

**NEW**

# Ultra low noise and overwhelming high stability

## Rack mount High Voltage Power Supplies

### AE series

1kV to 150kV/15W to 120W



# AE series

Rack mount High Voltage Power Supplies



## High-performance high voltage power supply with ultra-low noise of a minimum 1.5V in 150kV output models

AE series is a high-performance rackmount high voltage power supply with a broad range of lineup in output voltage from 1 kV to 150 kV.

With ultra-low noise 1.5 Vrms at 150 kV output, the AE series has already received a high evaluation in quality from Japan and abroad since its release.

The series meets the demand for high performance and stability reference power supply.

The series is also designed for highly reliable operation and equipped with built-in protection circuits based on our power supply technology.

The product offers high reliability and safety that can ensure safe use at any time.

In addition, the series comes with various functions of remote control and monitoring as standard.

Using -LG option, remote PC control is available via LAN, USB, RS-232C, RS-485, and GPIB by adding the control adapter.

## Features

### Ultra-low noise

The original oscillation circuit suppresses spike noise to an extremely low level.

### Abundant functions

The series is equipped with various remote functions of output ON/OFF and output voltage setting/control, output of the output voltage/current value monitoring, door switch, and other features that make it easy to use high performance.

### Outstanding operability

Two potentiometers supplied with fine or coarse adjustment can set the output voltage quickly and accurately, and the large LED meter with excellent visibility provides easy and accurate operation.

## Applications

- Electron Microscope
- MASS spectrometry
- Electron gun
- Electron Beam Lithography (EBL)
- All kinds of High-Voltage Testing etc.
- Voltage reference
- Electron Beams
- Ion Beams
- Electronic component evaluation test
- X-ray tube
- Insulation breakdown test
- Scanning Electron Microscope (SEM)

## Lineup

Output voltage [kV]	Output current [mA]	Output power [W]	MODEL			Case type *2	Weight [kg (typ.)]
			Positive polarity output	Negative polarity output	Reversible polarity output *1		
1	15	15	<b>AE-1P15</b>	<b>AE-1N15</b>	<b>AE-1R15</b>	<b>A</b>	15
	30	30	<b>AE-1P30</b>	<b>AE-1N30</b>	<b>AE-1R30</b>		
3	10	30	<b>AE-3P10</b>	<b>AE-3N10</b>	<b>AE-3R10</b>		
	20	60	<b>AE-3P20</b>	<b>AE-3N20</b>	<b>AE-3R20</b>		
5	6	30	<b>AE-5P6</b>	<b>AE-5N6</b>	<b>AE-5R6</b>		
	12	60	<b>AE-5P12</b>	<b>AE-5N12</b>	<b>AE-5R12</b>		
10	3	30	<b>AE-10P3</b>	<b>AE-10N3</b>	<b>AE-10R3</b>	<b>B</b>	20
	6	60	<b>AE-10P6</b>	<b>AE-10N6</b>	<b>AE-10R6</b>		
20	1.5	30	<b>AE-20P1.5</b>	<b>AE-20N1.5</b>	<b>AE-20R1.5</b>		
	3	60	<b>AE-20P3</b>	<b>AE-20N3</b>	<b>AE-20R3</b>		
30	1	30	<b>AE-30P1</b>	<b>AE-30N1</b>	<b>AE-30R1</b>	<b>C</b>	Unipolar model 23 Bipolar model 28
	2	60	<b>AE-30P2</b>	<b>AE-30N2</b>	<b>AE-30R2</b>		
40	0.75	30	<b>AE-40P0.75</b>	<b>AE-40N0.75</b>	<b>AE-40R0.75</b>		
	1.5	60	<b>AE-40P1.5</b>	<b>AE-40N1.5</b>	<b>AE-40R1.5</b>		
50	0.5	25	<b>AE-50P0.5</b>	<b>AE-50N0.5</b>	<b>AE-50R0.5</b>		
	1	50	<b>AE-50P1</b>	<b>AE-50N1</b>	<b>AE-50R1</b>		
60	0.5	30	<b>AE-60P0.5</b>	<b>AE-60N0.5</b>	<b>AE-60R0.5</b>	<b>D</b>	35
	1	60	<b>AE-60P1</b>	<b>AE-60N1</b>	<b>AE-60R1</b>		
80	0.3	24	<b>AE-80P0.3</b>	<b>AE-80N0.3</b>			
	0.75	60	<b>AE-80P0.75</b>	<b>AE-80N0.75</b>		<b>E</b>	45
100	0.3	30	<b>AE-100P0.3</b>	<b>AE-100N0.3</b>			
	0.25	30	<b>AE-120P0.25</b>	<b>AE-120N0.25</b>			
120	1	120	<b>AE-120P1</b>	<b>AE-120N1</b>		<b>E</b>	45
	0.2	30	<b>AE-150P0.2</b>	<b>AE-150N 0.2</b>			

\*1: Bipolar switching has an internal connector replacement method.

