

wipos

wipos PS1 Power supplies
81.000.6xxx.x

USER MANUAL

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About this manual

This manual will support you during installation and commissioning for the wipos power supplies.

This document contains the information necessary for proper use, the technical data for the projects described therein.

Target groups and qualification of personnel

Commissioning and installation of components should only be carried out by specialized technicians. The legal and valid regulations for such types of installations must be considered.


Therefore, the system manual is targeted at the following:


- Those who can verify that they have the corresponding training and already have corresponding basic knowledge
- System integrators
- Electricians


Presentation of safety-relevant information

Information that warns of personal injury or property damage are emphasized by safety instructions.

This operating manual uses various safety notices that are assigned according to the severity of a potential hazard:


DANGER	
	"Danger" indicates an imminently hazardous situation or state which, if not avoided, will result in death or serious injury. The use of "Danger" is limited to the most extreme situations.


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

CAUTION	
	"Caution" indicates a potentially hazardous situation or state which, if not avoided, could result in minor or moderate injuries. "Caution" is also used to warn against unsafe practices or obvious misuse. "Caution" is also used for situations which may result in material damage or personal injury.

NOTICE	
	"Notice" indicates information that is directly or indirectly related to the safety of personnel or property. It is not directly associated with hazards or hazardous situations.

"Danger" or "Warning" are strictly used for cases which present a risk to life or limb. Damage to property only falls into these categories if there is also a risk of personal injury that corresponds to these levels.

DANGER	
	<ul style="list-style-type: none">• Only electricians may install and commission this device. You must have read these instructions and understood them before carrying out the work.• Do not open the device. Do not introduce any foreign objects. Keep device away from water and fire.• Only connect or disconnect the device when no power is connected and the device is deenergized.• The relevant standards, guidelines, regulations, and provisions of the respective country must be observed.

WARNING	
	<p>Electric shock, fire, or Product failure may occasionally occur.</p> <ul style="list-style-type: none">• Do not disassemble, modify, or repair the Product or touch the interior of the Product.• Do not allow any pieces of metal or conductors or any clippings or cuttings resulting from installation work to enter the Product• Caution: Do not touch the Product while power is being supplied or immediately after power is turned OFF. Surface may be hot.• Caution possible risk of fire: Tighten terminal screws to the specified torque (0.5 to 0.6 Nm).

Product Description

Reliable and Easy Operation-Worldwide Power Supply Resistant in tough environments Easy and fast installation The most compact class on the market

- Universal input for worldwide applications:
100 to 240 VAC (85 to 264 VAC)
- DC input can be available: 90 to 350 VDC
- Possible for 2 phases input usage.
- Wide operation temperature range: -40 to 70 °C
- Power Boost function at 120%
- Safety standards:
UL 508/60950-1, CSA C22.2 No. 107.1/60950-1
ANSI/ISA 12.12.01
EN 50178, EN 60950-1.
Lloyd's standards, EN 60204-1 PELV
Safety of Power Transformers: EN 61558-2-16
- 15-W,30-W, and 60-W models conform to
UL Class 2 output Standards
- EMS: EN 61204-3
EMI: EN 61204-3 Class B
- RoHS Compliant



Refer to *Safety Precautions for All Power Supplies* and
Safety Precautions on page 4.

Model Number Structure

Model Number Legend

Note: Not all combinations are possible. Refer to *List of Models* in *Ordering Information*, below.

wipos PS1 □□ – □□
 1 2

1. Output voltage
24 V

2. Output current
1,25 A
2,5 A
5 A
10 A
20 A

Ordering Information

Power ratings	Input voltage	Output voltage	Output current	Boost-current	Model number	Part no.
30 W	100 to 240 V AC,	24 V	1,25 A	1,5 A	wipos PS1 24-1.25	81.000.6510.0
60 W		24 V	2,5 A	3 A	wipos PS1 24-2.5	81.000.6520.0
120 W		24 V	5 A	6 A	wipos PS1 24-5	81.000.6530.0
240 W		24 V	10 A	12 A	wipos PS1 24-10	81.000.6540.0
480 W		24 V	20 A	24 A	wipos PS1 24-20	81.000.6550.0

Other voltage variants available on request.

Specifications

Ratings, Characteristics, and Functions

Item	Power ratings		15 W			30 W		
	Output voltage		5 V	12 V	24 V	5 V	12 V	24 V
Efficiency (Typical)	230 VAC input		77 %		80 %	79 %	82 %	86 %
Input	Voltage *1		100 to 240 VAC, 90 to 350 VDC (allowable range: 85 to 264 VAC)					
	Frequency *1		50/60 Hz (47 bis 450 Hz)					
	Current (Typical)	115 VAC input	0.32 A	0.3 A	0.31 A	0.5 A	0.57 A	0.58 A
		230 VAC input	0.2 A	0.21 A	0.2 A	0.32 A	0.37 A	0.36 A
	Power factor (Typical)	230 VAC input	0.42			0.43	0.42	0.43 (No PFC)
	Harmonic current emissions		Conforms to EN61000-3-2					
	Leakage current (Typical)	115 VAC input	0.14 mA			0.13 mA		
		230 VAC input	0.25 mA			0.24 mA		
Inrush current (Typical) *2	115 VAC input	16 A						
	230 VAC input	32 A						
Output	Voltage adjustment range *3		-10 bis +15 % (with V.ADJ) (guaranteed)					
	Ripple *4	at 20 MHz (Typical)	60 mV	50 mV	30 mV	30 mV	30 mV	30 mV
	Input variation influence		0,5% max. (at 85 to 264 VAC input, 100% load)					
	Load variation Influence (Rated Input voltage)		max. 3,0 % (5 V), max. 2,0 % (12 V), max. 1,5 % (24 V) bei 0 bis 100 % Load					
	Temperature variation influence		max. 0,05 %/°C					
	Start up time (Typical) *2	115 VAC input	530 ms	520 ms	580 ms	550 ms	550 ms	600 ms
		230 VAC input	330 ms	400 ms	400 ms	430 ms	490 ms	480 ms
	Hold time (Typical) *2	115 VAC input	28 ms	29 ms	32 ms	33 ms	36 ms	23 ms
230 VAC input		134 ms	138 ms	134 ms	177 ms	170 ms	154 ms	
Additional functions	Overload protection *2		121% to 160% of rated load current (130% typ value)					
	Overvoltage protection *2		Yes*5					
	Power-Boost		120% of rated current (Refer to Engineering Data)					
	Parallel operation		Parallel operation Yes (Refer to Engineering Data)					
	Series operation		Series operation Possible for up to two Power Supplies (with external diode)					
Others	Ambient operating temperature		-40 to 70°C (Refer to Engineering Data)					
	Storage temperature		-40 to 85°C					
	Ambient operating humidity		0% to 95% (Storage humidity: 0% to 95%)					
	Dielectric strength (detection current: 20 mA)		3.0 kVAC for 1 min. (between all inputs and outputs) 2.0 kVAC for 1 min. (between all inputs and PE terminal) 1.0 kVAC for 1 min. (between all outputs and PE terminal)					
	Insulation resistance		100 M min. (between all outputs and all inputs/ PE terminals) at 500 VDC					
	Vibration resistance		10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions 10 to 150 Hz, 0.35-mm single amplitude (5 G max.) for 80 min. each in X, Y, and Z directions					
	Shock resistance		150 m/s ² , 3 times each in ±X, ±Y, and ±Z directions					
	Output indicator		Yes (color: green), lighting from 80% to 90% or more of rated voltage					
	EMI	Conducted Emission	Conforms to EN 61204-3 EN55011 Class B and based on FCC Class A					
		Radiated Emission	Conforms to EN 61204-3 EN55011 Class B					
	EMS		Conforms to EN 61204-3 high severity levels					
	Approved Standards		UL Listed: UL 508 (Listing, Class2 Output: Per UL 1310) UL UR: UL 60950-1 (Recognition) ANSI/ISA 12.12.01 cUL: CSA C22.2 No.107.1 (Class2 Output: Per CSA C22.2 No.223) cUR: CSA C22.2 No.60950-1 EN/VDE: EN 50178, EN 60950-1 Lloyd's standards					
	Fulfilled Standards		SELV (EN 60950-1/EN 50178/UL 60950-1), PELV (EN 60204-1, EN 50178), Safety of Power Transformers (EN 61558-2-16) EN 50274 for Terminal parts					
	Degree of protection		IP20 by EN/IEC 60529					
	SEMI		F47-0706 (200 to 240 VAC)					
Weight		150 g				195 g		

