

## Special Features

- ◆ Bulk Power for Distributed Power Architectures
- ◆ Up to 8.8 W/Inch<sup>3</sup> Power Density
- ◆ Hot Swap N+1 Redundancy
- ◆ Active Current Sharing
- ◆ LED Indicators on Front Panel
- ◆ Over Voltage, Over current and Under Voltage Protection
- ◆ Over Temperature Protection
- ◆ Power Factor & Harmonic Corrected
- ◆ UL60950-1, CSA60950-1, IEC60950-1 and EN60950-1
- ◆ RoHS Compliant

## Input Specifications

Specification	Notes	Min.	Typ.	Max.	Units
Operating Voltage Range	700 W operation	90	-	264	Vac
	1500 W operation	180	-	264	Vac
Turn-on Input Voltage	700 W operation	-	80	-	Vac
	1500 W operation	-	152	-	Vac
Turn-off Input Voltage	700 W operation	-	72	-	Vac
	1500 W operation	-	140	-	Vac
Input Frequency		47	50/60	63	Hz
Inrush current limitation	Rated input voltage (PS OFF status)	10	-	-	ApK
	PS_ON status	20	-	-	
Input Current	700 W operation	-	9	-	A
	1500 W operation	-	10	-	A
Power Factor		95	-	-	%
Input Leakage Current	240Vac	-	-	0.75	mA
Hold-up Time	700 W operation	20	-	-	ms
	700 W operation	20	-	-	ms
Efficiency	700 W operation	-	-	-	%
	1500 W operation	80	-	-	%
Input protection	Time delay Internal fuse	-	15	-	A

## Output Specifications

Specification	Notes	Min.	Typ.	Max.	Units
Output Voltage		-	48	-	Vdc
Voltage Regulation		-5	-	+5	%
Output Power	100Vac to 240Vac	-	-	700	W
	200Vac to 240Vac	-	-	1500	W
Output Current	100Vac to 240Vac	0.4	-	13.5	A
	200Vac to 240Vac	0.4	-	30.2	A
Ripple & Noise	0.1uF of Ceramic Cap. & 10uF of Electrolytic Cap	-	-	480	mVp-p
Load Sharing	Difference between two units at full load	-5	-	+5	%
Remote sense	Line drop compensation	-	-	-	V

### Auxiliary Output

Specification	Notes	Min.	Typ.	Max.	Units
Stand-by output Voltage		-	12.5	-	Vdc
Voltage Regulation		-4	-	+4	%
Stand-by output Current		0	-	4.0	A
Ripple & Noise	0.1uF of Ceramic Cap. & 10uF of Electrolytic Cap	-	-	120	mVp-p
Load Sharing	Difference between two units at full load	-	-	-	%
Stand-by output over voltage		-	-	-	%
Stand-by output under voltage		-	-	-	Vdc
Stand-by output over current		100	-	150	%

### Protections

Specification	Notes	Min.	Typ.	Max.	Units
Input Under Voltage	Shutdown if input voltage <70V for more than 1 sec	-	70	-	Vac
Output Over Voltage	Shutdown	51	-	55	Vdc
Output Under Voltage	Shutdown	14.4	-	38.4	Vdc
Output Over Current	Shutdown	110	-	150	%
Over Temperature	Power OFF	-	-	-	°C

### Serial Communications

Communications	Signal
Signals	PS_ON PRFL FANC AC RANGE AC_OK PS_KILL FAIL 48VLS PW_OK FRU PS_PRESENT
LED Signals	Refer to LED Indicators on Page 7

### Signal Condition

Signal Type	Circuit Condition	Electrical Condition
Input Signal PS_ON		48VDC turn ON/OFF signal Active Low (Below 1V)

Signal Type	Circuit Condition	Electrical Condition
Input Signal FANC		<p>Fan Speed control signal</p> <p>2~3V: Fan in LOW speed</p> <p>3~10.5V: Fan ramps from LOW to High speed.</p> <p>&gt;10.5V: Fan in HIGH speed.</p> <p>The power supply will supersede this request and increase the fan speed if it requires more cooling</p>
Output Signal AC_OK		<p>Input voltage monitor signal</p> <p>"Low" active (below 0.4V at 4mA)</p> <p>"High" shows AC input loss</p>
Output Signal FAIL		<p>Power supply failure signal</p> <p>"High" active</p> <p>"Low" (below 0.4V at 4mA) shows normal</p>
Output Signal PWOK		<p>Output status signal</p> <p>"High" active</p> <p>"Low" (below 0.4V at 4mA) shows abnormal output</p>
PS_PRESENT		<p>Power supply present signal</p>
Output Signal PRFL		<p>Fan speed drop signal</p> <p>"High" active</p> <p>"Low" (below 0.4V at 4mA) shows normal</p>