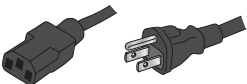
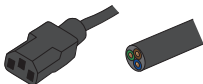
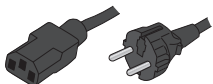

\*2: See "Dimensions" on page 05.

# Specifications

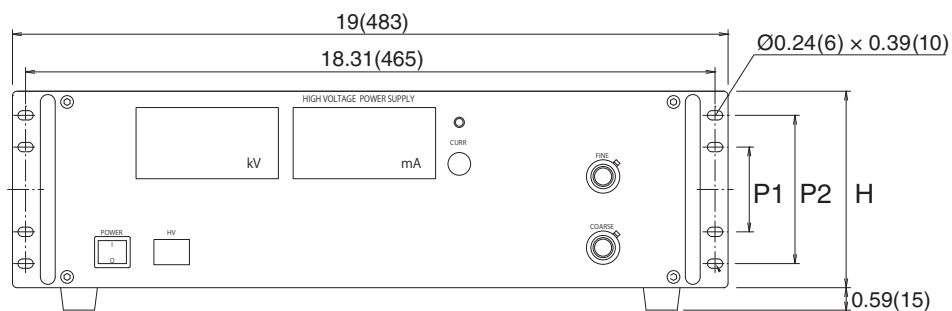
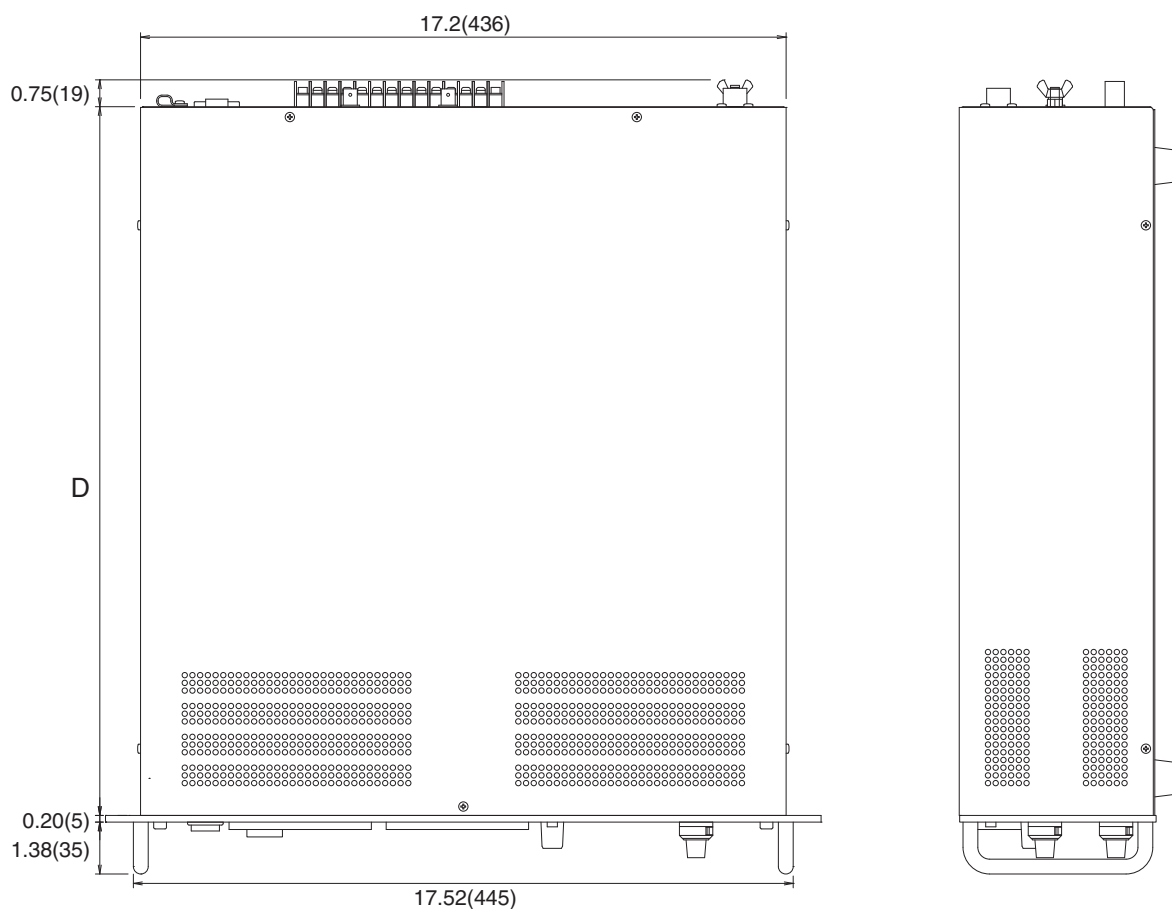
These specifications, unless otherwise specified, at maximum rated output after four hours of warm up, and scope of application is between 10% and 100% of maximum rated output.

