature coefficiency	±100 ppm/°C			
		Ripple	3 mA (typical)			
		Load variation *2	± (0.01% of setting +1 mA)			
Measure-ment	Voltage	Measuring resolution of DC voltage	0.001 V (5 digits)			
		Measuring accuracy of DC voltage	± (0.05% of reading +0.05% rating)			
		Measuring resolution of AC voltage	0.001 V (5 digits)			
		Measuring accuracy of AC voltage	± (0.5% of reading +0.1% rating)			
	Current	Measuring resolution of DC current	0.001 A (5 digits)			
		Measuring accuracy of DC current	± (0.3% of reading +0.1% of rating)			
		Measuring resolution of AC current	0.001 A (5 digits)			
		Measuring accuracy of AC current	± (3% of reading +0.1% of rating)			
Source of signal	Waves	sine, rectangular, triangle	Standard application			
		Optional application	Optional application			
	Functions	Soft start	Standard application			
		Soft stop	Standard application			
		Setting time	0.1 ms to 1999 s 999 ms			
	Sequences	Number of memories	64 for each CV and CC			
		Number of steps	Maximum 1,024 steps			
		Minimum step time	0.1 ms			
		Setting time	0.1 ms to 1000 h			
	Preset	Set-upped memory	99 memories			
Protection functions	Overvoltage Protection (OVP)		Selectable Droop/Cut-off			
	Overcurrent Protection (OCP)		Selectable Droop/Cut-off			
	Protection for Short-circuit on output		Standard application			
	Over temperature Protection (OTT)		Standard application			
	Limit of sink current		Standard application			
Others		Switching responses (4 steps)	Standard application			
		External Vcon input	Standard application			
		External monitor output (volt/current)	Standard application			
		Key lock	Standard application			
		Communication (RS-232C)	Standard application			
		Communication (USB)	Standard application			
		Communication (CC-Link)	Optional application			
		Communication (GPIB)	Standard application			
		Display	3.5 inches color liquid crystal			
		Analogue remote	Standard application			
		LS/LD	Standard application			
		Synchronized Operation (Clock, Trigger)	Standard application			
		Master/slave (Parallel operation)	Optional application			
		Remote sense	Standard application			
		Operating temperature	0°C to +40°C			
		Operating humidity	20% to 80%, no condensing			
		Storage temperature	20°C to +70°C			
		Storage humidity	0% to 80%, no condensing			
		Accessories	Instruction manual (1) /AC input cable (1) /Remote connector cover (1) /D-sub 25-pin male connector (1)			

AC input cable

CABLE TYPE 8 (standard)	
125 V/15 A 2.5 m	

* Please use appropriate AC cable.

Options

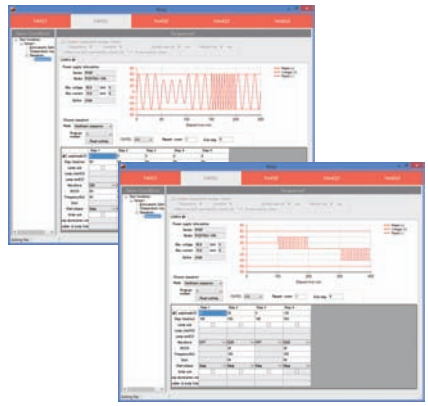
-LMsm
-LMss **Master/slave Control (parallel operation)**
Maximum 3 units including master unit are hooked.
("-LMsm" for the master unit and "-LMss" for slave units. Please order required number of units.
Every master unit and slave units are exclusive use. When change the combination of master-slave, they should be readjusted in our shop.)
(If you take this option, the synchronized operation is not available.)

-LRa **The front panel attachable to the 19-inch rack of EIA or JIS**
The front panel becomes the panel attachable to the 19-inch rack of EIA or JIS standards.
Dimension of the front panel is modified in case attached. Please consult our sales staff.
(It is impossible to support the main unit only with these brackets. Please utilize always a sole plate or angle bars to support the unit weight.)

-LCk **CC-Link Interface Board**
It enables digital remote control via net work of CC-Link.

Introduction of Related Product

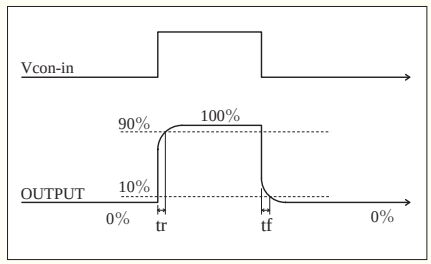
Sequence software for Power Supplies (PSS2en-DOKF)



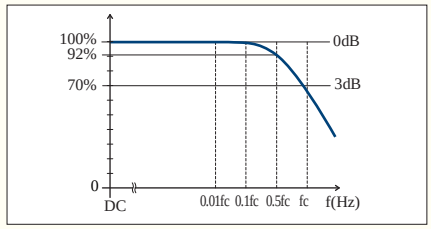
This is the dedicated software to make DOKF series to activate sequence operation with simplified setting. Of course sequence operation of high speed and large capacity equipped on the power supply, it can generate and output optional wave from the power supply.
(USB or RS-232C)

As for characteristics of amplifiers

Rising time
(step time) : responsiveness may be expressed with rise time.
(see right figure)
Rise time for amplifiers in fc (Hz) of response time (-frequency band) is calculated with following equation generally. $tr \fallingdotseq \frac{0.35}{fc}$
Decay time tf is equal to tr.
Frequency bandwidth : to 120 kHz, tr = tf ≒2.9 µs
: to 60 kHz, tr = tf ≒5.8 µs



Response speed
When accurate output wave is required, please select an amplifier in sufficiently higher frequency band than applied frequency.
Generally, speedy frequency bandwidth as 3 to 5 times of applied frequency for sine wave and 10 times for rectangular wave are required. If frequency bandwidth is in lacking, as not only output oscillation is reduced but also phase difference of between input and output become larger, consideration to utilize it monitoring output wave is required.



For Capacitive Loads
In case of capacitive load, oscillation may be caused.
If so, please insert a power resistance to the output in series.
And, in capacitive load, please attend to that frequency band is limited by the resistance and capacity inserted in series

For Induced Loads
At CC mode, oscillation may be caused by inductance of induced loads.
If so, please connect C-R straight circuit between output terminals so as not to cause oscillation.

FAX

USA/Canada : +1-888-652-8651

other countries : +81-6-6150-5089

Customer Inquiry Sheet (DOKF 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

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CAT : 01.215 rev.05 pub.2020.06