*1. Do not use an inverter output for the Power Supply. Inverters with an output frequency of 50/60 Hz are available, but the rise in the internal temperature of the Power Supply may result in ignition or burning.

*2. For a cold start at 25 C. Refer to Engineering Data on page 11 for details.

*3. If the output voltage adjuster (V. ADJ) is turned, the voltage will increase by more than +15% of the voltage adjustment range. When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.

*4. A characteristic when the ambient operating temperature is between -25 to 70 C.

*5. To reset the protection, turn OFF the input power for three minutes or longer and then turn it back ON.

Item	Power ratings		60 W		120 W
	Output voltage		12 V	24 V	24 V
Efficiency (Typical)	230 VAC input		85 %	85 %	89 %
Input	Voltage *1		100 bis 240 V AC, 90 bis 350 V DC (allowable range: 85 to 264 VAC)		
	Frequency *1		50/60 Hz (47 bis 450 Hz)		
	Current (Typical)	115 VAC input	1.0 A	1.3 A	1.3 A
		230 VAC input	0.6 A	0.7 A	
	Power factor (Typical)	230 VAC input	0.46	0.45 (No PFC)	0.94 (Active PFC)
	Harmonic current emissions		Conforms to EN61000-3-2		
	Leakage current (Typical)	115 VAC input	0.16 mA		0.24 mA
		230 VAC input	0.30 mA		0.38 mA
Inrush current (Typical) *2	115 VAC input	16 A			
	230 VAC input	32 A			
Output	Voltage adjustment range *3		-10% to 15% (with V.ADJ) (guaranteed)		
	Ripple *4	at 20 MHz (Typical)	150 mV	50 mV	150 mV
	Input variation influence		0.5% max. (at 85 to 264 VAC input, 100% load)		
	Load variation Influence (Rated Input voltage)		max. 2.0 % (12 V), max. 1.5 % (24 V) bei 0 bis 100 % load		
	Temperature variation influence		max. 0.05 %/°C		
	Start up time (Typical) *2	115 VAC input	570 ms	650 ms	790 ms
		230 VAC input	432 ms	500 ms	750 ms
	Hold time (Typical) *2	115 VAC input	26 ms	25 ms	42 ms
230 VAC input		139 ms	129 ms	42 ms	
Additional functions	Overload protection *2		121% to 160% of rated load current, (130% typ value)		
	Overvoltage protection *2		Yes*5		
	Power-Boost		120% of rated current (Refer to Engineering Data)		
	Parallel operation		Yes (Refer to Engineering Data)		
	Series operation		Possible for up to two Power Supplies (with external diode)		
Others	Ambient operating temperature		-40 bis 70 °C (siehe technische Informationen)		
	Storage temperature		-40 bis 85 °C		
	Ambient operating humidity		0% to 95% (Storage humidity: 0% to 95%)		
	Dielectric strength (detection current: 20 mA)		3.0 kVAC for 1 min. (between all inputs and outputs) 2.0 kVAC for 1 min. (between all inputs and PE terminal) 1.0 kVAC for 1 min. (between all outputs and PE terminal)		
	Insulation resistance		100 M min. (between all outputs and all inputs/ PE terminals) at 500 VDC		
	Vibration resistance		10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions 10 to 150 Hz, 0.35-mm single amplitude (5 G max.) for 80 min. each in X, Y, and Z directions		
	Shock resistance		150 m/s ² , 3 times each in ±X, ±Y, and ±Z directions		
	Output indicator		Yes (color: green), lighting from 80% to 90% or more of rated voltage		
	EMI	EMI	Conforms to EN 61204-3 EN 55011 Class B and based on FCC Class A		
		Radiated Emission	Conforms to EN 61204-3 EN 55011 Class B		
	EMS		Conforms to EN 61204-3 high severity levels		
	Approved Standards		UL Listed: UL 508 (Listing, For 60 W only Class2 Output: Per UL 1310) UL UR: UL 60950-1 (Recognition) ANSI/ISA 12.12.01 cUL: CSA C22.2 No.107.1 (For 60 W only Class2 Output: Per CSA C22.2 No.223) cUR: CSA C22.2 No.60950-1 EN/VDE: EN 50178, EN 60950-1 Lloyd's standards		
	Fulfilled Standards		SELV (EN 60950-1/EN 50178/UL 60950-1), PELV(EN 60204-1, EN 50178), Safety of Power Transformers (EN 61558-2-16) EN 50274 for Terminal parts		
	Degree of protection		IP20 by EN/IEC 60529		
	SEMI		F47-0706 (200 to 240 VAC)		
Weight		260 g			
		620 g			

*1. Do not use an inverter output for the Power Supply. Inverters with an output frequency of 50/60 Hz are available, but the rise in the internal temperature of the Power Supply may result in ignition or burning.

