

# Ziegler

Redefine Innovative Metering

## Switched-Mode Power Supplies

1 Phase, 2 Phase & 3 Phase. ( 5 V<sub>DC</sub>, 12 V<sub>DC</sub> & 48 V<sub>DC</sub> )

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Thank you for having chosen one of our products for your work. We are certain the Ziegler Power Supplies will meet your application requirements.

## Application

The power supplies Ziegler Series can be used in areas from extreme industrial environment, and complies with the latest technical standard. Before working with the unit, read these instructions carefully and completely. All these power supplies are single output, IP20, have Mounting DIN Rail IEC 60715/TH35. Class 1 isolation devices suitable for SELV and PELV solutions.

## Safety and warning notes



**WARNING** – Explosion Hazard Do not disconnect Equipment unless power has been switched off or the area is known to be non-hazardous.  
**WARNING** – Explosion Hazard. Substitution of components may impair suitability for class 1, Division 2.  
**WARNING** – Switch off the system before connecting the module. Never work on the machine when it is live. The device must be installed in accordance with UL508. The device must have a suitable isolating facility outside the power supply unit, via which can be switched to idle. Danger of fatal injury!

## Connection

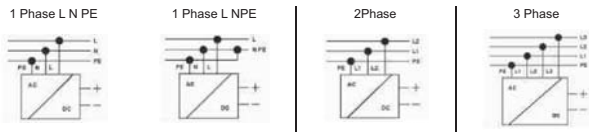
Cable Connection: The following cable cross-sections may be used:

	Solid (mm <sup>2</sup> )	Stranded (mm <sup>2</sup> )	AWG	Torque (Nm)	Stripping Length	Power Supply
Input:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6	7 mm	Others
	4.0	6.0	30 – 10	0.8 – 1.0	7 mm	ZieglerPS1-4812
Output:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6	7 mm	Others
	4.0	6.0	30 – 10	0.8 – 1.0	7 mm	ZieglerPS1-4812
Signal:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6	7 mm	Others
	4.0	6.0	30 – 10	0.8 – 1.0	7 mm	ZieglerPS1-4812

The connection is made by the screw type 2.5 mm<sup>2</sup> (others) or 4.0 mm<sup>2</sup> (ZieglerPS1-4812) terminal blocks. Use only copper cables that are designed for operating temperatures of > 75 °C. Wiring terminal shall be marked to indicate the proper connection for the power supply.

Input - Output power connection:

Input:		
Ziegler PS1 series	1 Phase Switching Power Supplies	L, N, PE ⊕
Ziegler PS2 series	2 Phase Switching Power Supplies	L1, L2, PE ⊕
Ziegler PS3 series	3 Phase Switching Power Supplies	L1, L2, L3, PE ⊕
Output:	Nominal Voltage (Vdc) is made via the	(+), (-).

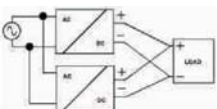


## Signalling

Red led (Dc ok) status:	Jumper Setting
Output voltage OK: Lights up permanently	Hiccup Mode / Manual Reset / Continuous Mode
Switch off, in overload and short circuit conditions	Manual Reset / Continuous Mode
Blink, in overload and short circuit conditions	Hiccup Mode

## Parallel Connection, to Increase Output Power

- Make parallel connection with same model of power supply to increase the output power.
- Adjust the output approximately to the same value (± 20mV) applying 1-2 A load to all devices output before connecting them in parallel.
- Easy parallel connections Jumper. In Ziegler PS1- 1216 / 4807 & PS1 - 4812 for more power, you must change position of the jumper to enable parallel connection. In this mode you can put in parallel up to 4 power supplies.



Easy Parallel connection OFF (factory selection)

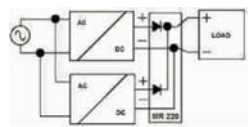


Easy Parallel connection ON

## Parallel connection Redundancy

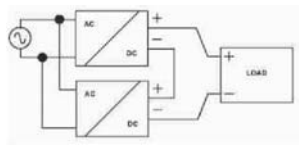
Power supplies can be paralleled for 1+1 redundancy to obtain a higher system availability. Redundant systems require a certain amount of extra power to support the load in case one power supply unit fails. The simplest way is to put two Ziegler power supplies in parallel. In case one power supply unit fails, the other one is automatically able to support the load current without any interruption. This simple way to build a redundant system has two major disadvantages:

