

FEATURES

1. Wide input voltage range 3:1
2. Efficiency 92% (Typ.)
3. Low standby power consumption
4. Operating Temperature from -40°C to +105°C
5. High isolation voltage 3000VAC(input-output) & 2100VAC(input-case)
6. Input under voltage protection, output over current, over voltage, over temp. & short circuit protections
7. Standard full brick size



3 years
Warranty

Selection Guide

Part No.	Input voltage range	Output Power (W)(1)	Output Voltage (VDC)	Output Current (A)	Ripple & Noise (mVp-p)(2)	Full load Efficiency(%) Min/Typ.
NQ1500-24FB	90-264VAC 140-400VDC	1500	24	62.5	240	89/91
NQ1500-28FB	90-264VAC 140-400VDC	1500	28	53.6	280	90/92
NQ1500-48FB	90-264VAC 140-400VDC	1500	48	31.2	480	89/92

Note:
 (1)When the input voltage is below 154VAC and 200VDC, the output load capacity is linearly reduced. When the input voltage is 90VAC and 140VDC, the stable output power is 750W.
 (2)Ripple and noise is tested under 20M bandwidth, with external capacitor $\geq 470\mu\text{F}$

Input Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
AC input starting working voltage		--	--	90	VAC
AC input under voltage protection		--	--	85	
AC input over voltage protection		290	--	315	
Input impulse voltage (1sec.max.)	Input beyond this range may cause permanent damage	-0.7	--	315	
DC input starting working voltage		--	--	145	VDC
DC input under voltage protection		--	--	135	
DC input over voltage protection		425	--	435	
Input maximum impulse current	Input line in series 5.6R, 20mm diameter thermal sensitive, 220Vac input	--	--	40	A
Input voltage frequency		47	--	63	Hz
Start-up time		--	--	5	S
Standby power consumption	220Vac input	--	15	20	W
PF value	220Vac input, full load output	95	--	--	%

Output Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Nominal input voltage, 0-100% load	--	±0.5	±1.0	%
Line Regulation	Full load, input voltage from low to high	--	±0.1	±0.2	
Load Regulation	Nominal input voltage, 10%-100% load	--	±0.2	±0.5	
Transient recovery time	25% load step change (step rate 1A/50uS)	--	200	250	uS
Transient Response Deviation		-5	--	5	%
Temperature Drift Coefficient	Full load	-0.02	--	+0.02	%/°C
Output voltage adjustment (TRIM)		43.2	--	50.4	%
Distal end compensation (Sense)		--	--	5	%
Over temperature protection	Maximum temperature of the Metal Base	105	115	125	°C
Output over voltage protection		125	--	150	%
Output over current protection	24V	65.6	--	81.3	A
	28V	58.9	--	75	
	48V	32.8	--	40.6	
Output short circuit protection		Hiccup, continuous, self-recovery			

General Specifications

Item	Operating conditions		Min.	Typ.	Max.	Unit
Isolation voltage	I/P-O/P	Test 1min, leakage current <3mA	--	--	3000	VAC
	I/P-Case	Test 1min, leakage current <3mA	--	--	2100	VAC
	O/P-Case	Test 1min, leakage current <3mA	--	--	1000	VAC
Insulation resistance	I/P-O/P	@ 500VDC	100	--	--	MΩ
MTBF	MIL-HDBK-217F@25°C		150	--	--	K hours

Environmental characteristics

Item	Operating conditions	Min.	Typ.	Max.	Unit
Operating Temperature	Refer to the temperature derating graph	-40	--	+105	°C
Storage Humidity	No condensing	5	--	95	%RH
Storage Temperature		-40	--	+125	°C
Pin Soldering temperature	1.5mm from the case, <1.5S	--	--	+350	
Cooling requirement		EN60068-2-1			
Dry and heat requirement		EN60068-2-2			
Moisture and heat requirement		EN60068-2-30			
Shock and vibration		IEC/EN 61373 C1/Body Mounted Class B			