*2. For a cold start at 25 C. Refer to Engineering Data on page 11 for details.

*3. If the output voltage adjuster (V. ADJ) is turned, the voltage will increase by more than +15% of the voltage adjustment range. When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.

*4. A characteristic when the ambient operating temperature is between -25 to 70 C.

*5. To reset the protection, turn OFF the input power for three minutes or longer and then turn it back ON.

Item	Power ratings		240 W		480 W	
	Output voltage		24 V	48 V	24 V	48 V
Efficiency (Typical)	230 VAC input		92 %		92 %	
Input	Voltage *1		100 bis 240 V AC, 90 bis 350 V DC (allowable range: 85 to 264 VAC)			
	Frequency *1		50/60 Hz (47 to 63 Hz)			
	Current (Typical)	115 VAC input	2.4 A		4.7 A	
		230 VAC input	1.3 A		2.3 A	
	Power factor (Typical)	230 VAC input	0.9 (active PFC)		0.97 (active PFC)	
	Harmonic current emissions		Conforms to EN61000-3-2			
	Leakage current (Typical)	115 VAC input	0.23 mA		0.3 mA	
		230 VAC input	0.33 mA		0.49 mA	
Inrush current (Typical) *2	115 VAC input	16 A				
	230 VAC input	32 A				
Output	Voltage adjustment range *3		-10% to 15% (with V.ADJ) (guaranteed)			
	Ripple *4	at 20 MHz (Typical)	180 mV	350 mV	230 mV	470 mV
	Input variation influence		max. 0.5 % (bei 85 bis 264 V AC Versorgungsspannung und 100 % Last)			
	Load variation Influence (Rated Input voltage)		1.5% max. (24 V, 48 V), at 0% to 100% load			
	Temperature variation influence		max. 0.05 %/°C			
	Start up time (Typical) *2	115 VAC input	250 ms	290 ms	380 ms	
		230 VAC input	250 ms	290 ms	260 ms	
	Hold time (Typical) *2	115 VAC input	44 ms	43 ms	40 ms	
230 VAC input		44 ms		50 ms		
Additional functions	Overload protection *2		121 bis 160 % des Nennlaststroms (130% typ value)			
	Overvoltage protection *2		Yes*5			
	Power-Boost		120% of rated current (Refer to Engineering Data)			
	Parallel operation		Yes (Refer to Engineering Data)			
	Series operation		Possible for up to two Power Supplies (with external diode)			
Others	Ambient operating temperature		-40 to 70°C (Refer to Engineering Data)			
	Storage temperature		-40 bis 85 °C			
	Ambient operating humidity		0% to 95% (Storage humidity: 0% to 95%)			
	Dielectric strength (detection current: 20 mA)		3.0 kVAC for 1 min. (between all inputs and outputs) 2.0 kVAC for 1 min. (between all inputs and PE terminal) 1.0 kVAC for 1 min. (between all outputs and PE terminal)			
	Insulation resistance		100 M min. (between all outputs and all inputs/ PE terminals) at 500 VDC			
	Vibration resistance		10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions			
	Shock resistance		150 m/s ² , 3 times each in ±X, ±Y, and ±Z directions			
	Output indicator		Yes (color: green), lighting from 80% to 90% or more of rated voltage			
	EMI	Conducted Emission		Entspricht EN61204-3, EN55011 Klasse B und basiert auf FCC Klasse A		
		Radiated Emission		Entspricht EN61204-3 und EN55011 Klasse B		
	EMS		Conforms to EN 61204-3 high severity levels			
	Approved Standards		UL Listed: UL 508 (Listing, Class2 Output: Per UL 1310) UL UR: UL 60950-1 (Recognition) ANSI/ISA 12.12.01 cUL: CSA C22.2 No.107.1 (Class2 Output: Per CSA C22.2 No.223) cUR: CSA C22.2 No.60950-1 EN/VDE: EN 50178, EN 60950-1 Lloyd's standards			
	Fulfilled Standards		SELV (EN 60950-1/EN 50178/UL 60950-1), PELV (EN 60204-1, EN 50178), Safety of Power Transformers (EN 61558-2-16) EN 50274 for Terminal parts			
	Degree of protection		IP20 by EN/IEC 60529			
	SEMI		F47-0706 (200 to 240 VAC)			
Weight		900 g		1500 g		

*1. Do not use an inverter output for the Power Supply. Inverters with an output frequency of 50/60 Hz are available, but the rise in the internal temperature of the Power Supply may result in ignition or burning.

*2. For a cold start at 25 C. Refer to Engineering Data on page 11 for details.

*3. If the output voltage adjuster (V. ADJ) is turned, the voltage will increase by more than +15% of the voltage adjustment range. When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.

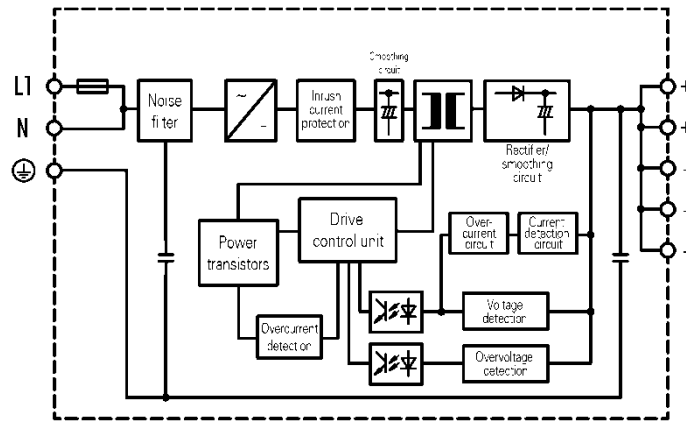
*4. A characteristic when the ambient operating temperature is between -25 to 70 C.

*5. To reset the protection, turn OFF the input power for three minutes or longer and then turn it back ON.

