



# RHINO SELECT PSFA Series Power Supplies With Integrated UPS

## Overview

RHINO SELECT PSFA series open frame power supplies come with integrated DC UPS function. The PSFA models will switch to battery operation (batteries not included) without interruption to prevent end-product downtime for the customer in the event of power disruption or unexpected loss of AC input power. Consequently, the PSFA series can increase operational reliability of a critical operation. Convection cooling is applied for the single phase design with wide operating temperature range from -20°C to +70°C. Diagnostic monitoring signals for AC OK and Battery Low status will alert the user of any failure through TTL open collector. Metal chassis with case cover is available for different installation preferences.

## Features

- Universal AC input voltage range
- Zero switch over time from loss of AC to battery operation
- Protection against reverse polarity battery connection
- Built-in diagnostic monitoring for AC OK and Battery Low status
- Overvoltage / Overcurrent / Over Temperature / Short circuit Protections
- Built-in over current and short circuit protection in buffering (battery discharging) mode operation
- 3-year warranty



| PSFA Series Specifications          |         |                |                      |                            |
|-------------------------------------|---------|----------------|----------------------|----------------------------|
| Part Number                         | Price   | Output Voltage | Maximum Output Power | Drawing Link               |
| <a href="#"><u>PSFA12-060-U</u></a> | \$35.50 | 13.8 V         | 60W                  | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>PSFA24-060-U</u></a> | \$35.50 | 27.6 V         | 60W                  | <a href="#"><u>PDF</u></a> |



