
# INSTRUCTION & SAFETY MANUAL

## SIL 3 Power Supply System PSS1250
## 48Vdc, 25 A,
## 7” Rack with 2 power modules PSM1250

gmi technology for safety

## SIL 3 Power Supply System PSS1250 48Vdc, 25 A
## 7'' Rack with 2 power modules PSM1250

## General characteristics

**General Description:**
The Power Supply System type PSS1250-2-48 is an anodized aluminium 7" Rack unit (4U high) suitable to accept 2 plug-in Power Supply Modules type PSM1250. Each PSM1250 module provides 24 Vdc output and PSM1250 modules have their outputs connected in series by internal copper bar, therefore PSS1250-2-48 system provides 48Vdc, 25 A output.
The system accepts AC power source from 100 to 264 Vac.

**Overvoltage protection:**
Each PSM1250 module has got 3 independent overvoltage protections: 1 voltage limiting loop at 30 Vdc and 1+1 crowbars at 30 Vdc.
Therefore, PSS1250-2-48 system has 60 Vdc upper limit as maximum overvoltage protection value, considering series connection between overvoltage protections of both PSM1250 modules.

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

**High load fuses breaking capability:**
In case of short circuit on the load, the Power supply system delivers a very high peak current (about 800 Amp) for a duration of 0.5 ms.
This characteristic ensures the instant breakage of the protective fuse or circuit breaker. Because of the very short peak current duration, other equipment connected to the load are not affected by the failure event and continue to operate without interruption.

**Functional Safety Management Certification:**
G.M. International is certified by TUV to conform to IEC61508:2010 part 1 clauses 5-6 for safety related systems up to and included SIL3.

FSM SIL 3

## Technical Data

**Supply:**
***Input voltage:*** 110 to 240 Vac (±10%) with 48 to 62 Hz frequency.
***Power Factor Correction (AC input):*** 0.95 typ.@230Vac, 0.99 typ.@115Vac, full load.
***Efficiency @48Vdc out (full load):*** better than 85 % @ 230 Vac and 83% @ 115 Vac.
***Max. internal power dissipation @48Vdc out (full load):*** 220 W @ 230 Vac; 250 W @ 115 Vac.
***AC input current (sinusoidal at full load) @48Vdc out:*** 14.6A @100Vac input voltage, 12.7 A @115 Vac input voltage, 6.5 A @230 Vac input voltage.
***Inrush current:*** 74 A peak @ 264 Vac; 64 A peak @ 230 Vac; 32 A peak @ 115 Vac.
***AC input connection:*** screw terminal blocks suitable for 4mm$^2$ wires on wall mounting panel.

**Isolation (Test Voltage):**
***Input to Output isolation:*** 2500 Vrms (routine test).
***Input to Ground isolation:*** 1500 Vrms (routine test).
***Ground to Output isolation:*** 500 Vrms (routine test).
***Output or Ground to Fault contact isolation:*** 500 Vrms (routine test)

**Output:**
***Output voltage:*** 48 Vdc (adjustable from 42 to 56 Vdc). Each PSM1250 output is 24 Vdc (adjustable from 21 to 28 Vdc).
***Regulation:*** 0.2 % for a 100 % load change.
***Stability:*** 0.01 % for a 20 % line voltage change.
***Ripple:*** ≤ 250 mVpp.
***Output current:*** 25 A nominal (*@48Vdc out)*.
***Output power:*** max 1200W (*@48Vdc out)* and up to 1300 W nominal (*@56Vdc out)*.
***Output Rise Time:*** 2.5 s.
***Dynamic Response:*** 1 ms for 0-100% load change (overshoot ±0.5% of Vout setting).
***Connection:*** screw terminals on copper bars suitable for 50A available on wall mounting panel.
***Hold-up time at full load:*** 40 ms (AC input).
***Over voltage protection:*** each PSM1250 output is limited to 30 Vdc plus two redundant crowbars for over voltage protection at 30 Vdc.
Therefore, PSS1250-2-48 output is upper limited to 60 Vdc maximum value.

**Power good signaling (for each PSM1250 module):**
***Output good:*** 19.5 V ≤ Vout ≤ 29.5 V (see page 4 for more information).
***Indication:*** by Power ON green LED on each PSM1250 module front panel.
***Signaling:*** voltage free SPST normally energized relay (contact closed), de-energize in over/under voltage conditions (contact open).
***Contact Rating:*** 2 A 50 Vac 100 VA, 2 A 50 Vdc 60 W (resistive load).
***Connection:*** screw terminal blocks suitable for 1.5 mm$^2$ wires on wall mounting panel.

**Compatibility:**
CE mark compliant, conforms to Directive: 2014/30/EU EMC, 2014/35/EU LVD, 2011/65/EU RoHS.

**Environmental conditions:**
***Operating temperature limits:*** -40 to +70°C.
***Relative humidity limits:*** 95 %, up to 55 °C.
***Transport, storage temperature limits:*** - 45 to + 85 °C. ***Max altitude:*** 2000 m a.s.l.

**Approvals:**
SIL 3 / SIL 1 conform to IEC 61508:2010 Ed. 2.
SIL 3 Functional Safety TÜV Certificate conforms to IEC61508:2010 Ed.2, for Management of Functional Safety.

**Mechanical:**
***Mounting:*** 7" Rack unit, 4 units high.
***Weight:*** 7" fully equipped about 7 Kg, fully equipped with 2 PSM1250.
***Location:*** Safe Area.
***Protection class:*** IP 20, Open Type.
***Dimensions:*** see drawings pages 9 and 11.

## Features

- SIL 3 for NE Load according IEC 61508:2010 (see page 6 for more information).
- SIL 1 for ND Load according to IEC 61508:2010 (see page 7 for more information).
- Systematic capability SIL 3.
- AC Input Line: 110 to 240 Vac (±10%) with 48 to 62 Hz frequency.
- Power factor correction.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- TÜV Functional Safety Certification.
- Highly regulated output of 48 Vdc - 25 A, due to 24 Vdc out for each PSM1250 module.
- Under and over voltage alarm monitoring, for each PSM1250 module.
- 3 over voltage redundant protections, for each PSM1250 module.
- 85% efficiency @230 Vac input and 48 Vdc output with full load.
- Fan speed control depending on ambient temperature and output power.
- High load fuse breaking capability without interrupting operations.
- 7" Rack unit, 4 U high,anodized aluminium, durable metal enclosure.
- Tropicalization for electronic components.

## Ordering Information for PSS1250-2-48:

| Description | Rack Dimension (inches) and Configuration | Ordering Code |
|---|---|---|
|  Rack unit and back panel for wall mounting into a cabinet | 7" wide<br><br>1 output 48 Vdc up to 25 A | **PSS1250-2-48** |
|  Power supply module | With<br>24 Vdc – 50 A output | **PSM1250** :<br>**needed 2 pieces** |

## Output voltage setting - Fault indications

For each PSM1250 power module, the output voltage can be set to 24 Vdc + 18%; -14% via a front panel trimmer.
Under voltage threshold is set to 19.5 V, while Over voltage threshold is set to 29.5 V.
A front panel power ON green LED signals mains voltage is applied to the power module and normal DC output voltage is present on DC output bus.
Power module Fault conditions are signaled by opening contact of NE relay (contact closed in normal condition), positioned on WMP "Fault" terminal block. Faults can be:

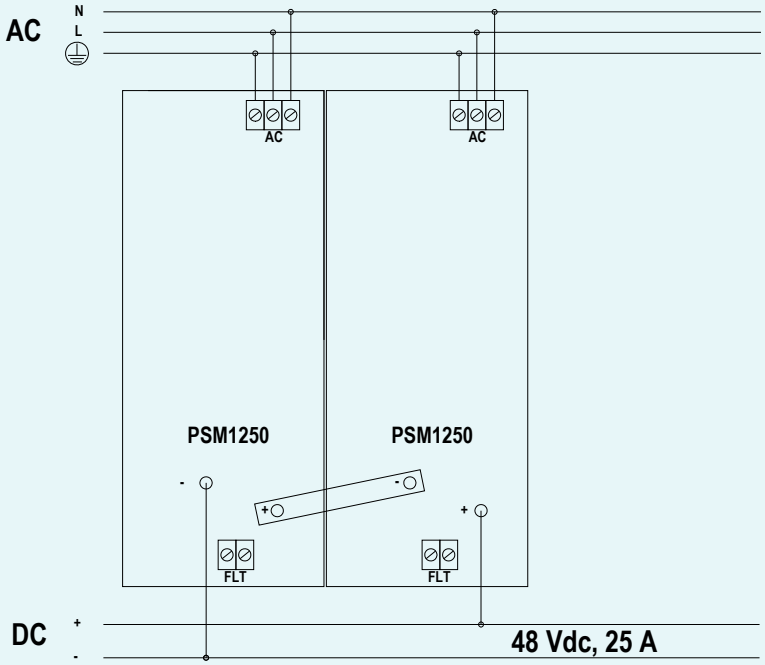
- Under voltage Vout < 19.5 V.
- Over voltage Vout > 29.5 V.