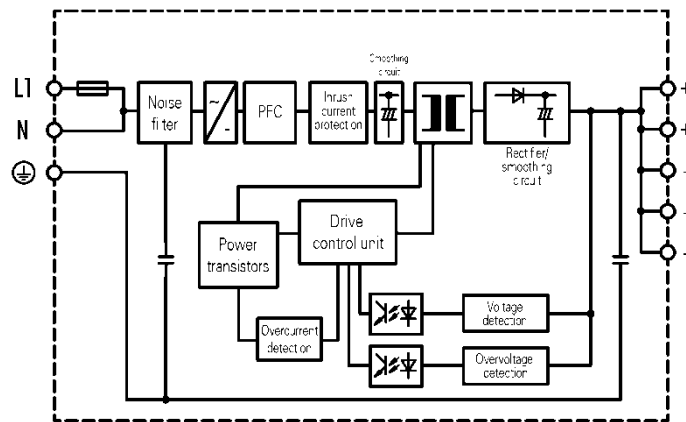
Connections

Block Diagrams

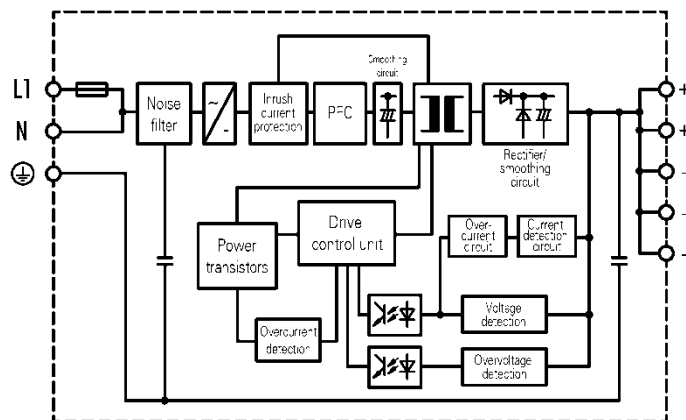
wipos PS1 24-1.25 (30 W)
wipos PS1 24-2.5 (60 W)



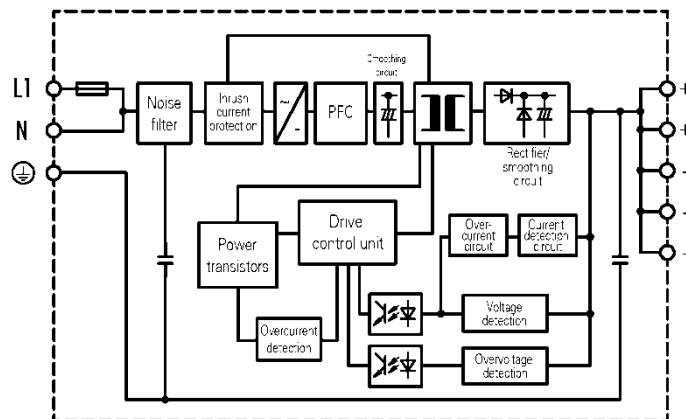
wipos PS1 24-5 (120 W)



wipos PS1 24-10 (240 W)



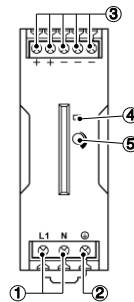
wipos PS1 24-20 (480 W)



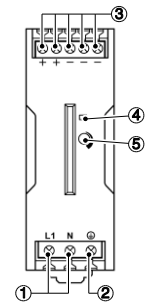
Construction and Nomenclature

Nomenclature

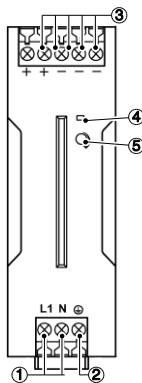
30-W-Models
wipos PS1 24-1.25



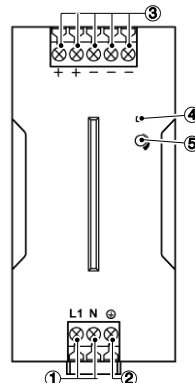
60-W- Models
wipos PS1 24-2.5



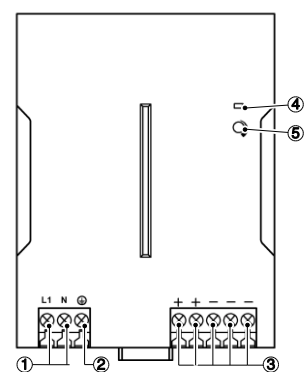
120-W- Models
wipos PS1 24-5



240-W- Models
wipos PS1 24-10



480-W- Models
wipos PS1 24-20



No.	Name	Function
1	Input terminals (L), (N)	Connect the input lines to these terminals. *1
2	Protective Earth terminal (PE)	Connect the ground line to this terminal. *2
3	DC Output terminals (V), (+V)	Connect the load lines to these terminals.
4	Output indicator (DC ON: Green)	Lights while a direct current (DC) output is ON.
5	Output voltage adjuster (V.ADJ)	Use to adjust the voltage

*1. The fuse is located on the (L) side. It is not user-replaceable. For a DC input, connect the positive voltage to the L terminal..

*2. This is the protective earth terminal specified in the safety standards. Always ground this terminal.

*3. **The rated current for output terminals is 10 A per terminal.**

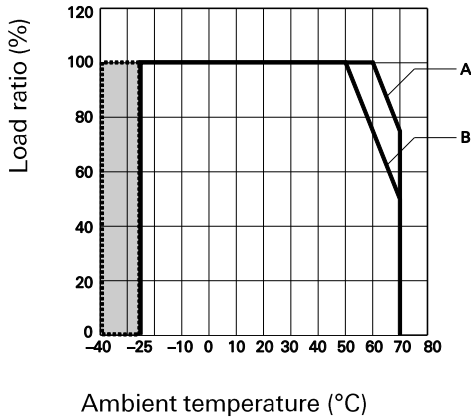
Be sure to use multiple terminals simultaneously for current that exceeds the terminal rating.

When applying a current of 10 A or more, use at least two terminals each for the positive and negative wires.

Engineering Data

Derating Curve

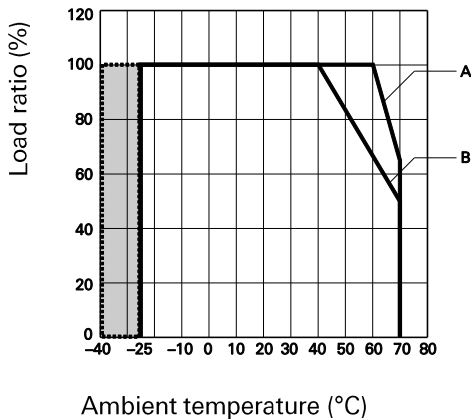
30, 240 W (wipos PS1 24-1.25, wipos PS1 24-10)



Note:

- At less than 90 VAC, the derating is 2.5%/V
 - For a DC power input, reduce the load given in the above derating curve by multiplying the following coefficients.
 - wipos PS1 24-1.25 : 0.9
 - wipos PS1 24-10 : 0.8
 - See „-40 °C Operation Guarantee Condition“
- A. Standard mounting
60 °C and over: the derating is 2.5 %/°C
- B. Face-up mounting
50°C and over: the derating is 2.5%/°C.

