

# HIGH VOLTAGE POWER SUPPLY



High voltage power supplies listed in this catalog have the following features:

- Low noise
- High efficiency
- High stability
- Protection function included

Our many years of experience and achievements amassed as a leading manufacturer of photomultiplier tubes as well as the high voltage power supplies that drive them ensure highly reliable performance in a diverse range of applications.



Human beings obtain more than 70 percent of the information visually by using their eyes. However, there are vast sums of information and unknown possibilities hidden within light not visible to the naked eye. This kind of light includes ultraviolet, infrared, X-ray and ultra-low level light impossible for human eyes to detect.

Since its founding over 60 years ago, Hamamatsu Photonics has been investigating not only light seen by the human eye but also light that far exceeds this level. As a leading manufacturer specializing in the field of photonics, Hamamatsu Photonics has marketed dozens of photosensitive devices, light sources and related products. Through these state-of-the-art products, Hamamatsu Photonics has committed itself to pioneering industrial and academic research work in still unexplored areas in many fields.



Hamamatsu Photonics will continue to deliver innovative breakthroughs in a diverse range of fields, always striving to make human life fuller and richer by "researching the many ways to use light".

# High Voltage Power Supply Modules

	Type No.		Output Voltage (Max.) (V)	Output Current (Max.) (mA)	Input Voltage (V)	Size W × H × D <sup>Ⓐ</sup> (mm)	Note
	C10940	-03	-1200	0.6	+5	15 × 18 × 15	Digital Control RS-485, Daisy-chain (-R2 type only)
		-03-R2					
		-53	+1200				
		-53-R2					
	C4900	—	-1250	0.6	+15	46 × 24 × 12	
		-01		0.5	+12		
		-50	+1250	0.6	+15		
		-51		0.5	+12		
	C10673	—	-1250	0.6	+15	46 × 24 × 12	UL recognized
		-01		0.5	+12		
	C10764	—	-1250	1	+15	46 × 24 × 12	
		-50	+1250				
	C11152	—	-1500	1	+15	41 × 10 × 41	Low ripple / noise
		-01			+12		
		-50	+1500		+15		
		-51			+12		
	C9619	—	-2000	2	+15	62 × 15 × 45	
		-01			+12		
		-50	+2000		+15		
		-51			+12		
	C11784	-12	-2000	5	+24	62 × 15 × 45	
		-52	+2000				
	C12446	-12	-1000	10	+24	62 × 15 × 45	
		-52	+1000				
	C11323	-02	-1800	20	+24	98 × 27 × 51	High current output -R1 type: RS-232C Control -R2 type: RS-485 Control
		-02-R1					
		-02-R2					
		-52	+1800				
		-52-R1					
-52-R2							
	C12766	-12	-1500	30	+24	107 × 25.5 × 72	High current output
		-52	+1500				

<sup>Ⓐ</sup>Excluding projecting parts

# Bench-top Type High Voltage Power Supplies

	Type No.		Output Voltage (Max.) (V)	Output Current (Max.) (mA)	Input Voltage (V)	Size W × H × D <sup>Ⓐ</sup> (mm)	Note
	C9525	-02	-2000	1.8	AC 100 to AC 240	246 × 85 × 312	USB control Multiple outputs of ±5 V, ±15 V and high voltage (+2000 V, -2000 V)
		-03					
		-52	+2000				
		-53					
	C9727	—	-3500	2	AC 100 to AC 240	246 × 85 × 312	USB control Multiple outputs of ±5 V, ±15 V and high voltage (+3500 V, -3500 V)
		-01	+3500				
		-50					
		-51					

<sup>Ⓐ</sup>Excluding projecting parts

# High Voltage Power Supply Modules

0.7 W Output 1200 V / 0.6 mA

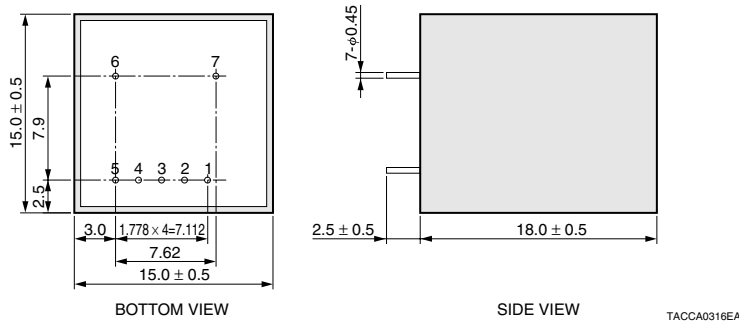
## C10940 Series



Parameter		C10940-03	C10940-03-R2	C10940-53	C10940-53-R2	Unit
Input Voltage		+5 ± 0.5				V
Input Current <sup>(A)</sup>	with no load	60				mA
	with full load	230				mA
Variable Output Voltage Range		-10 to -1200		+10 to +1200		V
Specification Guaranteed Output Voltage Range		-200 to -1200		+200 to +1200		V
Output Current		Max. 0.6				mA
Line Regulation Against ±0.5 V Input Change <sup>(A)(B)</sup>		Typ. ±0.02				%
Load Regulation Against 0 % to 100 % Load Change <sup>(A)</sup>		Typ. ±0.01				%
Ripple / Noise (p-p) <sup>(A)(B)</sup>		Typ. 50				mV
Output Voltage Control		See output voltage control diagrams below	See remote control diagram below	See output voltage control diagrams below	See remote control diagram below	—
Reference Voltage Output		Typ. +1.2		Typ. +1.2		V
Output Voltage Setting (Absolute Value)		Typ. Controlling voltage × 1000		Typ. Controlling voltage × 1000		V
Output Voltage Rise Time (0 % → 99 %) <sup>(A)(B)</sup>		Typ. 120		Typ. 300		ms
Temperature Coefficient <sup>(A)(B)</sup>		Typ. ±0.01				%/°C
Operating Ambient Temperature <sup>(A)(B)</sup>		0 to +50				°C
Operating Ambient Humidity <sup>(C)</sup>		Below 80				%
Storage Temperature		-20 to +60				°C
Storage Humidity <sup>(C)</sup>		Below 80				%
Weight		Typ. 8.5				g
Protective Functions		Units protected against reversed power input, reversed/excessive controlling voltage input, continuous overloading/short circuit output				—

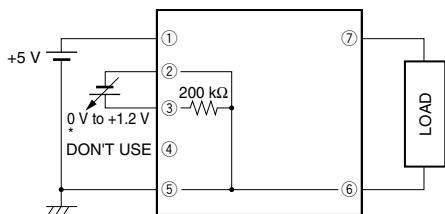
NOTE: <sup>(A)</sup>At maximum output voltage <sup>(B)</sup>At maximum output current <sup>(C)</sup>No condensation  
 \* -R2 type: RS-485 control

### Dimensional Outline (Unit: mm)

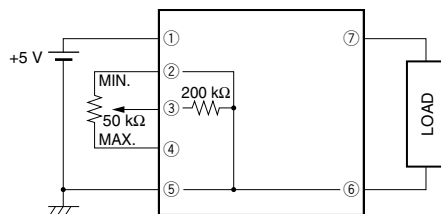


### Output Voltage Control (C10940-03, C10940-53)

#### By External Voltage



#### By External Potentiometer

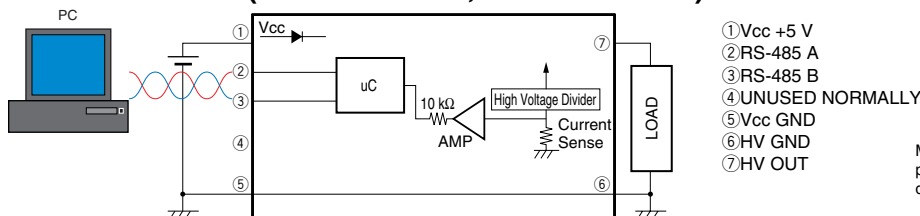


- ① Vcc +5 V
- ② Vcont GND
- ③ Vcont
- ④ Vref +1.2 V Typ.
- ⑤ Vcc GND
- ⑥ HV GND
- ⑦ HV OUT

\* The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.