In absence of under / over voltage fault, the green Power ON LED is ON if output voltage is within 19.5 V - 29.5 V range.
If output voltage goes below 19.5 V, the green Power ON LED blinks and holds this condition as long as output voltage goes over 20 V.
If output voltage goes over 29.5 V, the green Power ON LED is OFF and holds this condition as long as output voltage goes below 29 V.
After under / over voltage fault, coming back to normal condition, the green Power ON LED is ON if output voltage is within 20 V - 29 V range.
About PSS1250-2-48 fault indication, it's important to connect in series the Fault relay contacts of two PSM1250 modules, so that when a PSM1250 module goes in fault condition, the fault is reflected to whole PSS1250-2-48 system because the PSS1250-2-48 Fault contact can be considered the series of the Fault relay contacts of two PSM1250 modules.
In addition, when both front panel power ON green LEDs of two PSM1250 modules are ON, the PSS1250-2-48 system is in normal operation.
If at least one green Power ON LED of PSM1250 module blinks or is OFF, the PSS1250-2-48 system is in fault (under / over voltage) condition.

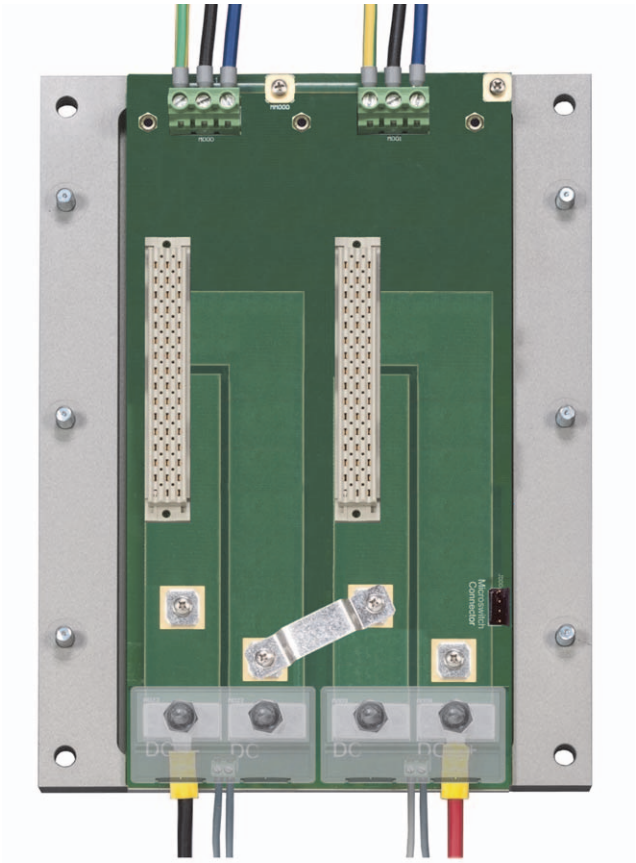
## Function Diagram wiring architecture for PSS1250-2-48 fully equipped:

SAFE AREA ,
NON HAZARDOUS LOCATIONS

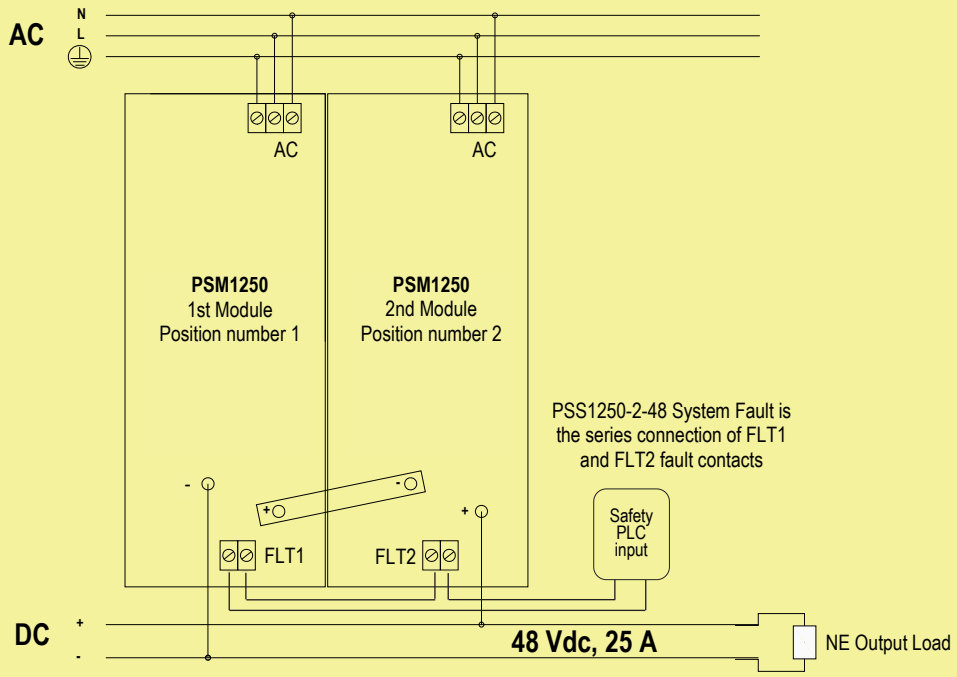
**PSS1250-2-48, 48 V - 25 A Output.**
two PSM1250 power modules connected in series to provide 48 V - 25 A output.




## Back Panel PCB of PSS1250-2-48:



## Application of PSS1250-2-48 system with 2 PSM1250 modules, for NE output load




**Description:**

In normal operation the output series connection of 2 PSM1250 modules is powered by connecting AC input supply to related terminal blocks on the Wall Mounting Panel backboard. Both PSM1250 fault relay contacts must be connected in series to Safety PLC or Safety logic solver input because each PSM1250 internal diagnostic uses this contact to notifies under/over voltage faults to logic solver, which can require to turn off power supply and to replace it with a new PSM1250 module. In absence of fault the relay contact is closed, while in presence of fault the relay contact is open. The outputs of both PSM1250 modules are already connected in series on the Wall Mounting Panel backboard by specific copper bar, in order to give 48 Vdc out for NE load. Green Power ON LED of each PSM1250 is lit in presence of AC input supply. In normal condition, NE output load is Normally Energized. In absence of AC input supply, both PSM1250 modules are shutdown (their fault relay contacts are open) and output load is de-energized (Safe State).

