

**DESCRIPTION**

Unipower's **SGH9233-R1U** is a 650 Watt fault-tolerant power system manufactured to support high-end server and communication equipment. The power system consists of two SGH3000 Power Modules which mate into the SGHR1U Chassis / Backplane.

**The SGH3000 Power Module:**

- Universal AC Input with Active PFC
- >92% Efficiency (at 50% Load)
- +12V Main with 5VSB oUTPUT
- Active Current Share with OR'ng Diodes
- >100,000 Hours MTBF (MIL217F)

**The SGHR1U Chassis / Backplane:**

- DC-DC Regulation for ATX outputs
- Parallel Connecting the Power Modules
- ATX Output Harness (standard)

The power system provides hot-swap / redundant functionality of the AC-DC Power Supplies and the backplane's dc-dc regulators feature reliability measured in millions of hours to support high-reliability applications.

**FEATURES**

- ◆ ≥80% Efficiency @ 115VAC
- ◆ 1U High: 1.63"
- ◆ 0°C to +50°C Operation (Full Load)
- ◆ Universal AC Input
- ◆ >0.95 Power Factor (minimum)
- ◆ Hot Swappable / Redundant Operation
- ◆ International Safety Approvals
- ◆ Class B EMI Filter
- ◆ LED Indicators
- ◆ TTL Compatible Status & Control Signals
- ◆ PMBus Serial Communications
- ◆ Variable Speed Cooling Fans

**TWO-YEAR WARRANTY**

**INTERNATIONAL STANDARDS**

UL/cUL 60950-1, TUV EN 60950-1  
CB IEC 60950-1, WEEE, CE Mark (LVD)



**Fault-Tolerant Power System**

MODEL	POWER	VOUT	IOUT
SGH9233-R1U (integrated system)	650W	3.3V	24A
		5V	24A
		12V	53A
		-12V	0.5
		5VSB	3A

**Component Parts**

MODEL	DESCRIPTION
SGH3000	650 Watt Hot-Swap Power Module
SGHR1U	650 Watt Chassis & Backplane

# SGH3000 POWER MODULE SPECIFICATIONS

Typical at Nominal Line, Full Load and 25°C Unless Otherwise Noted.

## INPUT

Voltage Range	90-264 VAC
Power Factor	>0.95
Total Harmonic Distortion, Max	5%
Frequency	47-63Hz
Inrush Current Limiting, Max	35 / 70A Peak @ 115 / 230 VAC
EMI Filter, Conducted	FCC20780 pt 15J Curve B EN55022 Curve B
Fast Transients	EN61000-4-4
Surges	EN61000-4-5
Remote Sense Compensation	>250mV
Input Protection	Internal Fuse, 15A

## OUTPUT

Current & Voltage	12V @ 54A, 5VSB @ 3A
Output Power	650W
Ripple / Noise, max	12V = 120mV   5V = 60mV
Line Regulation	Max ±1%
Load Regulation	Max ±5%
Transient Load / Slew Rate	0.5/Aus
Holdup Time	17msec @ 70% load
Overvoltage Protection (12V Only)	14.5V Max (Latch Off)
Current Limit	>130% (Latch Off)
Efficiency	87% Minimum at Full Load

**SAFETY STANDARDS** ..... UL60950-1, CSA22.2 No. 60950-1, EN60950-1

**PMBus Version Compliance** ..... 1.1

## STATUS INDICATORS

Normal(AC OK)	Green
Standby (Only +5VSB output)	(AC OK) Blinking Green
Power Fail	Red
Fan Fail	Blinking Red
Audible Buzzer	Fan / Power / AC Failure

## ALARM SIGNALS (open drain, TTL compatible)

PSON	Remote ON Off (LOW=ON)
PSKILL	Activates PSU (Short)
PDBALERT	Run Fan at Max Sped (LOW)
PDB FAULT	System Fault Shutdown (HIGH)
PWOK	Power Good (HIGH)
PS Present	Indicates Power Module is present