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### Remote Control (C10940-03-R2, C10940-53-R2)



- ① Vcc +5 V
- ② RS-485 A
- ③ RS-485 B
- ④ UNUSED NORMALLY
- ⑤ Vcc GND
- ⑥ HV GND
- ⑦ HV OUT

Multiple wiring of -R2 type can be possible up to 32 pieces using a daisy-chain via RS-485.

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# High Voltage Power Supply Modules

0.7 W Output 1250 V / 0.5 mA, 0.6 mA

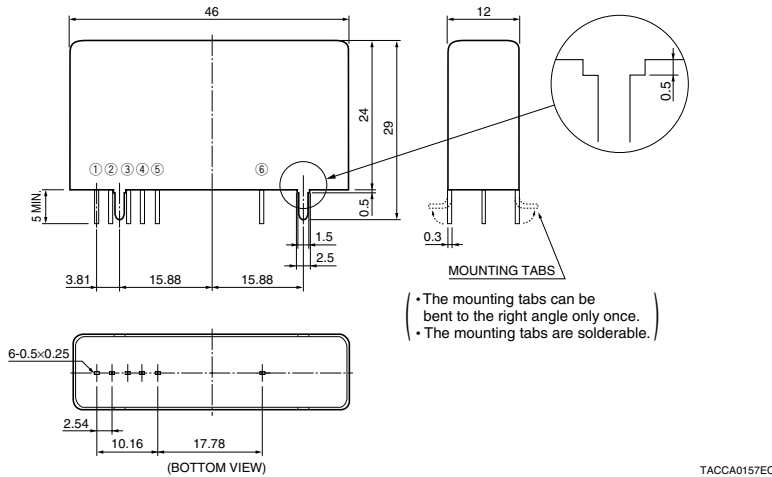
## C4900 Series



Parameter		C4900	C4900-01	C4900-50	C4900-51	Unit
Input Voltage		+15 ± 1	+12 ± 0.5	+15 ± 1	+12 ± 0.5	V
Input Current <sup>(A)</sup>	with no load	Typ. 14	15	14	15	mA
	with full load	Typ. 90	95	90	95	
Variable Output Voltage Range		0 to -1250		0 to +1250		V
Specification Guaranteed Output Voltage Range		-200 to -1250		+200 to +1250		V
Output Current		Max. 0.6	0.5	0.6	0.5	mA
Line Regulation Against ±1 V or ±0.5 V Input Change <sup>(A)(B)</sup>		Typ. ±0.01				%
Load Regulation Against 0 % to 100 % Load Change <sup>(A)</sup>		Typ. ±0.01				%
Ripple / Noise (p-p) <sup>(A)(B)</sup>		Typ. 0.003 % (38 mV)				—
Output Voltage Control		By external controlling voltage (0 V to +5 V) or external potentiometer (50 kΩ)				—
Controlling Voltage Input Impedance		Typ. 80				kΩ
Reference Voltage Output		Typ. +5.1				V
Output Voltage Setting (Absolute Value)		Typ. Controlling voltage × 250				V
Output Voltage Rise Time (0 % → 99 %) <sup>(A)(B)</sup>		Typ. 50				ms
Temperature Coefficient <sup>(A)(B)</sup>		Typ. ±0.01				% / °C
Operating Ambient Temperature <sup>(A)(B)</sup>		0 to +50				°C
Operating Ambient Humidity <sup>(C)</sup>		Below 80		Below 80 <sup>(D)</sup>		%
Storage Temperature		-20 to +70				°C
Storage Humidity <sup>(C)</sup>		Below 80				%
Weight		Typ. 31				g
Protective Functions		Units protected against reversed power input, reversed / excessive controlling voltage input, continuous overloading / short circuit in output				—

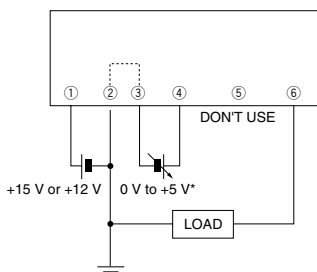
NOTE: <sup>(A)</sup>At maximum output voltage <sup>(B)</sup>At maximum output current <sup>(C)</sup>No condensation <sup>(D)</sup>At 0 °C to +40 °C

### Dimensional Outline (Unit: mm)

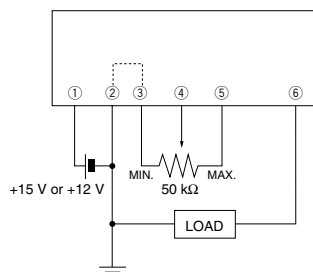


### Output Voltage Control

#### ●By External Voltage



#### ●By External Potentiometer



#### PIN ASSIGNMENT

- ① Vcc +15 V or +12 V
- ② GND
- ③ Vcont GND
- ④ Vcont
- ⑤ Vref +5.1 V Typ.
- ⑥ HV OUT

- The housing is internally connected to pin ②.
- Pins ② and ③ are internally connected.

\*The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.

# High Voltage Power Supply Modules

0.7 W Output 1250 V / 0.5 mA, 0.6 mA

## C10673 Series

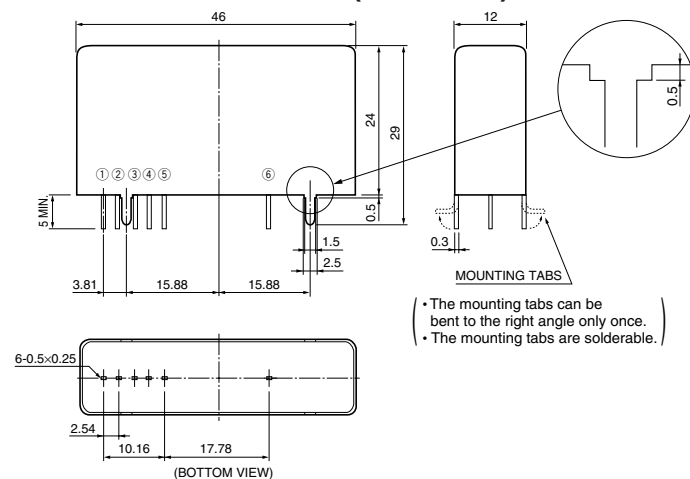
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Parameter			C10673	C10673-01	Unit
Input Voltage			+15 ± 1	+12 ± 0.5	V
Input Current <sup>(A)</sup>	with no load	Typ.	15	20	mA
	with full load	Typ.	95	100	
Variable Output Range			0 to -1250		V
Specification Guaranteed Output Voltage Range			-200 to -1250		V
Output Current		Max.	0.6	0.5	mA
Line Regulation Against ±1 V or ±0.5 V Input Change <sup>(A)(B)</sup>		Typ.	±0.01		%
Load Regulation Against 0 % to 100 % Load Change <sup>(A)</sup>		Typ.	±0.01		%
Ripple / Noise (p-p) <sup>(A)(B)</sup>		Typ.	0.01 % (125 mV)		—
Output Voltage Control			By external controlling voltage (0 V to +5 V) or external potentiometer (50 kΩ)		—
Controlling Voltage Input Impedance		Typ.	80		kΩ
Reference Voltage Output		Typ.	+5.1		V
Output Voltage Setting (Absolute Value)		Typ.	Controlling voltage × 250		V
Output Voltage Rise Time (0 % → 99 %) <sup>(A)(B)</sup>		Typ.	150		ms
Temperature Coefficient <sup>(A)(B)</sup>		Typ.	±0.015		% / °C
Operating Ambient Temperature <sup>(A)(B)</sup>			0 to +40		°C
Operating Ambient Humidity <sup>(C)</sup>			Below 80		%
Storage Temperature			-20 to +60		°C
Storage Humidity <sup>(C)</sup>			Below 80		%
Weight		Typ.	31		g
Protective Functions			Units protected against reversed power input, reversed / excessive controlling voltage input, continuous overloading / short circuit in output		—