**Safety Function and Failure behavior:**

PSS1250-2-48 system with 2 PSM1250 modules is considered to be operating in Low Demand mode, as a Type A module, having Hardware Fault Tolerance (HFT) = 0.
The failure behaviour of the system for NE load is described by the following definitions:

- □ Fail-Safe State: it is defined as the system output going below 4 Vdc. Internal diagnostics detect and notify Low/High (Under/Over voltage) fails (DD) to logic solver, which can operate to convert these fails to the fail-safe state, requiring to turn off malfunctioning power supply and to replace it with new PSM1250 module.
- □ Fail Safe: failure mode that causes the system to go to the defined fail-safe state without a demand from the process.
- □ Fail Dangerous: failure mode that does not respond to a demand from the process (i.e. being unable to go to the defined fail-safe state), so that the system output voltage is blocked or oscillating between 4 and 40 Vdc or above 60 Vdc, and both internal diagnostics cannot detect and notify faults to logic solver.
- □ Fail High - Overvoltage: failure mode that causes the system output to go above 60 Vdc. Internal overvoltage protections try to limit system output voltage < 60 Vdc, otherwise internal crowbars trip to fail safe state for system output ≥ 60 Vdc. Internal diagnostics detect and notify High fail to logic solver, which does not automatically trip on this failure, classified as Dangerous Detected (DD).
- □ Fail Low - Undervoltage: failure mode that causes the system output to go between 4 and 40 Vdc. Internal diagnostics detect and notify Low fail to logic solver, which does not automatically trip on this failure, classified as Dangerous Detected (DD).
- □ Fail "No Effect": failure mode of a component that plays a part in implementing the safety function but that is neither a safe failure nor a dangerous failure, so that the system output voltage is deviated between 40 and 60 Vdc. When calculating the SFF, this failure mode is not taken into account.
- □ Fail "Not part": failure mode of a component that is not part of the safety function but part of the circuit diagram and is listed for completeness. When calculating the SFF, this failure mode is not taken into account.

Failure rate data: taken from Siemens Standard SN29500.

**Failure rate table:**

| Failure category | Failure rates (FIT) |
|---|---|
| $\lambda_{dd}$ = Total Dangerous Detected failures | 85.02 |
| $\lambda_{du}$ = Total Dangerous Undetected failures | 24.68 |
| $\lambda_{sd}$ = Total Safe Detected failures | 0.00 |
| $\lambda_{su}$ = Total Safe Undetected failures | 3270.54 |
| **$\lambda_{tot\ safe}$ = Total Failure Rate (Safety Function) = $\lambda_{dd} + \lambda_{du} + \lambda_{sd} + \lambda_{su}$** | **3380.24** |
| **MTBF (safety function) = (1 / $\lambda_{tot\ safe}$) + MTTR (8 hours)** | **33 years** |
| $\lambda_{no\ effect}$ = "No Effect" failures | 1876.18 |
| $\lambda_{not\ part}$ = "Not Part" failures | 339.78 |
| **$\lambda_{tot\ device}$ = Total Failure Rate (Device) = $\lambda_{tot\ safe} + \lambda_{no\ effect} + \lambda_{not\ part}$** | **5596.20** |
| **MTBF (device) = (1 / $\lambda_{tot\ device}$) + MTTR (8 hours)** | **20 years** |

**Failure rates table according to IEC 61508:2010 Ed.2 :**

| $\lambda_{sd}$ | $\lambda_{su}$ | $\lambda_{dd}$ | $\lambda_{du}$ | SFF | $DC_S$ | $DC_D$ |
|---|---|---|---|---|---|---|
| 0.00 FIT | 3270.54 FIT | 85.02 FIT | 24.68 FIT | 96.75% | 0.00% | 77.50% |

**PFDavg vs T[Proof] table**, with determination of SIL supposing module contributes ≤20% of total SIF dangerous failures:

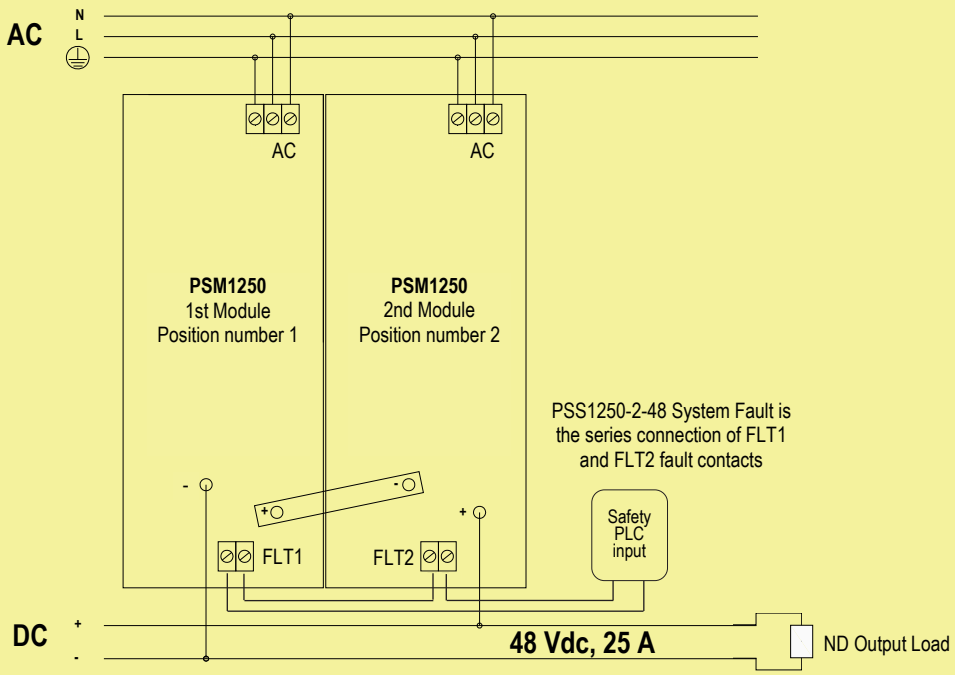
| T[Proof] = 1 year | T[Proof] = 1.5 years | T[Proof] = 18 years |
|---|---|---|
| PFDavg = 1.09E-04 Valid for **SIL 3** | PFDavg = 1.63E-04 Valid for **SIL 3** | PFDavg = 1.96E-03 Valid for **SIL 2** |

**PFDavg vs T[Proof] table**, with determination of SIL supposing module contributes >20% of total SIF dangerous failures:

| T[Proof] = 5 years | T[Proof] = 20 years |
|---|---|
| PFDavg = 5.45E-04 Valid for **SIL 3** | PFDavg = 2.18E-03 Valid for **SIL 2** |

**Systematic capability SIL 3.**

## Application of PSS1250-2-48 system with 2 PSM1250 modules, for ND output load




**Description:**

In normal operation the output series connection of 2 PSM1250 modules is powered by connecting AC input supply to related terminal blocks on the Wall Mounting Panel backboard. Both PSM1250 fault relay contacts must be connected in series to Safety PLC or Safety logic solver input because each PSM1250 internal diagnostic uses this contact to notifies under/over voltage faults to logic solver, which can require to turn off power supply and to replace it with a new PSM1250 module. In absence of fault the relay contact is closed, while in presence of fault the relay contact is open. The outputs of both PSM1250 modules are already connected in series on the Wall Mounting Panel backboard by specific copper bar, in order to give 48 Vdc out for ND load. In absence of AC input supply (normal condition), both PSM1250 modules are shutdown (their fault relay contacts are open) and ND output load is Normally De-energized. Green Power ON LED of each PSM1250 is lit in presence of AC input supply. In this case, both PSM1250 modules are operating (their fault relay contacts are closed) and output load is energized (Safe State).

**Safety Function and Failure behavior:**

PSS1250-2-48 system with 2 PSM1250 modules is considered to be operating in Low Demand mode, as a Type A module, having Hardware Fault Tolerance (HFT) = 0.

The failure behaviour of the system for ND load is described by the following definitions:

- □ Fail-Safe State: it is defined as the system output going between 40 and 60 Vdc.
- □ Fail Safe: failure mode that causes the system to go to the defined fail-safe state without a demand from the process.
- □ Fail Dangerous: failure mode that does not respond to a demand from the process (i.e. being unable to go to the defined fail-safe state), so that the system output voltage is blocked or oscillating between 0 and 40 Vdc or above 60 Vdc, and internal diagnostic cannot detect and notify faults to logic solver.
- □ Fail High - Overvoltage: failure mode that causes the system output to go above 60 Vdc. Internal overvoltage protections try to limit system output voltage < 60 Vdc, otherwise internal crowbars trip to fail safe state for system output ≥ 60 Vdc. In any case, this failure mode is dangerous, but internal diagnostic notifies High fail to logic solver, which cannot convert this failure to the fail-safe state but it can only require to turn off power supply and to replace it with a new PSM1250 module.
- □ Fail Low - Undervoltage: failure mode that causes the system output to go between 0 and 40 Vdc. This failure mode is dangerous, but internal diagnostic notifies Low fail to logic solver, which cannot convert this failure to the fail-safe state but it can only require to turn off power supply and to replace it with a new PSM1250 module.
- □ Fail "Not part": failure mode of a component that is not part of the safety function but part of the circuit diagram and is listed for completeness. When calculating the SFF, this failure mode is not taken into account.

