

SMi2800

USER GUIDE



1 - INSTALLATION

- 1.1 This apparatus is intended only for installation in a RESTRICTED ACCESS LOCATION and must be professionally installed by trained service personnel only.
- 1.2 This apparatus is intended to be installed in a host enclosure such that following installation operator access can be gained to the Front Panel ONLY and access cannot be gained to connections at the rear of the unit.
- 1.3 This apparatus must be installed in an enclosure to which the incoming safety earth is hard wired.
- 1.4 This apparatus is classified as being L5M1 as defined in UL1950/CSA C22.2 No.950, Table NAA1.
- 1.5 **Caution. Double-pole : neutral fusing.** This apparatus contains protection fuses in both input conductors (Live and neutral). This apparatus has been designed such that it can be connected to an IT Power System.
- 1.6 The apparatus must be installed such that one pole of its output is connected to the system earth in accordance with 2.5 of EN60950 (IEC950).
- 1.7 The output and signal ports are shown in section 7. The safety status of these ports is declared as SELV as defined in 2.3 of EN60950 (IEC 950). Each interconnection circuit with the rectifier should at its interconnection point, meet requirements of SELV.

WARNING:- Failure to observe the above precautions may result in hazardous condition on the network

- 1.8 The apparatus is intended for use in system where connection to its signal ports is limited to a maximum of 10 metres.
- 1.9 Polarity - For reference to the polarity of the output of the unit and/or which output pole should be connected to earth, see the unit's rating label and refer to the diagram in section 7 of this document.
 - indicates the negative (-) output pole is to be connected to earth.
 - + indicates the positive (+) output pole is to be connected to earth.

2 - MAINTENANCE

This equipment requires no routine maintenance, and is not designed for repair or maintenance to be carried out in the field. However, if it is felt necessary to remove the covers, the following precautions must be observed:

- 2.1 Remove the equipment from its host enclosure.
- 2.2 Wait 5 minutes before removing cover.
- 2.3 Check with a suitable voltmeter fitted with isolated test probes that the equipment carries no dangerous voltage at its input or its output or between the HT- and HT+ test points adjacent to the reservoir capacitors.
- 2.4 Adjustment should be made using only a suitable isolator trim tool.

3 - HAZARDOUS MATERIAL

Under normal circumstances there are no hazards arising from material used in SAFT manufactured equipment operated within its specification limits in accordance with the relevant Operating Manual. However, if the equipment is subject to misuse or an external fire, some of the electronic components used do contain very small amounts of rare metals and other substances which may be released or generate toxic gases when subject to very high temperatures.

Batteries if supplied as part of power systems will not constitute a risk when used as specified but do contain hazardous substances in the form of strong acids or alkalis, which may be released if subject to misuse, mechanical damage or fire which may also release toxic gases from the case materials.

For further specific information relating to any of our products please contact SAFT Power Systems Ltd.

4 - SPECIFICATIONS – 48V UNIT (24V UNIT SHOWN IN PARENTHESIS)

1.	AC Input Voltage	180V-305V rms, nominal. Single phase. 85V-180V rms, extended. Single phase. Extended range > Output Current Limit derated.
2.	Frequency	45 to 66 Hz.
3.	Inrush Current	Less than normal peak current.
4.	Inrush Current Harmonics	sinusoidal to IEC555-2
5.	Maximum input current (worst case conditions)	17.1A rms.
6.	Power Factor	Better than 0.99 typically.
7.	Efficiency	Greater than 90% (88%) for 40% to 100% load and nominal input voltage.
8.	Output voltage adjustment range	42V to 60V (21V TO 30V)
9.	Output Current Limit	50A (92A) nominal
10.	Line regulation	Less than 10mV
11.	Load regulation	Forced slope of 100mV min (50mV min) to ensure equal current sharing between Rectifiers.
12.	Load sharing of parallel connected rectifiers	It is possible to connect Rectifiers in parallel in order to share a common load. The maximum number of rectifiers in parallel on a single CAN bus is 31. For larger systems, it is possible to parallel blocks of 31 Rectifiers.
13.	Ripple and noise	Narrow band noise less than 7mV from 1KHz to 100MHz. Wide band noise 5mV/MHz bandwidth over the range 3KHz to 100MHz. Voice band noise psophometric. Weighted 2mV (To CCITT) Flat 10mV (To CCITT)
14.	Transient Response	For a step load change of 10-90-10% rated load, maximum voltage deviation will be 1.5V maximum, recovering to 0.5V in less than 5ms. Transient response is measured at the output terminals at 25°C.
15.	Reverse bleed current	Less than 5mA.
16.	Soft start	Output voltage and current will ramp up with no overshoot.
17.	Temperature co-efficient	Less than 0.015% per °C (150ppm/°C)
18.	Output Polarity	The Serial Bus is referenced to Ground potential.
19.	Overload protection	Constant current set to 51A max. (94A Max)
20.	Over-voltage trip	Adjustable from 47V to 63.8V (23.5V to 31.9V). When more than one Rectifier is working in parallel, only the faulty Rectifier will shut down.