- The faulty power supply can not be recognized. The red LED will still be ON since it is reverse-powered from the other power supply. It does not cover failures such as an internal short circuit in the secondary side of the power supply. In such a - virtually nearly impossible - case, the defective unit becomes a load for the other power supplies and the output voltage can not be maintained any more.
- This can only be avoided by utilizing decoupling diodes which are included in the Redundancy Module ZMR220. Recommendations for building redundant power systems:
  - Use separate input fuses for each power supply.
  - Monitor the individual power supply units. A DC-Red led and Power Good Contact are already included on Ziegler power supplies. This feature reports a faulty unit, see power Good Section for any technical detail.
  - When possible, connect each power supply to different phases or circuits.



## Serial connection

- a) It is possible to connect as many units in series as needed, providing the sum of the output voltage does not exceed 150Vdc.
- b) Voltages with a potential above 60Vdc are not SELV any more and can be dangerous. Such voltages must be installed with a protection against touching.
- c) For serial operation use power supplies of the same type.
- d) Earthing of the output is required when the sum of the output voltage is above 60Vdc.
- e) Keep an installation clearance of 15mm (left/right) between two power supplies and avoid installing the power supplies on top of each other. Note: Avoid return voltage (e.g. from a decelerating motor or battery) which is applied to the output terminals.



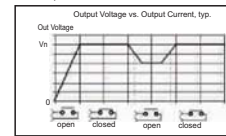
## Power Good Output Function

(Not for Ziegler PS1 - 505 / 1206)

Output is used for preventive function monitoring of the power supply. An electrically isolated signal contact is available. The signal contact Closes when output power is OK and Opens when output voltage falls (see following table).

Nominal Voltage	Threshold Voltage
12Vdc	11Vdc ±5%
48Vdc	42Vdc ±5%

This feature is particularly useful in redundant applications. Power Good Contact rating:  
 Max. DC1: 30 Vdc 1 A; Resistive load (EN 60947-4-1)  
 AC1: 60 Vac 1 A; Min. permissible load  
 Min.: 1mA at 5 Vdc



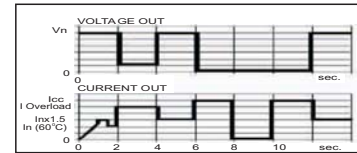
## Protection

On the primary side: the device is equipped with an internal fuse; follow the next page table. If the internal fuse is blown (fails opens), it is most probable that there is a fault in the device. If this failure occurs, the device must be checked in the factory. Caution: in two phase Input models, Double pole / Neutral Fusing.  
 On the secondary side: the devices are electrically protected against: Over Load, Over Voltage Output (typ.30 Vdc for Ziegler PS1 1206 / 1214 / 1216 typ. 72Vdc for Ziegler PS1 4804 / 4807 / 4812, and Short circuit automatically.

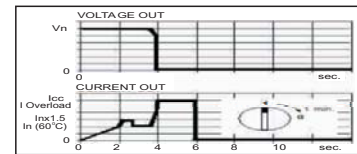
## Short circuit and overload Protection Modes

Depending on the users application loads, the Ziegler Line offers three types of protection modes which are available by removing the plastic window and changing the Jumper to the desired setting as shown below: (No Settings jumper for Ziegler PS1 505 / 1206 only Continuous Mode Condition)

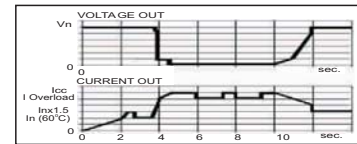
- HICCUP MODE** (default factory Jumper setting)  
 General purpose mode, used for normal load. In case of short-circuit or overloading, the output current is interrupted. The device tries again to re-establish output voltage and normal condition about every 2 second till the problem is cleared.



- MANUAL RESET** (manual Restart by Operator)  
 This protection mode is particularly suggested in applications where safety procedures require that reset be carried out only by an authorized person. In case of short-circuit or overload, the output current is interrupted. In order to restart the output it is necessary to switch-off the input circuit for about 1 minute.