Failure rate data: taken from Siemens Standard SN29500.

**Failure rate table:**

| Failure category | Failure rates (FIT) |
|---|---|
| $\lambda_{dd}$ = Total Dangerous Detected failures | 0.00 |
| $\lambda_{du}$ = Total Dangerous Undetected failures | 3380.24 |
| $\lambda_{sd}$ = Total Safe Detected failures | 0.00 |
| $\lambda_{su}$ = Total Safe Undetected failures | 1876.18 |
| **$\lambda_{tot\ safe}$ = Total Failure Rate (Safety Function) = $\lambda_{dd} + \lambda_{du} + \lambda_{sd} + \lambda_{su}$** | **5256.42** |
| **MTBF (safety function) = (1 / $\lambda_{tot\ safe}$) + MTTR (8 hours)** | **21 years** |
| $\lambda_{not\ part}$ = "Not Part" failures | 339.78 |
| **$\lambda_{tot\ device}$ = Total Failure Rate (Device) = $\lambda_{tot\ safe} + \lambda_{not\ part}$** | **5596.20** |
| **MTBF (device) = (1 / $\lambda_{tot\ device}$) + MTTR (8 hours)** | **20 years** |

**Failure rates table according to IEC 61508:2010 Ed.2 :**

| $\lambda_{sd}$ | $\lambda_{su}$ | $\lambda_{dd}$ | $\lambda_{du}$ | SFF | $DC_S$ | $DC_D$ |
|---|---|---|---|---|---|---|
| 0.00 FIT | 1876.18 FIT | 0.00 FIT | 3380.24 FIT | 35.69% | 0.00% | 0.00% |

**PFDavg vs T[Proof] table**, with determination of SIL supposing module contributes ≤20% of total SIF dangerous failures:

| T[Proof] = 1 year |
|---|
| PFDavg = 1.48E-03 Valid for **SIL 1** |

**PFDavg vs T[Proof] table**, with determination of SIL supposing module contributes >20% of total SIF dangerous failures:

| T[Proof] = 3 years |
|---|
| PFDavg = 4.45E-02 Valid for **SIL 1** |

**Systematic capability SIL 3.**

## Warning

PSS1250-2-48 is isolated Switching Power Supply system located in Safe Area within the specified operating temperature limits -40°C ≤ Tamb ≤ +70°C and mounting conditions. Read installation manual before operating the unit. Failure of proper installation or use of the equipment may damage the unit or cause severe personal injury. PSS1250-2-48 must be installed, wired, operated and maintained only by qualified personnel, following established installation guide lines. PSS1250-2-48 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.
**Electrostatic Hazard:** clean only with antistatic cloth. **Green Power ON LED of PSM1250 power module:** check that green LED is OFF before screwing out PSM1250 module front panel.

## 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 -40 to +70 °C, the -45 to +80 °C is meant for limited periods, -10 to +30 °C is preferred. Humidity 0 to 95 %, 0 to 60 % humidity is preferred. **Vibration:** no prolonged 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.

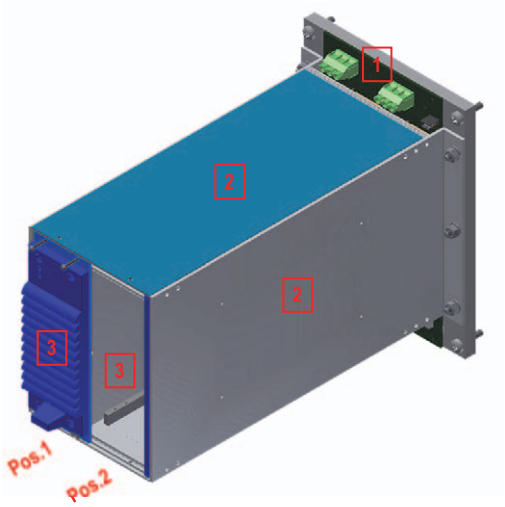
## Disposal

The product 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.
This product should not be mixed with other commercial wastes for disposal.

## System composition

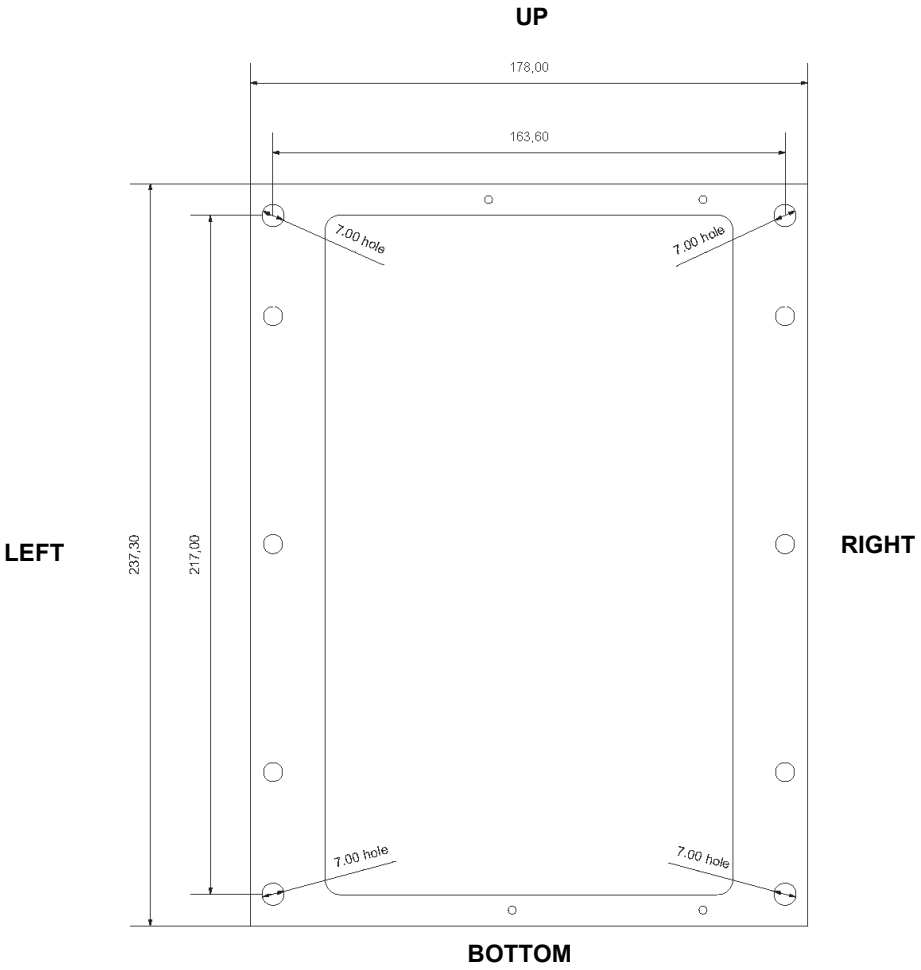
**PSS1250-2-48 system** includes the following parts:

1. Back Panel with connections for power supply modules;
2. 7” Rack unit, enclosure with guides for inserting modules;
3. 2 Power Supply Modules (PSM1250), for each inserting position (Pos.1, Pos.2)