# RHINO SELECT PSFA Series Technical Specifications

| Technical Specifications                     |                    |                                                                                                                                     |                   |                                     |                 |
|----------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------|-----------------|
| Specifications                               |                    | PSFA12-060-U                                                                                                                        |                   | PSFA24-060-U                        |                 |
|                                              |                    | V+                                                                                                                                  | B+                | V+                                  | B+              |
| Input (AC)                                   |                    |                                                                                                                                     |                   |                                     |                 |
| Input Voltage Range                          |                    | 90-264 VAC                                                                                                                          |                   |                                     |                 |
| Frequency                                    |                    | 47-63 Hz                                                                                                                            |                   |                                     |                 |
| Nominal Current                              |                    | < 1.2 A @ 115VAC, <0.8 A @ 230VAC                                                                                                   |                   |                                     |                 |
| Inrush Current Limitation I2t (+25 °C) typ   |                    | < 25A @ 115VAC & 230VAC                                                                                                             |                   |                                     |                 |
| Leakage Current                              | IEC/EN 60950-1     | < 0.5 mA / 1.0 mA @264VAC                                                                                                           |                   | TN/TT system / IT system            |                 |
|                                              | IEC/EN 62368-1     | < 1.0 mA / 2.0 mA @264VAC                                                                                                           |                   | TN/TT system / IT system            |                 |
| Recommend Circuit Breaker (Characteristic B) |                    | 10A                                                                                                                                 |                   |                                     |                 |
| Output (DC)                                  |                    |                                                                                                                                     |                   |                                     |                 |
| Nominal Output Voltage / Adjustment Range    |                    | 13.8 VDC / 13.52 - 14.00 V                                                                                                          | 13.6 VDC          | 27.6 VDC / 27.04 - 28.00 V          | 27.4 VDC        |
| Output Power                                 |                    | 60W max                                                                                                                             |                   |                                     |                 |
| Output Current                               | Normal Mode        | 3.5 A [0 - 4.3 A]                                                                                                                   | 0.8 A [0 - 0.8 A] | 1.4 A [0 - 2.15 A]                  | 0.75 A [0-75 A] |
|                                              | Buffering Mode     | –                                                                                                                                   | 0 - 4.3 A         | –                                   | 0.215 A         |
| PARD (20MHz)                                 | V+                 | < 100mVpp                                                                                                                           |                   |                                     |                 |
| Start-up Time                                | V+                 | < 3,000ms @ 115VAC [100% load], <1,500ms @ 230VAC [100% load]                                                                       |                   |                                     |                 |
| Hold-up Time                                 | V+                 | > 10ms @ 115Vac [100% load]                                                                                                         |                   |                                     |                 |
| Rise Time                                    | V+                 | < 50ms @ nominal input                                                                                                              |                   |                                     |                 |
| Efficiency                                   |                    | > 85.0% @ 115VAC / > 86.0% @ 230VAC                                                                                                 |                   | > 88.0% @ 115VAC / > 89.0% @ 230VAC |                 |
| Line Regulation                              | V+                 | < 0.5% [90-264VAC @ 100% load]                                                                                                      |                   |                                     |                 |
| Load Regulation                              | V+                 | < 1.0% [90-264VAC @ 0-100% load]                                                                                                    |                   |                                     |                 |
| Voltage Drop Between V+ and B+               | Normal Mode        | 0.2 V typ.                                                                                                                          |                   |                                     |                 |
|                                              | Buffering Mode     | 0.4 V typ.                                                                                                                          |                   |                                     |                 |
| General Data                                 |                    |                                                                                                                                     |                   |                                     |                 |
| Case Chassis / Cover                         |                    | SECC                                                                                                                                |                   |                                     |                 |
| Weight                                       |                    | 0.25 kg [0.56 lb]                                                                                                                   |                   |                                     |                 |
| MTBF                                         |                    | > 700,000 hrs. as per Telcordia SR-332, I/P: 115VAC & 230VAC, Ta: 25°C, O/P: 13.8V/4.3A for 13V model and 27.6V/2.15A for 27V model |                   |                                     |                 |
| Noise                                        |                    | Sound Pressure Level [SPL] < 25dBA                                                                                                  |                   |                                     |                 |
| Cooling                                      |                    | Convection                                                                                                                          |                   |                                     |                 |
| Input / Output Terminal                      | Input              | Terminal block 3-Pin [Rated 300V/16A]                                                                                               |                   |                                     |                 |
|                                              | Output with Signal | Terminal block 6-Pin [Rated 300V/8A]                                                                                                |                   |                                     |                 |
| Wire Size / Torque                           | Input              | AWG 22-12 / 7.0 lbf-in                                                                                                              |                   | AWG 24-12 / 7.0 lbf-in              |                 |
|                                              | Output with Signal | AWG 22-16 / 2.0 lbf-in                                                                                                              |                   | AWG 24-16/ 2.0 lbf-in               |                 |
| Shock Test                                   | Non-Operating      | IEC 60068-2-27, Half Sine Wave: 50G for a duration of 11ms; 3 times per direction, 9 times in total                                 |                   |                                     |                 |
|                                              | Operating          | IEC 60068-2-27, Half Sine Wave: 10G for a duration of 11ms; 1 time in X axis                                                        |                   |                                     |                 |
| Vibration                                    | Non-Operating      | IEC 60068-2-6, Random: 5-500Hz; 2.09Grms; 20 min per axis for all X, Y, Z directions                                                |                   |                                     |                 |
|                                              | Operating          | IEC 60068-2-6, Sine Wave: 10-500Hz; 2G peak; displacement of 0.35mm; 60 min per axis for all X, Y, Z directions                     |                   |                                     |                 |

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# RHINO SELECT PSFA Series Technical Specifications