NOTE: (A)At maximum output voltage (B)At maximum output current (C)No condensation

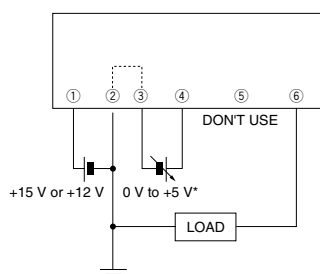
### Dimensional Outline (Unit: mm)



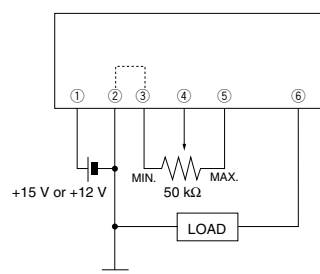
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### Output Voltage Control

#### ●By External Voltage



#### ●By External Potentiometer



#### PIN ASSIGNMENT

- ① Vcc +15 V or +12 V
- ② GND
- ③ Vcont GND
- ④ Vcont
- ⑤ Vref +5.1 V Typ.
- ⑥ HV OUT

- The housing is internally connected to pin ②.
- Pins ② and ③ are internally connected.

\*The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.

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# High Voltage Power Supply Modules

1.2 W Output 1250 V / 1 mA

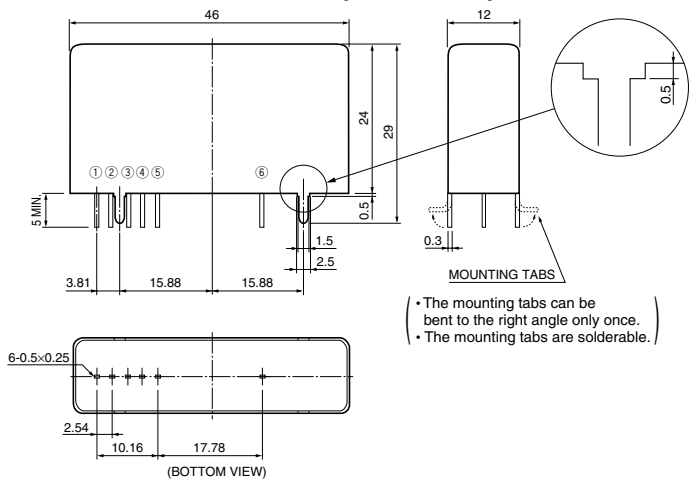
## C10764 Series



Parameter		C10764	C10764-50	Unit
Input Voltage		+15 ± 1		V
Input Current <sup>(A)</sup>	with no load	20		mA
	with full load	170		
Variable Output Voltage Range		0 to -1250	0 to +1250	V
Specification Guaranteed Output Voltage Range		-200 to -1250	+200 to +1250	V
Output Current		Max. 1		mA
Line Regulation Against ±1 V Input Change <sup>(A)(B)</sup>		Typ. ±0.01		%
Load Regulation Against 0 % to 100 % Load Change <sup>(A)</sup>		Typ. ±0.01		%
Ripple / Noise (p-p) <sup>(A)(B)</sup>		Typ. 0.01 % (125 mV)		—
Output Voltage Control		By external controlling voltage (0 V to +5 V) or external potentiometer (50 kΩ)		—
Controlling Voltage Input Impedance		Typ. 80		kΩ
Reference Voltage Output		Typ. +5.2		V
Output Voltage Setting (Absolute Value)		Typ. Controlling voltage × 250		V
Output Voltage Rise Time (0 % → 99 %) <sup>(A)(B)</sup>		Typ. 100		ms
Temperature Coefficient <sup>(A)(B)</sup>		Typ. ±0.01		% / °C
Operating Ambient Temperature <sup>(A)(B)</sup>		0 to +40		°C
Operating Ambient Humidity <sup>(C)</sup>		Below 80		%
Storage Temperature		-20 to +60		°C
Storage Humidity <sup>(C)</sup>		Below 80		%
Weight		Typ. 31		g
Protective Functions		Units protected against reversed power input, reversed / excessive controlling voltage input, continuous overloading / short circuit in output		—

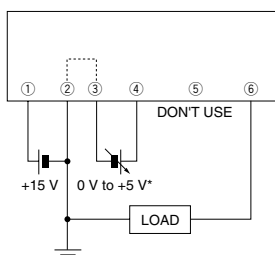
NOTE: (A)At maximum output voltage (B)At maximum output current (C)No condensation

### Dimensional Outline (Unit: mm)

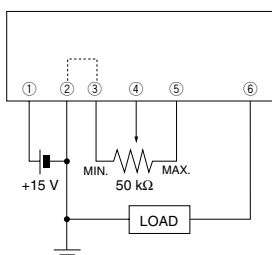


### Output Voltage Control

#### ●By External Voltage



#### ●By External Potentiometer



#### PIN ASSIGNMENT

- ① Vcc +15 V
- ② GND
- ③ Vcont GND
- ④ Vcont
- ⑤ Vref +5.2 V Typ.
- ⑥ HV OUT

- The housing is internally connected to pin ②.
- Pins ② and ③ are internally connected.

\*The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.

# High Voltage Power Supply Modules

## 1.5 W Output 1500 V / 1 mA

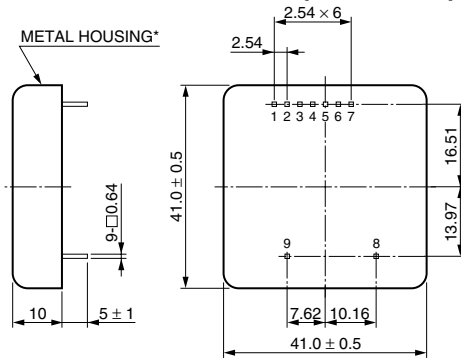
# C11152 Series



Parameter			C11152	C11152-01	C11152-50	C11152-51	Unit
Input Voltage			+15 ± 1	+12 ± 0.5	+15 ± 1	+12 ± 0.5	V
Input Current <sup>(A)</sup>	with no load	Typ.	45	50	45	50	mA
	with full load	Typ.	180	220	180	220	
Variable Output Voltage Range			0 to -1500		0 to +1500		V
Specification Guaranteed Output Voltage Range			-240 to -1500		+240 to +1500		V
Output Current			Max.			1	mA
Line Regulation Against ±1 V or ±0.5 V Input Change <sup>(A)(B)</sup>			Typ.			±0.01	%
Load Regulation Against 0 % to 100 % Load Change <sup>(A)</sup>			Typ.			±0.01	%
Ripple / Noise (p-p) <sup>(A)(B)</sup>			Typ.			5 (>5 kHz), 8 (≤5 kHz)	mV
Output Voltage Control			By external controlling voltage (0 V to +5 V) or external potentiometer (50 kΩ)				—
Controlling Voltage Input Impedance			Typ.		130	150	kΩ
Reference Voltage Output			Typ.			+5.2	V
Output Voltage Setting (Absolute Value)			Typ.			Controlling voltage × 300	V
Output Voltage Rise Time (0 % → 99 %) <sup>(A)(B)</sup>			Typ.			120	ms
Temperature Coefficient <sup>(A)(B)</sup>			Typ.			±0.005	% / °C
High Voltage Monitor Output			0 to +5 (Output impedance 10 kΩ)				V
ON / OFF Input			TTL positive logic				—
ON / OFF Input Impedance			30				kΩ
Operating Ambient Temperature <sup>(A)(B)</sup>			0 to +50				°C
Operating Ambient Humidity <sup>(C)</sup>			Below 80				%
Storage Temperature			-20 to +60				°C
Storage Humidity <sup>(C)</sup>			Below 80				%
Weight			Typ.			38	g
Protective Functions			Units protected against reversed power input, reversed / excessive controlling voltage input, continuous overloading / short circuit in output				—

