



GM International SIL 3 power supply system

Unmatched special features

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SIL 3 modular power supply system for installation in Zone 2 / Div. 2, 24Vdc, up to 3600 W redundant

MODULES

PSD1220	20Amp, SIL 3, DIN Rail mounted
PSW1250	50Amp, SIL 3, wall mounted
PSS1250	Up to 6 modules of 50Amp , SIL 3, rack or wall mounted, hot swappable, diagnostic & monitoring optionally

Features

N+N redundant GMI PSU

It can be used with N+N redundant configuration as also with N+1 or N+2 redundant configuration.

External OR-ing diode not required for redundant configuration

Each GMI PSU has got internal MOSFETs with dedicated integrated circuit controller to give active ideal OR-ing diode necessary for paralleled / redundant output configuration.

PSU alarm contact wiring to DCS/PLC

Each GMI PSU has got fault relay contact (closed in normal condition and open in case of fault) to signal undervoltage or overvoltage fault output condition.

Replacement cycle of old PSU

All GMI PSU use long life (5000 h at 105°C) bulk electrolytic capacitors (output of 1st internal stage or PFC stage) and long life (7000 h at 105°C) DC output electrolytic capacitors (output of 2nd internal stage or PWM stage). Bulk capacitors have lower life than DC output capacitors. According to bulk capacitors datasheet a lifetime multiplier factor of 32 can be applied when mean ambient temperature is less than 50°C and operating ripple current at 120 Hz is less than 1.25 times than rated ripple current at 120 Hz. Therefore, 5000 h multiply for 32 factor is equivalent to 160000 h, or to 18 years. Further considering mean ambient temp within control room panel, around 40 °C and max 50% constant loading on individual PSU modules (redundant mode) the lifetime expectancy goes over 20 years in practical sense.

HOLD-UP TIME or BUFFER TIME in case of momentary AC mains failure

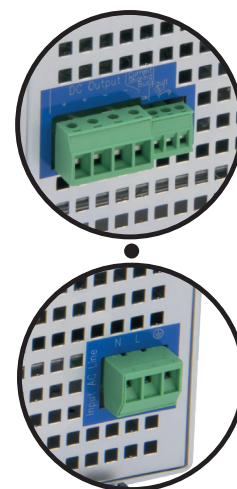
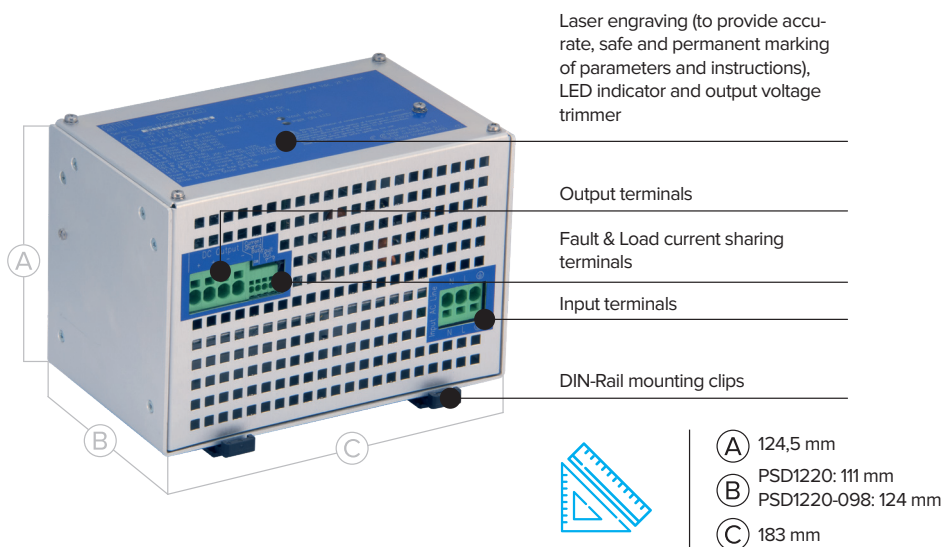
The hold up time (AC input) is 22msec at full load condition i.e. 24 Vdc output voltage can hold the max. current during an absence of Vac input up to 22 msec (that is a cycle at 50 Hz and more than a cycle at 60 Hz AC frequency). This Hold-up time is inversely proportional to the load: example, in case of load 70% of full capacity 20A i.e. 14A, the hold up time will be $22/0.7 = 32\text{ms}$ (approx).