Signal Type	Circuit Condition	Electrical Condition
Input Signal AC_RANGE		AC input range setting signal "Low" (below 1V) : 200-240VAC input range "High" 100-240VAC input range
Input Signal PS_KILL		Power supply force shut off signal for hotswapping "Low" (below 1V) : Power on "High" (above 2V): Power off
48VLS		48VDC current balance signal 200V : 30.2A at 8V 100V : 13.5A at 8V
FRU		Based on SSI Specification

## Function Specification

### 1 Redundant Operation

-The power supply unit has redundant operation function with up to 10 units in parallel.

-Hot swappable

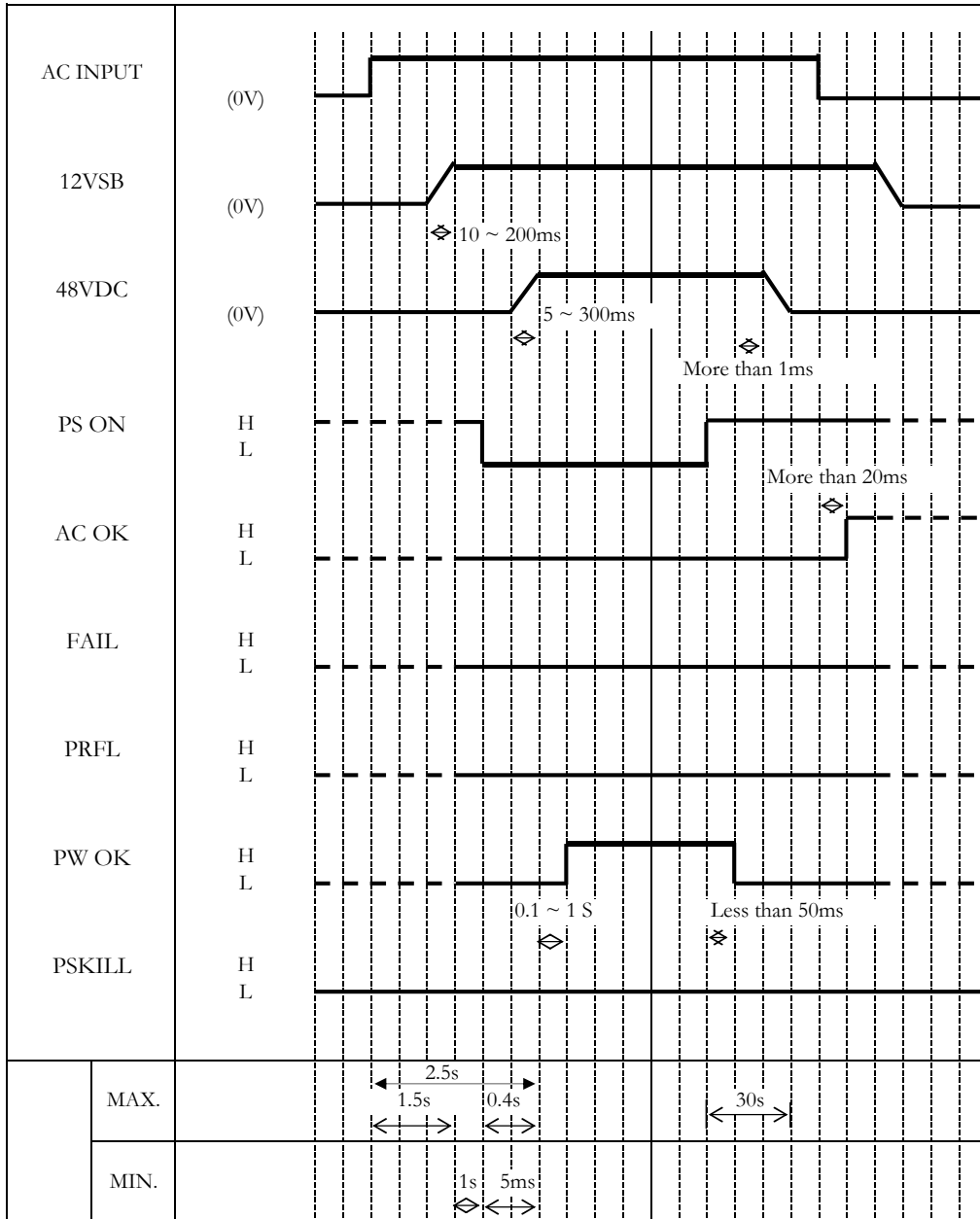
-Current sharing function

The 48VDC output current is balanced within +/-5% tolerance by wiring each 48LS current balance signals.

The 12VSB output has the current limit point balance function.