## Technical Specifications (continued)

| Specifications                             | PSFA12-060-U                                                                                                                                                                                          |    | PSFA24-060-U |    |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------|----|
|                                            | V+                                                                                                                                                                                                    | B+ | V+           | B+ |
| <b>Safety / Environmental</b>              |                                                                                                                                                                                                       |    |              |    |
| <b>EMC / Emissions</b>                     | CISPR 32, EN 55032, FCC Title 47: Class B GB9254.1                                                                                                                                                    |    |              |    |
| <b>Immunity</b>                            | EN 55024, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-12                                                                                    |    |              |    |
| <b>Voltage Dips</b>                        | Conform to IEC 61000-4-11                                                                                                                                                                             |    |              |    |
| <b>Galvanic Isolation</b>                  | Input to Output : 3.0K VAC, Input to Ground : 1.5KVac, Output to Ground : 0.5K VAC                                                                                                                    |    |              |    |
| <b>RoHS Compliant</b>                      | Yes                                                                                                                                                                                                   |    |              |    |
| <b>Operating Temperature</b>               | -20 to 70°C [-4 to 158°F]                                                                                                                                                                             |    |              |    |
| <b>Storage Temperature</b>                 | -40 to 85°C [-40 to 185°F]                                                                                                                                                                            |    |              |    |
| <b>Humidity at +25 °C, no condensation</b> | 5 to 95% RH [Non-Condensing]                                                                                                                                                                          |    |              |    |
| <b>Approvals</b>                           | SIQ Bauart: EN 62368-1,<br>UL 62368-1 and CSA C22.2 No. 62368-1; File No. E508040<br>CB scheme: IEC 62368-1<br>CE [In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU] |    |              |    |

## PSFA Series Battery Input / Output Characteristics

| Specifications                                                      |                                  | PSFA12-060-U                                                                                                                                                |    | PSFA24-060-U                                                                      |    |
|---------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------|----|
|                                                                     |                                  | V+ <sup>4</sup>                                                                                                                                             | B+ | V+                                                                                | B+ |
| Nominal Battery Voltage<br>(Battery not included with Power Supply) |                                  | 12VDC<br>SLA Sealed lead acid battery                                                                                                                       |    | 24VDC<br>SLA Sealed lead acid battery<br>2x12 VDC<br>SLA Sealed lead acid battery |    |
| Battery Voltage Range                                               | Continuously Operating           | 11.0 - 13.8 VDC [nominal at 12V]                                                                                                                            |    | 22.0 - 27.6 VDC [nominal at 24V]                                                  |    |
|                                                                     | Maximum Allowed Voltage          | 16VDC maximum                                                                                                                                               |    | 32VDC maximum                                                                     |    |
|                                                                     | Battery Low Voltage <sup>1</sup> | 11.5 VDC typ                                                                                                                                                |    | 22.5 VDC typ                                                                      |    |
|                                                                     | Minimum Voltage <sup>2</sup>     | 10.0 VDC +/- 0.5 VDC                                                                                                                                        |    | 18.0 VDC +/- 0.5 VDC                                                              |    |
| Battery Capacity                                                    |                                  | 3.2AH - 15AH                                                                                                                                                |    | 3.2AH – 7AH                                                                       |    |
| Charging Time <sup>3</sup>                                          |                                  | < 9hrs ± 1hr for battery 12V/7AH                                                                                                                            |    | < 10hrs ± 1hr for battery 24V/7AH                                                 |    |
| Buffering Time                                                      |                                  | Approx. 1hr 30mins for battery 12V/7AH                                                                                                                      |    | Approx. 3hrs for battery 24V/7AH                                                  |    |
| Recommended Extended Fuse for Battery                               |                                  | Automotive 20A / 80V, FK3 type from Littelfuse, or similar in the battery B+ path.<br>The battery fuse protects the wires between the battery and the unit. |    |                                                                                   |    |
| Battery Charging (Normal Mode)                                      |                                  | CC-CV mode [constant current-constant voltage]                                                                                                              |    |                                                                                   |    |
| End-Of-Charge Voltage                                               |                                  | The unit always charges battery to a fixed voltage value.                                                                                                   |    |                                                                                   |    |

1. The voltage level of battery to enable "Battery Low" function.
2. Minimum battery voltage required for power supply to detect battery in order to begin charging. Battery must be connected to power supply, with the correct polarity, across B+ and B- terminals; and, with input and output loads disconnected.
3. Charging time depends on the state/condition of battery discharge; and will depend on the amount of buffering/discharging time, and load current that battery was discharged at.
4. V+ and V- terminals are for power supply voltage output.

## Wiring Diagram