Load current sharing

All GMI power supplies can be paralleled on their output (there is internal active ideal OR-ing diode (AID) and their internal load current sharing circuits operate to distribute current load equally to each power supply module to increase reliability and reduce internal power dissipation of each module. For correct current sharing operation, the power supply modules have output voltages calibrated (by trimmer on frontal panel) within $\pm 0.5\text{ V}$ (for PSW1250 or PSM1250) and $\pm 0.3\text{ V}$ (for PSD1220 or PSD1220-098). Another advantage of load current sharing functionality is the request of little modification on system output voltage when 2 or more PS modules are normally operating. Indeed, a light increment of system output voltage is possible by changing the output voltage of only one PSU, holding unchanged output voltage setting for other PS modules.



PSD1220



PSD1220-098 version with removable terminals, which are equivalent to predecessor

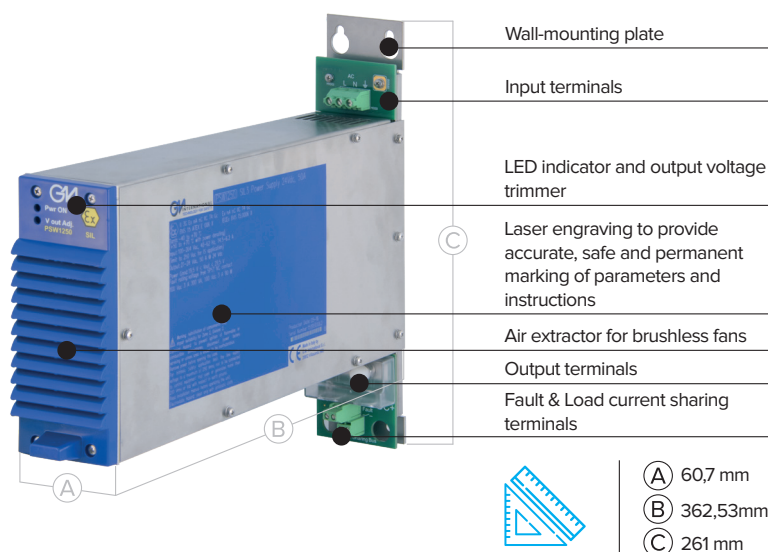
SIL 3 power supply - 20 A, 24 V

PSD1220 is the latest addition to the GM International power supply line, offering an innovative 20 Amps DIN Rail unit. It supersedes predecessor model PSD1210 doubling the output capacity, yet retaining the exact same dimensions, terminal blocks and mounting arrangements. Compact in size, yet fully featured: from SIL3 certification to automatic load sharing, very high efficiency (93%) and suitable for installation in classified areas.

PSD1220 modules are "Din rail mounted TUV certified SIL3 & SC3 power supply system, for NE as well as ND load more specifically, 2 x PSD1220 modules with paralleled outputs is a SIL3 & SC3 power supply system (with full redundancy and T-proof = 10 years) for NE load up to 20 Amps. Then, 3 x PSD1220 modules with paralleled outputs is a SIL3 & SC3 power supply system (with full redundancy and T-proof = 1 year) for ND load up to 20 Amps. In addition, 2 x PSD1220 modules with paralleled outputs is a SIL2 & SC3 power supply system (with full redundancy and T-proof = 4 years) for ND load up to 20 Amps.

T-proof time value is calculated supposing power system dangerous failures ≤ 10% of total SIF dangerous failures.