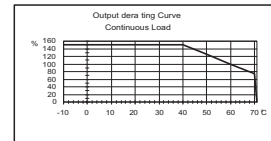
- Continuous Output Mode**  
 In case of short-circuit or overload, the output current is kept at high values with near zero voltage. In case of short circuit the current can reach up to 3 times the rated current at 60°C. This protection mode is used to meet the requirements of demanding loads such as motors, solenoid valves, lamps, PLC with highly capacitive input circuits and other loads with marked transient overload behavior



The output of the device is electrically protected against overload and short circuit. For the nominal voltage and nominal current at temperature condition, please see technical data. The device can supply at the nominal Current without switching off. As the overload increases, the output voltage is reduced until zero.

## Temperature Ratings

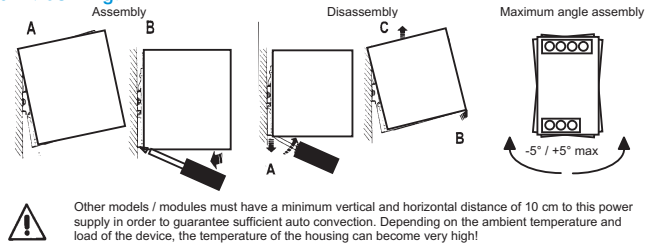
Surrounding air temperature 50 °C for Ziegler PS1 505 / 1206 for others 60°C. At the temperature of 70°C the output current will be 75% - 50% of In. The equipment does not switch off in case of ambient temperature above 70°C or thermal overload. The devices are protected for Over temperature conditions "worst case"; in this situation the device Shut-downs the output and automatically restarts when temperature inside falls.



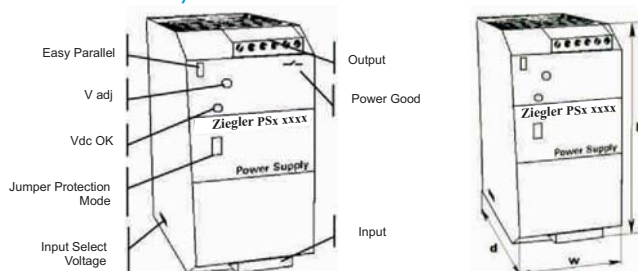
## Standards and Certification

Electrical Safety: IEC/EN 60950 (VDE 0805) and EN 50178 (VDE 0160).  
 Assembling device: IEC/EN 60950.  
 Input / Output separation: SELV EN 60950-1 and PELV EN 60204-1. Double or reinforced insulation.  
 EMC Standards: Immunity: EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5.  
 EMC Standards Emission: EN 61000-6-4, EN 61000-3-2.  
 Standards Conf ormity: Safety of Electrical Equipment Machines: EN 60204-1.  
 CE The CE mark in According to EMC 2004/108/EC and Low voltage directive 2006/95/EEC

