



wieland

www.wieland-electric.com

wipos

wipos PS3 Power supplies

81.000.6xxx.x

USER MANUAL

Doc.-No. BA001013

Updatet: 07/2015 (Rev. A)



COPYRIGHT	<p>This document is copyright-protected. The rights derived from this copyright are reserved for Wieland Electric GmbH. Reproduction of this document or parts of this document is only permissible within the limits of the statutory provision of the Copyright Act. Any modification or abridgment of the document is prohibited without the express written agreement of Wieland Electric GmbH.</p> <p>wipos is a trademark of Wieland Electric. Other names may in this assembly manual mentioned product and brand- trademarks or registered trademarks of their respective owners could be used, whose use by third parties for their own purposes could violate the rights of the owners.</p>
NOTE	<p>Every effort has been made to ensure that the information contained in this document was complete and accurate at the time of publishing. Nevertheless, the authors retain the right to modify the information. This customer document describes all the hardware units and functions known at the present time. Descriptions may be included for units which are not present at the customer site. The exact scope of delivery is described in the respective purchase contract.</p>
Conformity Information	<p>For more information regarding CE marking and Declaration of Conformity (DoC), please contact your local Wieland Electric customer service organization.</p>
Trademarks	<p>Microsoft, Windows 98, Windows NT, Windows 2000, Windows XP, Windows 7, Windows 8, and .NET Framework are registered trademarks of the Microsoft Corporation. Any other product or trade names listed in these operating instructions are the trademarks or registered trademarks of the respective owners.</p>
Technical support	<p>Up-to-date information concerning the product is available from the following websites: http://www.wieland-electric.com/ http://eshop.wieland-electric.com/</p> <p>Technical support</p> <p>Industrial Automation -Electronics Hotline: +49 951 / 93 24-995 E-Mail: AT.TS@wieland-electric.com</p>
Adress	<p>Wieland Electric GmbH Brennerstraße 10-14 96052 Bamberg</p> <p>Phone: +49 (0) 9 51 93 24-0 Fax: +49 (0) 9 51 93 24-198 E-mail: info@wieland-electric.com http://eshop.wieland-electric.com http://www.wieland-electric.com</p>

Contents

- About this manual..... 4
- Product Description 5
- Model Number Structure 6
 - Model Number Legend..... 6
- Specifications..... 7
 - Ratings, Characteristics, and Functions..... 7
- Connections 9
 - Block Diagrams..... 9
- Construction and Nomenclature 10
 - Nomenclature..... 10
- Engineering Data..... 11
 - Derating Curve..... 11
 - Mounting 12
 - Overvoltage Protection 13
 - Power consumption..... 13
 - Reference Value..... 13
- Dimensions 14
 - Precautions for Safe Use 15
 - Power Boost Function 16
 - Series Operation 16
 - Parallel Operation..... 16
 - Backup Operation..... 16

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



- 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



Electric shock, fire, or Product failure may occasionally occur.


- 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

Worldwide 3-phase Power Supply
Resistant in tough environments
Easy and fast installation
The most compact class on the market

- Wide input range for worldwide applications:
380 to 480 VAC (320 to 576 VAC)
- Possible for 2-phase input usage:
380 to 480 VAC (340 to 576 VAC)
- DC input can be available*:
450 to 600 VDC (450 to 810 VDC)
* Excluding 960 W
- High efficiency 91% typ. at 480 W model
- Wide operation temperature range: -40 to 70°C
- Power Boost function at 120%
- Meets LR maritime standards
- EMS: Conforms to EN 61204-3
EMI: EN61204-3 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 PS3 $\square\square - \square\square$
 1 2

1. Output voltage

24 V

2. Output current

5 A
10 A
20 A
40 A

Ordering Information

Power ratings	Input voltage	Output voltage	Output current	Boost-current	Model number	Part no.
120 W	2-phase and 3-phase 380 to 480 V AC 450 to 600 V DC	24 V	5 A	6 A	wipos PS3 24-5	81.000.6560.0
240 W		24 V	10 A	12 A	wipos PS3 24-10	81.000.6570.0
480 W		24 V	20 A	24 A	wipos PS3 24-20	81.000.6580.0
960 W	3-phase 380 to 480 V AC	24 V	40 A	48 A	wipos PS3 24-40	81.000.6590.0
	2-phase 380 to 480 V AC	24 V	32 A	-		

Other voltage variants available on request.

