e-Front runners

FH2200U1
12V 2200Watt 1U AC-DC FRONT END POWER SUPPLY

Special Features

- ◆Up to 25 W/Inch³ Power Density
- ◆Hot Swap N+1 Redundancy
- ◆Active Current Sharing (Single Wire)
- ◆I²C Serial Bus and PSMI Compliant
- ◆LED Indicators on Front Panel
- ◆Over Voltage, Over current and Under Voltage Protection
- ◆Over Temperature Protection
- ◆Remote ON/OFF , Remote Sense
- ◆Power Factor& Harmonic Corrected
- ◆UL60950-1(Ed.2), CSA60950-1(Ed.2), IEC60950-1(Ed.2) and EN60950-1(Ed.2)
- ◆RoHS Compliant
- ◆Front Panel AC Access via IEC60320 C20 Inlet

Input Specifications

Specification	Notes	Min.	Typ.	Max.	Units
Operating Voltage Range					
1225 W operation		90	-	132	Vac
2227 W operation		180	-	264	Vac
Input Frequency		47	50/60	63	Hz
Inrush current limitation		20	-	-	ApK
Input Current					
1225 W operation	Measured at 90Vac, Vout=12V, Load=91.7A	-	-	TBD	A
2227 W operation	Measured at 180Vac, Vout=12V, Load=181.7A	-	-	TBD	A
Power Factor	at 100% load, 230VAC	95	-	-	%
Input Leakage Current	240VAC	-	-	0.75	mA
Hold-up Time	Single Unit Operation, at 67% load	20	-	-	ms
Efficiency					
2227 W operation	Measured at 230Vac, Vout=12V, Load=181.7A	92	-	-	%
Input protection	Time delay Internal fuse	-	20	-	A

Output Specifications

Specification	Notes	Min.	Typ.	Max.	Units
Output Voltage		-	12.12	-	Vdc
Voltage Regulation		-3	-	3	%
Output Power	100Vac to 120Vac	-	-	1225	W
	200Vac to 240Vac	-	-	2227	W
Output Current	100Vac to 120Vac	0	-	99	A
	200Vac to 240Vac	0	-	181.7	A
Ripple & Noise	0.1uF of Ceramic Cap. & 10uF of Electrolytic Cap	-	-	120	mVp-p
Load Sharing	Difference between two units at full load	-	-	10	%
Remote sense	Line drop compensation	-	-	0.5	V

Auxiliary Output

Specificfation	Notes	Min.	Typ.	Max.	Units
Stand-by output Voltage		-	5	-	Vdc
Voltage Regulation		-3		3	%
Stand-by output Current		0	-	5	A
Ripple & Noise	0.1uF of Ceramic Cap. & 10uF of Electrolytic Cap	-	-	50	mVp-p
Stand-by output over voltage		5.6	-	6.3	Vdc
Stand-by output over current		110	-	150	%

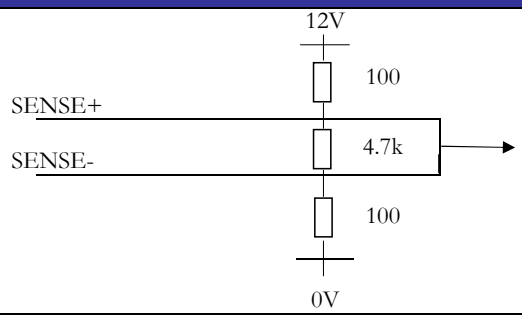
Protections

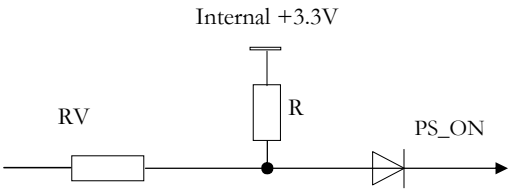
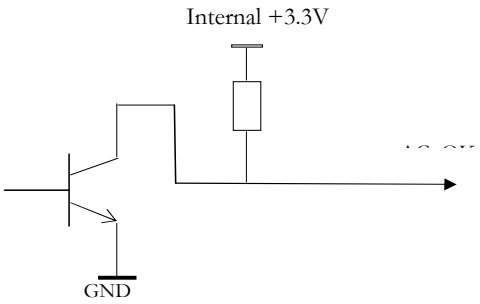
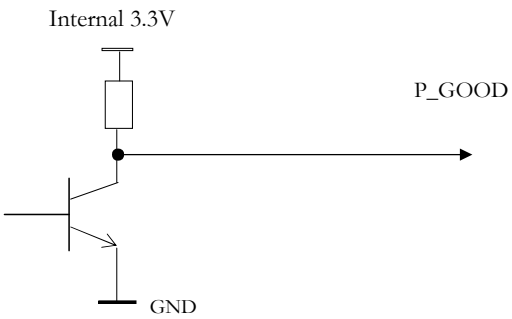
Specificfation	Notes	Min.	Typ.	Max.	Units
Input Under Voltage	Shutdown if input voltage < 160V for more than 1 sec	-	160	-	Vac
Output Over Voltage	Shutdown	14	-	16	Vdc
Output Under Voltage	Shutdown	3.5	-	9.6	Vdc
Output Over Current	Shutdown	110	-	150	%
Over Temperature	Output shuts off	-	-	-	℃

