



# INSTRUCTION MANUAL

Intrinsically Safe  
5 V Supply Module  
Model PSU1003

## Characteristics

**General Description:** The Intrinsically Safe Power Supply module PSU1003, is an intrinsically safe module potted as a sealed component in a 55 x 30 x 15 mm plastic enclosure with soldering pins for printed circuit board mounting. It can be installed in Hazardous Area zone 0, gas group IIB, temperature classification T4.

Powered at about 12 Vdc from the intrinsically safe associated apparatus PSD1001C supply module, it provides a stabilized 5 V, 160 mA supply with 500 V input/output isolation, short circuit and reverse input polarity protection, remote sensing capability and regulation.

**Function:** I.S. power supply module, provides input/output isolation and 5 V, 160 mA regulated voltage. Typical application is to power intrinsically safe circuits implementing digital logic blocks, microcontroller operated peripherals like keyboards, encoders, logic solvers, LCD display units and transmitters.

**EMC:** Fully compliant with CE marking applicable requirements.

## Technical Data

**Supply:** from PSD1001C supply module (nominal 20.5 Vdc with 68.3  $\Omega$  series resistance).

**Isolation (Test Voltage):** Input/Output 500 V.

**Output Voltage:** 5 Vdc  $\pm$  3 %.

**Current:** 0 to 160 mA.

**Voltage regulation:**  $\leq$  0.2 % for a 0 to 160 mA load change.

**Output ripple:**  $\leq$  20 mVrms.

**Compatibility:**

**CE** CE mark compliant, conforms to 94/9/EC Atex Directive and to 2004/108/CE EMC Directive.

**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 1 G EEx ia IIB T4.

$U_o = 6.51$  V,  $P_o = 1760$  mW at output pins O+, O-, S+, S-.

$U_i = 24.2$  V,  $I_i = 363$  mA,  $P_i = 1760$  mW,  $C_i = 330$  nF,  $L_i = 0$  nH at input pins I+, I-.

-20 °C  $\leq$  Ta  $\leq$  60 °C.

**Approvals:** DNV-2005-OSL-ATEX-0334X conforms to EN50014, EN50020, EN50284, IEC60079-0, IEC60079-11.

**Mounting:** soldered on printed circuit board by connection pins.

**Weight:** about 30 g.

**Connection:** by PCB soldering, square pins 0.6 mm, length 7 mm ( $\varnothing$  1 mm drilling).

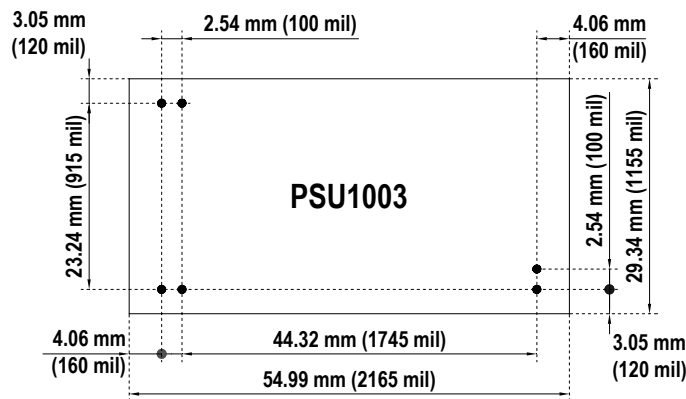
**Location:** Hazardous Area Zone 0, Group IIB, Temperature Class T4 installation.