NOTE: (A)At maximum output voltage (B)At maximum output current (C)No condensation

### Dimensional Outline (Unit: mm)

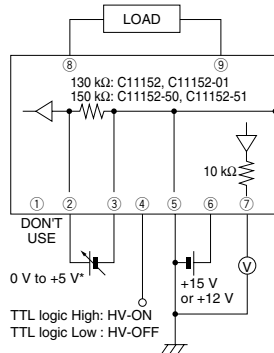


\* The metal housing is internally connected to the GND.

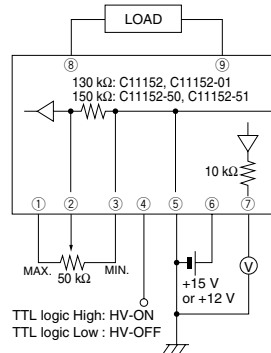
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### Output Voltage Control

#### ●By External Voltage



#### ●By External Potentiometer



#### PIN ASSIGNMENT

- ① Vref +5.2 V Typ.
- ② Vcont
- ③ Vcont GND\*\*
- ④ ON / OFF IN
- ⑤ GND\*\*
- ⑥ Vcc +15 V or +12 V
- ⑦ HV MONITOR OUT
- ⑧ HV OUT
- ⑨ HV GND

\* The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.  
\*\* Never connect the pin number 3 and 5 directly and externally.



# High Voltage Power Supply Modules

4 W Output 2000 V / 2 mA

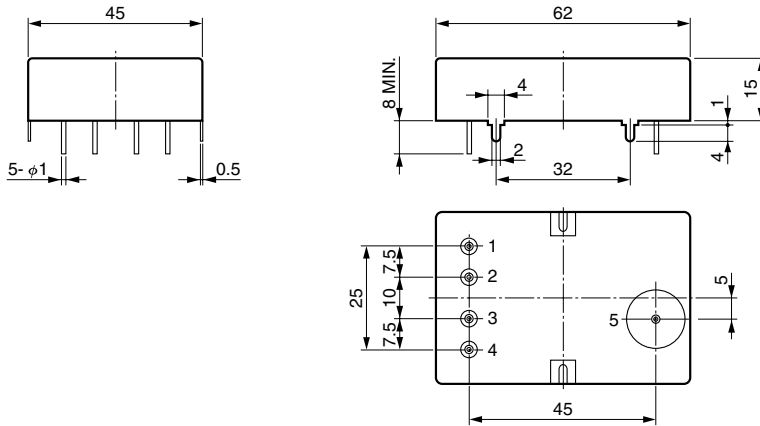
## C9619 Series



Parameter			C9619	C9619-01	C9619-50	C9619-51	Unit
Input Voltage			+15 ± 1	+12 ± 1	+15 ± 1	+12 ± 1	V
Input Current <sup>(A)</sup>	with no load	Typ.	120	100	120	100	mA
	with full load	Typ.	380	460	380	460	
Variable Output Voltage Range			0 to -2000		0 to +2000		V
Specification Guaranteed Output Voltage Range			-320 to -2000		+320 to +2000		V
Output Current			Max.			2	mA
Line Regulation Against ± 1 V Input Change <sup>(A)(B)</sup>			Typ.		±0.01	±0.03	%
Load Regulation Against 0 % to 100 % Load Change <sup>(A)</sup>			Typ.			±0.03	%
Ripple / Noise (p-p) <sup>(A)(B)</sup>			Typ.			0.003 % (60 mV)	—
Output Voltage Control			By external controlling voltage (0 V to +5 V) or external potentiometer (50 kΩ)				—
Controlling Voltage Input Impedance			Typ.		110	97	kΩ
Reference Voltage Output			Typ.			+5.2	V
Output Voltage Setting (Absolute Value)			Typ.			Controlling voltage × 400	V
Output Voltage Rise Time (0 % → 99 %) <sup>(A)(B)</sup>			Typ.			150	ms
Temperature Coefficient <sup>(A)(B)</sup>			Typ.			±0.01	%/°C
Operating Ambient Temperature <sup>(A)(B)</sup>			Typ.			0 to +40	°C
Operating Ambient Humidity <sup>(C)</sup>			Typ.			Below 85	%
Storage Temperature			Typ.			-20 to +60	°C
Storage Humidity <sup>(C)</sup>			Typ.			Below 90	%
Weight			Typ.			100	g
Protective Functions			Units protected against reversed power input, reversed / excessive controlling voltage input, continuous overloading / short circuit in output				—

NOTE: <sup>(A)</sup>At maximum output voltage <sup>(B)</sup>At maximum output current <sup>(C)</sup>No condensation

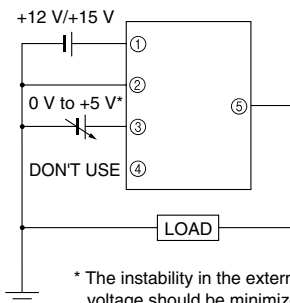
### Dimensional Outline (Unit: mm)



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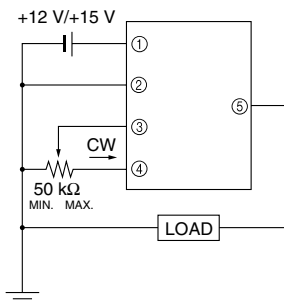
### Output Voltage Control

#### By External Voltage



\* The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.