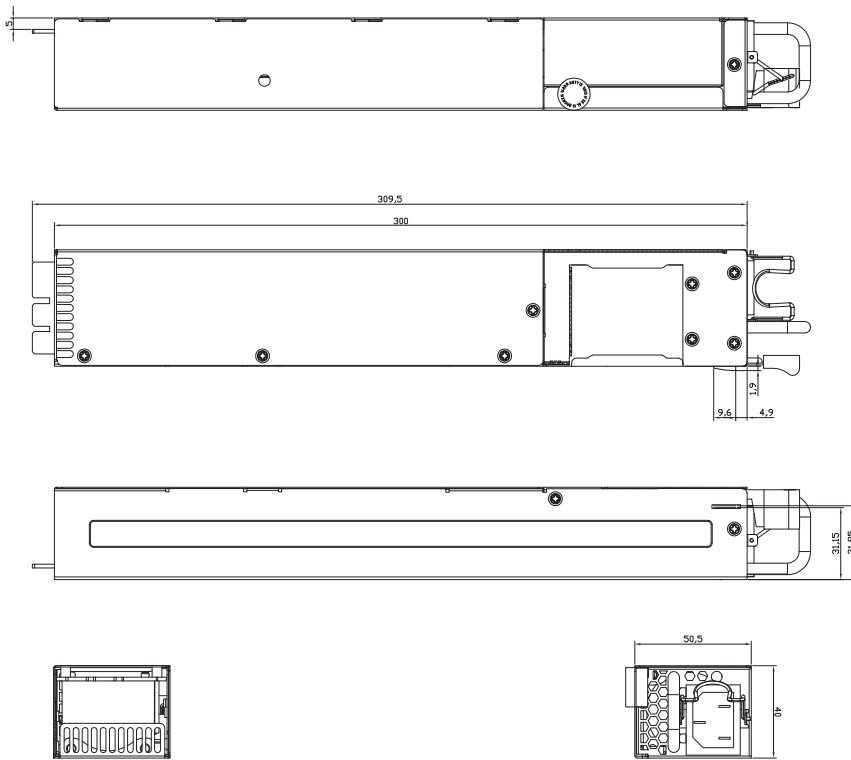
## ENVIRONMENTAL

Operating Temp. Range	0°C to +50°C (Full Load)
Output Current Derating	3%/°C, 50°C to 60°C
Storage Temp. Range	-40°C to + 70°C
Humidity	0% to 95%, Non-Condensing
ESD	Bellcore GR-1089-Core and EN61000-4-2
MTBF, 25°C (MIL217F)	100,000 Hours
Cooling	Integral Ball Bearing Fans

## PHYSICAL SPECIFICATIONS

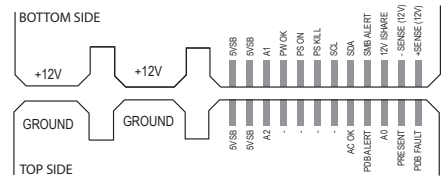
Case Material	Steel
Case Dimensions, Inches (mm)	11.81"(L) x 1.99"(W) x 1.57"(H) (300 x 50.5 x 40mm)
Weight	2.4 lbs. (1.1 kg.)

## OUTLINE DRAWING



## DC CONNECTOR DETAILS

Edge Connector mates with Molex 45984-4161



Pin Name	Function
+12V	+12V power output
GND	Grounding
5VSB	+5V standby power
A0	I2C Address(LSB)
A1	I2C Address(MSB)
Vsense	5VSB negative feedback
PW_OK	Power Good Output. Signal is pulled HIGH to indicate all outputs ok.
PSON	Module PSON. Remote control Power On/Off (Pulled LOW = POWER ON)
PS_KILL	Activate PSU by hot-plug activity
SCL	I2C CLOCK
SDA	I2C DATA
PDB-ALERT	To receive ALERT signal from system or PSU backplane. If signal is pulled LOW, the power internal fan shall be forced to run at maximum speed to improve thermal performance
SMB-ALERT	If PSU FAIL,FAN FAIL,OCP occurs, signal will be pulled from High to Low , PSU normal =High(TTL LEVEL)
12LS	12V Load Share
Present	This pin is grounded with a 47R resistor. To indicate a power has been plugged in.
12VRS+	+12V Remote sense
12VRS-	+12V negative feedback
PDB-FAULT	To receive a FAULT signal. Power shall be shutdown if this pin is pulled HIGH.