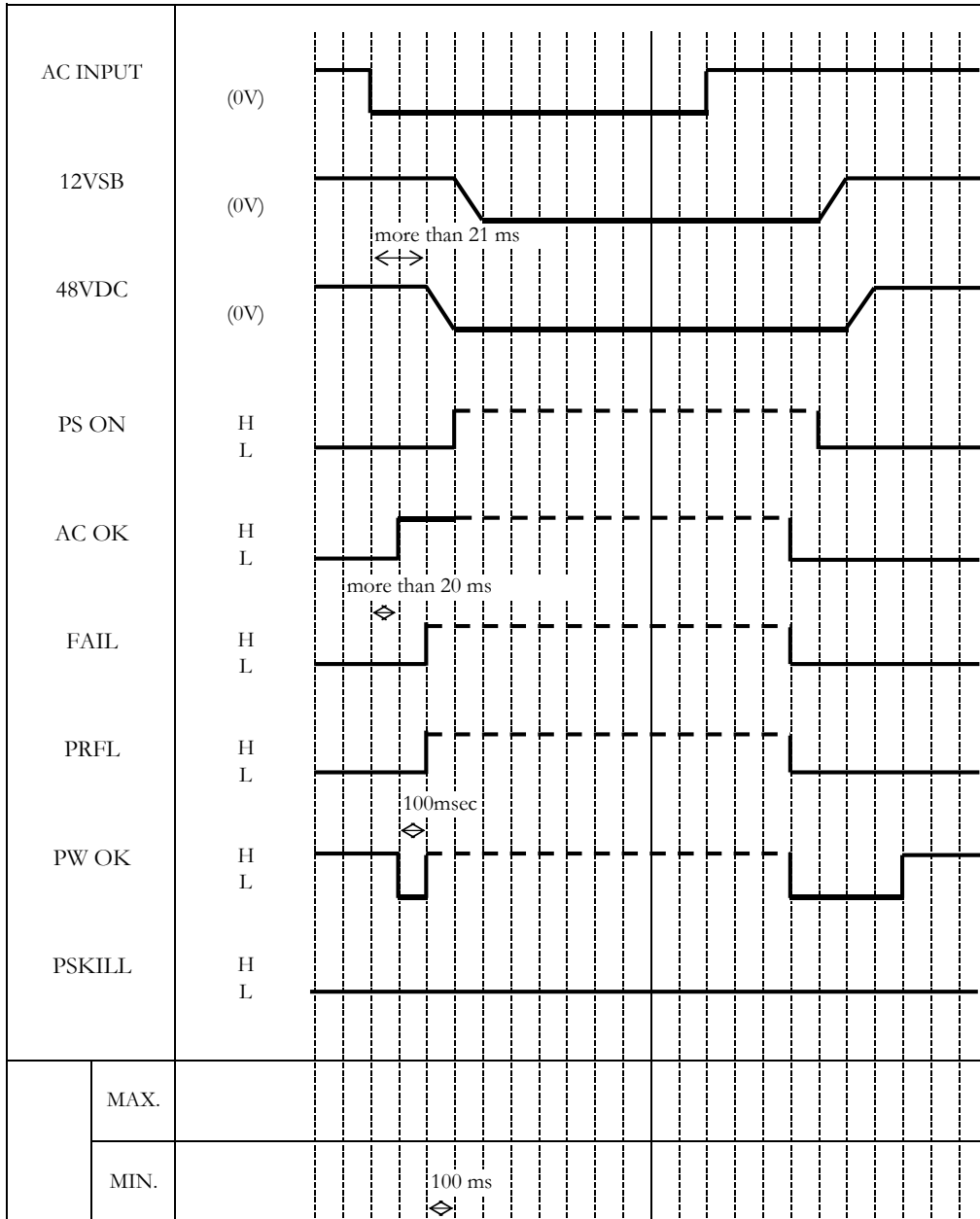
**Timing Chart**

Turn ON/OFF Timing



**Timing Chart**

AC Input Loss Timing



## LED Indicators

Power Supply Condition	Power Supply LED		
	POWER	PRFL	FAIL
LED Color	Green	Amber	Amber
No AC power to all PSU	OFF	OFF	OFF
No AC power to this PSU but provided to other units	OFF	OFF	ON
AC present / Standby Output On	Blinking	OFF	OFF
Power supply DC outputs ON and Okay	ON	OFF	OFF
Power supply failure	OFF	OFF	ON
Current limit on 48VDC output	ON	OFF	Blinking
Predictive failure	ON	Blinking	OFF

## Environmental & Reliability Specifications

Specification	Notes	Min.	Typ.	Max.	Units
Operating Temperature Range	Standard airflow direction	0	-	+50	°C
	Optional airflow direction	0	-	+40	°C
Operating Temperature Range (12VSB On)	With Fan low sleep	0	-	+50	°C
	Fan Stop	0	-	+40	°C
Humidity	Relative Humidity, non-condensing	-20	-	+85	% RH
Cooling	Internal fan cooled				
Fan Speed	Automatically adjusted based on load and ambient temperature				
Vibration Test	Non-operating ; 20-250Hz 0.5G, 3 axes, 15 min	0.5	-	-	G
MTBF	Calculated @ 25°C ambient temperature.	500K	-	-	Hours

## EMC Specifications

Specification	Test Condition	Performance