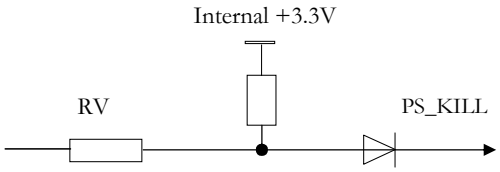
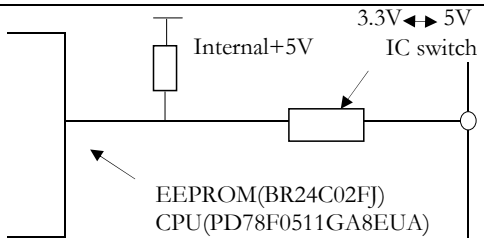
Serial Communications

Communications	Signal
Signals	SENSE+ PS_KILL SENSE- I_SHARE PS_ON FRU(I2C_CLOK, I2C_DATA, I2C_ADR0, I2C_ADR1, I2C_ADR2) AC_OK P_GOOD PS_PRESENT
LED Signals	Refer to LED Indicators on Page 7

Signal Condition

Signal Type	Circuit Condition	Electrical Condition
Input Signal SENSE+ SENSE-		Remote Sense (12V Output)

Signal Type	Circuit Condition	Electrical Condition
Input Signal *PS_ON		12V Output turn ON/OFF signal Low (Below 1V) = On
Output Signal AC_OK		Signal monitoring input voltage Low (Below 0.4V at 4mA) =Brownout High (Above 2.4V) =Normal
Output Signal P_GOOD		Output working signal Low (Below 0.4V at 4mA) =Abnormal High (Above 2.4V) = Normal
PS_PRESENT		Power supply present indicator Low (Below 0.4V at 4mA) = Present High =Not-present

Signal Type	Circuit Condition	Electrical Condition
Input Signal PS_KILL		Signal indicating a forcible PSU disconnect for hot-swapping Low (below 1V) =Enabling PS_ON signal High (Above 2V) = Forcible PSU disconnect
I-SHARE		12VDC current balance signal Outputs from 100V input and 200V are propotional
FRU I2C_CLOK I2C_DATA I2C_ADR0 I2C_ADR1 I2C_ADR2		Refer to PSMI spec for details Physical condition -Depends on the 12C bus condition