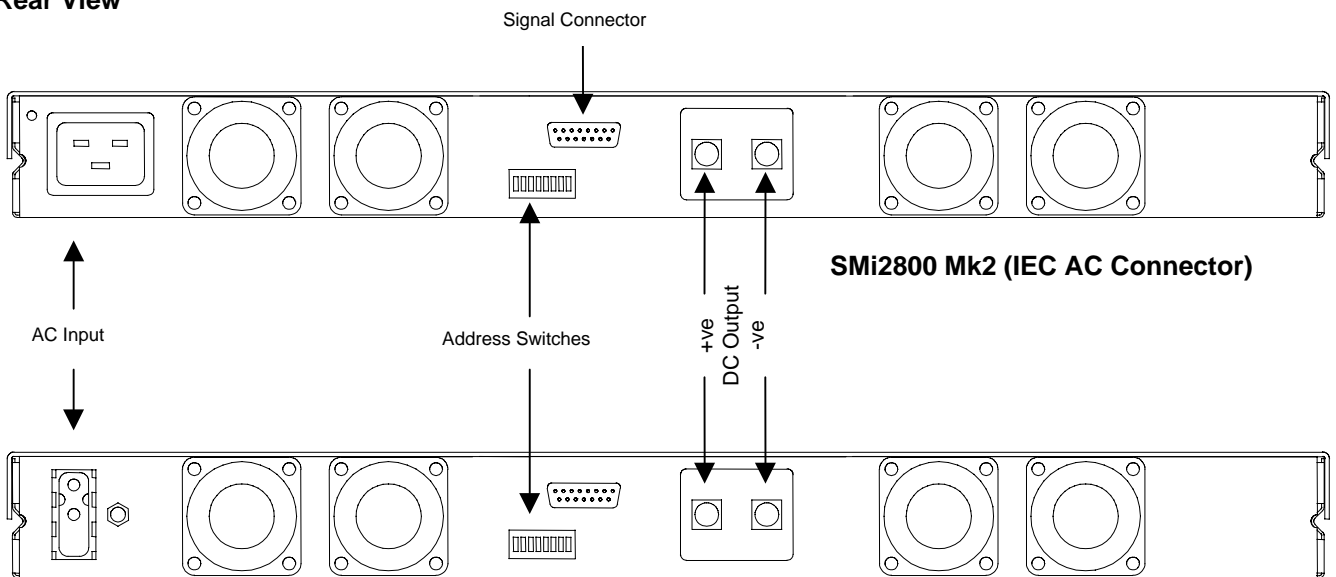
21.	Output remote shutdown	Function not included.
22.	Reverse polarity protection	The Rectifier contains protection fuses in its DC Output to protect against reverse polarity connection of these lines.
23.	Input Over-voltage Trip	The Rectifier will shutdown if the input voltage exceeds 305V rms. The Rectifier shall automatically recover upon removal of input over-voltage condition.
24.	Input Under-voltage Protection	The Rectifier shall protect itself against abnormally low input supply conditions by reducing its output current limit.
25.	Thermal protection	The Rectifier monitors its internal hot spot and incorporates an over-temperature trip, which is adjustable via the serial bus. The Rectifier will reduce its maximum output current under Abnormal (high temperature) operating conditions in order to protect itself.
26.	Temperature compensation	Function not included.
27.	Remote sense	Function not included.
28.	Digital I/O	The Rectifier accepts digital I/O communication via a 2 wire Canbus.
29.	Hot plug	The Rectifier is designed to be hot plugged into a live system without the use of circuit breakers.
30.	Remote indicators – Front Panel	The Rectifier incorporates 4 front panel LED's indicating Output Present, AC Present, Rectifier On-line, and Fault. A fault indicates the Rectifier has failed and cannot produce power.
31	Remote Indication – Signal Connector	Function not included.
32.	ENVIRONMENTAL	
	Cooling	Fan cooled with active control.
	Operating Temperature	The Rectifier will supply full rated power from -15°C to +50°C inlet ambient. Current limit is reduced at higher temperatures. Extended operating conditions extend to -40°C and +70°C.
	Storage Temperature	-40°C to +80°C
	Humidity	0-95% RH non-condensing.
	Pressure – Normal Operating	750 to 1100hPa (3000 metres)
	Pressure – Non-Operating	750 to 1100hPa (3000 metres)
	Pressure – Short Term (1 hour)	250hPa (12000m)
33.	EMC (conducted and radiated)	Compliant with EN50081-1, EN50082-2, EN55022 'B', EN61000-4-5, EN300386, and ANSI62.41.
34.	Safety	Compliant with EN60950.
35.	Outline Dimensions	1U High (44.5mm max.), 305mm Deep (excluding connectors), 19" (483mm) Front Panel.