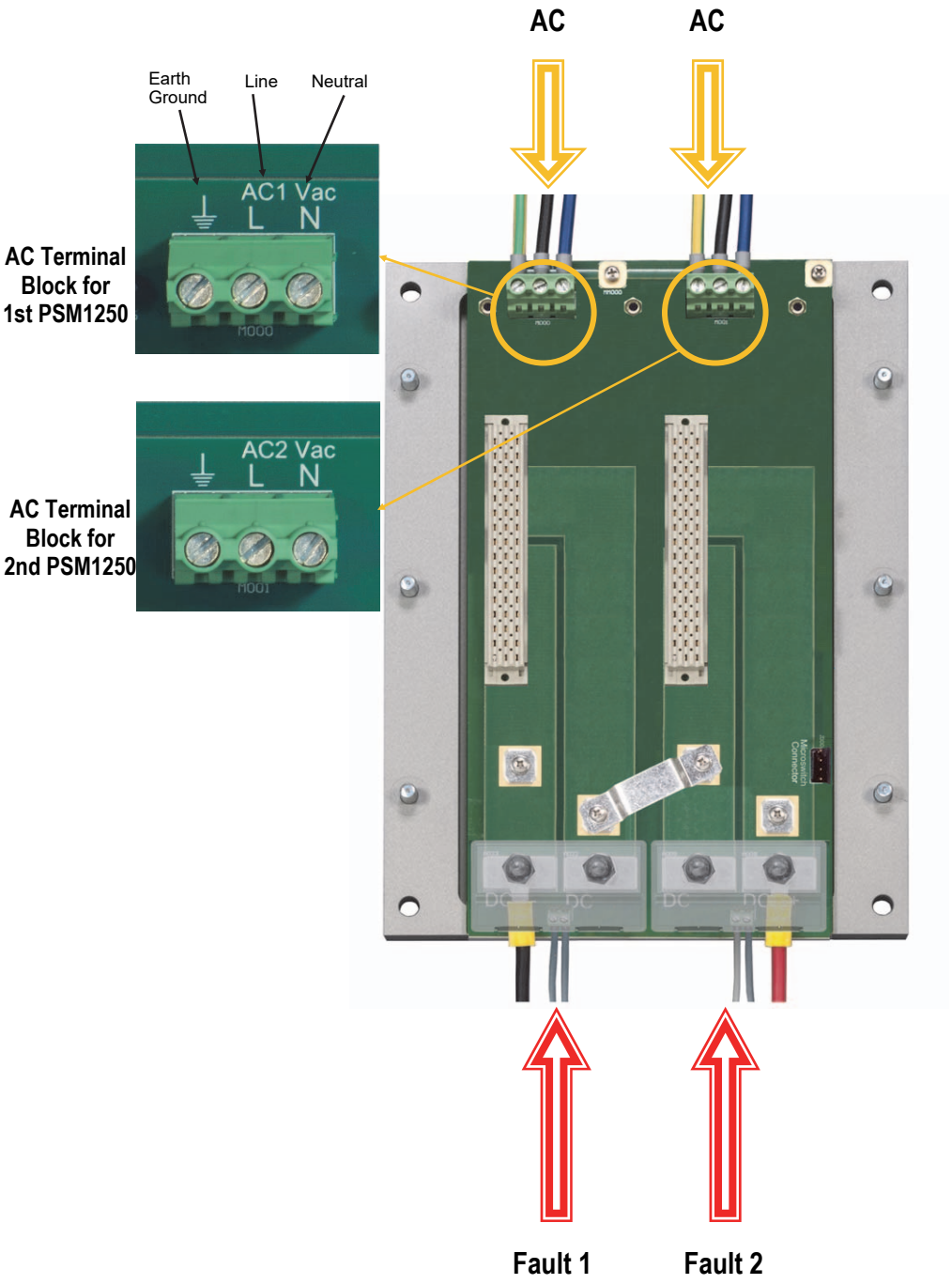


## Installation Procedure - 1st step: Back Panel installation (for wall mounting into a cabinet)

The following drawing with overall dimensions (mm) is applicable to: PSS1250-2-48.
The wall mounting panel is fixed to a vertical wall by means of four screws through four 7.00 mm diameter holes shown in the drawing.
The wall mounting panel must only be installed as oriented in the following drawing.



The following picture shows for example PSS1250-2-48 terminal block wiring.

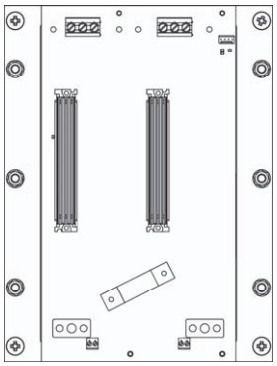


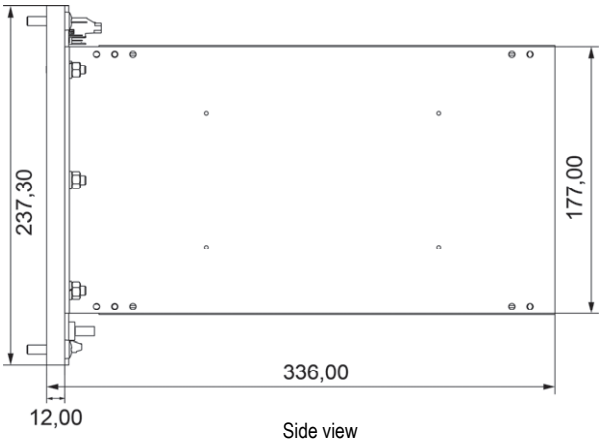

The PSS1250-2-48 system requires one AC input power line, to drive both PSM1250 power supply modules.
See functional diagram at page 5 for more information about wiring connection.
For AC input terminal blocks, use a typical cable section of AWG12 (maximum AWG11 or 4 $mm^2$).

About PSS1250-2-48 fault indication, it's important to connect in series the Fault relay contacts of two PSM1250 modules, so that when a PSM1250 module goes in fault condition, the fault is reflected to whole PSS1250-2-48 system because the PSS1250-2-48 Fault contact can be considered the series of the Fault relay contacts of two PSM1250 modules.
For fault contact output (of each PSM1250 ) terminal blocks, use a typical cable section of AWG18 (maximum AWG16 or 1.5 $mm^2$).

The following drawing shows overall dimensions (mm) of PSS1250-2-48, with rack unit mounted on back panel.
Fix the rack unit to 6 wall mounting panel bolts (3 on the right side and 3 on the left side) by means of 6 M6 nuts and groovers.