PSW1250



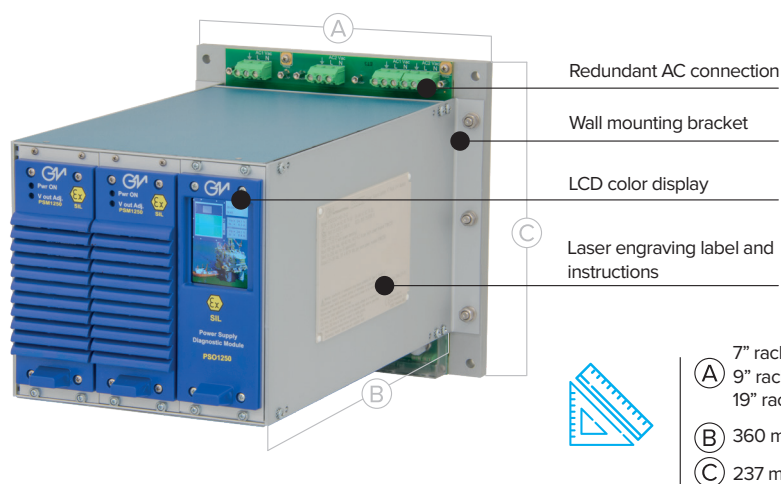
ENCLOSURE CHARACTERISTICS

- Wall or DIN-Rail mounting compact housing
- Load sharing up to 10 modules
- Remote alarm contact
- Redundant fans

SIL 3 power supply - 50 A, 24 V

PSW1250 is the most powerful unit GM International can offer in a single wall mounted solution. Innovative design and state-of-the-art circuitry have been used to provide 50 Amps in such a small package; with efficiency higher than 89%. All the features of the rack mounted series are made available in this compact solution with SIL 3 certification and installation in + 70°C ambient temperature.

PSS1250



ENCLOSURE CHARACTERISTICS

- Wall or rack mounting compact housing
- Field configurable copper bar outputs
- DNV marine type approval
- 2/4/6 modules configuration available
- Redundant AC supply connection

- 7" rack: 178 mm
- 9" rack: 238 mm
- 19" rack: 482mm
- (B) 360 mm
- (C) 237 mm

How to detect the degradation of PSU?

GMI PSS1250 rack power supply system, with two or more (up to six) PSM1250 power supply modules, can be also equipped with PSO1250 diagnostic module to query each PSU (using an internal proprietary bus) and read data such as: input/output voltage, current and power; input line frequency; output current sharing percentage; internal temperature; alarm status (under/over out voltage, AC line absence, internal PFC or PWM stage in OFF state, internal high temperature, fans malfunctioning). Alarm status of one or more power modules is signaled by opening contact of common fault NE relay (contact closed in normal condition) on related PSS1250 rack backboard terminal block. This information is available via front panel LCD color touch screen and externally via Modbus RTU on related PSS1250 rack backboard terminal block. The PSO1250 does not interfere with the power system functional safety. The power system can perfectly work without the diagnostic module and any failure of the diagnostic module does not affect system performance, reliability and SIL level of functional safety applications. Therefore PSO1250 could be used to define a methodology to detect and forecast degradation of each PSU in the PSS1250 system by observing data of each PSU during operating time.

A possible "rack mounted PSU system" could be a PSS1250-HS-2 power supply system wall mounting, 7 inches rack with 2 PSM1250 power supply modules, each up to 50 Amps. HS in the order code is related to hot swapping capability, useful and optional in safe area installation but mandatory if this system is installed in Zone 2 / Division 2. The system is TUV certified SIL3 & SC3 for NE and SIL2 & SC3 for ND load. More specifically, this system is SIL3 & SC3 (with full redundancy and T-proof = 8 years) for NE load up to 50 Amps. Then, this system is SIL2 & SC3 (with full redundancy and T-proof = 2 year) for ND load up to 50 Amps. T-proof time is calculated supposing power system dangerous failures ≤ 10% of total SIF dangerous failures.

Hot swapping feature



Hot swapping solution; also certified for Zone 2 installation

- Power supply is close to the load, in hazardous area
- Less cables, lower voltage drop, lower costs
- Connection and disconnection under power without interrupting operations (certified)