5 - STANDARD FACTORY SETTINGS

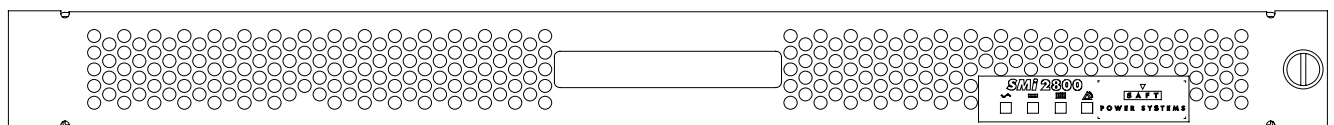
Output Voltage (Zero load)	54.48V (27.24V)
Current Limit/Short Circuit Current	50.0A (92A)
I_{\leq} Imin Current	5.0A (11A)
Over-Voltage Threshold	57.6V (28.8V)
Over-Temperature Trip	100°C
Slope Temperature Compensation STC	+/- 1,44V (+/-0.72V)
Start Up Delay	4 secs
Ramp Up Time	4 secs

6 - INPUT/OUTPUTS AND INDICATORS

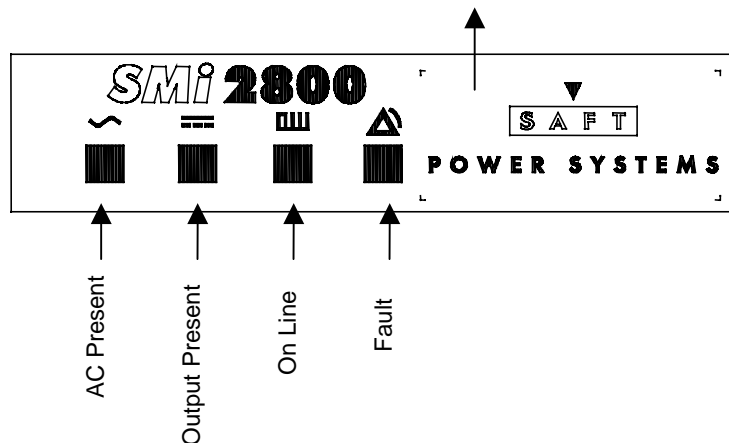
Rear View



Front View:



Signal Connections



8000014115 BAL, EN

Pin no.	Signal name	Signal Description
1		Not used
2		Not used
3		Not used
4	I _{cs}	Active current share connection. This needs to be connected to each rectifier that is required to share current.
5	CANL	CAN bus connection
6		Not used
7		Not used
8		Not used
9		Not used
10		Not used
11	D _{gnd}	Digital ground
12	CANH	CAN bus connection
13	RIP	Rectifier in place - the rectifier will only start if this connected to D _{gnd}
14		Not used
15		Not used

LED indicators :-

AC present - this is green if the AC voltage at the input is sufficient to run the unit.