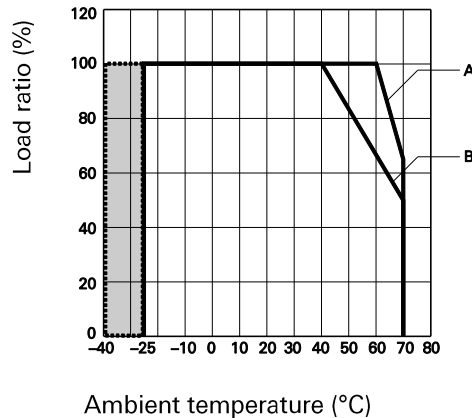
60 W (wipos PS1 24-2.5)



Note:

- At less than 90 VAC, the derating is 2.5%/V
 - For a DC power input, reduce the load given in the above derating curve by multiplying the following coefficients.
 - wipos PS1 24-2.5 : 0.9
 - See „-40 °C Operation Guarantee Condition“
- A. Standard mounting
60 °C and over: the derating is 2.5 %/°C.
- B. Face-up mounting
40°C and over: the derating is 1.67 %/°C.

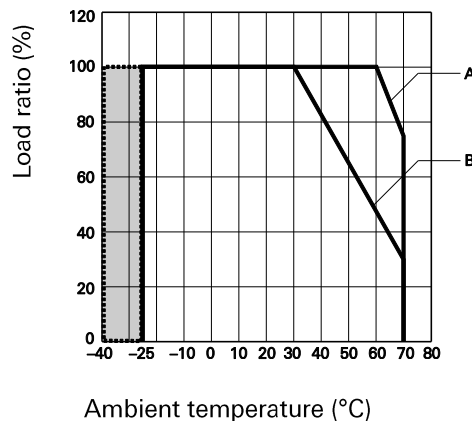
120 W (wipos PS1 24-5)



Note:

- At less than 90 VAC, the derating is 2.5%/V
 - For a DC power input, reduce the load given in the above derating curve by multiplying the following coefficients.
 - wipos PS1 24-5 : 0.9
 - See „-40 °C Operation Guarantee Condition“
- A. Standard mounting
60 °C and over: the derating is 3.5 %/°C.
- B. Face-up mounting
40°C and over: the derating is 1.67 %/°C.

480 W (wipos PS1 24-20)



Note:

- At less than 90 VAC, the derating is 2.5%/V
 - For a DC power input, reduce the load given in the above derating curve by multiplying the following coefficients.
 - wipos PS1 24-20 : 0.8
 - See „-40 °C Operation Guarantee Condition“
- A. Standard mounting
60 °C and over: the derating is 2.5 %/°C.
- B. Face-up mounting
30°C and over: the derating is 1.75 %/°C.

-40 °C Operation Guarantee Condition

The unit can start up and operate normally at -40°C, but the following criteria will be inferior to the values of datasheet. Please consider these influences.

		15 W 5 V	15 W 12 V	15 W 24 V	30 W 5 V	30 W 12 V	30 W 24 V	60 W 12 V	60 W 24 V	120 W 24 V	240 W 24 V	240 W 48 V	480 W 24 V	480 W 48 V
Ripple (typ.)	230 VAC input	280 mV	170 mV	100 mV	110 mV	330 mV	180 mV	200 mV	420 mV	440 mV	840 mV	1220 mV	460 mV	580 mV
Ripple (max.)	230 VAC input	830 mV	450 mV	220 mV	240 mV	630 mV	290 mV	480 mV	430 mV	450 mV	1030 mV	1320 mV	670 mV	870 mV
Anstiegszeit (typ.)	230 VAC input	420 ms	440 ms	490 ms	410 ms	440 ms	480 ms	420 ms	490 ms	760 ms	230 ms	280 ms	260 ms	260 ms
Haltezeit (typ.)	230 VAC input	88 ms	110 ms	109 ms	137 ms	112 ms	114 ms	124 ms	118 ms	20 ms	35 ms	37 ms	39 ms	41 ms

Mounting

(A) Standard (Vertical) mounting



(B) Face-up mounting

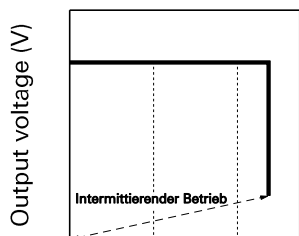


Overload Protection

The load and the power supply are automatically protected from overcurrent damage by this function.

Overload protection is activated if the output current rises above 121% of the rated current.

When the output current returns within the rated range overload protection is automatically cleared.



The values shown in the above diagrams are for reference only.

Output current (%)

Note:

- Internal parts may occasionally deteriorate or be damaged if a short-circuited or overcurrent state continues during operation.
- Internal parts may possibly deteriorate or be damaged if the Power Supply is used for applications with frequent inrush current or overloading at the load end. Do not use the Power Supply for such applications.

Power Boost Function

For All Models

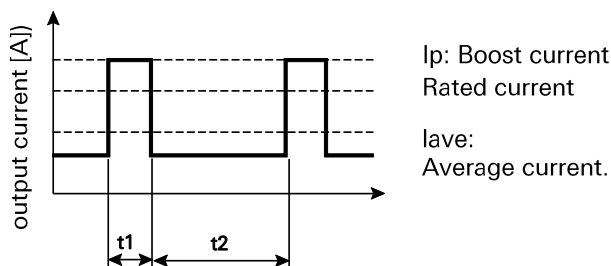
Power Boost is a function that can output the temporary repeated boost current larger than the rated current. However, it should meet the following four Boost current conditions.

- Time that the boost current flows: t_1
- The maximum value of the boost current: I_p
- The average output current: I_{ave}
- The time ratio of the boost current flow: Duty

Note: Boost current conditions

- $t_1 \leq 10 \text{ s}$
- $I_p \leq \text{Rated boost current}$
- $I_{mitt} \leq \text{Rated current}$

$$\text{rel. ED} = \frac{t_1}{t_1 + t_2} \times 100 [\%] \leq 30 \%$$



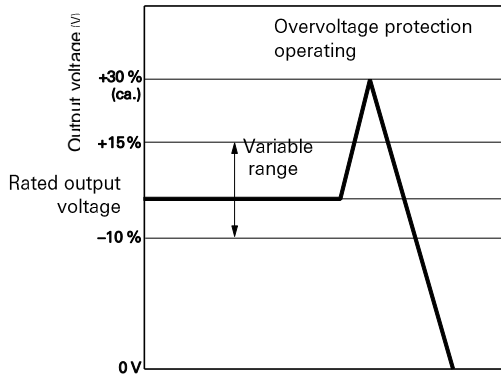
I_p : Boost current
Rated current

I_{ave} : Average current.