<b>Input voltage</b>	115 Vac, $\pm 10\%$ , 50 Hz/60 Hz, single phase AC Input power (MAX) <table border="1"> <tr> <td>30 W models</td><td>115 VA</td></tr> <tr> <td>60 W models</td><td>160 VA</td></tr> <tr> <td>120 W models</td><td>330 VA</td></tr> </table>	30 W models	115 VA	60 W models	160 VA	120 W models	330 VA
30 W models	115 VA						
60 W models	160 VA						
120 W models	330 VA						
<b>Output voltage control</b>	Local: "Coarse" and "Fine" 10-turn potentiometers on the front panel Remote: External control voltage 0 to 10 Vdc (input impedance 10 k $\Omega$ typ.) or by External 5 k $\Omega$ potentiometer.						
<b>Voltage regulation</b>	Line: $\pm 10$ ppm of maximum voltage for $\pm 10\%$ input line change Load: 10 ppm of maximum voltage for 10% to 100% load change						
<b>Ripple</b>	10 ppm rms						
<b>Stability</b>	50 ppm/Hr    100 ppm/8 Hr						
<b>Temperature Coef.</b>	50 ppm/ $^{\circ}$ C						
<b>Overload trip level adjust</b>	Front panel 1-turn potentiometer 10% to 105% of maximum output current (With -LC option, current limit value is adjustable.)						
<b>Output display</b>	Output voltage: 4.5-digit digital meter $\pm 19999$ Output current: 3.5-digit digital meter    1999						
<b>Monitor output</b>	Voltage monitor: $\pm 10$ V/maximum output voltage [output impedance 1 k $\Omega$ ] Current monitor: 10 V/maximum output current [output impedance 1 k $\Omega$ ]						
<b>Protections</b>	Overvoltage protection [limiting when approx. 105% of rating] Overcurrent protection [standard: High-voltage cut-off, manual recovery or recovery by remote set] [with -LC option: Limit the output current by dropping output voltage] Enable to change current by front panel 1-turn dial. Protection against output short circuit and arc discharge						
<b>Other functions</b>	Remote switch ON/OFF [by external relay] Door switch [by external relay] Remote reset [Reset the Overcurrent cut off mode by remote signal. Not for models with -LC option]						
<b>Operating temperature</b>	0 to +45 $^{\circ}$ C						
<b>Storage temperature</b>	-20 $^{\circ}$ C to +75 $^{\circ}$ C						
<b>Relative humidity</b>	20% to 80%, non condensing						
<b>Accessories</b>	- AC line input cable 2.5 meters $\times$ 1 - Shielded high voltage output cable 2.5 meters (flying lead) $\times$ 1 - Instruction manual $\times$ 1						