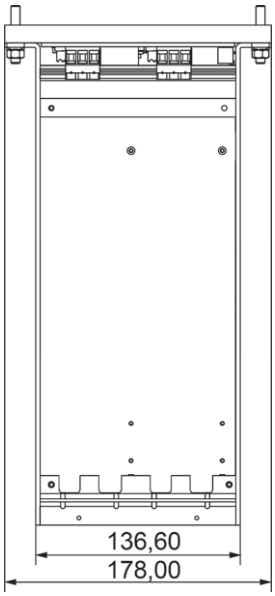
Front view

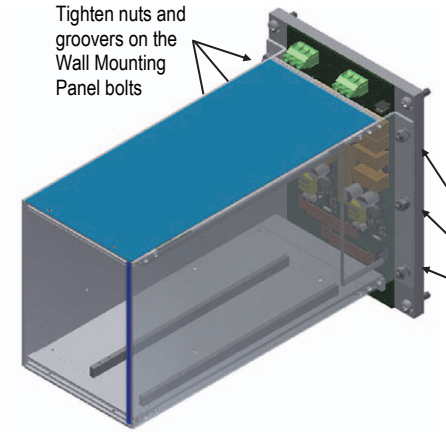





Side view

Top view

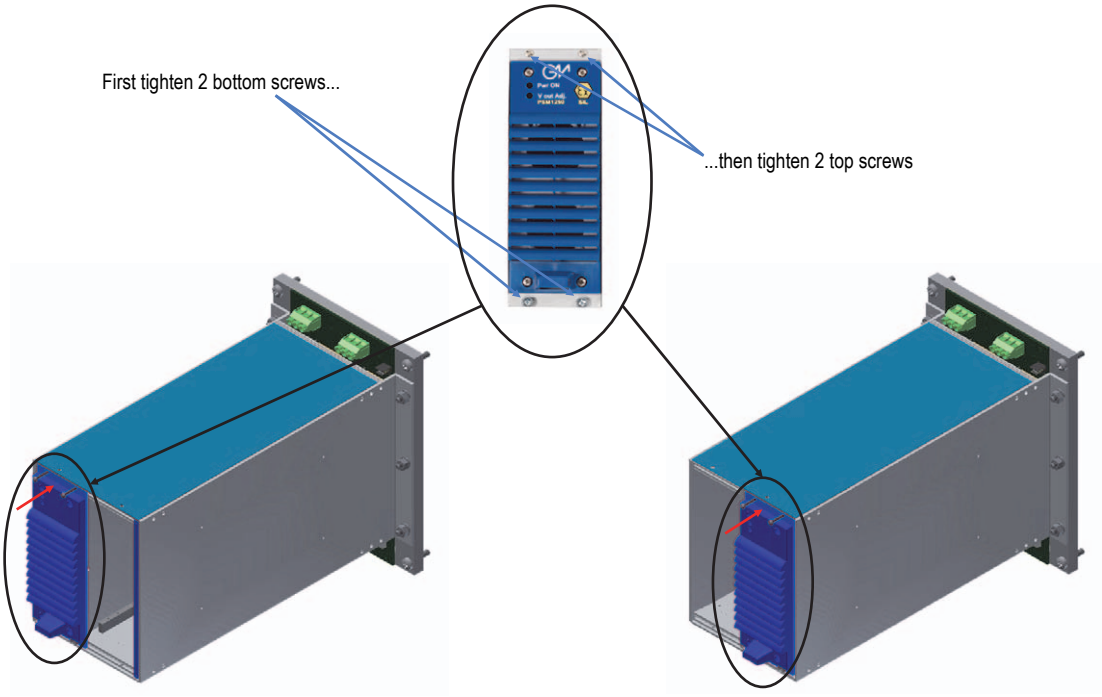


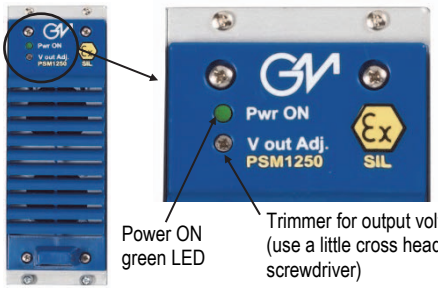



**This step could be not executed if PSS1250-2-48 output voltage factory setting to 48 Vdc is corrected for your applications.**
**Instead, execute this step if it's necessary to set up a different value for PSS1250-2-48 output voltage in the range 42 to 56 Vdc.**

**AC input power line is unpowered**.
The following procedure is split in 3 sub-steps and it is the same for each PSM1250, independently from its position in the rack unit.
Starting from position 1 to position 2, execute pre-start up of each PSM1250 module.

1st sub-step: insert and fix the PSM1250 module into the rack unit by means of its 4 screws on its front side.



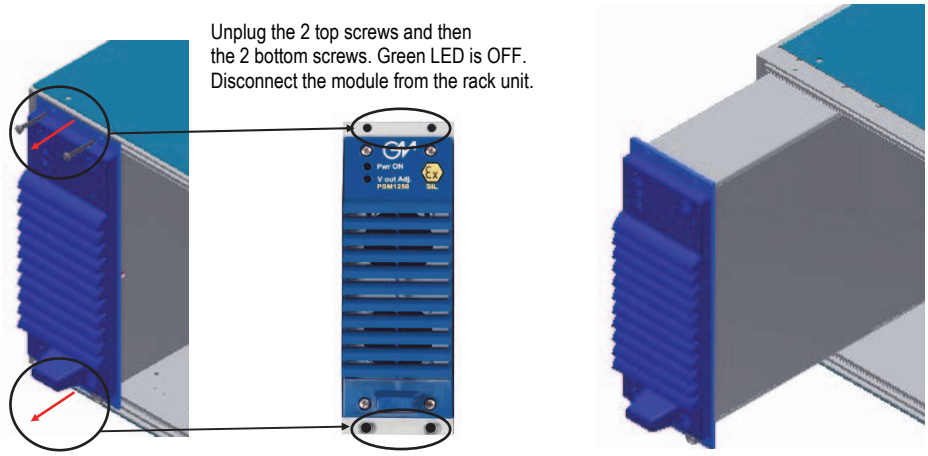




2nd sub-step: **powering AC input power line**, PSM1250 module is turned on, its front panel Power ON green LED is ON and 24 Vdc (factory setting) output voltage is present on PSM1250 screw output terminals DC- and DC+ (see page 4 for more information about Power ON green LED signalling).
The output voltage can be measured on PSM1250 screw output terminals by means of a multimeter.
If it is required to set an output voltage value different from factory setting (24 Vdc), use the trimmer for output voltage adjusting. Turn the trimmer clockwise (to the right) to increase output voltage (max. 28 Vdc) or turn the trimmer counterclockwise (to the left) to decrease output voltage (min. 21 Vdc).
To set PSS1250-2-48 output voltage to V_out-system value in the range 42 to 56 Vdc, therefore V_out-PSM must be set to V_out-system / 2 value, because 2 PSM1250 modules have their outputs connected in series.


1st PSM1250 screw output terminals on copper bars:
DC1- is negative out pole,
DC1+ is positive out pole.

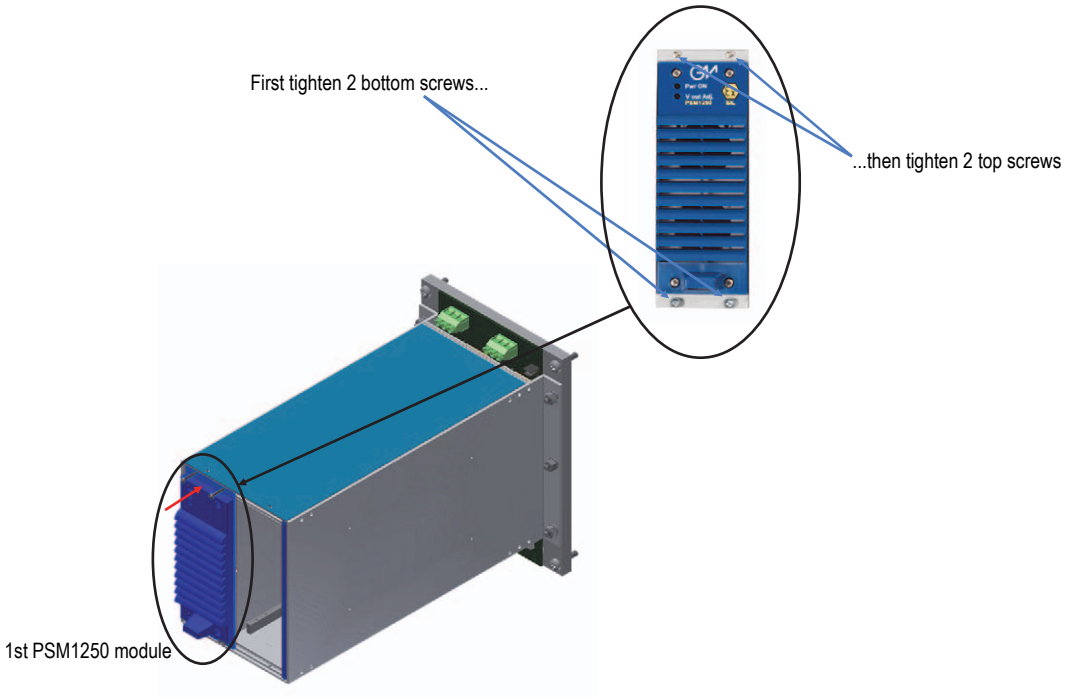

2nd PSM1250 screw output terminals on copper bars:
DC2- is negative out pole,
DC2+ is positive out pole.