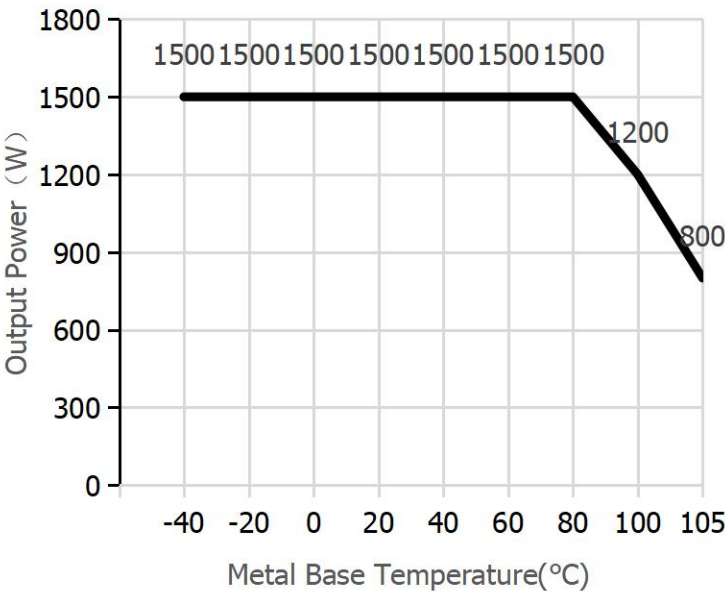
Mechanical Specifications

Case Materials	Metal base + Plastic case in black, flame class UL94-V0				
Cooling Method	Conduction cooling or forced air cooling with fan				
Weight	Standard	320g			
Size	Standard	122*70*14mm			

Electromagnetic compatibility (EMC EN55032)

EMI	CE	GB/T18655 EN55032		Class A
	RE	GB/T18655 EN55032		Class A
EMS	ESD	IEC/EN61000-4-2/GB/T 17626.2-2006	Contact ±6KV/Air ±8KV	perf. Criteria A
	RS	IEC/EN61000-4-3/GB/T 17626.3-2006	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4/GB/T 17626.4-2008	±2kV 5/50ns 5kHz	perf. Criteria A
	Surge	IEC/EN61000-4-5/GB/T 17626.5-2008	line to line 1KV Line-FG 2KV	perf. Criteria A
	CS	IEC/EN61000-4-6/GB/T 17626.6-2008	0.15MHz-80MHz 10 Vr.m.s	perf. Criteria A

Typical Characteristic Curves



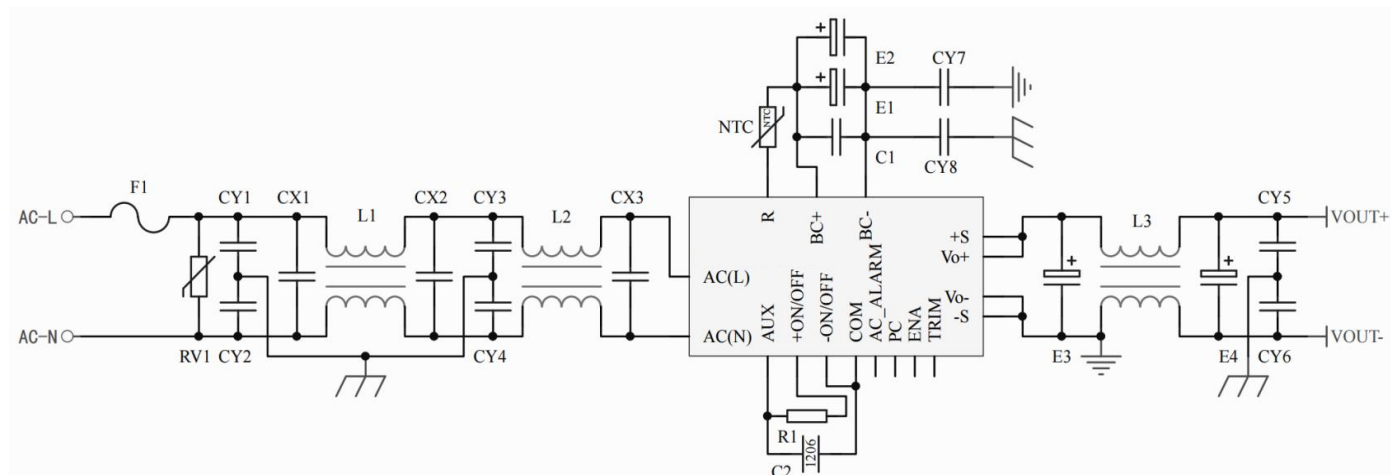
Note:

1. Both the output power and efficiency in the graphs have been tested with typical values.

2. The data in the temperature derating graph have been tested at laboratory test conditions. It is recommended to keep the temperature of the Metal base not more than 105 °C when the converter operates at the rated load for the application.