Specifications

Ratings, Characteristics, and Functions

		Power ratings	120 W	240 W
Item		Output voltage	24 V	24 V
Efficiency (Typical)		3-phase, 400 VAC input *10	typ. 89 %	typ. 89 %
Input	Voltage range *1		3-phase, 380 to 480 VAC (allowable range: 320 to 576 VAC) 2-phase, 380 to 480 VAC (allowable range: 340 to 576 VAC) 450 to 600 VDC (allowable range: 450 to 810 VDC) *8	
	Frequency *1		50/60 Hz (47 to 63 Hz)	
	Current	3-phase, 400 VAC input *10	0.38 A typ.	0.69 A typ.
	Power factor		-	
	Leakage current	3-phase, 400 VAC input	max. 3.5 mA/typ. 1,3 mA	
	Inrush current (for a cold start at 25°C) *2	3-phase, 400 VAC input	typ 28 A	typ 29 A
Output	Rated output current		5 A	10 A
	Boost current		6 A	12 A
	Voltage adjustment range *3		22.5 to 29.5 VDC (with V.ADJ) (guaranteed)	
	Ripple & Noise voltage *4	3-phase, 400 VAC input *10	160 mV p-p max. at 20 MHz of bandwidth	190 mV p-p max. at 20 MHz of bandwidth
	Input variation influence		max. 0,5 %	
	Load variation influence*11		max. 1,5 %	
	Temperature variation influence	3-phase, 400 VAC input	max. 0,05 %/°C	
	Start up time*2	3-phase, 400 VAC input *10	typ. 700 ms	typ. 600 ms
	Hold time*2	3-phase, 400 VAC input *10	typ. 30 ms	typ. 20 ms
	Additional functions	Overload protection		Yes, automatic reset
Overvoltage protection		Yes, 130% or higher of rated load current, power shut off (shut off the input voltage and turn on the input again)*5		
Series operation		Yes (For up to two Power Supplies, external diodes are required.)		
Parallel operation		Yes (Refer to Engineering Data) (For up to two Power Supplies)		
Output indicator		Yes (LED: Green), lighting from 80% to 90% or more of rated voltage		
Insulation	Withstand voltage		3.0 kVAC for 1 min. (between all input terminals and output terminals) cutoff current 20 mA 2.5 kVAC for 1 min. (between all input terminals and PE terminal) cutoff current 20 mA 1.0 kVAC for 1 min. (between all output terminals and PE terminal) cutoff current 30 mA	
	Insulation resistance		100 M min. (between all output terminals and all input terminals / PE terminal) at 500 VDC	
Environment	Ambient operating temperature		-40 to 70°C (Derating is required according to the temperature.) (with no condensation or icing)	
	Storage temperature		-40 to 85°C (with no condensation or icing)	
	Ambient operating humidity		0% to 95% (Storage humidity: 0% to 95%)	
	Vibration resistance		10 to 55 Hz, 0.375-mm half 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	
Construction	Weight		max. 700 g	max. 1000 g
	Degree of protection		IP20 by EN / IEC 60529	
Normen	Harmonic current emissions		Conforms to EN 61000-3-2	
	EMI	Conducted Emission	Conforms to EN 61204-3 Class B EN 55011 Class B	
		Radiated Emission	Conforms to EN 61204-3 Class B EN 55011 Class B	
	EMS		Conforms to EN 61204-3 high severity levels	
	Approved Standards *6		UL Listed: UL 508 *7 EN: EN 50178 Lloyd's Register *9 ANSI/ISA 12.12.01 *7	UL Listed: UL 508 *7 UL UR: UL 60950-1 (Recognition) cUR: CSA C22.2 No.60950-1 CSA: CSA C22.2 No.60950-1 EN: EN 50178, EN 60950-1 Lloyd's Register *9 ANSI/ISA 12.12.01 *7
	Conformed Standards		SELV (EN 50178), PELV(EN 60204-1, EN 50178) Safety of Power Transformers (EN 61558-2-16) EN 50274 for Terminal parts	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
	SEMI		Conforms to F47-0706 (380 to 480 VAC input)	

*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 29.5 VDC 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. Refer to Overvoltage Protection on page 13 for the time when input voltage shuts off and input turns on again.

*6. To meet safety standards, the Power Supply must be protected with an external circuit-breaker or a fuse. Be sure to use an external circuit-breaker or a fuse. Refer to Precautions for Safe Use on page 15 for details.

*7. Model FAZ-C1/3, EATON INDUSTRIES (AUSTRIA) GMBH (E177451) and Model KLKDS, LITTELFUSE INC. (E10480) of the Supplementary Fuse/Circuit Breaker must be installed in accordance with NEC.

*8. Safety Standards for a DC Input
The following safety standards apply to a DC input: UL 60950-1, EN 50178, and EN 60950-1.

*9. In the case of using side-mounting bracket, Lloyd's Standards are not applicable.

*10. The value is when both rated output voltage and rated output current are satisfied.

*11. 380 to 480 VAC input, in the range of 0 A to the rated output current.

Item		Power ratings		
		480 W	960 W (768 W*14)	
		Output voltage		
		24 V	24 V	
Efficiency (Typical)	3-phase, 400 VAC input *10	91% typ.	92% typ.	
Input	Voltage range *1	3-phase, 380 to 480 VAC (allowable range: 320 to 576 VAC) 2-phase, 380 to 480 VAC (allowable range: 340 to 576 VAC) 450 to 600 VDC (allowable range: 450 to 810 VDC) *8		
	Frequency *1	50/60 Hz (47 to 63 Hz)		
	Current	3-phase, 400 VAC input *10	1.2 A typ.	2.1 A typ.
	Power factor		-	-
	Leakage current	3-phase, 400 VAC input	3.5 mA max./1.0 mA typ.	3.5 mA max./1.2 mA typ.
	Inrush current (for a cold start at 25°C) *2	3-phase, 400 VAC input	28 A typ.	
Output	Rated output current	20 A	40 A	
	Boost current	24 A	48 A	
	Voltage adjustment range *3	22.5 to 29.5 VDC (with V.ADJ) (guaranteed)		
	Ripple & Noise voltage *4	3-phase, 400 VAC input *10	130 mV p-p max. at 20 MHz of bandwidth	90 mV p-p max. at 20 MHz of bandwidth
	Input variation influence	0.5% max.		
	Load variation influence*11	1.5% max.		
	Temperature variation influence	3-phase, 400 VAC input	max. 0.05 %/°C	
	Start up time*2	3-phase, 400 VAC input *10	470 ms typ.	720 ms typ.
	Hold time*2	3-phase, 400 VAC input *10	21 ms typ.	21 ms typ.
	Additional functions	Overload protection	Yes, automatic reset	Yes, automatic reset
Overvoltage protection		Yes, 130% or higher of rated load current, power shut off (shut off the input voltage and turn on the input again) *5		
Series operation		Yes (For up to two Power Supplies, external diodes are required.)		
Parallel operation		Yes (Refer to Engineering Data) (For up to two Power Supplies)		
Insulation	Output indicator	Yes (LED: Green), lighting from 80% to 90% or more of rated voltage		
	Withstand voltage	3.0 kVAC for 1 min. (between all input terminals and output terminals) cutoff current 20 mA 2.5 kVAC for 1 min. (between all input terminals and PE terminal) cutoff current 20 mA 1.0 kVAC for 1 min. (between all output terminals and PE terminal) cutoff current 30 mA		
Environment	Insulation resistance	100 M min. (between all output terminals and all input terminals / PE terminal) at 500 VDC		
	Ambient operating temperature	-40 to 70°C (Derating is required according to the temperature.) (with no condensation or icing)		
	Storage temperature	-40 to 85°C (with no condensation or icing)		
	Ambient operating humidity	0% to 95% (Storage humidity: 0% to 95%)		
	Vibration resistance	10 to 55 Hz, 0.375-mm half 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		
Construction	Weight	max. 1,600 g	max. 2,700 g	
	Degree of protection	IP20 by EN / IEC 60529		
Normen	Harmonic current emissions	Conforms to EN 61000-3-2 *12		
	EMI	Conducted Emission	Conforms to EN 61204-3 Class B EN 55011 Class B *11	
		Radiated Emission	Conforms to EN 61204-3 Class B EN 55011 Class B *11	
	EMS	Conforms to EN 61204-3 high severity levels		
	Approved Standards *6	UL Listed: UL 508 *7 UL UR: UL 60950-1 (Recognition) cUR: CSA C22.2 No.60950-1 CSA: CSA C22.2 No.60950-1 EN: EN 50178, EN 60950-1 Lloyd's Register ANSI/ISA 12.12.01 *7		
		Conformed 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	
	SEMI	Conforms to F47-0706 (380 to 480 VAC input)*15		