- Do not allow the boost current to continue for more than 10 seconds. Also, do not let the duty cycle exceed the boost current conditions. These conditions may damage the Power supply.
- Ensure that the average current of one cycle of the boost current does not exceed the rated output current. This may damage the Power Supply.
- Lessen the load of the boost load current by adjusting the ambient temperature and the mounting direction.

Overvoltage Protection

Consider the possibility of an overvoltage and design the system so that the load will not be subjected to an excessive voltage even if the feedback circuit in the Power Supply fails. If an excessive voltage that is approximately 130% of the rated voltage or more is output, the output voltage is shut OFF. Reset the input power by turning it OFF for at least three minutes and then turning it back ON again.

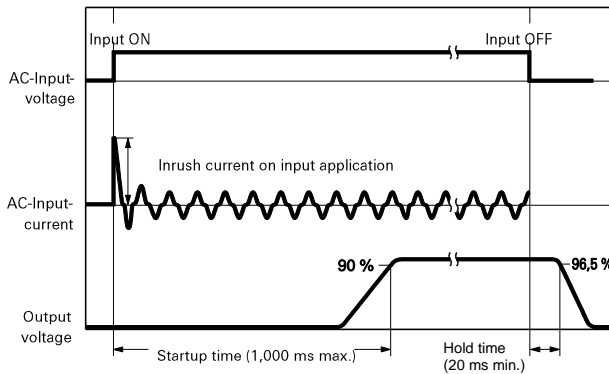


The values shown in the above diagram is for reference only.

Note:

Do not turn ON the power again until the cause of the overvoltage has been removed.

Inrush Current, Startup Time, Output Hold Time



Note:

Twice the input current or above will flow during the parallel operation or redundant system. Therefore, check the fusing characteristics of fuses and operating characteristics of breakers making sure that the external fuses will not burn out and the circuit breakers will not be activated by the inrush current.

Two phases application for Single phase models

For All Single phase Models

Basically the single phase power supply can be use on two phase-system when some of conditions satisfy like below.

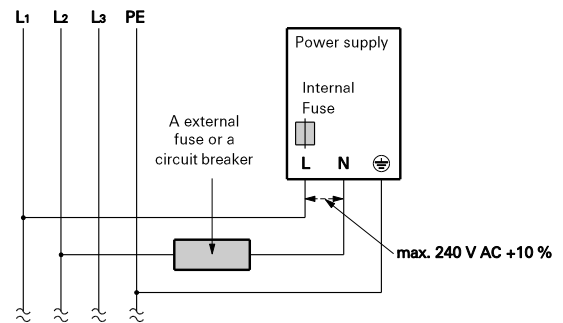
1. The supplying voltage is below the maximum rated input.

The Power supply allows the input voltage equivalent or less than 240 VAC+10%.

Please confirm the input voltage between two lines if the input voltage satisfies this condition before connecting.

2. The external protector is needed on N input line to secure a safety. N line has no protection of a fuse internally.

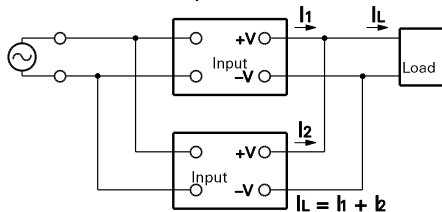
An appropriate fuse or circuit breaker should be connected on N input line like the following.



Parallel Operation

The parallel operation is possible to increase the output power. However please consider the following notes when the parallel operation must be done.

1. The range of ambient temperature for Parallel operation is -25 to 40°C
2. Up to two of the same model can be connected in parallel.
3. Adjust the output voltage difference of each Power Supply to 50 mV or less, using the output voltage adjuster (V. ADJ).
4. There is no current balancing function for wipos PS1. A high output voltage unit may work at overcurrent state and in this situation, a life of a Power Supply will be extremely short. After adjusting the output voltage, confirm the output current of the two Power Supplies balances.
5. Using the parallel operation will not satisfy UL1310 Class2 output.
6. For Parallel Operation, to balance the current of the each unit, the length and thickness of each wire connected to the load and each unit must be same as much as possible.
7. For Parallel Operation with units 120 W or less, connect diodes or the Redundancy module wipos R20 to the outputs of each unit if sudden load variation influence occurs in the ambient operation environment.



Power consumption

Power consumption inside of Power supply [Loss of Power: Wattage]

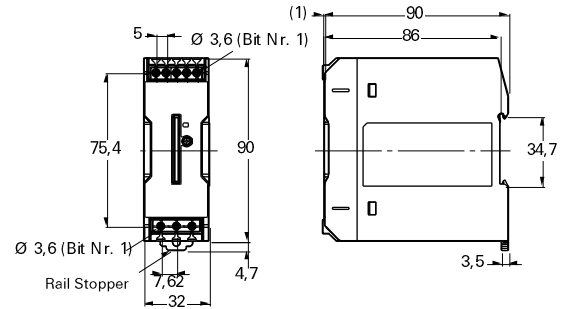
Input: 230 VAC	Load ratio					
	0%	10%	30%	50%	80%	100%
wipos PS1 24-1.25	2.60	2.9	3.3	3.4	5.1	4.8
wipos PS1 24-2.5	2.20	2.0	3.1	4.6	6.9	8.6
wipos PS1 24-5	3.80	4.1	6.5	9.0	13.1	15.4
wipos PS1 24-10	3.70	4.9	8.0	11.3	17.2	22.0
wipos PS1 24-20	5.66	10.3	13.6	18.2	27.5	36.8

Reference Value

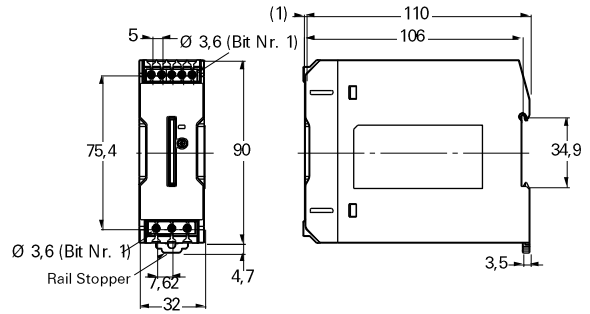
	Value
Reliability (MTBF)	Single phase model 15 W: 600.000 hrs 30 W: 580.000 hrs 60 W: 590.000 hrs 120 W: 450.000 hrs 240 W: 360.000 hrs 480 W: 230.000 hrs
Definition	MTBF stands for Mean Time Between Failures, which is calculated according to the probability of accidental device failures, and indicates reliability of devices. Therefore, it does not necessarily represent a life of the product.
Life expectancy	10 yrs. Min.
Definition	The life expectancy indicates average operating hours under the ambient temperature of 40°C and a load rate of 50%. Normally this is determined by the life expectancy of the built-in aluminum electrolytic capacitor.