Recommended circuits for application

1. Recommended application circuit.



F1	AC250V 20A fuse
RV1	14D 560V varistor
CX1,CX2,CX3	250Vac 2.2uF X2 capacitor
CY1,CY2,CY3,CY4,CY8	1000pF 250VAC Y2 capacitor
CY7	470pF 250VAC Y1 capacitor
L1,L2	6.0mH common mode inductor, rated current not less than 12A
E1,E2	450V 330uF electrolytic capacitor
C1	2.2 uF 630V polypropylene capacitor
NTC	5.6 Ω 20mm thermistor
E3, E4	1500uF 35V low ESR capacitor
CY5,CY6	10nF 2KV ceramic chip capacitor
L3	4.7uH common mode inductor, rated current not less than 63A
R1	When ON/OFF is not used as a remote control switch, connect R1 to a 1K/1206 resistor, and the module will output normally.
C2	104/50V/0603

Note: There are limited requirements for the selection of capacitors CX3, C1, E1, and E2 in the recommended circuits above; CX3 and C1 must ≥ 1 uF capacitance; The capacity after E1 and E2 are connected in parallel must ≥ 500 uF; the NTC resistor must be installed; if this restriction is not followed, the power supply may be damaged.

2. Remote Terminal (ON/OFF) Instructions

The module has a built-in remote switch function, which enables output ON/OFF control while the input voltage is powered on. The remote control circuit is isolated from the power input circuit via an optocoupler. See Figure 1 below for the wiring diagram. When an external power supply is connected to +ON/OFF, the external supply voltage shall be DC 5~15V. See Figure 2 below for the wiring diagram.

If the remote switch function is not used, short-circuit +ON/OFF to AUX and -ON/OFF to COM before operation.

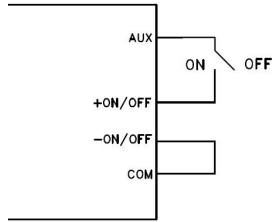


Fig 1

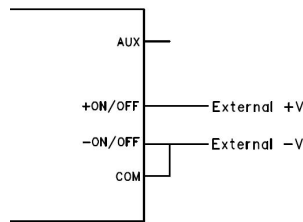
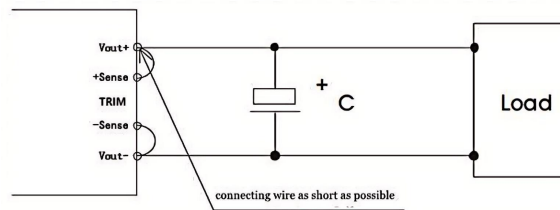


Fig 2

3. Application for Sense

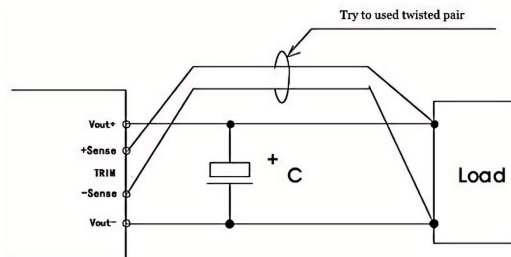
1) With NO distal end compensation



Note:

1. Vout+ & Sense+, Vout- & Sense- should be shorted when distal end compensation is not needed
2. The lead wire between Vout+ and Sense+, Vout- and Sense- should be as short as possible, and close to the pins, or else the output may be unstable.

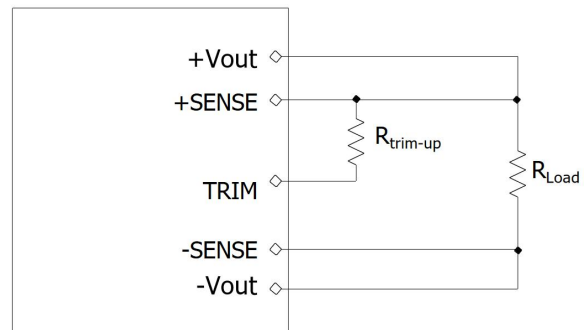
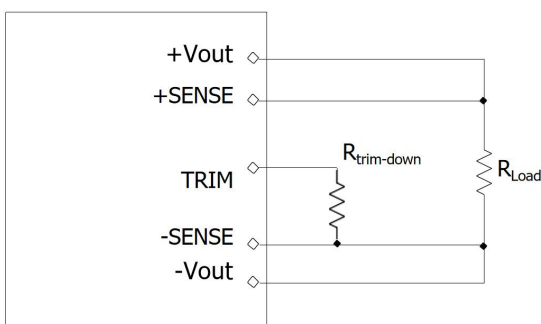
2) With distal end compensation



Notes:

1. The output voltage may be unstable if the compensation cables are too long.
2. The twisted pair or shielded cables are recommended, the cable length should be as short as possible.
3. Wide copper path on PCB or thick lead wires between the power supply and the load should be used to achieve the line voltage drop <0.3V. The target is to keep output voltage within the specified range.
1. The leads wire resistance may create the output voltage oscillation or larger ripples. Please verify it before to use.