*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 29.5 VDC 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. Refer to Overvoltage Protection on page 13 for the time when input voltage shuts off and input turns on again.

*6. To meet safety standards, the Power Supply must be protected with an external circuit-breaker or a fuse. Be sure to use an external circuit-breaker or a fuse. Refer to Precautions for Safe Use on page 15 for details.

*7. Model FAZ-C4/3, EATON INDUSTRIES (AUSTRIA) GMBH (E177451) and Model KLD10, LITTELFUSE INC. (E10480) of the Supplementary Fuse/Circuit Breaker must be installed in accordance with NEC.

*8. Safety Standards for a DC Input The following safety standards apply to a DC input: UL 60950-1, EN 50178, and EN 60950-1.

*9. The value is when both rated output voltage and rated output current are satisfied.

*10. 380 to 480 VAC input, in the range of 0 A to the rated output current

*11. The wipos Power Supply conforms to EMI under the following conditions for 2-phase input.
480 W: to conform to class B: rated output voltage, and 65% or less of rated output current/ to conform to class A: rated output voltage, and 65% to 100% of rated output current
960 W: to conform to class B: rated output voltage, and 45% or less of rated output current/to conform to class A: rated output voltage, and 45% to 100% of rated output current

*12. The wipos Power Supply conforms to EN 61000-3-2 under the following conditions for 2-phase input.

480 W: rated output voltage, and 65% or less of rated output current
960 W: rated output voltage, and 45% or less of rated output current

*13. Use at 26.4 VDC or lower for 2-phase input.

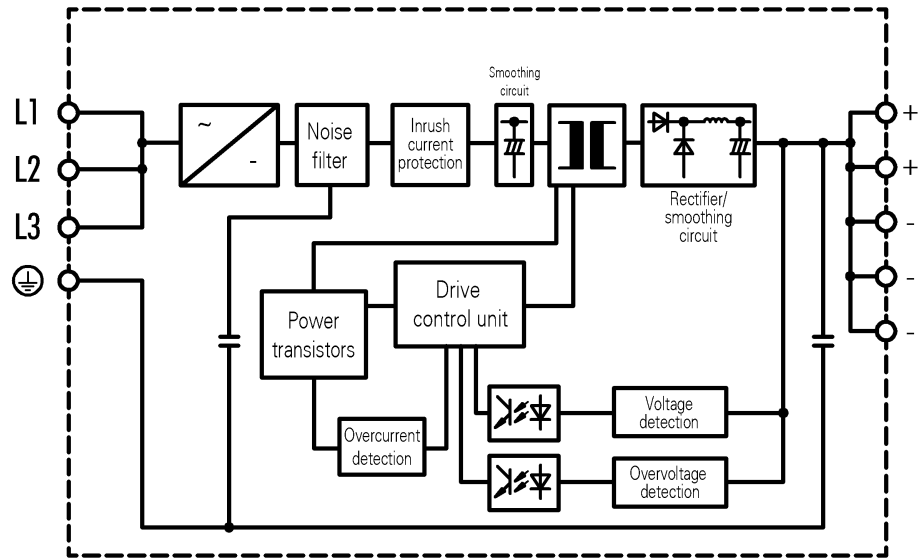
*14. When using 2-phase input voltage. Further information is available in Section "Operation of the 960W model with 2-phase input voltage" under "Instructions for safe use" on Page 15.

*15. 480 W: Nominal output voltage and max. 50% of the nominal output current.
960 W: Nominal output voltage and max. 92.5 % of the nominal output current.

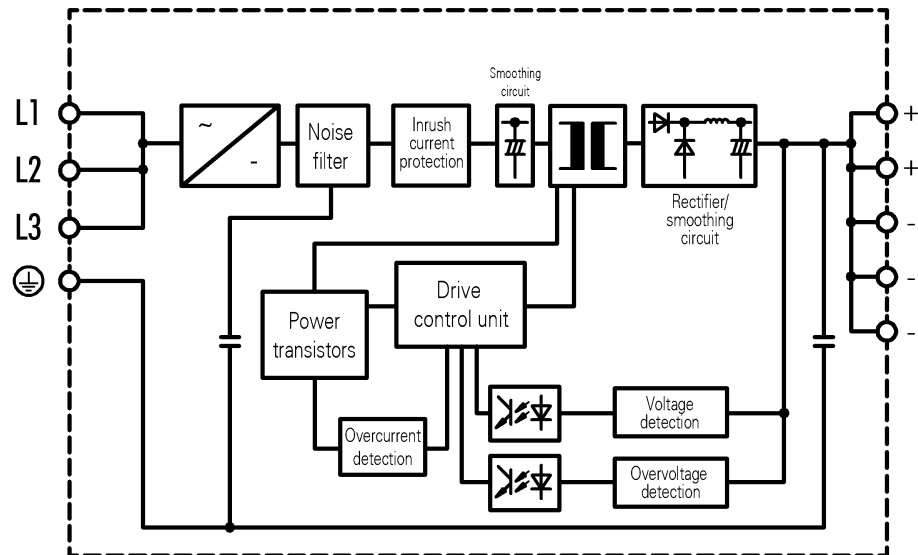
Connections

Block Diagrams

wipos PS3 24-5 (120 W)
wipos PS3 24-10 (240 W)