# SGHR2U CHASSIS / BACKPLANE SPECIFICATIONS

Typical at Nominal Line, Full Load and 25°C Unless Otherwise Noted.

## INPUT

Input from Power Modules .....+12 VDC, 5VSB

## OUTPUT

Voltage	Minimum Load	Current	Load Regulation	Line Regulation	Ripple & Noise
3.3V	0A	24A	±5%	±1%	60mV
5V	0A	24A	±5%	±1%	60mV
12V	1A	53A	±5%	±1%	120mV
-12V	0A	0.5A	±5%	±1%	120mV
5VSB	0A	3.0A	±5%	±1%	60mV

Output Power ..... 650W  
 Holdup Time ..... >1 AC Cycle, Full Load  
 Overvoltage Protection ..... 3.3V, 5V, 12V only (Latch Off)  
 Current Limit ..... 3.3V, 5V, 12V only (Latch Off)  
 Efficiency ..... >92% (Minimum @ Full Load)

**SAFETY STANDARDS** ..... UL60950-1, CSA22.2 No. 60950-1, EN60950-1

## STATUS / CONTROL

Digital Communication ..... PM Bus Rev 1.1 (see specification)  
 Remote Sense ..... 3.3V, 5V, 12V Only  
 Normal ..... High Signal (open drain, TTL compatible)  
 Power Fail ..... Low Signal (open drain, TTL compatible)  
 Fan Fail ..... Low Signal (open drain, TTL compatible)

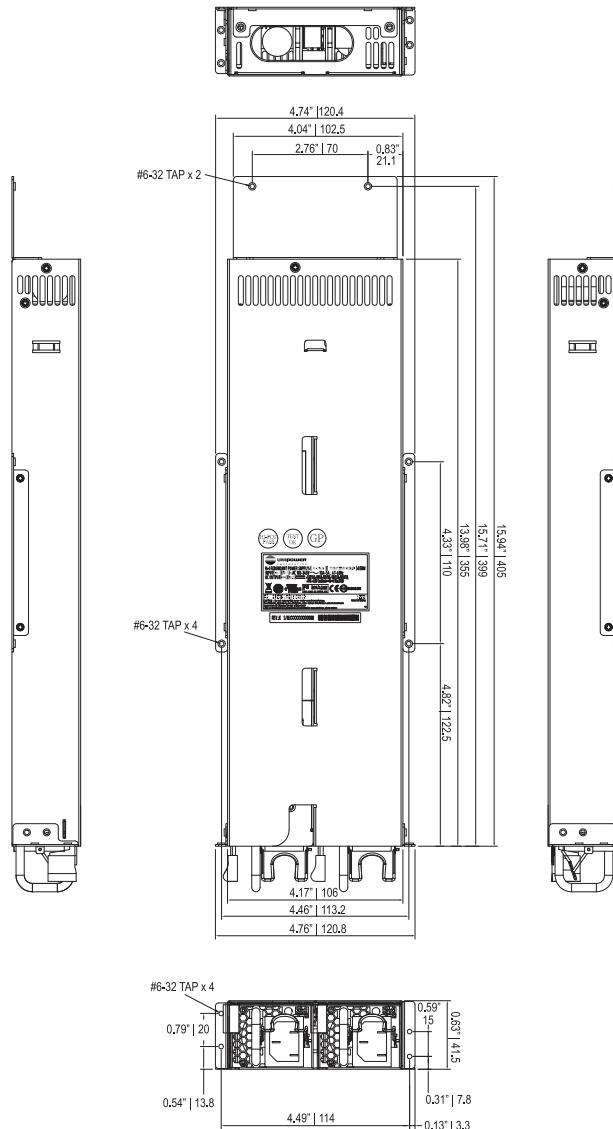
## ENVIRONMENTAL

Operating Temp. Range ..... 0°C to +50°C  
 Output Current Derating ..... 3%/°C, 50°C to 60°C  
 Storage Temp. Range ..... -40°C to +70°C  
 Humidity ..... 20% to 90%, Non-Condensing  
 ESD ..... Bellcore GR-1089-Core and EN61000-4-2  
 MTBF, 25°C (MIL217F) ..... 100,000 Hours  
 Cooling ..... Integral Ball Bearing Fans