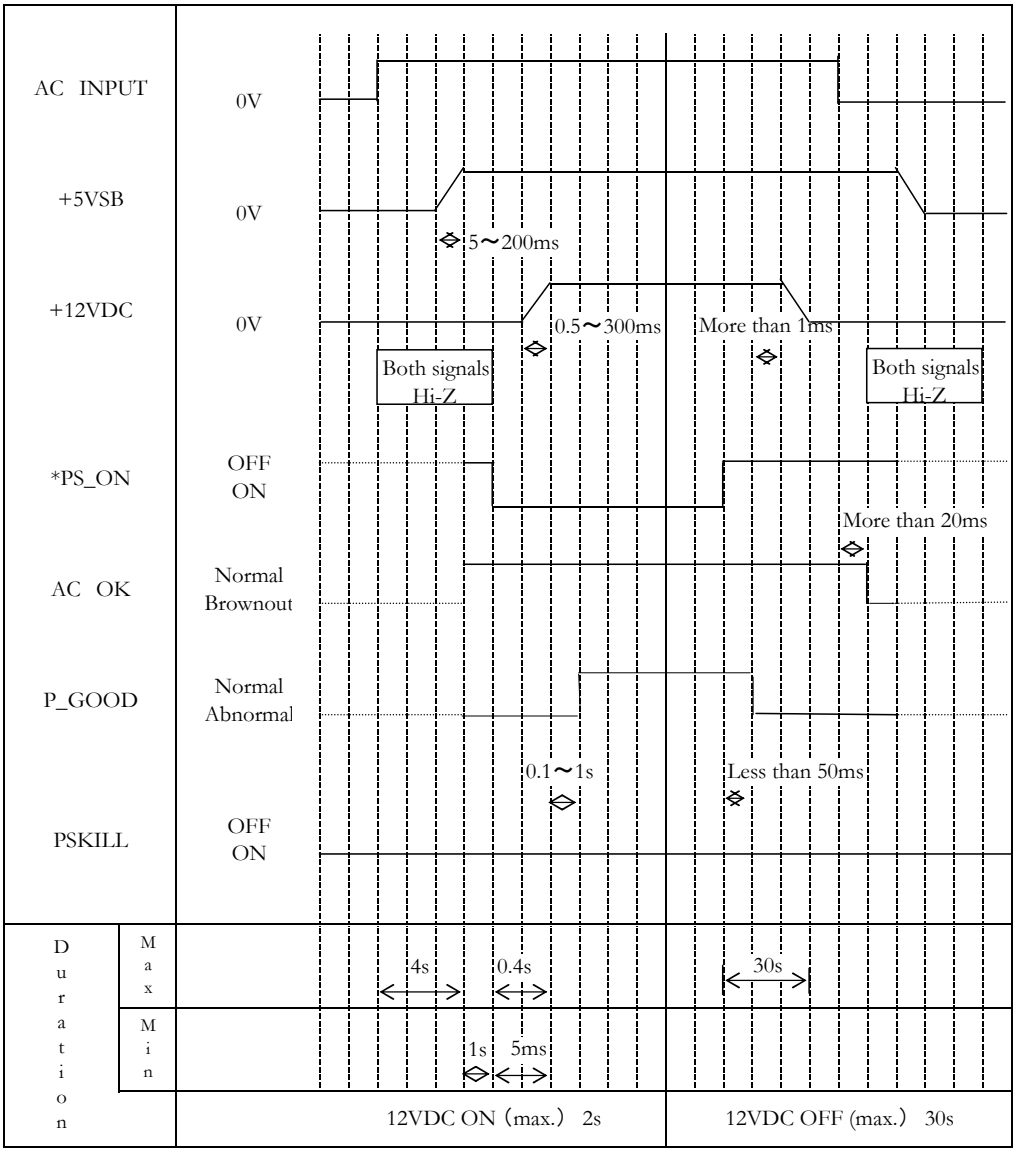
Note: Filter circuit needed to absord noise that may emerge on the output signals

*3 Power Supply ON / OFF/KILL Operation

PSKILL (ON / KILL)	REMOTE (ON / OFF)	OUTPUT	5VSB OUTPUT	FAN STATE
ON	ON	ON	ON	ON
ON	OFF	OFF	ON	OFF
KILL	ON	OFF	OFF	OFF
KILL	OFF	OFF	OFF	OFF