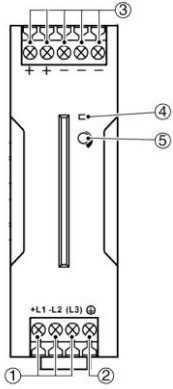
wipos PS3 24-20 (480 W)
wipos PS3 24-40 (960 W)



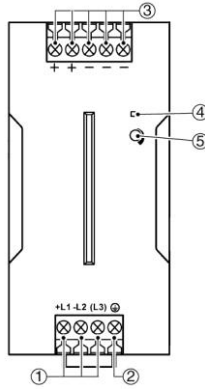
Construction and Nomenclature

Nomenclature

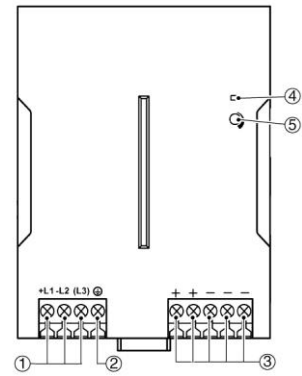
120-W-Models
wipos PS3 24-5



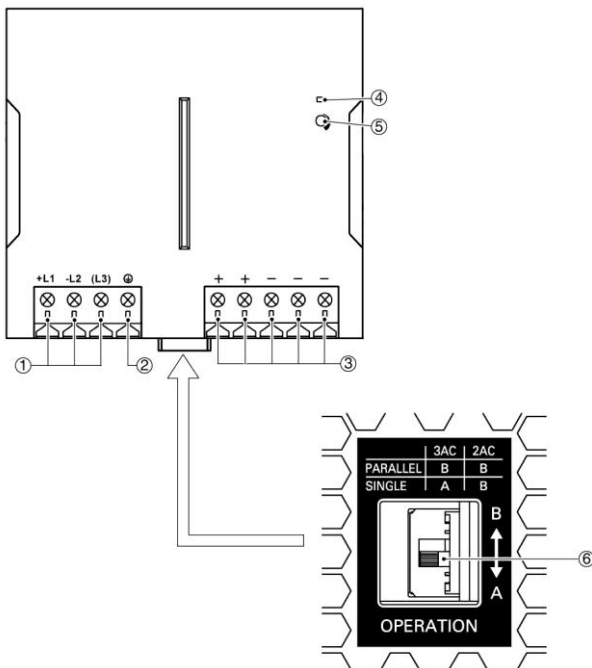
240-W-Models
wipos PS3 24-10



480-W-Models
wipos PS3 24-20



960-W-Models
wipos PS3 24-40



Note:

- A: 100% of the nominal output current is available for use as the output current.
- B: When the OPERATION SWITCH is set to the "B" side, the output current is limited to 80% of the rated output current.

No.	Name	Function
1	Input terminals (L1), (L2), (L3)	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.
6	Operation Switch *3 *4	To operate in parallel or 2-phase input, set the switch to the "B" side. (960 W model only).

*1. For wiring, refer to Wiring in Precautions for Safe Use on page 15.

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

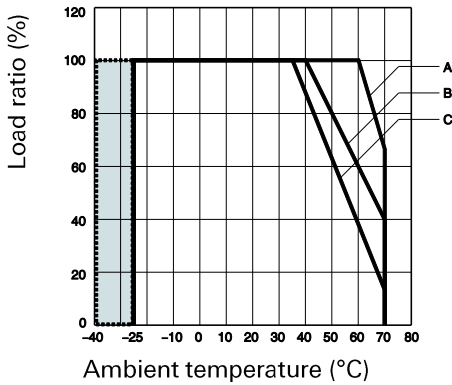
*3. For parallel operation, refer to Parallel Operation in Precautions for Safe Use on page 15.

*4. For 2-phase input, refer to 2-Phase Input Operation For 960 W Model in Precautions for Safe Use on page 15.

Engineering Data

Derating Curve

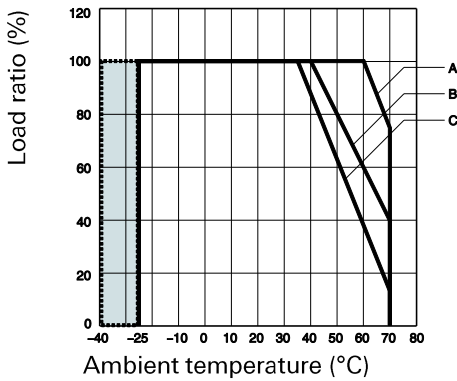
120 W (wipos PS3 24-5)



Note: This is the guaranteed range for 3-phase and DC input. For 2-phase by -25°C

- A. Standard mounting
- B. Face-up mounting at less than 480 VAC or 678 VDC
- C. Face-up mounting at less than 576 VAC or 810 VDC

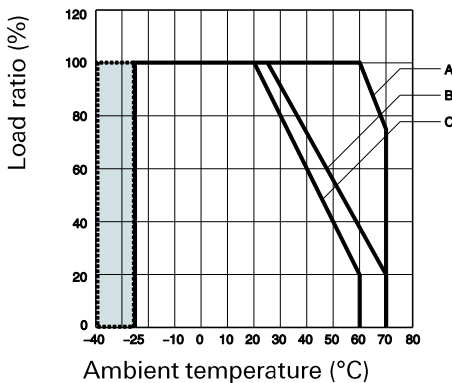
240 W (wipos PS3 24-10)



Note: This is the guaranteed range for 3-phase and DC input. For 2-phase by -25°C

- A. Standard mounting
- B. Face-up mounting at less than 480 VAC or 678 VDC
- C. Face-up mounting at less than 576 VAC or 810 VDC

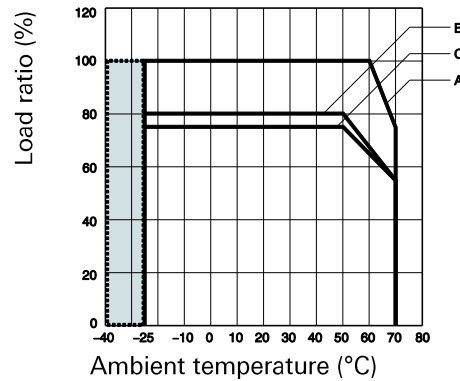
480 W (wipos PS3 24-20)