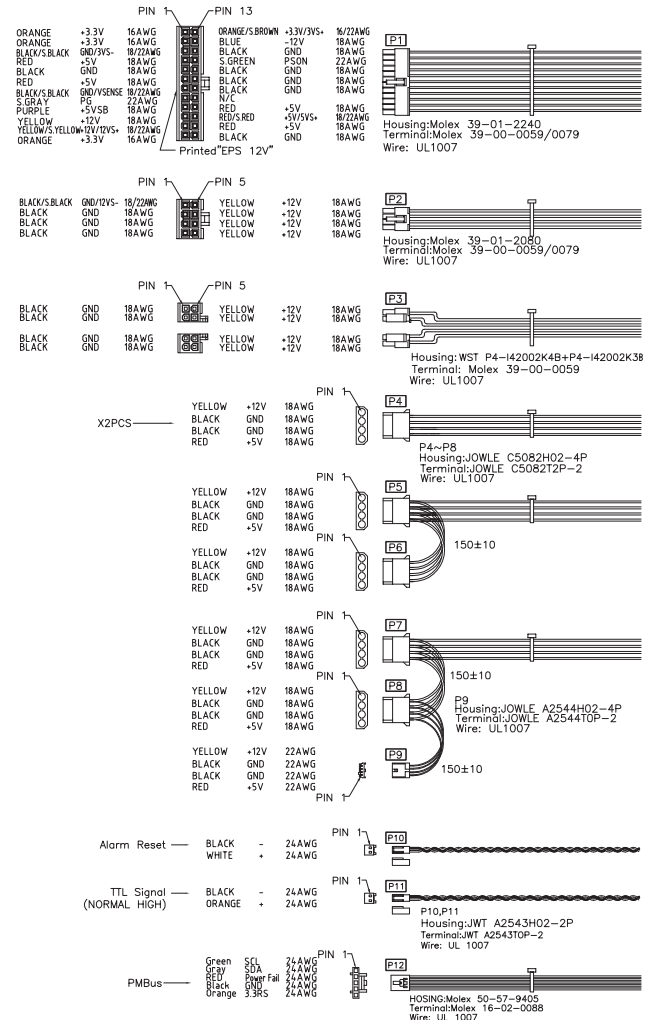
## PHYSICAL SPECIFICATIONS

Case Material ..... Steel  
 Dimensions ..... 13.97 x 4.17 x 1.63" / 355 x 106 x 41.5mm  
 Weight (populated chassis) ..... 9.92 lbs. (4.5 kg.)

## OUTLINE DRAWING



Standard Cable Assemblies are 500mm ±20mm. Customer specified cable assemblies available upon request and will be designated by customer specific suffix in the final part number.

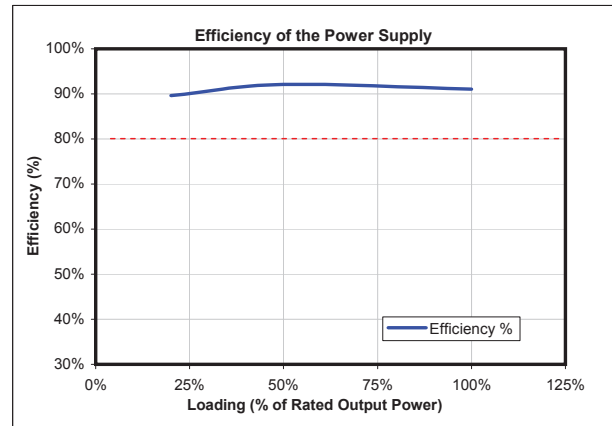
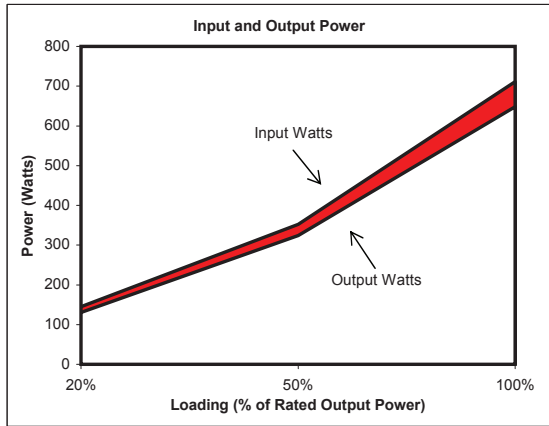