#### By External Potentiometer



#### PIN ASSIGNMENT

- ① Vcc +12 V or +15 V
- ② GND
- ③ Vcont
- ④ Vref +5.2 V Typ.
- ⑤ HV OUT

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# High Voltage Power Supply Modules

10 W Output 2000 V / 5 mA

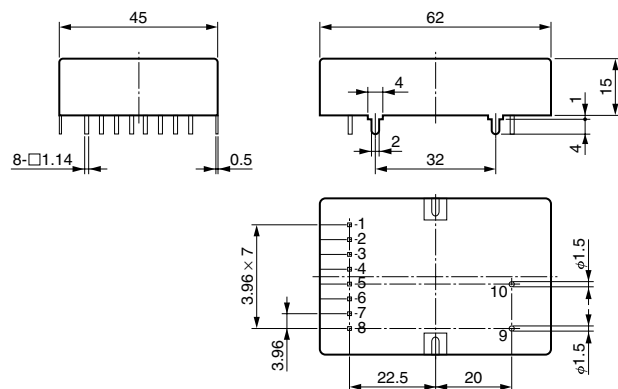
## C11784 Series



Parameter		C11784-12	C11784-52	Unit
Input Voltage		+24 ± 1.2		V
Input Current <sup>Ⓐ</sup>	with no load	Typ.	55	mA
	with full load	Typ.	530	
Variable Output Voltage Range		0 to -2000	0 to +2000	V
Specification Guaranteed Output Voltage Range		-320 to -2000	+320 to +2000	V
Output Current		Max.	5	mA
Line Regulation Against ± 1.2 V Input Change <sup>ⒶⒷ</sup>		Typ.	±0.01	%
Load Regulation Against 0 % to 100 % Load Change <sup>Ⓐ</sup>		Typ.	±0.01	%
Ripple / Noise (p-p) <sup>ⒶⒷ</sup>		Typ.	50	mV
Output Voltage Control		By external controlling voltage (0 V to +5 V) or external potentiometer (50 kΩ)		
Controlling Voltage Input Impedance		Typ.	640	kΩ
Reference Voltage Output		Typ.	+5.3	V
Output Voltage Setting (Absolute Value)		Typ.	Controlling voltage × 400	V
Output Voltage Rise Time (0 % → 99 %) <sup>ⒶⒷ</sup>		Typ.	150	ms
Temperature Coefficient <sup>ⒶⒷ</sup>		Typ.	±0.005	%/°C
High Voltage Monitor Output		0 to +5 (Output impedance 10 kΩ)		
Current Monitor Output		0 to +5 (Output impedance 10 kΩ)		
ON / OFF Input		TTL positive logic		
ON / OFF Input Impedance		30		
Operating Ambient Temperature <sup>ⒶⒷ</sup>		0 to +50		
Operating Ambient Humidity <sup>Ⓒ</sup>		Below 85		
Storage Temperature		-20 to +60		
Storage Humidity <sup>Ⓒ</sup>		Below 85		
Weight		Typ.	100	g
Protective Functions		Units protected against reversed power input, reversed / excessive controlling voltage input, continuous overloading / short circuit in output		

NOTE: <sup>Ⓐ</sup>At maximum output voltage. <sup>Ⓑ</sup>At maximum output current. <sup>Ⓒ</sup>No condensation

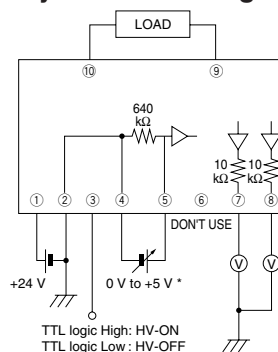
### Dimensional Outline (Unit: mm)



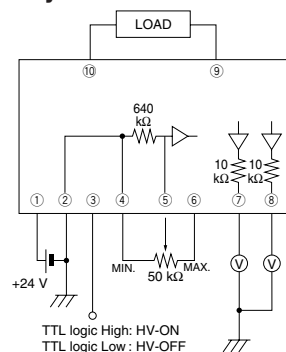
TACCA0315EA

### Output Voltage Control

#### ●By External Voltage



#### ●By External Potentiometer



#### PIN ASSIGNMENT

- ① Vcc +24 V
- ② Vcc GND \*\*
- ③ ON / OFF IN
- ④ Vcont GND \*\*
- ⑤ Vcont
- ⑥ Vref +5.3 V Typ.
- ⑦ CURRENT MONITOR OUT
- ⑧ HV MONITOR OUT
- ⑨ HV GND
- ⑩ HV OUT

\* The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.

\*\* Never connect the pin number ② and ④ directly and externally.

TACCC0158EA

# High Voltage Power Supply Modules

## 10 W Output 1000 V / 10 mA

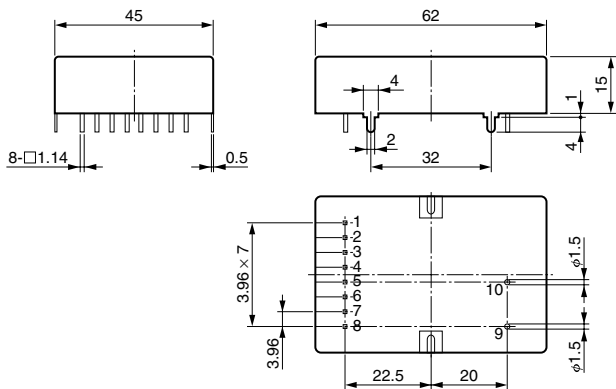
# C12446 Series



Parameter			C12446-12	C12446-52	Unit
Input Voltage			+24 ± 1.2		V
Input Current <sup>(A)</sup>	with no load	Typ.	55		mA
	with full load	Typ.	550		mA
Variable Output Voltage Range			0 to -1000	0 to +1000	V
Specification Guaranteed Output Voltage Range			-200 to -1000	+200 to +1000	V
Output Current			10		mA
Line Regulation Against ± 1.2 V Input Change <sup>(A)(B)</sup>			±0.01		%
Load Regulation Against 0 % to 100 % Load Change <sup>(A)</sup>			±0.01		%
Ripple / Noise (p-p) <sup>(A)(B)</sup>			50		mV
Output Voltage Control			By external controlling voltage (0 V to +5 V) or external potentiometer (50 kΩ)		—
Controlling Voltage Input Impedance			640		kΩ
Reference Voltage Output			+5.3		V
Output Voltage Setting (Absolute Value)			Controlling voltage × 200		V
Output Voltage Rise Time (0 % → 99 %) <sup>(A)(B)</sup>			150		ms
Temperature Coefficient <sup>(A)(B)</sup>			±0.005		%/°C
High Voltage Monitor Output			0 to +5 (Output impedance 10 kΩ)		V
Current Monitor Output			0 to +5 (Output impedance 10 kΩ)		V
ON / OFF Input			TTL positive logic		—
ON / OFF Input Impedance			30		kΩ
Operating Ambient Temperature <sup>(A)(B)</sup>			0 to +50		°C
Operating Ambient Humidity <sup>(C)</sup>			Below 85		%
Storage Temperature			-20 to +60		°C
Storage Humidity <sup>(C)</sup>			Below 85		%
Weight			100		g
Protective Functions			Units protected against reversed power input, reversed / excessive controlling voltage input, continuous overloading / short circuit in output		—

**NOTE:** (A)At maximum output voltage (B)At maximum output current (C)No condensation

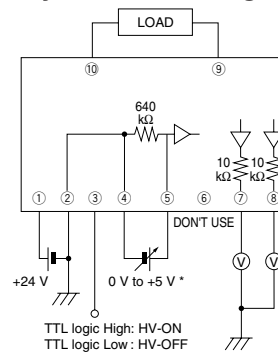
### Dimensional Outline (Unit: mm)



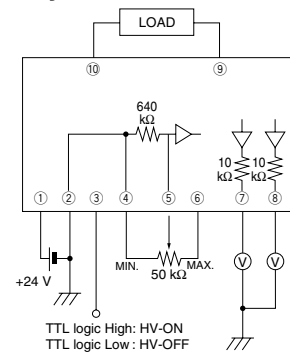
TACCA0315EA

### Output Voltage Control

#### ●By External Voltage



#### ●By External Potentiometer



#### PIN ASSIGNMENT

- ① Vcc +24 V
- ② Vcc GND \*\*
- ③ ON / OFF IN
- ④ Vcont GND \*\*
- ⑤ Vcont
- ⑥ Vref +5.3 V Typ.
- ⑦ CURRENT MONITOR OUT
- ⑧ HV MONITOR OUT
- ⑨ HV GND
- ⑩ HV OUT

\* The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.

\*\* Never connect the pin number ② and ④ directly and externally.