Note: This is the guaranteed range for 3-phase and DC input. For 2-phase by -25°C

- A. Standard mounting
 - 528 VAC and over: the derating is 0.21%/VAC
 - 746 VDC and over: the derating is 0.16%/VDC
- B. Face-up mounting at less than 480 VAC or 678 VDC
- C. Face-up mounting at less than 576 VAC or 810 VDC

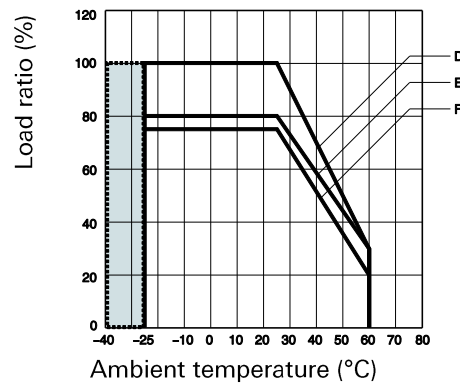
960 W (wipos PS3 24-40): Standard mounting



Note: This is the guaranteed range for 3-phase and DC input. For 2-phase by -25°C

- A. 3-Phase (340 VAC or over to 576 VAC or lower)
 - For less than 340 VAC, it is possible to use with output voltage at 28.5 VDC or lower and load rate 60% or lower.
- B. 2-Phase (380 VAC or over to 576 VAC or lower, and output voltage 26.4VDC or lower)
- C. 2-Phase (360 VAC or over to 380 VAC or lower, and output voltage 28.5 VDC or lower)
 - For 340 VAC or over to less than 360 VAC, it is possible to use with output voltage at 26.4 VDC or lower, and whichever is the smaller of the load rate 60% or lower or the value of C.

960 W (wipos PS3 24-40): Face-up mounting



Note: This is the guaranteed range for 3-phase and DC input. For 2-phase by -25°C

- D. 3-Phase (340 VAC or over to 576 VAC or lower)
 - For less than 340 VAC, it is possible to use with output voltage at 28.5 VDC or lower and load rate 60% or lower.
- E. 2-Phase (380 VAC or over to 480 VAC or lower, and output voltage 26.4 VDC or lower)
- F. 2-Phase (Over 480 VAC to 576 VAC or lower)
 - For 340 VAC or over to less than 380 VAC, it is possible to use with output voltage at 26.4 VDC or lower, and whichever is the smaller of the load rate 60% or lower or the value of F.

Mounting

(A) Standard (Vertical) mounting



(B) Face-up mounting

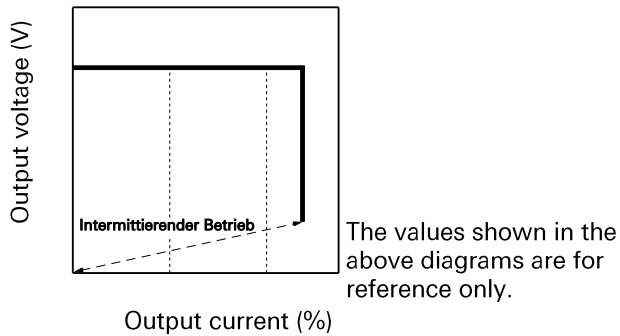


Overload Protection

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.

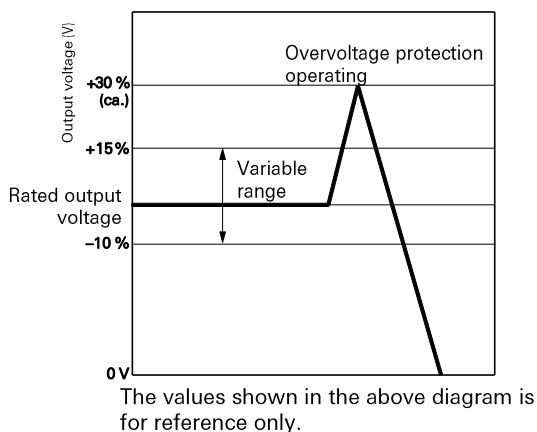


Note:

1. Internal parts may occasionally deteriorate or be damaged if a short-circuited or overcurrent state continues during operation.
2. 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.

Overvoltage Protection

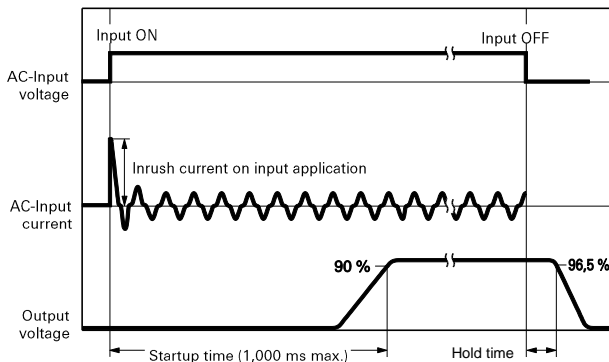
Consider the possibility of an overvoltage and design the system so that the load will not be subjected to an excessive voltage even if the feedback circuit in the Power Supply fails. If an excessive voltage that is approximately 130% of the rated voltage or more is output, the output voltage is shut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



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.

Power consumption

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

Input: 230 VAC	Load ratio					
Model name	0%	10%	30%	50%	80%	100%
wipos PS3 24-5	4,67	5,4	8,2	10,1	14,1	15,4
wipos PS3 24-10	5,96	10,7	14,0	19,2	27,6	32,6
wipos PS3 24-20	10,9	16,4	23,3	26,8	33,8	47,0
wipos PS3 24-40	7,75	20,2	30,1	42,2	65,6	86,0

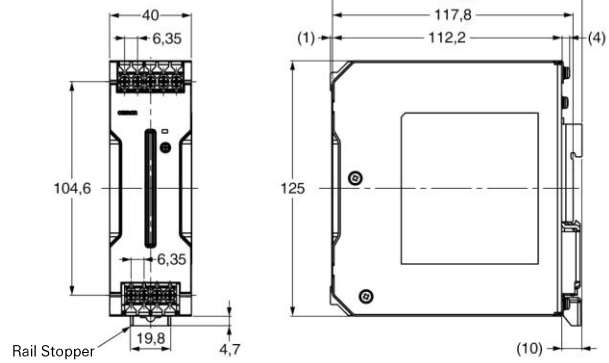
Reference Value

	Value
Reliability (MTBF)	120 W: 390,000 h 240 W: 350,000 h 480 W: 280,000 h 960 W: 260,000 h
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.