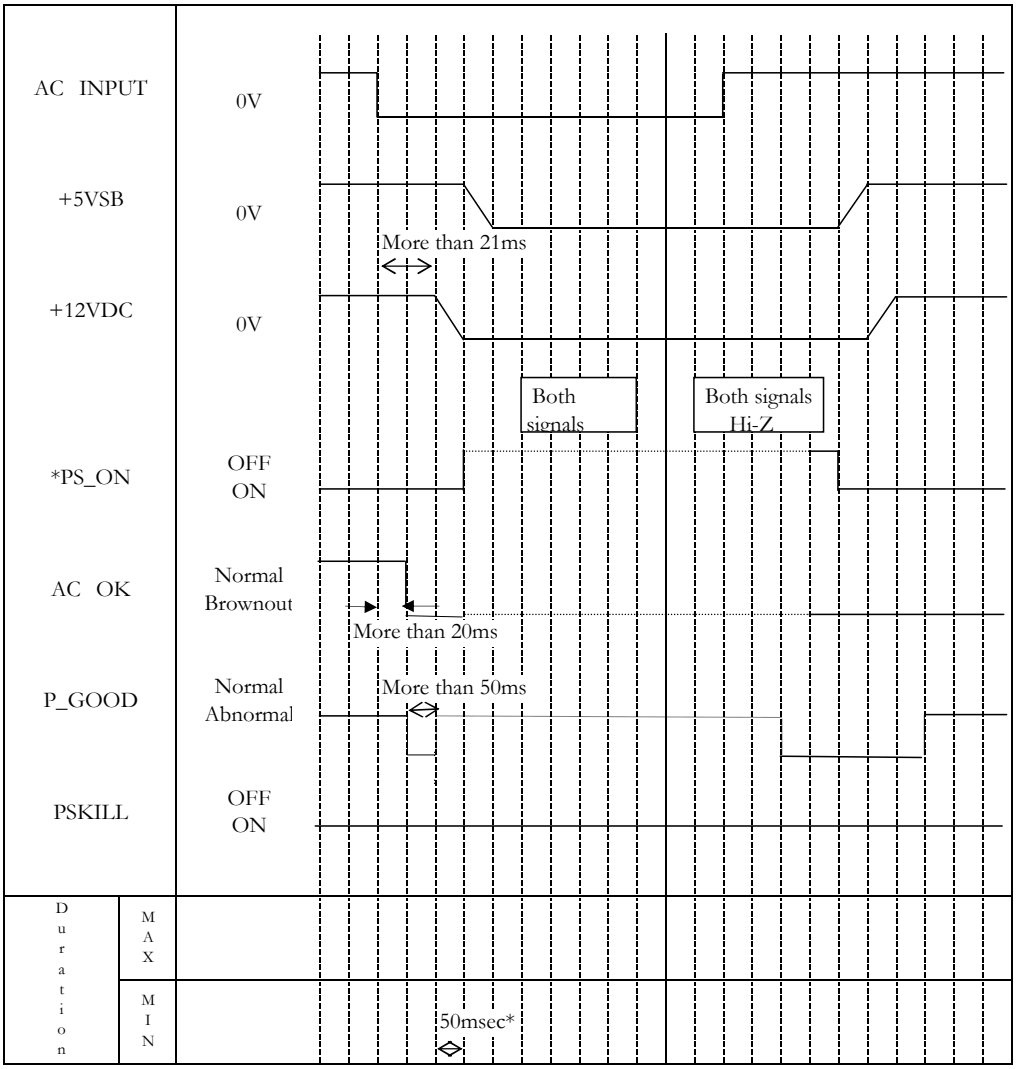
Timing Chart

PS ON/OFF Cycle Timing



Timing Chart

AC ON/OFF Cycle Timing



* Duration for sustaining +5VSB at Brownout

LED Indicators

	Power Supply LED	
Power Supply Condition	POWER	FAIL
LED Color	Green	Amber
No AC power to all PSU	OFF	OFF
No AC power to this PSU but provided to other units	OFF	OFF
AC present, PS_ON Off, Standby Output On	Blinking	OFF
Power supply DC outputs On and Okay	ON	OFF
Power supply failure (12V output failure, Fan failure)	OFF	ON
Power supply failure (5VSB output)	OFF	Blinking

Environmental & Reliability Specifications

Specification	Notes	Min.	Typ.	Max.	Units
Operating Temperature Range	All line conditions and Full load	0	-	+50*	°C
Storage Temperature		-40	-	+70	°C
Humidity	Relative Humidity, non-condensing	5	-	90	% RH
Cooling	Internal fan cooled				
Fan Speed	Automatically adjusted based on load and ambient temperature				
Acoustic Noise	Single unit operation, 100% load	-	-	55	dB
Vibration Test	3-60Hz	0.5	-	-	G
MTBF	Calculated @ 25°C ambient temperature.	500K	-	-	Hours

*Operating temperature for prototypes ranges from 0 to 35°C.

General Requirements

Specification	Notes	Min.	Typ.	Max.	Units
Shock	Non-Operating and no-packaging : Three times shock on each of the 6 faces , 2 inch drop				
Vibration	Operating : 0.5G , 5-400Hz, along three orthogonal axes , 30min.				
Electrostatic Discharge	Conditions: Contact and Air No components being damaged and work normally	10	-	-	KV
Input Line Surges	Line to Ground and Line to Line	-	2	-	KV
Conductive Emissions	EN55022 & FCC Class A (will be certified with customer's system)				
Radiated EMI	EN55022 & FCC Class A				

Safety Specifications

Specification	Notes and Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Isolation Voltage Input to Output	-	3000	-	Vac
	Isolation Voltage Output to Chassis	-	1500	-	Vac
Safety Agency Approvals	C-US,CSA,TUV,CB				
Safety Standards	IEC60950-1(Ed.2)				
	UL60950-1(Ed.2)				
	CSA60950-1(Ed.2)				
	EN60950-1(Ed.2)				

Input / Output Connections

◆ AC Input Connector

Circuit name and purpose		Terminal type
AC INPUT	L	Power Inlet (IEC60320 C-20)
	N	
	FG	

◆ DC Output Connector : Multi Beam 6450832-4 10P+24S (Tyco)

Pin Assignment

Single Pins						
	1	2	3	4	5	6
D	5VSB	5VSB	GND	GND	AC_OK	P_GOOD
C	5VSB	5VSB	GND	GND	NC	NC
B	ISHARE	I²C_AD0	I²C_AD1	I²C_ADR2	NC	PS_PRESENT
A	PSKILL*	SENSE+	SENSE-	I²C_DATA	I²C_CLOCK	PS_ON
Power Blades						
P1,P3, P5, P7, P9				P2, P4, P6, P8, P10		
12V				12V RTN		

PSKILL* : Pin A1 is a short pin

NC:Unconnected (Impossible to connect from outside)