TACCC0158EA

# High Voltage Power Supply Modules

36 W Output 1800 V / 20 mA

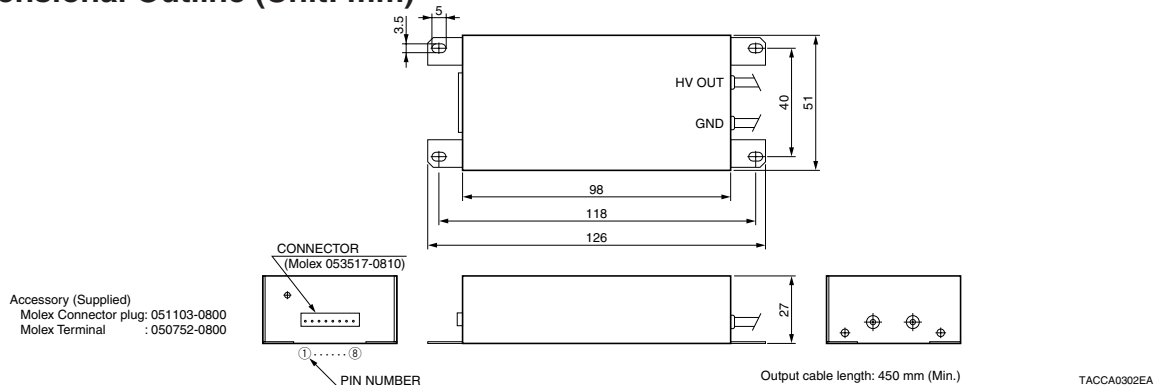
## C11323 Series



Parameter	C11323-02	C11323-02-R1/-R2	C11323-52	C11323-52-R1/-R2	Unit
Input Voltage	+24 ± 1.2				V
Input Current <sup>(A)</sup> with full load Typ.	1.7				A
Variable Output Voltage Range	0 to -1800		0 to +1800		V
Specification Guaranteed Output Voltage Range	-300 to -1800		+300 to +1800		V
Output Current Max.	20				mA
Line Regulation Against ±1.2 V Input Change <sup>(A)(B)</sup> Typ.	±0.01				%
Load Regulation Against 0 % to 100 % Load Change <sup>(A)</sup> Typ.	±0.01				%
Ripple / Noise (p-p) <sup>(A)(B)</sup> Typ.	40				mV
Output Voltage Control	See output voltage control diagrams below	See remote control diagram below	See output voltage control diagrams below	See remote control diagram below	—
Reference Voltage Output Typ.	+6.3	—	+6.3	—	V
Output Voltage Setting (Absolute Value) Typ.	Controlling voltage x 300	—	Controlling voltage x 300	—	V
Output Voltage Rise Time (0 % → 99 %) <sup>(A)(B)</sup> Typ.	100				ms
Temperature Coefficient <sup>(A)(B)</sup> Typ.	±0.005				% / °C
High Voltage Monitor Output	0 to +5 (Output impedance 10 kΩ)				V
Current Monitor Output	0 to +5 (Output impedance 10 kΩ)				V
ON /OFF Input	TTL negative logic				—
ON /OFF Input Impedance	1				kΩ
Operating Ambient Temperature <sup>(A)(B)</sup>	0 to +50				°C
Operating Ambient Humidity <sup>(C)</sup>	Below 85				%
Storage Temperature	-20 to +60				°C
Storage Humidity <sup>(C)</sup>	Below 85				%
Weight Typ.	230				g
Protective Functions	Units protected against reversed power input, reversed / excessive controlling voltage input, continuous overloading / short circuit in output				—

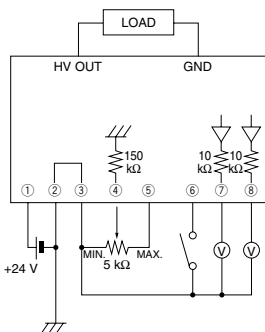
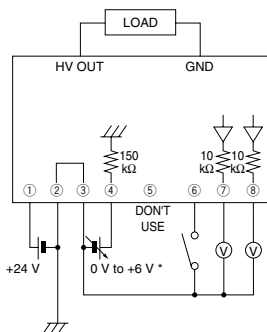
NOTE: (A)At maximum output voltage (B)At maximum output current (C)No condensation \* -R1 type: RS-232 control, -R2 type: RS-485 control

### Dimensional Outline (Unit: mm)



### Output Voltage Control (except for -R1, -R2)

●By External Voltage ●By External Potentiometer

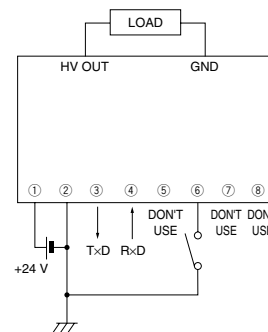


**PIN ASSIGNMENT**  
 ① Vcc +24 V  
 ② Vcc GND \*\*  
 ③ Vcont GND \*\*  
 ④ Vcont  
 ⑤ Vref +6.3 V Typ.  
 ⑥ ON /OFF IN  
 ⑦ CURRENT MONITOR OUT  
 ⑧ HV MONITOR OUT

\* The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.  
 \*\* Never connect the pin number ② and ③ directly and externally.

TACCC0145EA

### Remote Control (-R1, -R2 only)



**PIN ASSIGNMENT**  
 ① Vcc +24 V  
 ② Vcc GND  
 ③ Transmit Data (T x D Output) with respect to GND (Pin 2)  
 ④ Receive Data (R x D Input) with respect to GND (Pin 2)  
 ⑤ NC  
 ⑥ ON /OFF IN  
 ⑦ NC  
 ⑧ NC

-R1: RS-232  
 9600 bps, Data 8 bit, Stop 1 bit, None Parity  
 -R2: RS-485  
 Multi Drop, 32 Node Max., Half Duplex

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# High Voltage Power Supply Modules