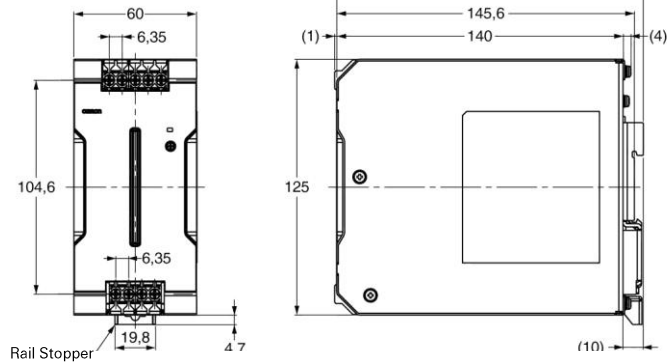
wipos PS3

Dimensions

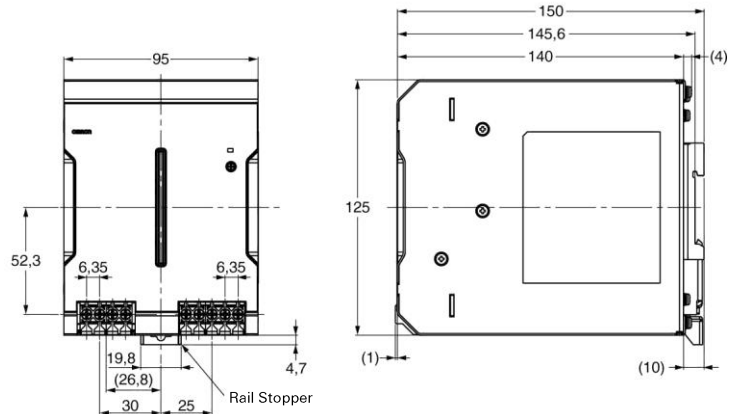
wipos PS3 24-5 (120 W)



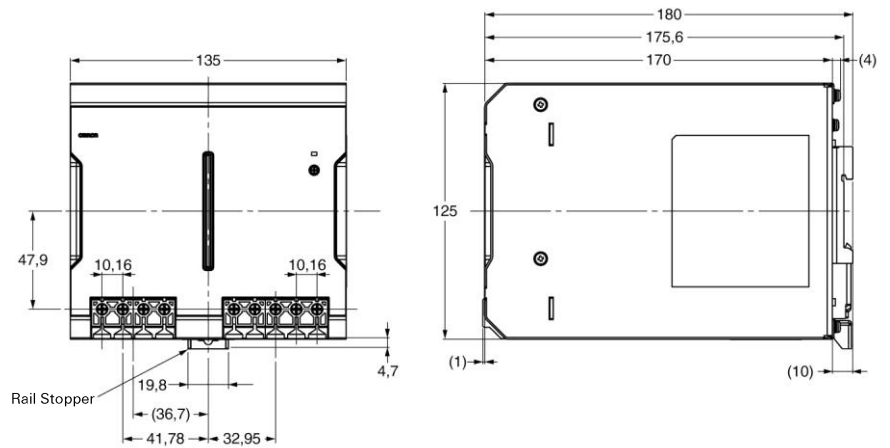
wipos PS3 24-10 (240 W)



wipos PS3 24-20 (480 W)



wipos PS3 24-40 (960 W)

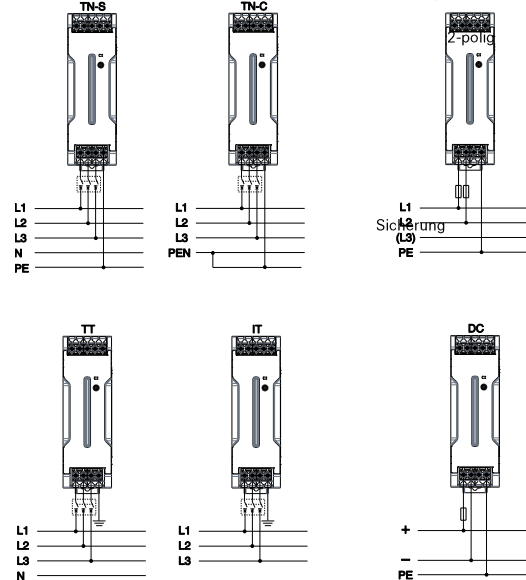


Precautions for Safe Use

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* PS3 to prevent smoking or ignition caused by abnormal loads.

- Wire the input as shown in the following figures depends on your power distribution system. Do not connect the neutral line in a 3-phase, 4-wire system.



Recommended power circuit-breakers

Model	Input	Recommended power circuit-breakers
<i>wipos</i> PS3 24-5	3-phase	Circuit breaker Conforming UL/CE 480 V, 1 A, characteristic C, 3-pole, or equivalent breaker
<i>wipos</i> PS3 24-10	2-phase DC	Fuse Conforming UL/CE 600 V, 5 A. Fast Acting or identical function fuse
<i>wipos</i> PS3 24-20	3-phase	Circuit breaker Conforming UL/CE 480 V, 4 A, characteristic C, 3-pole, or equivalent breaker
<i>wipos</i> PS3 24-40	2-phase DC	Fuse Conforming UL/CE 600 V, 5 A. Fast Acting or identical function fuse

Note: Do not use the *wipos* PS3 24-40 with a DC input voltage.

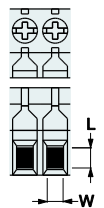
- Use the following material for the wires to be connected to the *wipos* PS3 to prevent smoking or ignition caused by abnormal loads or phase failure.