## Input/Output Cable

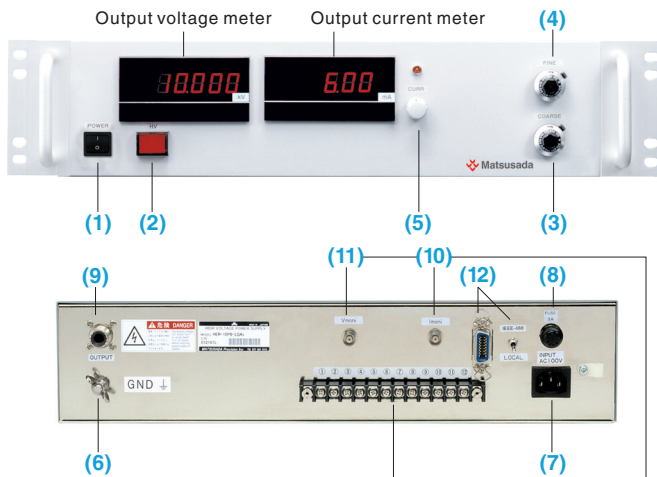
Input Cable		Output Cable
<b>Standard</b> <b>CABLE TYPE 1</b> with 3-pin plug 	<b>Standard</b> with -L(230V) option <b>CABLE TYPE 3</b> Flying lead 	<b>Standard</b> 1 kV to 15 kV models, 20 kV to 30 kV models, 40 kV models, 50 kV to 60 kV models, 80 kV to 120 kV models, 150 kV models <b>CN-□-MHVP</b>  * Depending on output voltage, length will be varied. Please contact nearby sales office for details.
<b>Sold separately</b> with -L(230V) option <b>CABLE TYPE 4</b> 	<b>Sold separately</b> with -L(230V) option <b>CABLE TYPE 13</b> 	* For details about cable diameter, etc., refer to the CN series datasheet.

## Dimensions [inch (mm)]



Case Type	H	P1 (EIA)	P2 (JIS)	D
<b>A</b>	5.24(133)	2.25(57.15)	3.94(100)	18.98(482)
<b>B</b>	6.97(177)	4(101.6)	5.91(150)	18.98(482)
<b>C</b>	6.97(177)	4(101.6)	5.91(150)	21.65(550)
<b>D</b>	8.74(222)	15.75(146)	7.87(200)	21.65(550)
<b>E</b>	10.47(266)	7.5(190.5)	7.87(200)	24.02(610)

# Functions

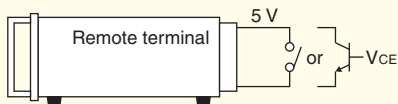


Normal Operation: Output (1) → (5), conversely to stop operation.

- (1) **POWER ON/OFF switch**: This has priority over all operations.
- (2) **HV ON/OFF switch**: Output is enable when this is ON. Remote switch can be turned ON/OFF only when HV switch is ON. This switch is also used for resetting interlock and cut off mode.
- (3) **COARSE potentiometer** (10-turn, lockable)
- (4) **FINE potentiometer** (10-turn, lockable)
- (5) **Overload trip level setting dial**: 1-turn LED is lit up when protection circuit is operating.
- (6) **GND Terminal**(M6)
- (7) **AC Inlet**
- (8) **Fuse**
- (9) **Output connector** (Matsusada's property)
- (10) **Output voltage monitor**
- (11) **Output current monitor**
- (12) **Connector for USB, RS-232C, RS-485, and GPIB interface, and changing-over switch** (option)

## Remote Control Connector M4

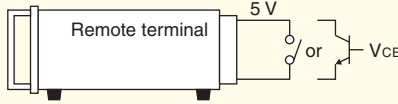
### Remote Switch ON/OFF \*



Output	External relay	Open collector
ON	Short	$V_{CE} \leq 0.4 \text{ V}$
OFF	Open	$V_{CE} \geq 2 \text{ V}$

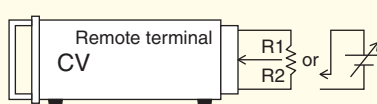
Sink Current  $\geq 10 \text{ mA}$

### Door Switch



Sink Current  $\geq 10 \text{ mA}$

### Output Control \*

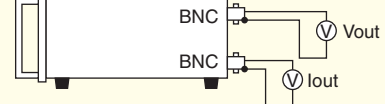


Output voltage	LR	Vcon
0 to MAX	R2: 0 to 5 k $\Omega$	0 to 10 V Input imp $\geq 10 \text{ k}\Omega$

Output is possible in external relay short or a status of V<sub>CE</sub> less than 0.4 V. Output will be cut off when open or 2 V or mote. To output again, turn OUTPUT switch ON after resetting by turning OUTPUT switch OFF in a status of short or 0.4 V or less.

\* -LG option: When switch (12) is on IEEE-488 side, remote switch and output control is not enable from remote terminal, but from only IEEE-488 operation.