Output present - this illuminates green if the output current exceeds a threshold set either through the system controller. The default is 10% of maximum output current, so on the 2800i the LED will come on if the unit is supplying more than 5amps (*11amps*).

On line - this shows that the rectifier is communicating with the system controller. When you first switch the system on it will be off and after a few minutes it will be on more or less continuously if all is well. If the controller is not present it will flash briefly every 20s as the rectifier checks to see if a controller has been plugged in.

Fault - Indicates a hardware fault which prevents the unit from working or communicating with the controller. Most faults are displayed through the controller and do not illuminate the red fault LED. Only fatal problems such as the inverter not running or a problem with the processor control system in the rectifier will bring the red fault light on, as at this point it would be unable to communicate with the controller.

7 - Address Switch Settings

The Rectifier is « Plug & Play », so it is possible to add or extract a rectifier even if the system is running.

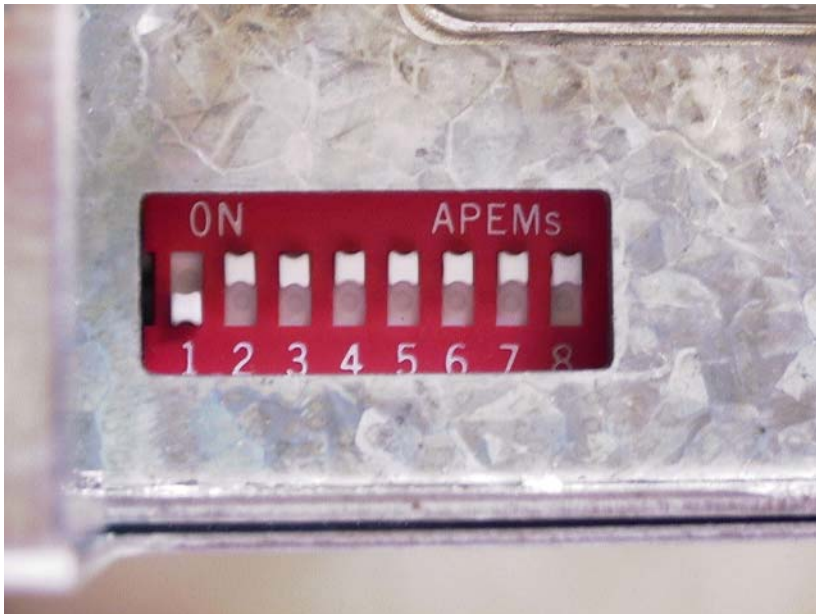
If a Rectifier is added, the Controller will update the system settings automatically to show the new Rectifier configuration.

For security reasons, if a Rectifier is removed, the Controller will flag an alarm after a short delay requiring the Installer to update the system configuration setting for number of Rectifiers. This confirmation can be done via the Controller Front Panel or via the Front End Software.

For system Log-on purposes, and to ensure the Rectifier Display Map on the Front End Software shows the Rectifiers in a logical order as arranged in the system, the 8-way Dip switches on the rear or the Rectifier should be configured as shown below.

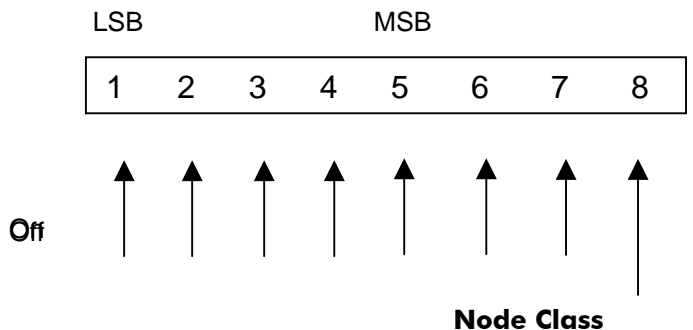
It is necessary to set the Dip Switches on each Rectifier prior to inserting it into the system.

