



INSTRUCTION MANUAL

Universal AC Input Switching
Power Supply 24 Vdc Output
DIN-Rail Models PSD1000, PSD1000F

Characteristics

General Description: The PSD1000 is a DIN Rail mounting universal AC input switching power supply with 24 Vdc 500 mA current output capability, to supply D1000 Series units or other 24 Vdc devices; it provides isolation between input and output and for model PSD1000F a relay for detection of supply fault (input line, output overload or thermal overload). The output is protected from overload (current or thermal) and short circuit (the unit switches the output off for a second and then tries to re-activate it until the fault condition is removed). The output is diode protected to connect multiple power supplies (redundant output) or to increase the output power.

Function: Universal input power supply to drive D1000 Series units or other field equipment, provides 3 port isolation (supply/output/fault).

Signalling LED: Power supply indication (green).

EMC: Fully compliant with CE marking applicable requirements.

Technical Data:

Supply: 115-230 Vac, 50-60 Hz nom (95 to 264 Vac, 48 to 400 Hz) or 115 to 350 Vdc, ripple within voltage limits ≤ 10 Vpp.

Limit supply voltage to 250 Vrms for Intrinsic Safety applications.

Current consumption @ 115 Vac: 220 mA with 500 mA output current.

Current consumption @ 230 Vac: 150 mA with 500 mA output current.

Efficiency: 80 % at 115 Vac input, 82 % at 230 Vac input.

Inrush current: 10 A with ≤ 10 ms duration.

Max. power consumption: 15 W with full output, 1W with no load, max. internal power dissipation 3 W.

Isolation (Test Voltage): AC Input/DC Output 2.5 KV; AC Input/Fault Output 2.5 KV; DC Output/Fault Output 500 V (PSD1000F only).

Output: 24 Vdc nom (22.8 to 25.2 Vdc) with 500 mA current capability, parallel connection possible for redundant output.

Current output: 400 mA with 95 Vac input, 60 °C ambient temperature, 700 mA with 230 Vac input and 40 °C ambient temperature.

Short circuit current: 750 mA.

Ripple content: ≤ 400 mVrms.

Fault Output (PSD1000F only): voltage free SPDT relay contact, normally energized. De-energize in fault conditions (output overload or input line fault).

Contact rating: 1 A 50 V (resistive load).

Response time: 20 ms.

Compatibility:



CE mark compliant, conforms to 94/9/EC Atex Directive and to 2004/108/CE EMC Directive and EN60950 for electrical safety.

Environmental conditions: Operating: temperature limits -20 to + 60 °C, relative humidity max 90 % non condensing, up to 35 °C.

Storage: temperature limits - 45 to + 80 °C.

Safety Description:



II 3G Ex nA IIC T4, -20 °C \leq Ta \leq 60 °C applicable to PSD1000, not for PSD1000F.

Approvals: GM International CRR028 conforms to EN60079-0, EN60079-15,

FM & FM-C No. 3024643, 3029921C, conforms to Class 3600, 3611, 3810 and C22.2 No.142, C22.2 No.213, E60079-0, E60079-15,

DNV and KR Type Approval Certificate for marine applications.

Mounting: T35 DIN Rail according to EN50022.

Weight: about 150 g PSD1000, 160 g PSD1000F.

Connection: by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm².

PSD1000 Location: Safe Area/Non Hazardous Locations or Zone 2, Group IIC T4, Class I, Division 2, Groups A, B, C, D Temperature Code T4 and Class I, Zone 2, Group IIC, IIB, IIA T4 installation.

PSD1000F Location: Safe Area installation.

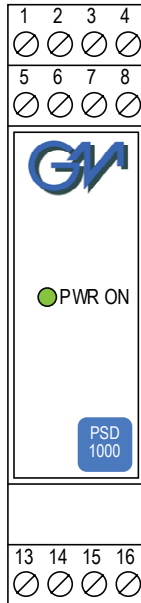
Protection class: IP 20.

Dimensions: Width 22.5 mm, Depth 99 mm, Height 114.5 mm.