### Output Monitor BNC receptacle \*



V<sub>out</sub>: 0 to  $\pm 10 \text{ V}$  (0 to +10 V)  
[standard] Monitor polarity equals output polarity.  
[-LG option] Positive polarity regardless of HV polarity.

I<sub>out</sub>: 0 to +10 V  
Output imp is 1 k $\Omega$ .

\* -LG option: Generates output no matter switch (12) is on or off.

# Options

- LC **Current limiting** Front panel adjustable 10% to 105% of maximum output current.
- LG **Connector for USB, LAN, RS-232C, RS485, GPIB Interface.**  
(CO-HV adapter is required. Please refer to CO-HV catalog for details.)
- LN **No protection against power failure** AC input line ON/OFF enables High Voltage output ON/OFF.
- LW **Slow start** 10 second HV output ramp up
- L(230V) **Input Voltage 198 Vac to 253 Vac, single phase**
- L(3m) **The length of high voltage output shielded cable is changed to 3 meters.**
- L(5m) **The length of high voltage output shielded cable is changed to 5 meters.** (only for  $\leq 40 \text{ kV}$  models)
- L(7m) **The length of high voltage output shielded cable is changed to 7 meters.** (only for  $\leq 10 \text{ kV}$  models)

**How to order** When ordering, add Option No. in the following order by alphabet, number, input voltage, and output cable length to Model No.  
<Example> AE-60P1-LCGNW(230V)(3m)



## Accessory (Sold separately)

### Optical Communication

Optical isolation adapters, utilize fiber optic cables for the digital communication, which enables extremely reliable communication even in noisy environments such as in factories and for long-distance control. By using optical fibers, they are electrically isolated, so safe operation is possible even in power supply configurations with potential differences.

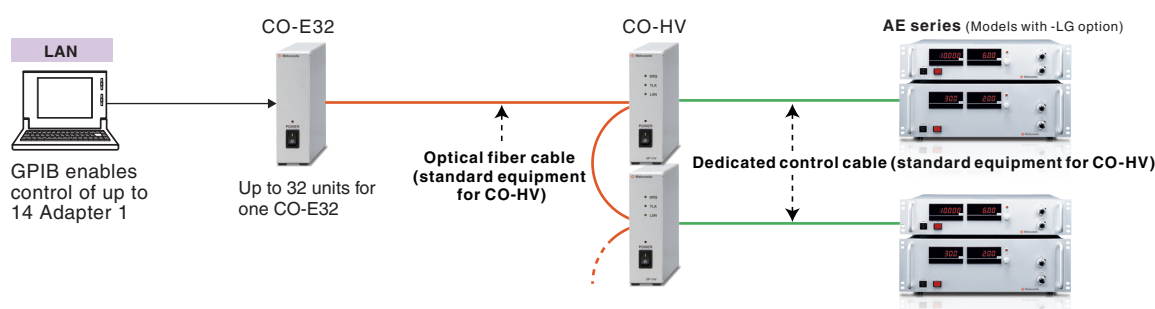
**Application** Control of high voltage power supplies via LAN, USB, RS-232C, RS-485, or GPIB.

**Connection** Using fiber optical cables, the adapter for each interface is connected to CO-HV units. And with the dedicated control cable, the CO-HV units are connected to high voltage power supply AE series.

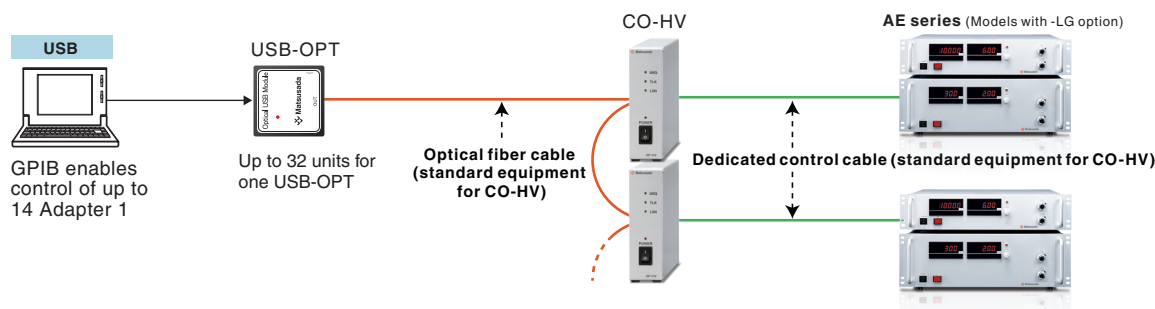
**Number of unit** Up to 32 pairs with CO-HV unit and high voltage power supply are available. With GPIB, by setting the address, you can connect a maximum of 448 high voltage power supply units (14 addresses x 32 units).