The corresponding Rectifier addressing (MACID) in the Controller will then correspond to the number set on the Rectifier Dip Switches.



**Picture shows
Address 1
Node Class 8**

Set Dip switches (MACID) as follows:



Weighting: 1 2 4 8 16 Not Used

- Notes:
- 1) Switch down (Off) is binary value 1, switch up (On) is binary value 0.
 - 2) Address 0 is not valid – do not use.
 - 3) Ensure that each Rectifier is given its own unique Dip Switch setting and that no two Rectifiers on one system CanBus have the same setting.
 - 4) Node Class switches, SW6 and SW7 are for future expansion. SW6 and SW7 should normally be set to Node Class 8. When System controllers become available that can communicate with node classes 9, A and B as well as node class 8 then it will be possible to control systems of up to 124 rectifiers using a single CAN bus.

SW6	SW7	Node Class
ON	ON	8
OFF	ON	9
ON	OFF	A

Address Switch Setting:

MACID	SW1	SW2	SW3	SW4	SW5	MACID	SW1	SW2	SW3	SW4	SW5
0	NOT VALID/DO NOT USE					16	ON	ON	ON	ON	OFF
1	OFF	ON	ON	ON	ON	17	OFF	ON	ON	ON	OFF
2	ON	OFF	ON	ON	ON	18	ON	OFF	ON	ON	OFF
3	OFF	OFF	ON	ON	ON	19	OFF	OFF	ON	ON	OFF
4	ON	ON	OFF	ON	ON	20	ON	ON	OFF	ON	OFF
5	OFF	ON	OFF	ON	ON	21	OFF	ON	OFF	ON	OFF
6	ON	OFF	OFF	ON	ON	22	ON	OFF	OFF	ON	OFF
7	OFF	OFF	OFF	ON	ON	23	OFF	OFF	OFF	ON	OFF
8	ON	ON	ON	OFF	ON	24	ON	ON	ON	OFF	OFF
9	OFF	ON	ON	OFF	ON	25	OFF	ON	ON	OFF	OFF
10	ON	OFF	ON	OFF	ON	26	ON	OFF	ON	OFF	OFF
11	OFF	OFF	ON	OFF	ON	27	OFF	OFF	ON	OFF	OFF
12	ON	ON	OFF	OFF	ON	28	ON	ON	OFF	OFF	OFF
13	OFF	ON	OFF	OFF	ON	29	OFF	ON	OFF	OFF	OFF
14	ON	OFF	OFF	OFF	ON	30	ON	OFF	OFF	OFF	OFF
15	OFF	OFF	OFF	OFF	ON	31	OFF	OFF	OFF	OFF	OFF

8 - CHECKING UNIT OPERATION

To check that a rectifier is working correctly, it is possible to connect power directly to the unit without using a controller or mounting cradle.

For units with an IEC AC Connector, a suitable IEC60320(16A/21A) IEC AC connector is required for mains supply.

For units with a Harting AC Connector, an AC cable needs to be made up using the following parts:

1 off	Harting HANC module 09 14 003 3101	SAFT part number KKC HAN FECON0
2 off	Harting Female contact 09 32 000 6205	SAFT part number KEK CRP CTFE02
1 off	Multi contact Earth socket B5N	SAFT part number SKT0359

In addition a standard 15 way D style connector with a link between pins 11 and 13 is required.

Set the rectifier on a bench with the ac connected, 'D' connector in place and a meter connected to the DC power pins. Switch on the ac input power. The green ac present LED should illuminate. After about 5 seconds a DC output voltage corresponding to the current fallback setting voltage should appear on the output pins. Connect a resistive load such that the unit is providing in excess of 15 amps and the green dc LED should then illuminate. The orange communication LED will flash approximately every 20s if the uP control circuitry is operating correctly.

There are no user adjustments so if the unit does not function as described above it will need to be returned to SAFT for repair.

9 - CUSTOMER SERVICE

If the troubleshooting procedures fail to fix your problem, consult the specialist.

SAFT POWER SYSTEMS WORLDWIDE can propose the following services:

- Repair
- Supply of spare parts
- Preventative maintenance
- User training
- Maintenance contracts

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