Dimensions

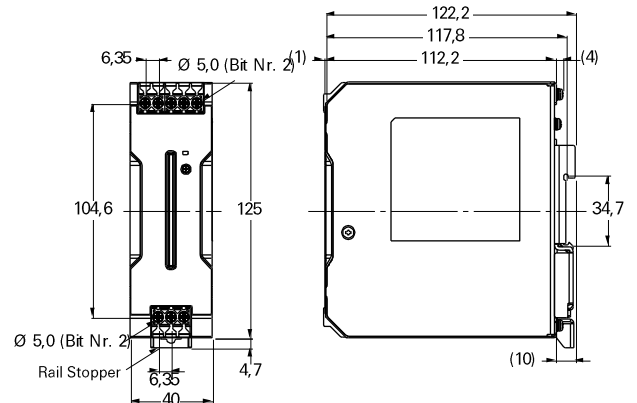
wipos PS1 24-1,25 (30 W)



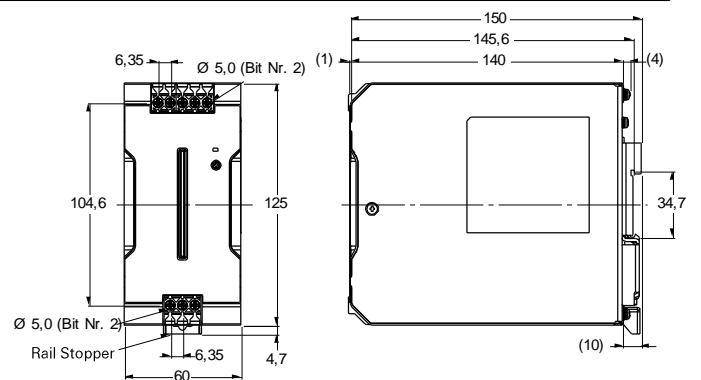
wipos PS1 24-2.5 (60 W)



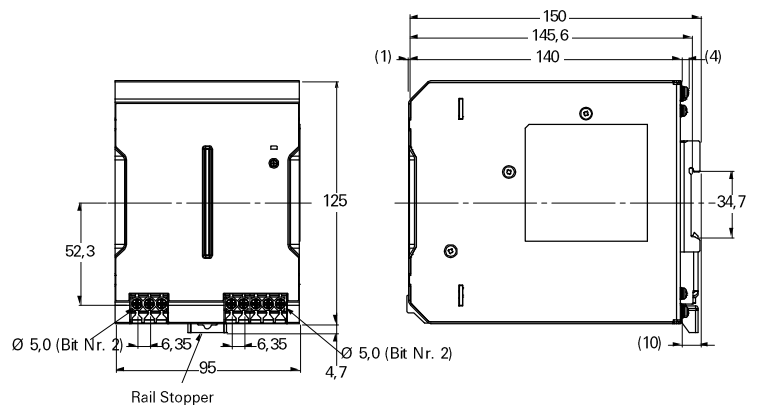
wipos PS1 24-5 (120 W)



wipos PS1 24-10 (240 W)



wipos PS1 24-20 (480 W)



Precautions for Safe Use

Wiring

- Connect the ground completely. A protective earthing terminal stipulated in safety standards is used. Electric shock or malfunction may occur if the ground is not connected completely.
- Minor fire may possibly occur. Ensure that input and output terminals are wired correctly.
- Do not apply more than 75-N force to the terminal block when tightening it.
- Be sure to remove the sheet covering the Product for machining before power-ON so that it does not interfere with heat dissipation.
- Use the following material for the wires to be connected to the wipos PS1 to prevent smoking or ignition caused by abnormal loads.

Model name	INPUT		OUTPUT		PE	
	American Wire Gauge (AWG,	Solid Wire /Stranded Wire	American Wire Gauge (AWG,	Solid Wire /Stranded Wire	American Wire Gauge (AWG,	Solid Wire /Stranded Wire
wipos PS1 24-1.25	AWG24 to 12	0.25 to 4 mm ² / 0.25 to 2.5 mm ²	AWG22 to 12	0.35 to 4 mm ² / 0.35 to 2.5 mm ²	AWG14 or thicker	2.5 mm ² or thicker / 2.5 mm ² or thicker
wipos PS1 24-2.5	AWG22 to 12	0.35 to 4 mm ² / 0.35 to 2.5 mm ²	AWG20 to 12	0.5 to 4 mm ² / 0.5 to 2.5 mm ²		
wipos PS1 24-5	AWG22 to 10	0.35 to 6 mm ² / 0.35 to 4 mm ²	AWG18 to 10	0.75 to 6 mm ² / 0.75 to 4 mm ²		
wipos PS1 24-10	AWG20 to 10	0.5 to 6 mm ² / 0.5 to 4 mm ²	AWG14 to 10	2.5 to 6 mm ² / 2.5 to 4 mm ²		
wipos PS1 24-20	AWG16 to 10	1.5 to 6 mm ² / 1.5 to 4 mm ²	AWG12 to 10	4 to 6 mm ² / 4 mm ²		

Note:

The rated current for output terminals is 10 A per terminal.

Be sure to use multiple terminals simultaneously for current that exceeds the terminal rating.

When applying a current of 10 A or more, use at least two terminals each for the positive and negative wires.

Installation Environment

- Do not use the Power Supply in locations subject to shocks or vibrations. In particular, install the Power Supply as far away as possible from contactors or other devices that are a vibration source.
- Install the Power Supply well away from any sources of strong, high-frequency noise and surge.

Operating Life

- The life of a Power Supply is determined by the life of the electrolytic capacitors used inside. Here, Arrhenius Law applies, i.e., the life will be cut in half for each rise of 10°K or the life will be doubled for each drop of 10°K. The life of the Power Supply can thus be increased by reducing its internal temperature.