4. Use of TRIM and calculation of TRIM resistance



The external resistance is applied between the TRIM terminal and the $\pm$ SENSE terminal, which can increase or decrease the output voltage within the range of 66.6% -107% Vout. When a resistor is applied between the TRIM terminal and the +SENSE terminal, the output voltage increases; The resistor is applied between the TRIM and - SENSE terminals, resulting in a decrease in output voltage. During adjustment, adjust the resistance as close as possible to the lead of the module power supply. When this function is not needed, the TRIM end is suspended.

$$R_{trim-up} = (5.1 * \Delta * V_o - 12.75) / (2.5 * \Delta - 2.5) - 10.2 \text{ (K}\Omega\text{)}$$

$$R_{trim-down} = (10.2 * \Delta - 5.1) / (1 - \Delta) \text{ (K}\Omega\text{)}$$

For example, it is necessary to increase the output voltage to 26.4V, $V_o = 24V$; $\Delta = 26.4/24 = 1.1$. Bring into formula.

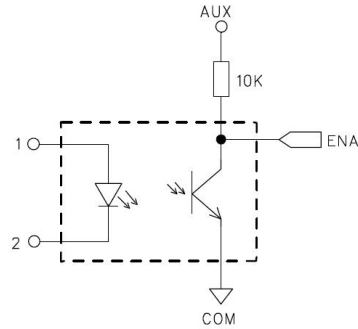
$$R_{trim up} = (5.1 * 1.1 * 24 - 12.75) / (2.5 * 1.1 - 2.5) - 10.2 = 477$$

It is necessary to lower the output voltage to 21.6V, $\Delta = 21.6/24 = 0.9$. Bring in formula

$$R_{trim down} = (10.2 * 0.9 - 5.1) / (1 - 0.9) = 40.8$$

5. Output Status Indication: ENA

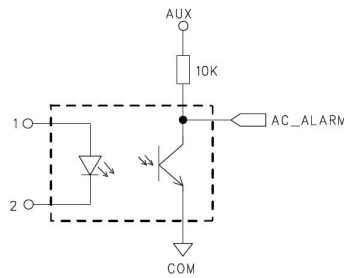
This signal is an output signal of the module, referenced to the COM terminal. Add an external 10K pull-up resistor from AUX as shown in the figure below. When the output voltage is normal, the ENA signal is low level (0–1.2 V). When the power supply is abnormal and the output voltage drops below 5 ± 0.5 V, the ENA signal is high level.



ENA Signal Connection

6. Input Power Loss Alarm: AC_ALARM

This signal is an output signal of the module, referenced to the COM terminal. Add an external 10K pull-up resistor from AUX as shown in the figure below. The AC_ALARM terminal can be used to detect whether the power module operates normally. It outputs low level when AC input is normal, and high level upon AC input loss.



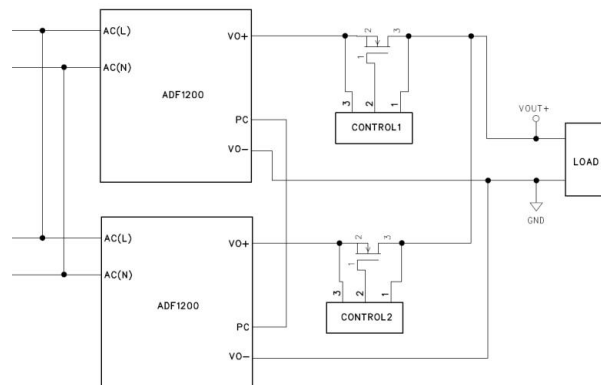
AC_ALARM Signal Connection

7. Output Parallel Operation Function

The PC terminal serves as the current-sharing bus for power parallel connection. When multiple power supplies operate in parallel, short the PC terminals of all units to realize output current sharing among modules.

An ORing circuit is adopted for parallel output to ensure high reliability and continuous operation of each module.

For optimal current-sharing performance, keep the trace width and length of output cables consistent among all modules with similar line impedance. Connect the positive and negative output cables in parallel near the load terminals.