Emissions	EN55022	-
Conducted	EN55022 & FCC Class	B
Harmonic	EN61000-3-2	-
Immunity	EN55024	-
Electro Static Discharge	EN61000-4-2	A
Fast Transient	EN61000-4-4	A
Input Line Surges	EN61000-4-5	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				
	UL60950-1				
	CSA60950-1				
	EN60950-1				

## Input / Output Connections

◆ AC Input Connector

Circuit name and purpose		Terminal type
AC INPUT	L	Power Inlet ( IEC320 C-14 ) Equivalent to AC-F01FB01
	N	
	FG	

◆ DC Output Connector : Multi Beam 1450330-1 (TYCO)

Pin Assignment

Single Pins						
	1	2	3	4	5	6
D	12VSB	12VSB RTN	48LS	ACRANGE	SCL	A0
C	12VSB	12VSB RTN	ACOK	PRFL	NC	A1
B	12VSB	12VSB RTN	PSOK	PSKILL	SDA	A2
A	FANP	PSAlert#	PRESENT	PWOK	FAIL	FANC
Power Blades						
P1			P2			
48VDC RTN			48VDC			

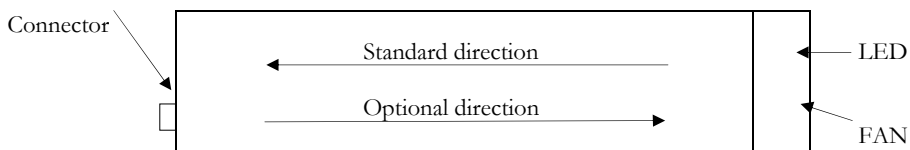
## Cooling

Fan Operation

Operation mode	FAN operation
Standby (12VSB on)	Either Stop or Low speed can be selected
Normal operation	Normal speed (High speed if internal Temp. is too high)

Airflow direction

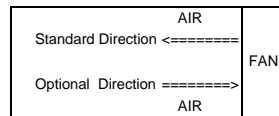
	Direction
Standard	From LED panel side to connector panel side
Optional	From connector panel side to LED panel side