Ordering information

Model:	PSD1000		
without fault output		blank	
with fault output		F	
Power Bus enclosure output			/B

Front Panel and Features



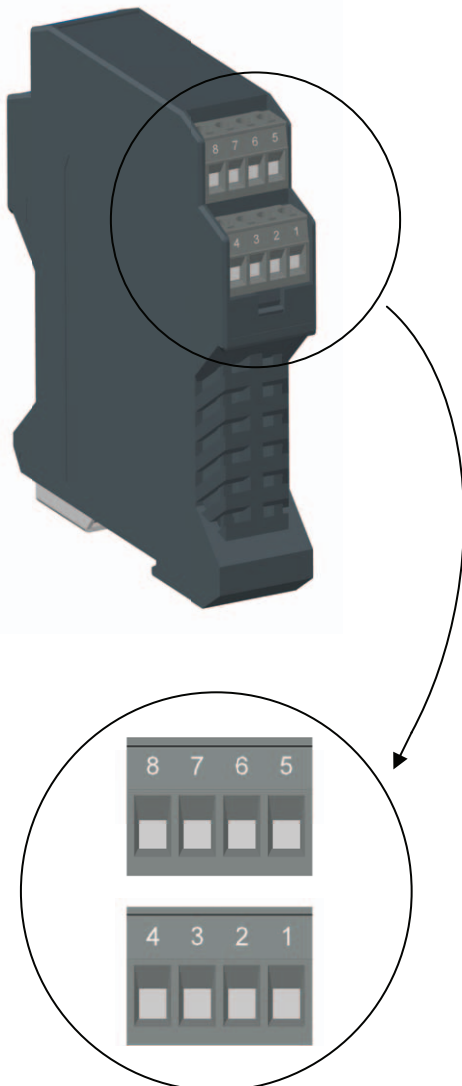
- PSD1000 unit can be mounted close to the I.S. modules (no 50 mm distance) because Vac input and Vdc output are on the same side (safe) of the unit (not for PSD1000F).
- PSD1000 Installation in Zone 2, Division 2 (not for PSD1000F).
- Universal AC input power supply.
- Stabilized 24 Vdc 500 mA output capability.
- Redundant outputs connection.
- Output short circuit proof and current limited.
- Three port isolation, Supply/Output/Fault.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- PSD1000 ATEX, FM & FM-C Certifications (not for PSD1000F).
- Type Approval Certificate DNV and KR for marine applications.
- High Reliability components.
- Simplified installation using standard DIN Rail and plug-in terminal blocks.

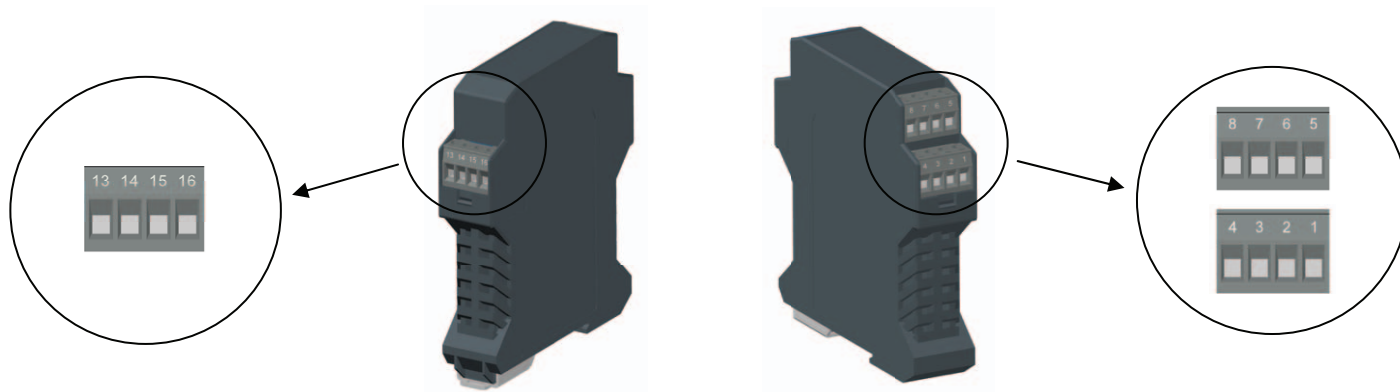
PSD1000 Terminal block connections

PSD1000

SAFE AREA

- | | |
|----------|------------------------------|
| 1 | + Output Power Supply 24 Vdc |
| 2 | - Output Power Supply 24 Vdc |
| 3 | + Output Power Supply 24 Vdc |
| 4 | - Output Power Supply 24 Vdc |
| 5 | Not used |
| 6 | L Power Supply 115-230 Vac |
| 7 | Not used |
| 8 | N Power Supply 115-230 Vac |