Recommended Wire Type/Cross-sectional Area and Stripping Length

Model name	INPUT		OUTPUT		PE		Wire tripping American Length
	American Wire Gauge (AWG,	Solid Wire /Stranded Wire	American Wire Gauge (AWG,	Solid Wire /Stranded Wire	American Wire Gauge (AWG,	Solid Wire /Stranded Wire	
<i>wipos</i> PS3 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	AWG14 to 10	2.5 to 6 mm ² / 2.5 to 4 mm ²	8 to 10 mm
<i>wipos</i> PS3 24-10	AWG22 to 12	0.35 to 6 mm ² / 0.35 to 4 mm ²	AWG14 to 10	2.5 to 6 mm ² / 2.5 to 4 mm ²			
<i>wipos</i> PS3 24-20	AWG20 to 10	0.5 to 6 mm ² / 0.5 to 4 mm ²	AWG12 to 10	4 to 6 mm ² / 4 mm ²			
<i>wipos</i> PS3 24-40	AWG16 to 6	1.5 to 16 mm ² / 1.5 to 16 mm ²	AWG8 to 6	10 to 16 mm ² / 10 to 16 mm ²	AWG14 to 6	2.5 to 16 mm ² / 2.5 to 16 mm ²	13 to 16 mm

- The rated current, wire insertion hole, and applicable screwdriver of the terminal block are as follows:

Model	Wire Insertion Hole (Refer to the diagram on the right)		Applicable Screwdriver		
	W	L	No.	Driver Diameter	Length
<i>wipos</i> PS3 24-5	2.9	2.9	Nr. 2	4.9 mm max.	10 mm min.
<i>wipos</i> PS3 24-10					
<i>wipos</i> PS3 24-20					
<i>wipos</i> PS3 24-40	5.4	5	Nr. 2	5.1 mm max.	12 mm min.



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. For usage onboard a ship, always attach an End Plate (PFP-M) to both sides of the Power Supply to hold the Power Supply in place.
- Install the Power Supply well away from any sources of strong, high-frequency noise and surge.

Lebensdauer

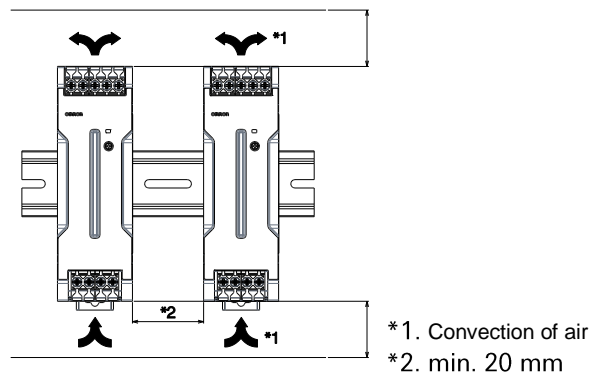
- The life of a Power Supply is determined by the life of the electrolytic capacitors used inside. Here, Arrhenius Law applies, i.e., the life will be cut in half for each rise of 10°K or the life will be doubled for each drop of 10°K. The life of the Power Supply can thus be increased by reducing its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

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.

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

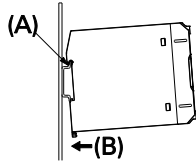
If you connect a battery as the load, install overcurrent control and overvoltage protection circuits.

Output Voltage Adjuster (V.ADJ)

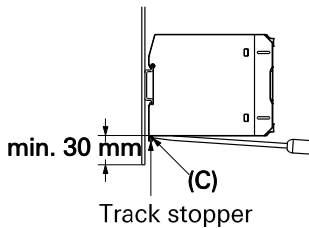
- The output voltage adjuster (V.ADJ) may possibly be damaged if it is turned with unnecessary force. Do not turn the adjuster with excessive force.
- After completing output voltage adjustment, be sure that the output capacity or output current does not exceed the rated output capacity or rated output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



Power Boost Function

For All Models

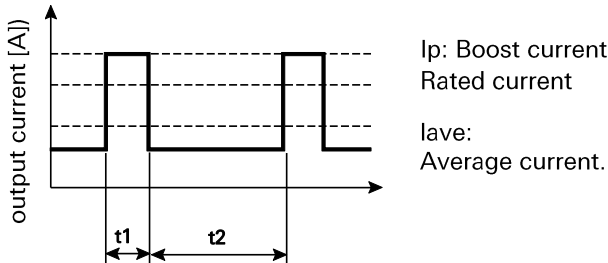
Power Boost is a function that can output the temporary repeated boost current larger than the rated current. However, it should meet the following four Boost current conditions.

1. Time that the boost current flows: t1
2. The maximum value of the boost current: Ip
3. The average output current: Iave
4. The time ratio of the boost current flow: Duty

Note: Boost current conditions

- t1 ≤ 10 s
- Ip ≤ Rated boost current
- Imitt ≤ Rated current

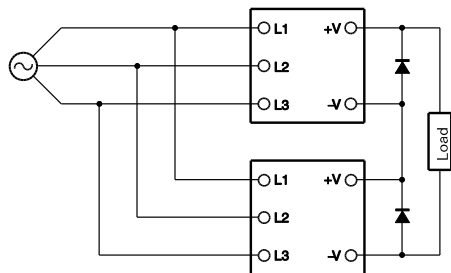
$$\text{rel. ED} = \frac{t1}{t1 + t2} \times 100 [\%] \leq 30 \%$$



- 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.
- Power Boost Function is not possible for the wipos PS3 960 at 2-phase input or in parallel operation.

Series Operation

Two power supplies can be connected in series.



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 (V_{RRM})	Twice the rated output voltage or above
Forward current (IF)	Twice the rated output current or above

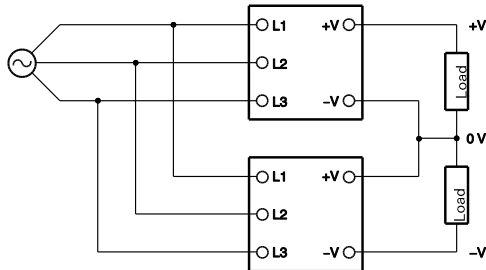
2. Although Products having different specifications can be connected in series, the current flowing through the load must not exceed the smaller rated output current.

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.