### 19.FH1500 Lineup table

Items		FH1500		FH1500DS		FH1500DW		FH1500DR		
FAN Direction *1)		Standard Direction		Standard Direction		Standard Direction		Optional Direction		
FAN Operating	Standby	Either Stop or Low speed can be selected *2)		Low speed		Low speed		Either Stop or Low speed can be selected *2)		
	Working(PS_ON)	Low ~ High Fan speed control *2)		Low ~ High Fan speed control *3)		Low ~ High Fan speed control *3)		Low ~ High Fan speed control *2)		
Operating Temperature	Standby	FANSTOP : 40 degrees C FAN low speed : 50 degrees C		50 degrees C		50 degrees C		FANSTOP : 40 degrees C FAN low speed : 50 degrees C		
	Working (PS_ON)	50 degrees C		50 degrees C		50 degrees C		40 degrees C		
Input Voltage	ACRANGE Open	100-240VAC		Regardless of the Acrange signal 200-240VAC		100-240VAC		100-240VAC		
	ACRANGE Low	200-240VAC				200-240VAC		200-240VAC		
Rated Current	ACRANGE Open	13.5A		Regardless of the Acrange signal		13.5A		13.5A		
	ACRANGE Low	30.2A		30.2A		30.2A		30.2A		
Operation at the 48VDC over current	Over current time duration	0 ~ 3sec	more than 3sec	0 ~ 3sec	more than 3sec	0 ~ 3sec	more than 3sec	0 ~ 3sec	more than 3sec	
	Output	48VDC	Hold	Shutdown	Hold	Shutdown	Hold	Shutdown	Hold	Shutdown
		12VSB	Hold	Hold	Hold	Hold	Hold	Hold	Hold	Hold
	POWER LED	ON	OFF	ON	OFF	ON	OFF	ON	OFF	
	FAIL LED	Blinking	ON	Blinking	Blinking	Blinking	Blinking	Blinking	ON	
	FAIL Signal	Low(OK)	High(FAIL)	Low(OK)	High(FAIL)	Low(OK)	High(FAIL)	Low(OK)	High(FAIL)	
	PWOK Signal	Low(NG)	Low(NG)	Low(NG)	Low(NG)	Low(NG)	Low(NG)	Low(NG)	Low(NG)	
	Latch up	NO	YES	NO	YES	NO	YES	NO	YES	
Operation at the 12VSB over current	Over current time duration	Output drop down between 7.5V and 9V (Regardless over current time duration)		Output drop down between 7.5V and 9V	Output drop down between 7.5V and 9V	Output drop down between 7.5V and 9V	Output drop down between 7.5V and 9V	Output drop down between 7.5V and 9V (Regardless over current time duration)		
	Output	48VDC	Hold	Shutdown	Hold	Shutdown	Hold	Shutdown	Hold	Shutdown
		12VSB	Hold	Hold	Hold	Hold	Hold	Hold	Hold	Hold
	POWER LED	ON	OFF	ON	OFF	ON	OFF	ON	OFF	
	FAIL LED	Blinking	ON	Blinking	Blinking	Blinking	Blinking	Blinking	ON	
	FAIL Signal	Low(OK)	High(FAIL)	Low (OK)	High(FAIL)	Low(OK)	High(FAIL)	Low(OK)	High(FAIL)	
	PWOK Signal	Low(NG)	Low(NG)	Low(abnomal output)	Low(abnomal output)	Low(abnomal output)	Low(abnomal output)	Low(abnomal output)	Low(abnomal output)	
	Latch up	NO(recovery automatically)		NO(recovery automatically)		YES		NO(recovery automatically)		
Alarm Latch Release	By turning AC input off		By turning AC input off		By turning AC input off		By turning AC input off			
DIP SW setting *4	SW1-1:OFF SW1-2:ON SW1-3:OFF SW1-4:ON		SW1-1:OFF SW1-2:ON SW1-3:ON SW1-4:OFF		SW1-1:OFF SW1-2:ON SW1-3:ON SW1-4:ON		SW1-1:OFF SW1-2:ON SW1-3:OFF SW1-4:ON			

\*1 FAN Direction



Power Supply

\*2) FAN Speed control

FANC signal of voltage	PSON(working)	PSOFF(standby)
less than 1V	High speed	Low speed
2V ~ 3V	Low speed	STOP
3V ~ 10V	Low ~ High changing	STOP
OPEN	High speed	STOP

However , FAN speed control gives priority to an internal temperature at PS\_ON conditions.

\*3) FAN Speed control

FANC signal of voltage	PSON(working)
less than 1V	High speed
2V ~ 3V	Low speed
3V ~ 10V	Low ~ High changing
OPEN	High speed

However , FAN speed control gives priority to an internal temperature at PS\_ON conditions.

\*4 ) Dip SW setting