PSD1000F

SAFE AREA

SAFE AREA

13 Fault Output

14 Fault Output

15 Not used

16 Fault Output

1 + Output Power Supply 24 Vdc

2 - Output Power Supply 24 Vdc

3 + Output Power Supply 24 Vdc

4 - Output Power Supply 24 Vdc

5 Not used

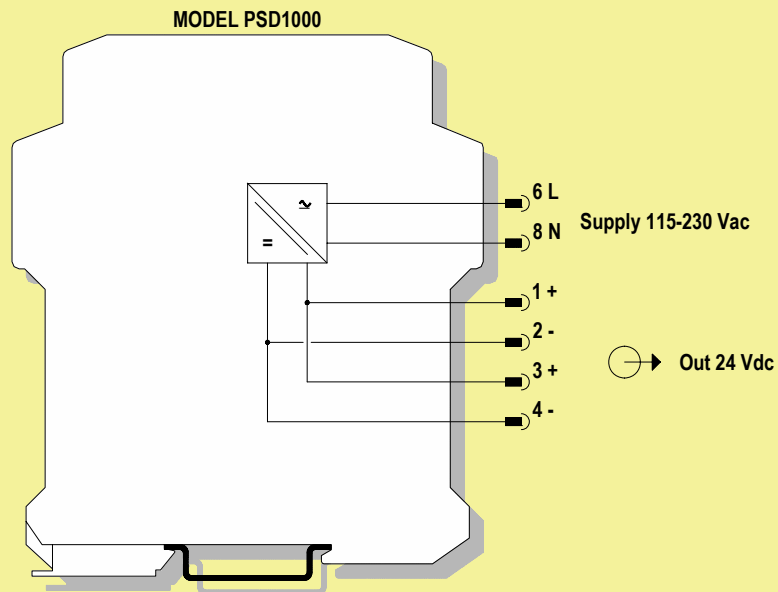
6 L Power Supply 115-230 Vac

7 Not used

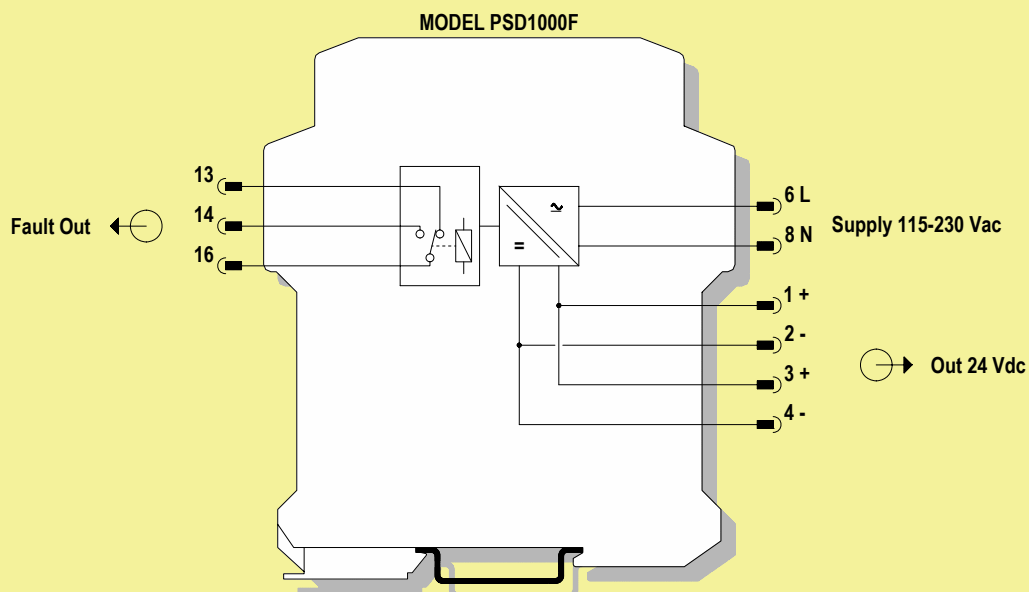
8 N Power Supply 115-230 Vac

Function Diagram

SAFE AREA, ZONE 2 GROUP IIC T4, NON HAZARDOUS LOCATIONS, CLASS I, DIVISION 2, GROUPS A, B, C, D T4, CLASS I, ZONE 2, GROUP IIC T4