## Rail Mounting:










## Dimension and Lay-out



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Ziegler power supply 1Phase	5Vdc	12Vdc				48Vdc		
<b>TECHNICAL DATA</b>								
Model	Ziegler PS1 - 505	Ziegler PS1 - 1206	Ziegler PS1 - 1214	Ziegler PS1 - 1216	Ziegler PS1 - 4804	Ziegler PS1 - 4807	Ziegler PS1 - 4812	
<b>INPUT DATA</b>								
Input Voltage Range Vac	90 – 280Vac	90 – 280Vac	90 – 135Vac (I/P selectable 180 – 280Vac by switch)	90 – 135Vac (I/P selectable 180 – 280Vac by switch)	90 – 135Vac (I/P selectable 180 – 280Vac by switch)	90 – 135Vac (I/P selectable 180 – 280Vac by switch)	90 – 135Vac (I/P selectable 180 – 280Vac by Link at Terminals)	
Inrush Current (Vn and In Load) I <sup>2</sup> t	≤ 7 A ≤ 5 msec.	≤ 11 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 11 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 16 A ≤ 5msec	
Frequency	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	
Input Current	0.5 – 0.25 A	1 – 0.7 A	2.8 – 1.3 A	4.6 – 2.2 A	2.8 – 1.3 A	4.6 – 2.2 A	8.0 – 4.2 A	
Internal Fuse	4 A	4 A	4 A	6.3 A	4 A	6.3 A	10 A	
External Fuse (recommended)	6 A (MCB curve B)	6 A	10 A	16 A	10 A	16 A	16 A	
<b>OUTPUT DATA</b>								
Output Voltage Factory Setting ±3% – (Vn)	5 Vdc	12Vdc	12Vdc	12Vdc	48Vdc	48Vdc	48Vdc	
Adjustment range (Vadj)	4.75 – 5.25 Vdc	10 – 15.5Vdc	10 – 14Vdc	10 – 14Vdc	41 – 55Vdc	41 – 55Vdc	41 – 55Vdc	
Start up with capacitive load	≤ 50,000µF	≤50,000µF	≤50,000µF	≤50,000µF	≤50,000µF	≤50,000µF	≤50,000µF	
Turn-On delay after applying mains voltage	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	
Continuous Current at Vn < 40°C (In)	5 A	4 A (115) 6A (230)	14 A	16 A	3.75 A	7.0 A	12.0 A	
Continuous Current at Vn < 50°C (In)	5 A	3 A (115) 5A (230)	12 A	15 A	3.0 A	6.0 A	11.0 A	
Continuous Current at Vn < 60°C (In)	5 A	2 A (115) 3A (230)	10 A	14 A	2.5 A	5.0 A	10.0 A	
Short circuit current (Icc)	10 A	10 A	20 A	30 A	7.5 A	15 A	30.0 A	
Hold-up Time ( min. Vac) Vn	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	
Residual Ripple	≤ 80 mV <sub>pp</sub>	≤ 80 mV <sub>pp</sub>	≤ 80 mV <sub>pp</sub>	≤ 80 mV <sub>pp</sub>	≤ 80 mV <sub>pp</sub>	≤ 80 mV <sub>pp</sub>	≤ 80 mV <sub>pp</sub>	
Efficiency (at 50% Vn)	≥ 82 %	≥ 88 %	≥ 91 %	≥ 92 %	≥ 91 %	≥ 91 %	≥ 92 %	
Over temperature Protection	Yes. Shut-down output and automatic restart	Shut-down output and automatic restart			Shut-down output and automatic restart			
Short-circuit protection	Continuous Mode	Continuous Mode	1° Hiccup Mode ; 2° Continuous Mode ; 3° Manual Reset		1° Hiccup Mode ; 2° Continuous Mode ; 3° Manual Reset			
Dissipation power load max (W)	6	6	17	28	17	28	54	
Over Load protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Over Voltage Output protection (Internal Failure)	Yes (typ. 15 Vdc)	Yes(typ. 30Vdc)	Yes(typ. 35Vdc)	Yes(typ. 35Vdc)	Yes(typ. 72Vdc)	Yes(typ. 72Vdc)	Yes(typ. 72Vdc)	
Parallel connection	Yes	Yes	Yes	Easy parallel	Yes	Easy parallel	Easy parallel	
Relay power good	No	No	Yes	Yes	Yes	Yes	Yes	
<b>CLIMATIC DATA</b>								
Ambient Temperature operation	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	
Derating T <sup>a</sup> > . (In)	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	
Ambient Temperature Storage	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	
Humidity at 25 °C, no condensation	95 %	95 %	95 %	95 %	95 %	95 %	95 %	
<b>GENERAL DATA</b>								
Isolation Voltage (IN / OUT)	3000Vac	3000Vac	3000Vac	3000V ac	3000Vac	3000Vac	3000Vac	
Isolation Voltage(IN / PE)	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	
Isolation Voltage(OUT / PE)	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	
Protection Class (EN/IEC 60529)	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	
Reliability: MTBF IEC 61709	> 5,00,000h	> 5,00,000h	> 5,00,000h	> 5,00,000h	> 5,00,000h	> 5,00,000h	> 5,00,000h	
Pollution Degree Environment	2	2	2	2	2	2	2	
Connection Terminal Blocks Screw Type	2.5mm <sup>2</sup>	2.5mm <sup>2</sup>	2.5mm <sup>2</sup>	2.5mm <sup>2</sup>	2.5mm <sup>2</sup>	2.5mm <sup>2</sup>	4 mm <sup>2</sup>	
Protection class (with PE connected)	I	I	I	I	I	I	I	
Dimension (w-h-d)	50x120x50	50x120x50	55x110x105	72x115x135	55x110x105	72x115x135	85x120x140	
Weight	0.30 kg approx	0.30 kg approx	0.6 kg approx	0.77 kg approx	0.60 kg approx	0.77 kg approx	1.1 kg approx	
Safety Standard Approval	CE	CE	CE	CE	CE	CE	CE	

All specifications are subject to change without notice

\*Ziegler PS1 4812 needs minimum load of 500mA for its proper operation.

**ZIEGLER INSTRUMENTS**

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