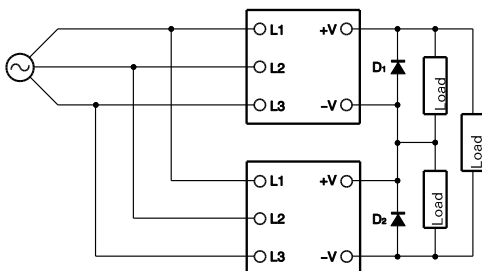
If positive and negative outputs are used, connect Power Supplies of the same model as in the following figure. (Combinations with different output capacities or output voltages can be made.

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.



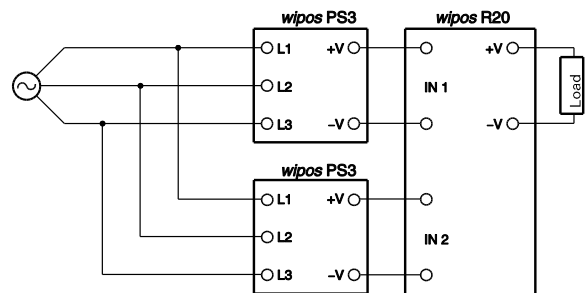
- Use the following information as a guide to the diode type, dielectric strength, and current.

Type	Schottky Barrier diode
Dielectric strength (V_{RRM})	Twice the rated output voltage or above
Forward current (IF)	Twice the rated output current or above

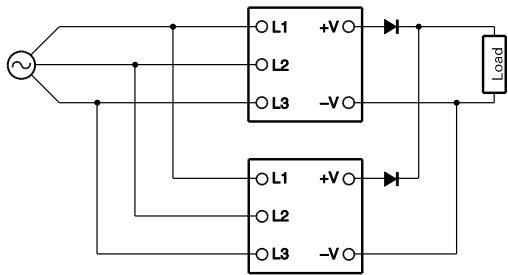
Parallel Operation

Two Power Supplies can be connected in parallel.

1. Parallel operation is possible only if the standard mounting and 3-phase input is used. Maintain an ambient temperature of between -25 and 40°C.
2. For parallel operation, always use two Power Supplies with the same capacity.
3. Use the output voltage adjusters (V. ADJ) to adjust the difference in the output voltages between the two Power Supplies to 50 mV or less.
4. If the output current from the two Power Supplies is not balanced, the Power Supply with the higher output voltage will operate in an overcurrent protection state, which will extremely reduce its service life. After you adjust the difference in the output voltages between the two Power Supplies, make sure that the currents are well balanced.
5. The length and thickness of each wire connected to the load and each unit must be the same so that there is no difference in the voltage drop value between the load and the output terminals of each Power Supply.
6. For Parallel Operation with units 120 W, 240 W, or 480 wipos PS3 Power Supplies, 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.



7. Internal components can sometimes reduce their performance or may be damaged. To operate wipos PS3 24-40 (960 W) Power Supplies in parallel, set the OPERATION SWITCH to "B" side. For Parallel Operation with units wipos PS3 24-40 (960 W) Power Supplies, connect diodes to the outputs of each unit if sudden load variation influence occurs in the ambient operation environment.



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

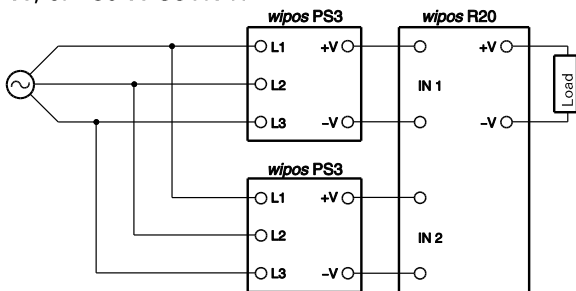
Type	Schottky Barrier diode
Dielectric strength (V_{RRM})	Twice the rated output voltage or above
Forward current (IF)	Twice the rated output current or above

Backup Operation

Backup operation is possible if you use two Power Supplies of the same model.

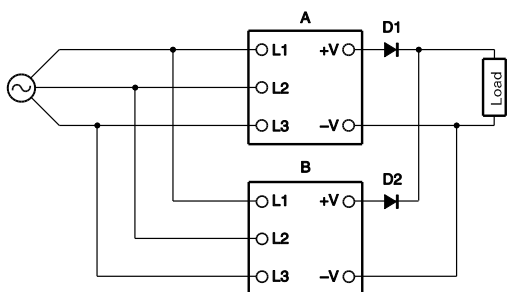
Make sure that the maximum load does not exceed the capacity of one Power Supply.

For backup operation, connect the wipos R20 for 120 W, 240 W, or 480 W S8VK-T.



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

For 960 W, always connect diodes to the output sides of the two Power Supplies as shown in the following diagram.



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

Type	Schottky Barrier diode
Dielectric strength (V_{RRM})	Twice the rated output voltage or above
Forward current (IF)	Twice the rated output current or above

- Increase the output voltage setting of Power Supply A and Power Supply B by the drop in the forward voltage (VF) of diodes D1 and D2. Also, the diodes will cause a power loss equivalent to the Power Supply output current (IOUT) times the diode forward voltage (VF). Therefore, cooling measures must be implemented so that the temperature of the diodes decreases to the catalog value or lower.
- Because of the load power and power loss due to the diodes, do not exceed the rated power of one Power Supply (rated output voltage x rated output current).

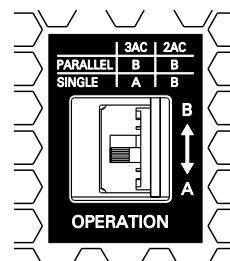
In Case There Is No Output Voltage

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 5 minutes. Then turn it ON again to see if this clears the condition.

2-Phase Input Operation For 960 W Model

When using the wipos PS3 24-40 (960 W) at 2-phase input, make sure to set the OPERATION SWITCH to the "B" side.



Hinweis:

- A: 100% of the nominal output current is available for use as the output current.
- B: When the OPERATION SWITCH is set to the "B" side, the output current is limited to 80% of the rated output current.



www.wieland-electric.com

Wieland Electric GmbH
Brennerstraße 10-14
D-96052 Bamberg
Tel.: +49 (0) 9 51 / 93 24-0
Fax: +49 (0) 9 51 / 93 24-198

Email: info@wieland-electric.com
www.wieland-electric.com