45 W Output 1500 V / 30 mA

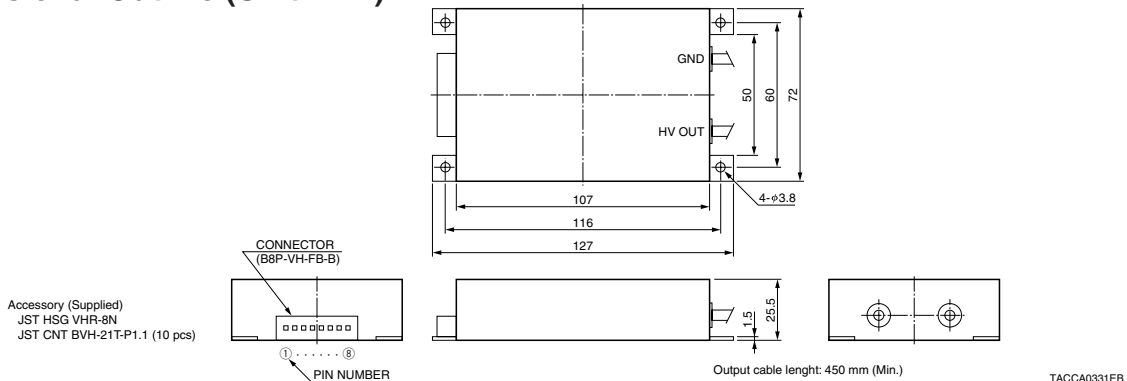
## C12766 Series



Parameter		C12766-12	C12766-52	Unit
Input Voltage		+24 ± 1.2		V
Input Current <sup>(A)</sup>	with no load	Typ.	65	mA
	with full load	Typ.	2.1	A
Variable Output Voltage Range		0 to -1500	0 to +1500	V
Specification Guaranteed Output Voltage Range		-240 to -1500	+240 to +1500	V
Output Current		Max.	30	mA
Line Regulation Against ± 1.2 V Input Change <sup>(A)(B)</sup>		Typ.	±0.01	%
Load Regulation Against 0 % to 100 % Load Change <sup>(A)</sup>		Typ.	±0.01	%
Ripple / Noise (p-p) <sup>(A)(B)</sup>		Typ.	75	mV
Output Voltage Control		By external controlling voltage (0 V to +5 V) or external potentiometer (50 kΩ)		—
Controlling Voltage Input Impedance		Typ.	640	kΩ
Reference Voltage Output		Typ.	+5.3	V
Output Voltage Setting (Absolute Value)		Typ.	Controlling voltage × 300	V
Output Voltage Rise Time (0 % → 99 %) <sup>(A)(B)</sup>		Typ.	1500	ms
Temperature Coefficient <sup>(A)(B)</sup>		Typ.	±0.01	%/°C
High Voltage Monitor Output		0 to +5 (Output impedance 10 kΩ)		V
Current Monitor Output		0 to +5 (Output impedance 10 kΩ)		V
ON / OFF Input		TTL positive logic		—
ON / OFF Input Impedance		30		kΩ
Operating Ambient Temperature <sup>(A)(B)</sup>		0 to +50		°C
Operating Ambient Humidity <sup>(C)</sup>		Below 85		%
Storage Temperature		-20 to +60		°C
Storage Humidity <sup>(C)</sup>		Below 85		%
Weight		Typ.	290	g
Protective Functions		Units protected against reversed power input, reversed / excessive controlling voltage input, continuous overloading / short circuit in output		—

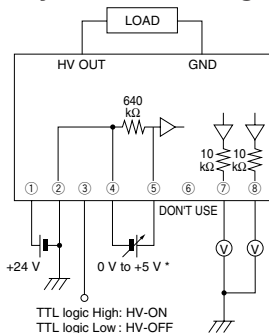
NOTE: (A)At maximum output voltage (B)At maximum output current (C)No condensation

### Dimensional Outline (Unit: mm)

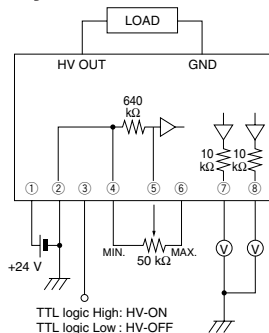


### Output Voltage Control

#### By External Voltage



#### By External Potentiometer



#### PIN ASSIGNMENT

- ① Vcc +24 V
- ② Vcc GND \*\*
- ③ ON / OFF IN
- ④ Vcont GND \*\*
- ⑤ Vcont
- ⑥ Vref +5.3 V Typ.
- ⑦ CURRENT MONITOR OUT
- ⑧ HV MONITOR OUT

\* The instability in the external controlling voltage should be minimized as it directly affects the output voltage quality.

\*\* Never connect the pin number ② and ④ directly and externally.

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## 4 W Output 2000 V / 1.8 mA

# C9525 Series



Multiple outputs of  $\pm 5$  V,  $\pm 15$  V and high voltage (+2000 V, -2000 V)  
USB Control

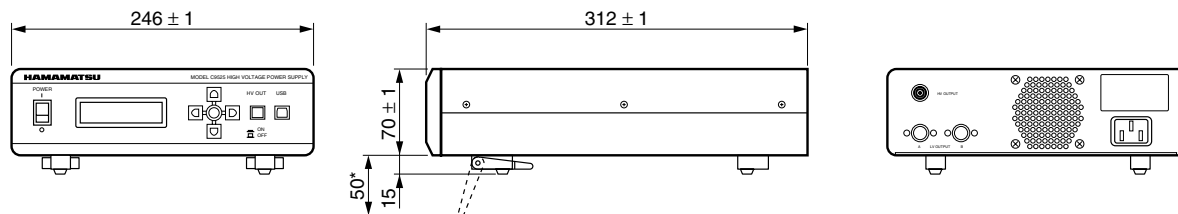
Parameter		High Voltage Power Supply Section	$\pm 5$ V Power Supply Section	$\pm 15$ V Power Supply Section
Output Voltage	C9525-02/C9525-03	0 V to -2000 V (variable)	$\pm 5$ V $\pm 0.25$ V (fixed)	$\pm 15$ V $\pm 0.75$ V (fixed)
	C9525-52/C9525-53	0 V to +2000 V (variable)		
Specification Guaranteed Output Voltage	C9525-02/C9525-03	-320 V to -2000 V (variable)	$\pm 5$ V $\pm 0.25$ V (fixed)	$\pm 15$ V $\pm 0.75$ V (fixed)
	C9525-52/C9525-53	+320 V to +2000 V (variable)		
Maximum Output Current		1.8 mA	500 mA	200 mA
Line Regulation (For 10 % change in line voltage) <sup>(A)(B)</sup>	Max.	$\pm 0.005$ %	$\pm 0.1$ %	$\pm 0.1$ %
Load regulation (For 0 % to 100 % change in load) <sup>(A)</sup>	Max.	$\pm 0.03$ %	$\pm 1$ %	$\pm 0.5$ %
Ripple / noise (p-p) <sup>(A)(B)</sup>	Typ.	0.003 %	0.06 %	0.02 %
Drift (After 30 minute warm-up) <sup>(A)(B)</sup>	Typ.	$\pm 0.05$ %/h	$\pm 0.05$ %/h	$\pm 0.05$ %/h
Temperature Coefficient <sup>(A)(B)</sup>	Typ.	$\pm 0.01$ %/°C	$\pm 0.01$ %/°C	$\pm 0.005$ %/°C
High Voltage Output Monitoring Accuracy <sup>(A)</sup>	Typ.	$\pm(0.1$ % +2 V)	—	—
Output Connector		SHV-R	DIN-R (6 pins)	
AC Input Voltage		AC 100 V to AC 240 V		
Power Consumption <sup>(A)(B)</sup>	Max.	60 V·A		
Operating Ambient Temperature <sup>(A)(B)</sup>		0 °C to +40 °C		
Operating Ambient Humidity <sup>(C)</sup>		Below 85 %		
Storage Temperature		-20 °C to +50 °C		
Storage Humidity <sup>(C)</sup>		Below 90 %		
Weight		Approx. 3.0 kg		

NOTE: (A)At maximum output Voltage  
(B)At maximum output Current  
(C)No condensation

### Accessories

- ① High voltage output cable (1.5 m long) terminated with SHV-P E1168-17 ..... 1
- ② AC line cable (2 m long) ..... 1  
 C9525-02/C9525-52: AC cable with a rating of 125 V  
 C9525-03/C9525-53: AC cable with a rating of 250 V
- ③ 3P/2P connector AC adapter (C9525-02 / C9525-52 only) ..... 1
- ④ USB cable (1.5 m long) with filter ..... 1
- ⑤ Low voltage power supply section DIN connector plugs ..... 2
- ⑥ CD-R (Containing instruction manual, sample software) ..... 1
- ⑦ Clamp filter ..... 2

### Dimensional Outline (Unit: mm)



\* The height of the C9525 is 120 mm with front legs extended.