**Dimensions:** Width 55 mm, Depth 30 mm, Height 15 mm.

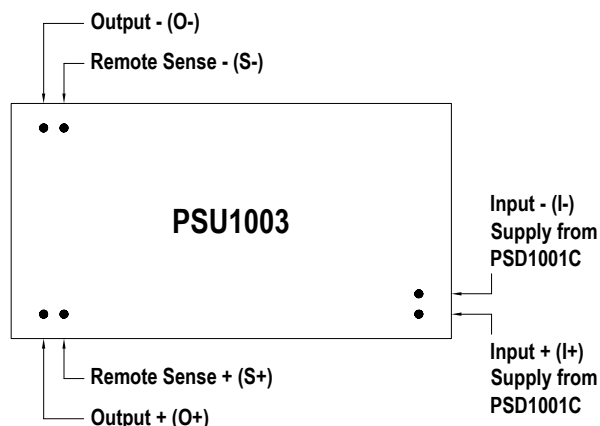
## Features

- Installation in Zone 0.
- High output capability Power Supply for Hazardous Area equipment.
- Short circuit proof stabilized output with remote sensing voltage regulation.
- Rugged sealed construction suitable for installation in harsh environments.
- Isolation Input/Output.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- ATEX Certification.
- High Reliability, SMD components.

## PCB Drilling Dimensions Top View



## PCB Assignment Top View



## Ordering information

Model: PSU1003

## Parameters Table

In the system safety analysis, always check the Hazardous Area/Hazardous Locations devices to conform with the related system documentation, if the device is Intrinsically Safe check its suitability for the Hazardous Area/Hazardous Locations and gas group encountered and that its maximum allowable voltage, current, power ( $U_i/V_{max}$ ,  $I_i/I_{max}$ ,  $P_i/P_i$ ) are not exceeded by the safety parameters ( $U_o/V_{oc}$ ,  $I_o/I_{sc}$ ,  $P_o/P_o$ ) indicated in this manual and enclosure side of the PSU1003 Intrinsically Safe Apparatus connected to it.

PSU1003 Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
$U_o / V_{oc}$	$\leq$	$U_i / V_{max}$
$I_o / I_{sc}$	$\leq$	$I_i / I_{max}$
$P_o / P_o$	$\leq$	$P_i / P_i$

When checking the power matching also consider the maximum operating temperature of the field device, check that added connecting cable and field device capacitance and inductance do not exceed the limits ( $C_o/C_a$ ,  $L_o/L_a$ ,  $L_o/R_o / L_a/R_a$ ) given in the Associated Apparatus parameters for the effective gas group (see parameters on enclosure side).

PSD1004 Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device + Cable Parameters
$C_o / C_a$	$\geq$	$C_i / C_i \text{ device} + C \text{ cable}$
$L_o / L_a$	$\geq$	$L_i / L_i \text{ device} + L \text{ cable}$

If the cable parameters are unknown, the following value may be used: Capacitance 60 pF per foot (180 pF per meter), Inductance 0.20 mH per foot (0.60 mH per meter). Note that for the PSU1003 the system analysis must be performed for the input and also for the output connection.

## Storage

If after an incoming inspection the unit is not installed directly on a system (parts for spare or expansion with long storage periods) it must be conveniently stocked. Stocking area characteristics must comply with the following parameters:

Temperature  $-10$  to  $+30$  °C    the  $-40$  to  $+80$  °C in the data sheet is meant for limited periods, mainly to arrange for air transport.  
 Humidity 0 to 70%            long period high humidity affects the package integrity and promotes corrosion of metal parts.  
 Vibration:                      no vibration should be perceivable in the stocking area to avoid loosening of parts or fatigue ruptures of components terminals.  
 Pollution:                        presence of pollutant or corrosive gases or vapors must be avoided to prevent corrosion of conductors and degradation of insulating surfaces.