3rd sub-step: after having adjusted the PSM1250 output voltage, **unpower AC input power line** to turn off the power module. Then release 4 screws on its front side and disconnect the module from the rack unit in order to repeat sub-steps 1 to 3 procedure for other module and complete the setting for both PSM1250 of PSS1250-2-48 power system.




In this figure only the 1st PSM1250 module is shown but the same disconnection procedure is also applicable to the 2nd PSM1250 module.

At this step **AC input power line is unpowered**, while both PSM1250 modules are disconnected.
Now insert and fix the 1st PSM1250 module into the rack unit by means of its 4 screws on its front side.




To wire bottom screw output terminal on copper bar (DC1- is negative out pole of PSS1250-2-48 system), see Fig. 1-2-3-4-5, where it's shown DC1- and DC1+, related to the 1st PSM1250 module.
For Back Panel, see functional diagrams at page 5 for more information about wiring connection.

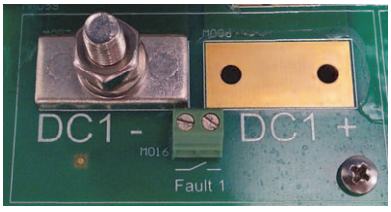


Fig. 1

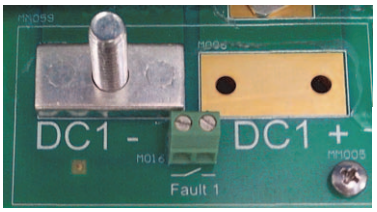
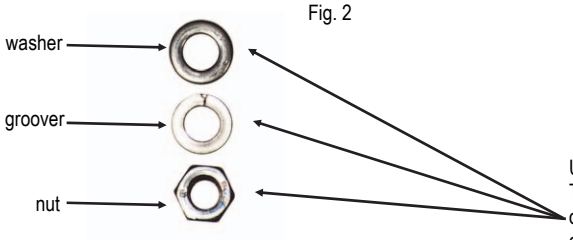


Fig. 2



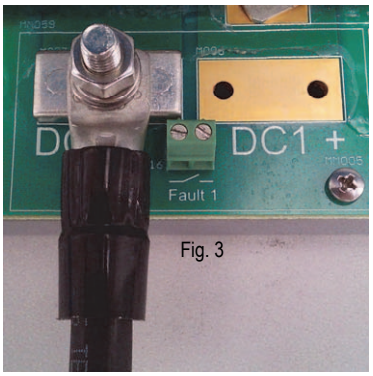



Fig. 3

Unplug M6 nut, groover and washer.
Then insert the cable lug with wire (negative out wire of PSS1250-2-48), washer and groover on the screw output terminal. Finally tighten nut to fix wire.

For DC screw output terminal, use a typical cable section of AWG7 (maximum AWG5 or 16 $mm^2$).

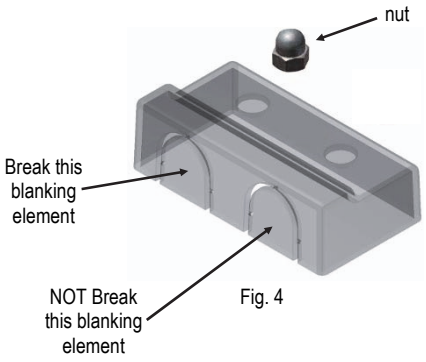


Fig. 4

A polycarbonate cover is used for IP20 to protect each couple of screw output terminals. Break only left side preformed blanking element to allow cable passage (negative out wire of PSS1250-2-48). Do NOT break right side preformed blanking element. Then insert and fix the cover on screw output terminal by means of M6 nylon-capped lock nut.

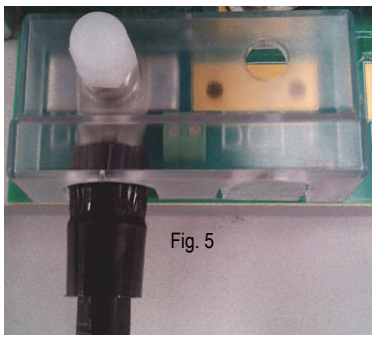
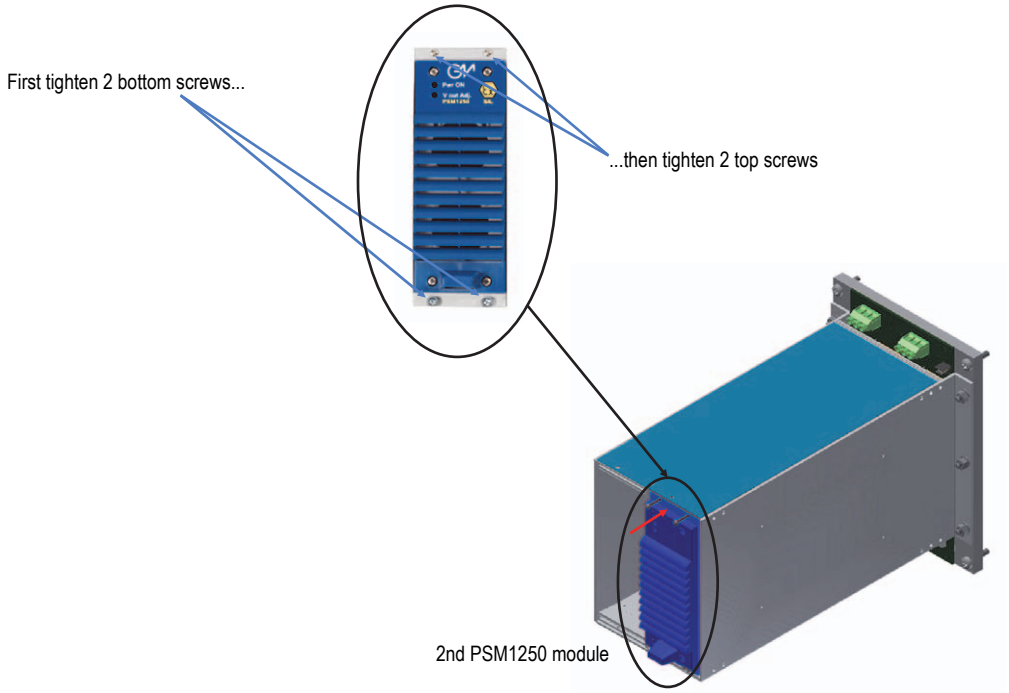


Fig. 5

## Installation Procedure - 4th step - Section C: Wiring of 2nd PSM1250 screw output terminal on copper bar (PSS1250-2-48 +DC out line) of Back Panel and start up of PSS1250-2-48 system

At this step **AC input power line is unpowered**, the 1st PSM1250 module is inserted and fix into the rack while the 2nd PSM1250 module is disconnect.
Therefore, insert and fix the 2nd PSM1250 module into the rack unit by means of its 4 screws on its front side.




To wire bottom screw output terminal on copper bar (DC2+ is positive out pole of PSS1250-2-48 system), see Fig. 1-2-3-4-5, where it's shown DC2- and DC2+, related to the 2nd PSM1250 module.
For Back Panel, see functional diagrams at page 5 for more information about wiring connection.

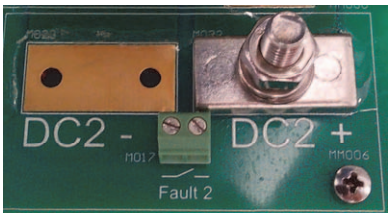


Fig. 1

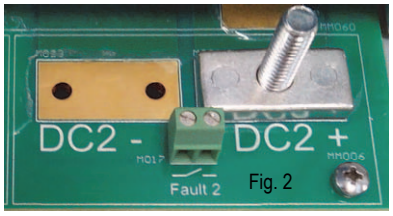
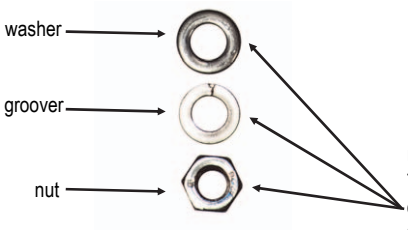


Fig. 2



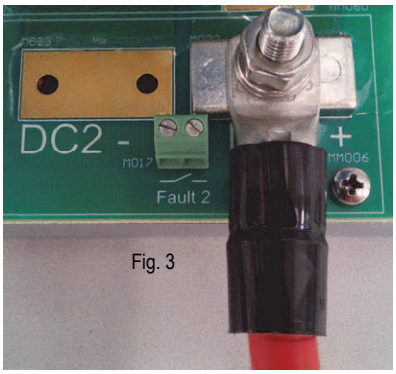



Fig. 3

Unplug M6 nut, groover and washer.
Then insert the cable lug with wire (positive out wire of PSS1250-2-48), washer and groover on the screw output terminal. Finally tighten nut to fix wire.