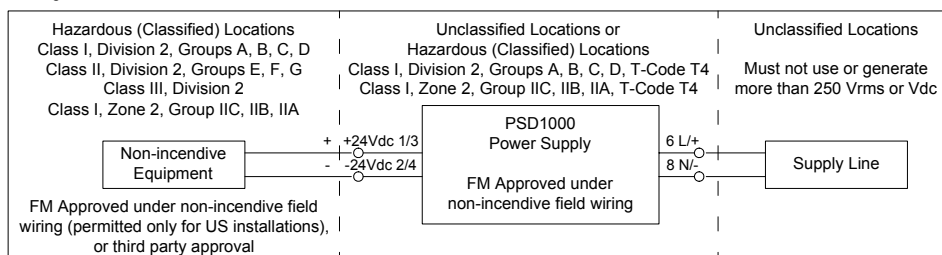
SAFE AREA/NON HAZARDOUS LOCATIONS



Relay contact shown in de-energized position

Warning

PSD1000 is an isolated Switching Power Supply unit installed into standard EN50022 T35 DIN Rail located in Safe Area/Non Hazardous Locations or Zone 2, Group IIC, Temperature Classification T4, Class I, Division 2, Groups A, B, C, D, Temperature Code T4 and Class I, Zone 2, Group IIC, IIB, IIA Temperature Code T4 Hazardous Area/Hazardous Locations (according to EN/IEC60079-15, FM Class No. 3611, CSA-C22.2 No. 213-M1987, CSA-E60079-15) within the specified operating temperature limits Tamb -20 to +60 °C and mounting conditions. PSD1000F is an isolated Switching Power Supply unit installed into standard EN50022 T35 DIN Rail located in Safe Area within the specified operating temperature limits Tamb -20 to +60 °C and mounting conditions.



Non-incendive field wiring is not recognized by the Canadian Electrical Code, installation is permitted in the US only.

For installation of the PSD1000 unit in a Class I, Division 2 or Class I, Zone 2 location, the wiring between the control equipment and the PSD1000, shall be accomplished via conduit connections or another acceptable Division 2, Zone 2 wiring method according to the NEC and the CEC.

With PSD1000 for Intrinsic Safety application limits the line supply voltage to a maximum of 250 Vrms, not to be connected to control equipment that uses or generates more than 250 Vrms or Vdc with respect to earth ground.

PSD1000 must be installed, operated and maintained only by qualified personnel, in accordance to the relevant national/international installation Standards (e.g. IEC/EN60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines), BS 5345 Pt4, VDE 165, ANSI/ISA RP12.06.01 Installation of Intrinsically Safe System for Hazardous (Classified) Locations, National Electrical Code NEC ANSI/NFPA 70 Section 504 and 505, Canadian Electrical Code CEC) following the established installation rules.

PSD1000 power supply must be placed in an enclosure with IP4X protection degree when used in locations providing adequate protection against the entry of solid foreign objects or water capable of impairing safety, or be placed in an enclosure with IP54 protection degree for other locations when used for Intrinsic Safety installations.

De-energize main power source (turn off power supply voltage), wait at least 2 minutes to discharge internal capacitors before plug or unplug the terminal blocks when installed in Hazardous Area/Hazardous Locations or unless area is known to be nonhazardous. Hazardous voltage are present at the input terminal block and inside the unit when connected to the main supply voltage, do not touch electrical connection and do not put conductive object inside the unit.

Warning: PSD1000 substitution of components may impair Intrinsic Safety and suitability for Division 2, Zone 2.

Explosion Hazard: to prevent ignition of flammable or combustible atmospheres, disconnect power before servicing or unless area is known to be nonhazardous.

Failure to properly installation or use of the equipment may risk to damage the unit or severe personal injury.

The unit has no serviceable parts inside, do not open the enclosure.

The unit cannot be repaired by the end user and must be returned to the manufacturer or his authorized representative, any unauthorized modification must be avoided.

Operation

PSD1000, PSD1000F provides fully floating 24 Vdc supply mainly to Series D1000 modules or to drive process control equipment like instrumentation, control system, PLC or load requiring a stabilized voltage. PSD1000 can be located in Safe Area/Non Hazardous Locations or Zone 2, Group IIC, Temperature Classification T4, Class I, Division 2, Groups A, B, C, D, Temperature Code T4 and Class I, Zone 2, Group IIC, IIB, IIA Temperature Code T4 Hazardous Area/Hazardous Locations ensuring that the relevant safety installation conditions are respected while PSD1000F can be located in Safe Area only. PSD1000, PSD1000F provides 500 mA, 12 W output capability.