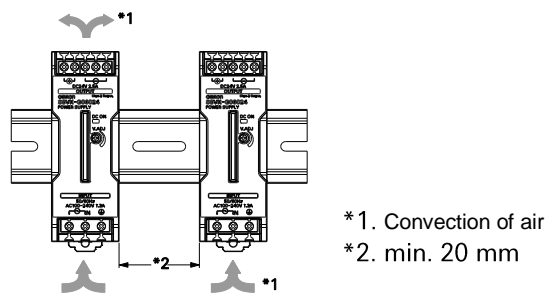
Ambient Operating and Storage Environments

- Store the Power Supply at a temperature of –40 to 85°C and a humidity of 0% to 95%.
- Do not use the Power Supply in areas outside the derating curve otherwise, internal parts may occasionally deteriorate or be damaged.
- Use the Power Supply at a humidity of 0% to 95%.
- Do not use the Power Supply in locations subject to direct sunlight.
- Do not use locations where liquids, foreign matter, or corrosive gases may enter the interior of Products.

Precautions for Correct Use

Mounting

- Take adequate measures to ensure proper heat dissipation to increase the long-term reliability of the Product. Be sure to allow convection in the atmosphere around devices when mounting. Do not use in locations where the ambient temperature exceeds the range of the derating curve.
- When cutting out holes for mounting, make sure that cuttings do not enter the interior of the Products.



- Improper mounting will interfere with heat dissipation and may occasionally result in deterioration or damage of internal parts. Use the Product within the derating curve for the mounting direction that is used.
- Use a mounting bracket when the Product is mounted facing horizontally.
- Heat dissipation will be adversely affected. When the Product is mounted facing horizontally, always place the side with the label facing upward.
- Operate the Power Supply within a range that is 5 C less than the values in the derating curve in Engineering Data on page 12 if the Power Supply is used with an installation spacing of 10 mm min. (20 mm max.) on the left and right.

Overcurrent Protection

- Internal parts may possibly deteriorate or be damaged if a short-circuited or overcurrent state continues during operation.
- Internal parts may possibly deteriorate or be damaged if the Power Supply is used for applications with frequent inrush current or overloading at the load end. Do not use the Power Supply for such applications.
- The DC ON indicator (green) flashes if the overload protection function operates.

Charging a Battery

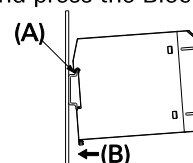
If you connect a battery as the load, install overcurrent control and overvoltage protection circuits.

Output Voltage Adjuster (V.ADJ)

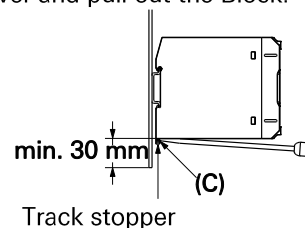
- The output voltage adjuster (V.ADJ) may possibly be damaged if it is turned with unnecessary force. Do not turn the adjuster with excessive force.
- After completing output voltage adjustment, be sure that the output capacity or output current does not exceed the rated output capacity or rated output current.

DIN Rail Mounting

To mount the Block on a DIN Rail, hook portion (A) of the Block onto the rail and press the Block in direction (B).

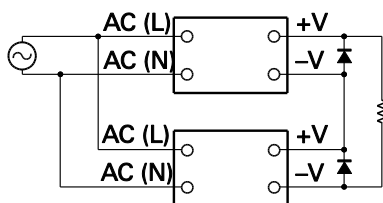


To dismount the Block, pull down portion (C) with a flat-blade screwdriver and pull out the Block.



Series Operation

Two power supplies can be connected in series.
Correct



Note:

1. The diode is connected as shown in the figure. If the load is short-circuited, a reverse voltage will be generated inside the Power Supply. If this occurs the Power Supply may possibly deteriorate or be damaged. Always connect a diode as shown in the figure. Select a diode having the following ratings.

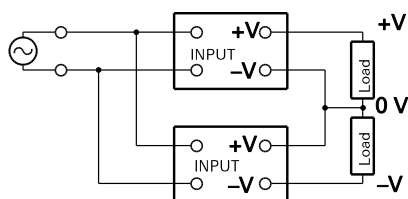
Type	Schottky-Barrier diode
Dielectric strength (VRRM)	Twice the rated output voltage or above
Forward current (IF)	Twice the rated output current or above

2. Although Products having different specifications can be connected in series, the current flowing through the load must not exceed the smaller rated output current.

Making Positive/Negative Outputs

• The outputs are floating outputs (i.e., the primary circuits and secondary circuits are separated). You can therefore make positive and negative outputs by using two Power Supplies. You can make positive and negative outputs with any of the models.

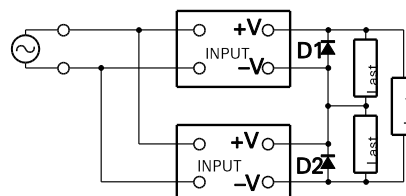
If positive and negative outputs are used, connect Power Supplies of the same model as in the following figure. (Combinations with different output capacities or output voltages can be made. However, use the lower of the two maximum rated output currents as the current to the loads.)



• Depending on the model, internal circuits may be damaged due to startup failure when the power is turned ON if loads such as a servomotor or operational amplifier may operate in series.

Therefore, connect bypass diodes (D1, D2) as shown in the following figure.

If the list of models that support series connection of outputs says that an external diode is not required, an external diode is also not required for positive/negative outputs.



• Use the following information as a guide to the diode type, dielectric strength, and current.

- Type: Schottky barrier diode
- Dielectric strength (VRRM): Twice the rated Power Supply output voltage or higher
- Forward current (IF): Twice the rated Power Supply output current or higher

Backup Operation

Backup operation can be performed with the Redundancy module *wipos* R20. Refer to the Datasheet Redundancy module for detail.

In Case There Is No Output Voltage

The possible cause for no output voltage may be that the overcurrent or overvoltage protection has operated. The internal protection may operate if a large amount of surge voltage such as a lightning surge occurs while turning ON the power supply. In case there is no output voltage, please check the following points before contacting us:

- Checking overload protected status: Check whether the load is in overload status or is short-circuited. Remove wires to load when checking.
- Checking overvoltage or internal protection: Turn the power supply OFF once, and leave it OFF for at least 3 minutes. Then turn it ON again to see if this clears the condition.

Audible Noise at Power ON

A harmonic current suppression circuit is built into the Power Supply. This circuit can create noise when the input is turned ON, but it will last only until the internal circuits stabilize and does not indicate any problem in the Product.



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