For DC screw output terminal, use a typical cable section of AWG7 (maximum AWG5 or 16 $mm^2$).

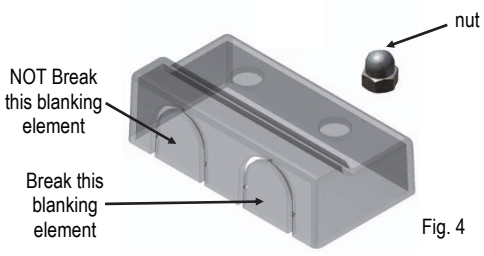


Fig. 4

A polycarbonate cover is used for IP20 to protect each couple of screw output terminals. Break only right side preformed blanking element to allow cable passage (positive out wire of PSS1250-2-48). Do NOT break left side preformed blanking element. Then insert and fix the cover on screw output terminal by means of M6 nylon-capped lock nut.

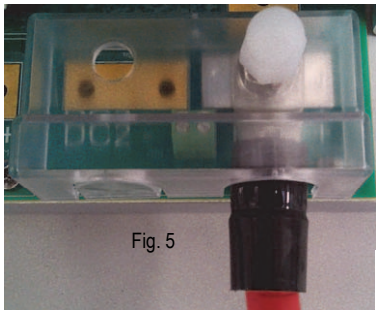


Fig. 5

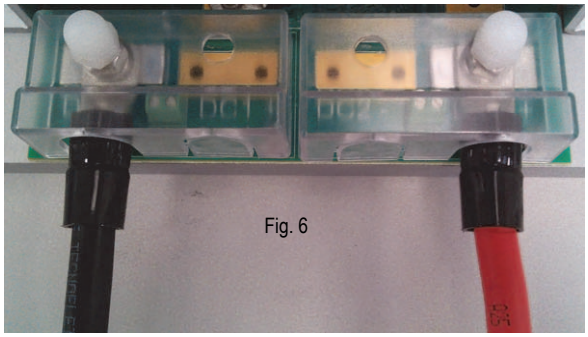
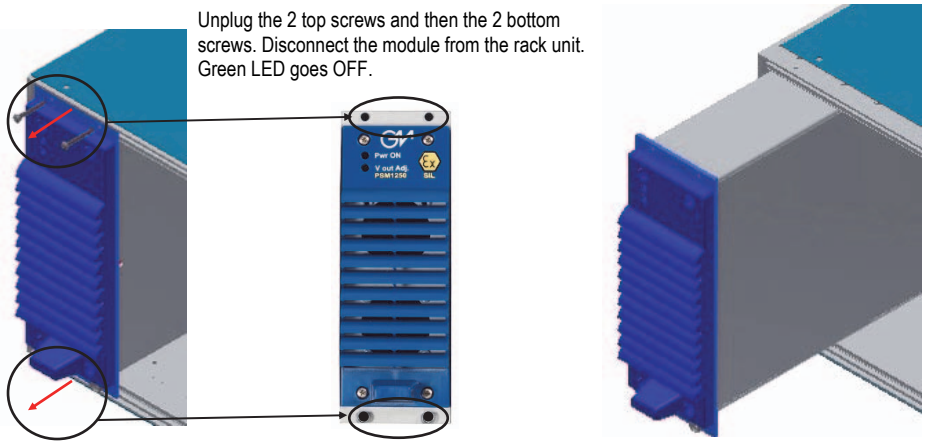


Fig. 6

After having wired all DC output lines (see Fig. 6) and tighten front panel screws, start up the PSS1250-2-48 system by **powering AC input power line**.
Both PSM1250 power modules will turn on and the PSS1250-2-48 system DC output lines will power the load.

## Shutdown and Disconnecting Procedure of PSM1250 power module from the rack unit

Disconnection of a PSM1250 module from the rack unit, must be done by switching off the power from AC lines.
To remove a PSM1250 power module release 4 screws on its front side and disconnect the module from the rack unit.



Unplug the 2 top screws and then the 2 bottom screws. Disconnect the module from the rack unit. Green LED goes OFF.

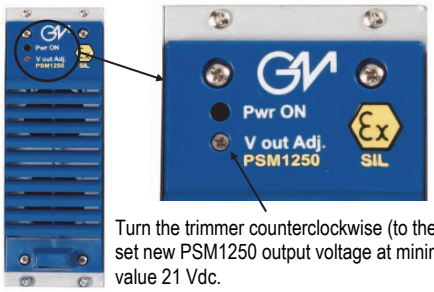
## Replacement Procedure of PSM1250 power module from the rack unit

To disconnect a PSM1250 module from the rack unit, follow the previous procedure "**Shutdown and disconnecting procedure of PSM1250 power module from the rack unit**" to unplug the PSM1250 module.

**If replace procedure is executed on a PSS1250-2-48 system with output voltage set to 48 Vdc,** take a new PSM1250 power module, follow only sub-step n°2 and finally restart the PSS1250-2-48 system by powering AC input power line.

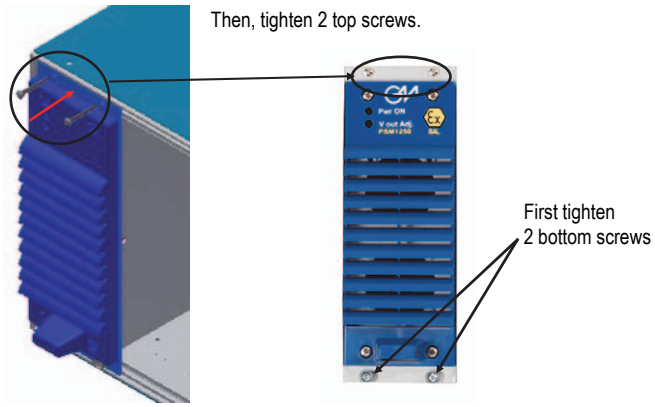
Instead, **if replace procedure is executed on a PSS1250-2-48 system with a different output voltage value in the range 42 to 56 Vdc,** take a new PSM1250 power module and follow sub-steps n°1, 2, 3.

Sub-step n° **1**




Turn the trimmer counterclockwise (to the left) to set new PSM1250 output voltage at minimum value 21 Vdc.

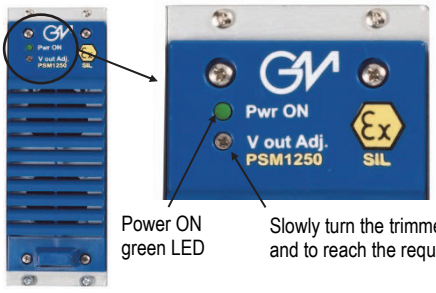
Sub-step n° **2** Then insert and fix the new PSM1250 module into the rack unit by means of its 4 screws on front side. First tighten 2 bottom screws and then tighten 2 top ones.



Then, tighten 2 top screws.

First tighten 2 bottom screws

Sub-step n° **3**




Power ON green LED

Slowly turn the trimmer clockwise (to the right) to increase the new PSM1250 output voltage and to reach the required PSS1250-2-48 output voltage in the range 42 to 56 Vdc.

Now, restart the PSS1250-2-48 system by powering AC input power line, so that the new PSM1250 module is powered and its green LED is ON. Then set PSS1250-2-48 output voltage in the range 42 to 56 Vdc by slowly increasing the new PSM1250 module output voltage, turning its trimmer clockwise (to the right).