TACCA0290EA

# Bench-top Type High Voltage Power Supplies

## 7 W Output 3500 V / 2 mA

# C9727 Series



Multiple outputs of  $\pm 5$  V,  $\pm 15$  V and high voltage (+3500 V, -3500 V)  
USB Control

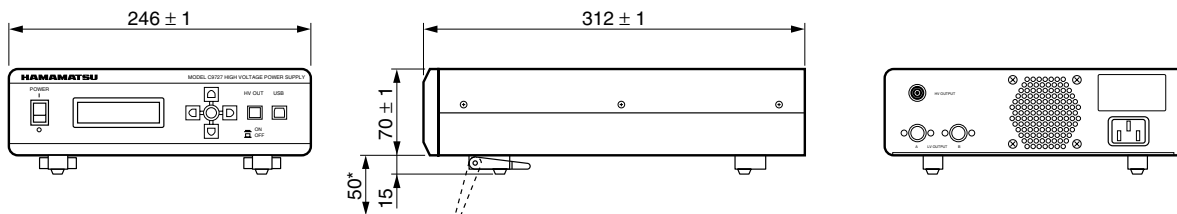
Parameter		High Voltage Power Supply Section	$\pm 5$ V Power Supply Section	$\pm 15$ V Power Supply Section
Output Voltage	C9727/C9727-01	0 V to -3500 V (variable)	$\pm 5$ V $\pm 0.25$ V (fixed)	$\pm 15$ V $\pm 0.75$ V (fixed)
	C9727-50/C9727-51	0 V to +3500 V (variable)		
Specification Guaranteed Output Voltage	C9727/C9727-01	-320 V to -3500 V (variable)	$\pm 5$ V $\pm 0.25$ V (fixed)	$\pm 15$ V $\pm 0.75$ V (fixed)
	C9727-50/C9727-51	+320 V to +3500 V (variable)		
Maximum Output Current		2 mA	500 mA	200 mA
Line Regulation (For 10 % change in line voltage) <sup>(A)(B)</sup>	Max.	$\pm 0.005$ %	$\pm 0.1$ %	$\pm 0.1$ %
Load regulation (For 0 % to 100 % change in load) <sup>(A)</sup>	Max.	$\pm 0.03$ %	$\pm 1$ %	$\pm 0.5$ %
Ripple / noise (p-p) <sup>(A)(B)</sup>	Typ.	0.003 %	0.06 %	0.02 %
Drift (After 30 minutes warm-up) <sup>(A)(B)</sup>	Typ.	$\pm 0.05$ %/h	$\pm 0.05$ %/h	$\pm 0.05$ %/h
Temperature Coefficient <sup>(A)(B)</sup>	Typ.	$\pm 0.01$ %/°C	$\pm 0.01$ %/°C	$\pm 0.005$ %/°C
High Voltage Output Monitoring Accuracy <sup>(A)</sup>	Typ.	$\pm(0.1$ % +2 V)	—	—
Output Connector		SHV-R	DIN-R (6 pins)	
AC Input Voltage		AC 100 V to AC 240 V		
Power Consumption <sup>(A)(B)</sup>	Max.	60 V·A		
Operating Ambient Temperature <sup>(A)(B)</sup>		0 °C to +40 °C		
Operating Ambient Humidity <sup>(C)</sup>		Below 85 %		
Storage Temperature		-20 °C to +50 °C		
Storage Humidity <sup>(C)</sup>		Below 90 %		
Weight		Approx. 3.1 kg		

NOTE: <sup>(A)</sup>At maximum output Voltage  
<sup>(B)</sup>At maximum output Current  
<sup>(C)</sup>No condensation

### Accessories

- ① High voltage output cable (1.5 m long) terminated with SHV-P E1168-19 ..... 1
- ② AC line cable ..... 1  
 C9727/C9727-50: AC cable with a rating of 125 V  
 C9727-01/C9727-51: AC cable with a rating of 250 V
- ③ 3P/2P connector AC adapter (C9727 / C9727-50 only) ..... 1
- ④ USB cable (1.5 m long) with filter ..... 1
- ⑤ Low voltage power supply section DIN connector plugs ..... 2
- ⑥ CD-R (Containing instruction manual, sample software) ..... 1

### Dimensional Outline (Unit: mm)



\* The height of the C9727 is 120 mm with front legs extended.

TACCA0290JA

## HANDLING PRECAUTIONS

- Products listed in this catalog generate high voltage. Do not directly touch the power output terminals with bare hands. Even when power is off, the internal parts may retain a high voltage, so do not touch them directly. Touching these may cause electrical shock, injury, or death.
- Do not try to disassemble, modify or repair the product by yourself. Doing so is dangerous because some internal parts of the product generate high voltage.
- Use or store the product within the ambient temperature and humidity range specified in the datasheet.
- Use caution when moving the product to a room with large changes in humidity or temperature since condensation may occur. Do not operate the product with wet or moist hands. Doing so may cause electrical shock or fire.
- Do not operate the product in locations subject to excessive dust, splashing from liquid such as water droplets, vibration or fire. Operation in such locations may result in fire.
- Do not operate the product in locations where flammable or explosive gases or vapors are present. Operation in such environments is extremely dangerous since it may cause explosion or fire.
- Ensure sufficient insulation and creepage distances on the printed circuit board where the high-voltage power module will be mounted.
- When connecting a benchtop high-voltage power supply to the AC power, always plug the AC power cable into a grounded 3-prong AC outlet. If a grounded 3-prong AC outlet is not available, then use the supplied 3-pin to 2-pin converter plug and securely ground the product using the grounding lead coming out of the 3-pin to 2-pin converter plug.
- Avoid installing a benchtop high-voltage power supply in such a way that the air vents are blocked or ventilation around it is interrupted or ambient temperature may rise excessively. Operation in such locations may result in fire.
- When replacing the fuse in a benchtop high-voltage power supply, use a fuse with the specified rating. Before replacing the fuse, be sure to turn off the power switch and unplug the AC cable from the power outlet. Do not use a fuse other than those specified and do not short-circuit the fuse terminals by using metal wire, etc. Failure to follow these replacement instructions may cause electrical shock or fire.
- When using the high-voltage output receptacle for a benchtop high-voltage power supply, always keep the high-voltage output cable (with an SHV plug) connected to that receptacle. If using a cable instead of the supplied high-voltage output cable, make sure the cable can withstand more than the required high voltage. Using a cable with a low breakdown voltage may cause electrical shock or malfunction. When not using the high-voltage output receptacle, always fit the protective cap onto it. Failure to follow this instruction may cause electrical shock.
- If the product malfunctions or any abnormal condition occurs during use, immediately disconnect the power source.



## ■ SAFETY ALERT SYMBOLS, SIGNAL WORDS, AND PICTORIAL SIGNS

The following alert symbols, signal words, and pictorial signs are shown on the product to indicate warnings and cautions that must be observed to ensure safe product use.

<Safety alert symbols and signal words>



**WARNING**

"WARNING" indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION**

"CAUTION" indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to the equipment.

<Pictorial sign>



Electrical Shock Hazard  
A high voltage is present.

## ■ PRODUCT WARRANTY PERIOD AND COVERAGE

Products listed in this catalog are warranted for a period of one year from the date of delivery. If a failure is found in a product within the warranty period that was caused by defects in the workmanship or materials used in the manufacture, then we will repair or replace it free of charge. The warranty is limited to repair or replacement of the defective product.

Even if within the warranty period, this warranty shall not apply to failures in cases where the product has been misused, mishandled, modified or repaired by the customer.





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**HAMAMATSU PHOTONICS K.K., Electron Tube Division**

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**Germany:** Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-2658 E-mail: [info@hamamatsu.de](mailto:info@hamamatsu.de)

**France:** Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10 E-mail: [infos@hamamatsu.fr](mailto:infos@hamamatsu.fr)

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