## EFFICIENCY TEST RESULTS

I <sub>RMS</sub> A	PF	I <sub>THD</sub> (%)	Load (%)	Fraction of Load	Input Watts	External Fan (W)**	DC Terminal Voltage (V)/ DC Load Current (A)			Output Watts	Efficiency %
							12V	5Vsb			
0.41	0.8212	33.35	*10%	Low	77	15.97	11.98/5.32		5.08/0.29	65	84.48%
0.70	0.8955	15.78	20%	Light	145	15.85	11.97/10.63		5.07/0.59	130	89.64%
1.57	0.9763	8.19	50%	Typical	352	15.85	11.95/26.51		5.04/1.47	324	92.08%
3.13	0.9887	8.10	100%	Full	712	15.73	11.95/52.97		5/2.94	648	91.04%

\* 10% load results are for informative purposes only and not included in certification requirements.

\*\* Fan power is not included in the efficiency calculations



## INDICATORS

### LED INDICATORS

Power Supply Status	Color
Normal(AC OK)	Green
Standby (AC OK)	Blinking Green
Power Fail	Red
Fan Fail	Blinking Red
AC Loss	Red

## PMBus SPECIFICATIONS

Command Code	Command Name	SMBus Transaction Type	Number of Data Bytes
19h	CAPABILITY	Read Byte	1
88h	READ_VIN(Note1)	READ WORD	2
89h	READ_IIN	READ WORD	2
8Bh	READ_VOUT	READ WORD	2
8Ch	READ_IOUT	READ WORD	2
8Dh	READ_TEMPERATURE_1	READ WORD	2
90h	READ_FAN_SPEED_1	READ WORD	2
91h	READ_FAN_SPEED_2	READ WORD	2
96h	READ_POUT	READ WORD	2
97h	READ_PIN	READ WORD	2
98h	PMBUS_REVISION	READ BYTE	1
99h	MFR_ID	READ BLOCK	6
9Ah	MFR_MODEL	READ BLOCK	9
9Bh	MFR_REVISION	READ BLOCK	2
9Eh	MFR_SERIAL	READ BLOCK	12
A0h	MFR_VIN_MIN	READ WORD	2
A1h	MFR_VIN_MAX	READ WORD	2
A7h	MFR_POUT_MAX	READ WORD	2
B0h	USER_DATA_00	READ BYTE	1

Note1: If AC Input= 90V ~ 180V PMBus sent the value of 115V  
If AC Input= 181V ~ 264V PMBus sent the value of 230V

Bit Number	Status Bit Name	Meaning
7	Reserved	Default=0
6	Reserved	Default=0
5	Reserved	Default=0
4	Reserved	Default=0
3	Reserved	Default=0
2	Module Status	Inserted=0, Not inserted=1
1	PS_ON Status	PS_OFF=0, PS_ON=1
0	AC Status	AC OK=0, AC Fail=1

Table 20 - Device address locations

PDB address A2/A1/A0	0/0/0	0/0/1	0/1/0	0/1/1	1/0/0	1/0/1	1/1/0	1/1/1
PSU IPMI FRU Device	A0h	A2h	A4h	A6h	A8h	AAh	ACh	AEnh
PSU PMBUS Device	B0h	B2h	B4h	B6h	B8h	BAh	BCh	BEh