**Features** The communication system is well suited for such situations where there is a distance between the computer and the high voltage power supply or noisy environments. Also, it is especially ideal for use in combination with DC power supplies. The standard cable length is 2 meters, and it can be optionally extended up to 40 meters.

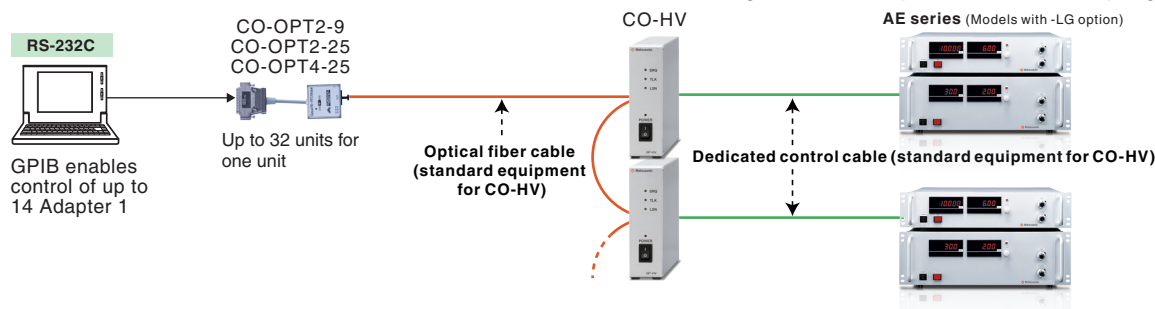
#### LAN Order both **CO-E32** and **CO-HV (with CO-RJ cables)** together.



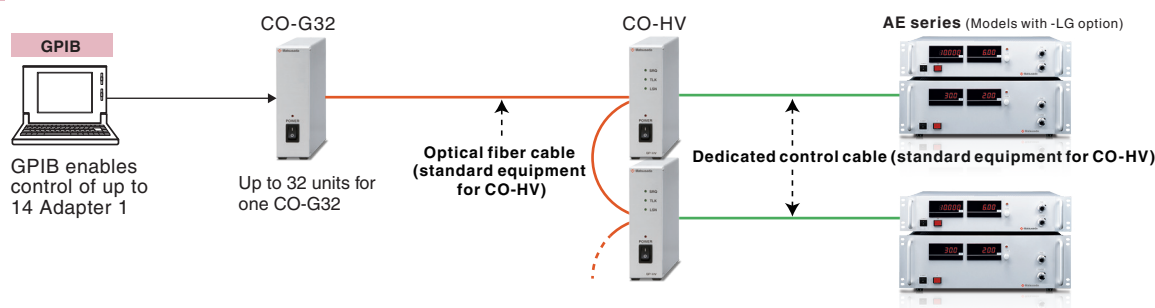
#### USB Order both **USB-OPT** and **CO-HV (with CO-RJ cables)** together.



#### RS-232C and RS-485 Order **CO-OPT2-9**, **CO-OPT2-25**, or **CO-OPT4-25** along with **CO-HV (with CO-RJ cables)** together.



#### GPIB Order both **CO-G32** and **CO-HV (with CO-RJ cables)** together.



# Who We Are

Matsusada Precision Inc. has manufactured High voltage power supplies for more than 50 years in Japan. Recognized by Japanese customers who demand high-quality levels, we have become a high voltage power supply manufacturer which has the highest market share in Japan. Currently, we are developing products not only for high-voltage power supplies, but also for DC power supplies, AC power supplies, electronic loads, high-voltage amplifiers, bipolar power supplies, and X-ray inspection equipment.

We have contributed to customers in various industries such as Semiconductor Production Equipment, Photomultiplier, IGBT, Electrostatic Chuck, Electron Beam, Electrospinning, Plasma, Motor for Electric vehicles, etc.

In addition, we have a direct sales system to respond promptly to customers. Our technical support team with many years of experience will respond promptly from Japan.

Our mission is to deliver products that meet Japan's strict quality standards to customers all over the world. We believe that if you contact us, you will surely find the power supply you need

Matsusada Precision



## Matsusada Precision Inc.

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### We follow-up customers from japan



**Contact Us**

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