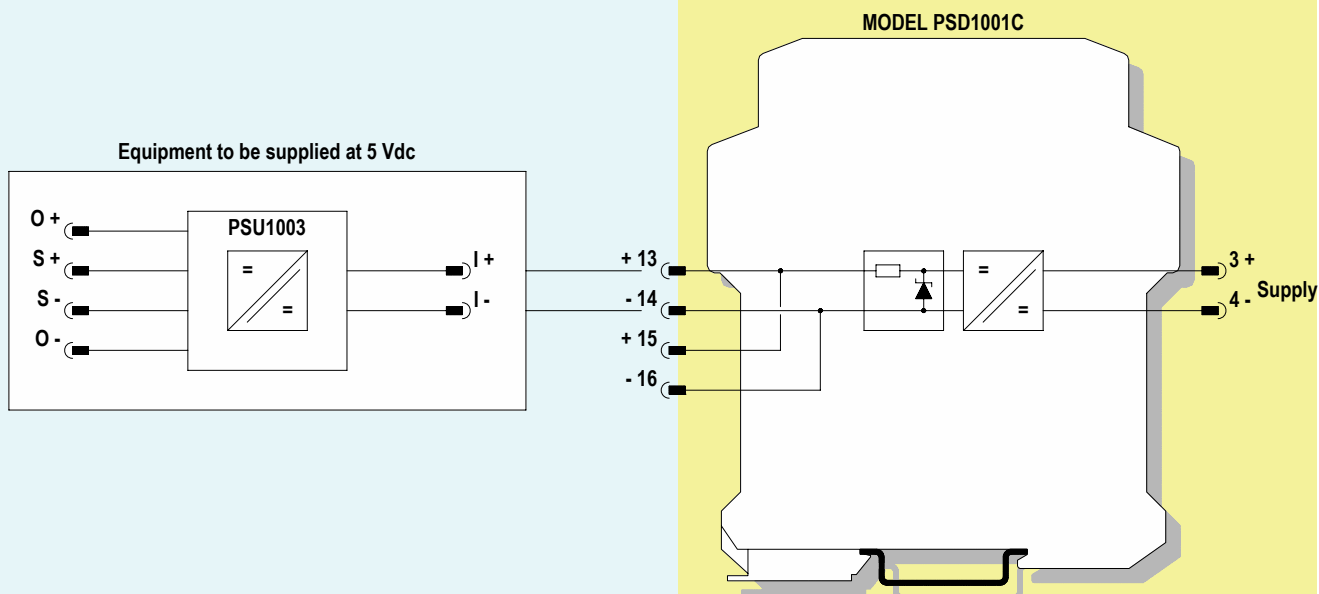
## Disposal (Waste Electrical and Electronic Equipment)

This marking shown on the products indicates that it should not be disposed with other wastes at the end of its working life. It may content hazardous substances for the health and the environment, to prevent possible harm from uncontrolled waste disposal, please separate this equipment from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources. Users should contact either the supplier or their local government office for details of where and how they can take this equipment for environmentally safe recycling. This product should not be mixed with other commercial wastes for disposal.

## Function Diagram

HAZARDOUS AREA ZONE 0, GROUP IIB T4

SAFE AREA, ZONE 2, GROUP IIC T4



## Warning

PSU1003 is an isolated Intrinsically Safe Power Supply Module component for installation on user defined printed circuit board, used in equipment located in Safe Area / Non Hazardous Locations or Zone 0, Zone 1, Zone 2 Hazardous Area, Gas Group IIB or IIA, Temperature Classification T4 (according to IEC/EN60079-11, EN50020) within the specified operating temperature limits Tamb -20 to +60 °C, and connected to Associated Apparatus equipment with a maximum limit for  $U_o < U_i$ ,  $I_o < I_i$  and  $P_o < P_i$  as specified in the data sheet. Note that effective Hazardous Area Zone, Gas Group and Temperature Class application must be defined by the end user equipment.

**Warning: substitution of components may impair Intrinsic Safety.**

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

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

PSU1003 provides fully floating 5 VDC supply to drive Intrinsically Safe loads, typically transmitter or display unit located in Hazardous Area.

PSU1003 has remote sensing capability to compensate PCB tracks resistance voltage drop-out, connect the sense terminals near the load at the output terminals for better performance and stabilization. If the PCB tracks resistance is low, connecting the sense terminals is not mandatory (the voltage stabilization is done internally to the module) but it is recommended to connect the sense terminals to the output terminals shorting the pins.

## Installation

PSU1003 is an Intrinsically Safe power supply housed in a potted plastic enclosure suitable for installation on user defined printed circuit board.

PSU1003 unit can be mounted with any orientation over the entire ambient temperature range.

Electrical connection are accommodated by square pins 0.6 mm to directly solder on PCB.

On the data sheet a block diagram identifies all connections and dimensional drawing.

The maximum soldering temperature is 260 °C for 10 seconds.