The power supply has a switching input resulting in a high efficiency module. Output is protected from overload and short circuit (the unit switches the output off and then tries to re-activate it until the fault condition is removed) and is provided with a decoupling diode that permits the parallel operation to increase the current capability or redundancy operation.

PSD1000F is provided with a contact relay output for detection of supply fault (input line, output overload or thermal overload); the relay is normally energized and it de-energizes in fault condition. Presence of supply power and normal working condition is displayed by a green signaling LED.

Installation

PSD1000, PSD1000F is a switching power supply housed in a plastic enclosure suitable for installation on T35 DIN Rail according to EN50022.

PSD1000, PSD1000F unit can be mounted with any orientation over the entire ambient temperature operation range, see section "Installation in Cabinet" and "Installation of Electronic Equipments in Cabinet" Instruction Manual D1000 series for detailed instructions.

Electrical connection of conductors up to 2.5 mm² are accommodated by polarized plug-in removable screw terminal blocks which can be plugged in/out into a powered unit without suffering or causing any damage **(for Zone 2 or Division 2 installations check the area to be nonhazardous before servicing)**.

On the data sheet and enclosure side a block diagram identifies all connections.

The input line is internally protected by fuse; connect an automatic bipolar "C" intervention characteristics switch, upstream the power supply line or other equipment to ensure compliance with local regulations.

For the choice of the input automatic circuit breaker protection, it is opportune to use the following formula:

$$I_{tar} = \frac{P_{out} * 1.2}{V_{in_min}} * 1.5 \quad \text{where } I_{tar} = \text{circuit breaker current, } P_{out} = \text{requested output power, } V_{in_min} = \text{minimum supply voltage.}$$

The terminal block are not usable as breaking device. The wiring cables have to be proportionate in base to the current and the length of the cable.

Identify the function and location of each connection terminal using the wiring diagram on the corresponding data sheet, as an example:

Connect AC input mains power at terminal "6 L/+" and "8 N/-" to the "Supply Line" terminal block.

Connect positive output at terminal "+ 1" or "+ 3" and negative output at terminal "- 2" or "- 4" to the "24 Vdc Output" terminal block (two connections provided).

For PSD1000F connect if required the alarm indication at terminal "16" common relay contact, at terminal "13" normally close relay contact and terminal "14" normally open relay contact; the alarm is provided by an SPDT relay normally energized, it de-energizes in fault condition of the power supply.

Installation and wiring must be in accordance to the relevant national or international installation standards (e.g. IEC/EN60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines), BS 5345 Pt4, VDE 165, ANSI/ISA RP12.06.01 Installation of Intrinsically Safe System for Hazardous (Classified) Locations, National Electrical Code NEC ANSI/NFPA 70 Section 504 and 505, Canadian Electrical Code CEC), make sure that conductors are well isolated from each other and do not produce any unintentional connection.

The enclosure provides, according to EN60529, an IP20 minimum degree of mechanical protection (or similar to NEMA Standard 250 type 1) for indoor installation, outdoor installation requires an additional enclosure with higher degree of protection (i.e. IP54 to IP65 or NEMA type 12-13) consistent with the effective operating environment of the specific installation.

PSD1000 power supply must be placed in an enclosure with IP4X protection degree when used in locations providing adequate protection against the entry of solid foreign objects or water capable of impairing safety, or be placed in an enclosure with IP54 protection degree for other locations when used for Intrinsic Safety installations.

Units must be protected against dirt, dust, extreme mechanical (e.g. vibration, impact and shock) and thermal stress, and casual contacts.

If enclosure needs to be cleaned use only a cloth lightly moistened by a mixture of detergent in water.

Electrostatic Hazard: to avoid electrostatic hazard, the enclosure of PSD1000, PSD1000F must be cleaned only with a damp or antistatic cloth.

Any penetration of cleaning liquid must be avoided to prevent damage to the unit. Any unauthorized card modification must be avoided.

Start-up

Before powering the unit check that all wires are properly connected, particularly their polarity. Check conductors for exposed wires that could touch each other causing dangerous unwanted shorts. Turn on power, the "power on" green led must be lit, check the supply voltage generated by PSD1000, PSD1000F is 24 Vdc.