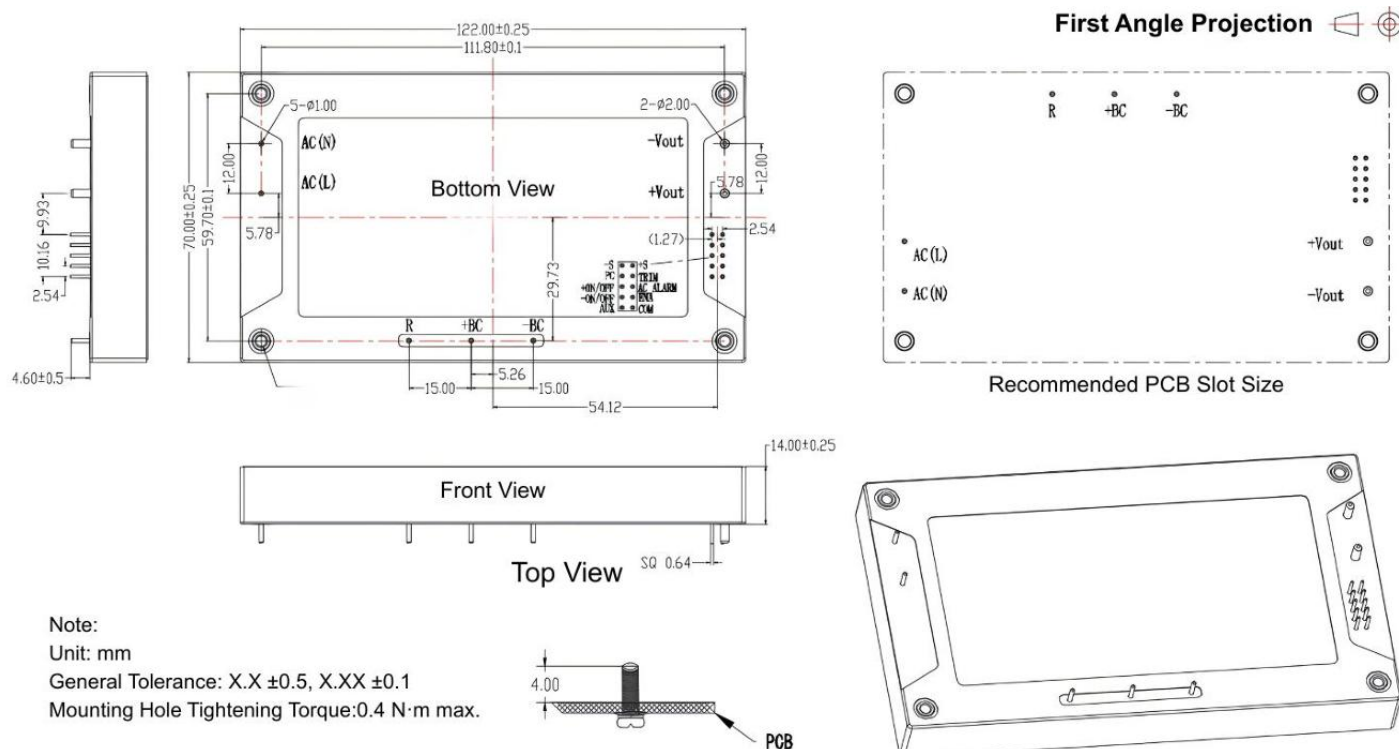


Connection Method for Parallel Power Operation

Note: When power modules are used in parallel, do not exceed the maximum total output power. Exceeding this rating may result in system failure to start.

During parallel operation, avoid overtemperature protection, overcurrent or short-circuit at the output load side. After troubleshooting, the power input voltage must be cycled (power off then on), or all units can be restarted simultaneously via remote ON/OFF control.

Dimensions



Pin Definitions	AC(L)	AC(N)	Vout-	Vout+	-BC	+BC	R
Function	AC Line	AC Neutral	Output Negative	Output Positive	PFC Bus Ground	PFC Bus+	PFC Rectifier Output

2.54mm 2*5P Header

Pin Definitions	-S	PC	+ON/OFF	-ON/OFF	AUX
Function	Remote Sense	Current Share Bus	Remote ON/OFF+	Remote ON/OFF-	Auxiliary Power
Pin Definitions	+S	TRIM	AC_ALARM	ENA	COM
Function	Remote Sense+	Output Trimming	AC Fail Alarm	Enable Signal	Signal Ground

Notes & Instructions

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;
2. The maximum capacitive load is tested under the input voltage range and full load condition;
3. Unless otherwise stated, all indexes in this manual are measured at Ta=25°C, humidity <75%RH, nominal input voltage and rated output load;
4. All index testing methods in this manual are based on the enterprise standards of the company;
5. Our company can provide product customization, specific needs can directly contact our technical staff;

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