AEF5000-5B-xx Series

DESCRIPTIONS 5000W, AC-DC Converter



RoHS

Note: The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.

CE Report EN62368-1

UKCA Report BS EN62368-1

FEATURES

- Input voltage range: 3W+PE△196-305VAC or 3W+N+PE Y 340-530VAC or DC input 277-430VDC
- Compatible with multiple input modes: 3-phase 4-wire, 3-phase 3-wire, single-phase and DC
- PF value up to 0.98
- Operating ambient temperature range: -40℃ to +70℃
- Low standby power consumption, high efficiency, low ripple & noise
- 20%-120% Ultra-wide range of voltage and current adjustment
- Parallel current sharing up to 20000W (3+1)
- 485 communication
- Double-sided conformal coating
- High I/O isolation test voltage up to 4000VAC
- Output short circuit, over-current, over-voltage, over-temperature protection
- Operating altitude up to 5000m
- OVC II
- 5 years warranty
- Safety according to IEC/EN/UL/BS EN62368

APPLICATIONS

- Industrial
- LED
- Street light control
- Electricity
- Security
- Telecommunications
- Smart home

Selection Guide

Certification	Part No.	Cooling Method	Output Power (W)*	Nominal Output Voltage and Current (Vo/Io)	Adjustable Range of Output Voltage ADJ(V)	Efficiency at 230VAC (%) Typ.	Maximum Capacitive Load at normal temperature (μF)
EN/BS EN	AEF5000-5B-24	Air cooling	4800	24V/200A	23.5-28.8	90	100000
--	AEF5000-5B-36	Air cooling	4968	36V/138A	35-43.2	90.5	44000
--	AEF5000-5B-48	Air cooling	5040	48V/105A	47-57.6	91	25000

Note: 1.*Under any conditions, the total power of the product should not exceed the rated power. When the output voltage is increased, the total output power cannot exceed the rated output power; when the output voltage is decreased, the output current cannot exceed the rated output current.

2. The product picture is for reference only. For details, please refer to the actual product.

Specifications

Product Specifications	Item	Operating Conditions			Min.	Typ.	Max.	Unit
Input Specifications	Input Voltage Range	Rated input (Certified voltage)	3W+N+PE, Y Or 3W+PE, △	Phase voltage	220	--	277	VAC
		AC input	3W+N+PE, Y	Phase voltage	196	--	305	
				Line voltage	340	--	530	
			3W+PE, △		196	--	305	
		Single-phase input *			196	--	305	
		DC input *			277	--	430	VDC
	Input Voltage Frequency	Rated input (Certified voltage)			47	--	63	Hz
		AC input			47	--	63	
	Input Current	Rated input (Certified voltage)			--	--	8	A
		230VAC-3W+PE △			--	--	15	
		400VAC-3W+N+PE Y			--	--	9	
		230VAC-1 phase 2 wire			--	--	27	
	Inrush Current	230VAC-3W+PE △	Cold start		--	45	75	
		400VAC-3W+N+PE Y			--	30	50	
		230VAC-1 phase 2 wire			--	60	100	
	Inrush Current Integral (I^2t)	230VAC-3W+PE △			--	121.5	337.5	A^2s
		400VAC-3W+N+PE Y			--	54	150	
	Power Factor	△ 230VAC (Y 400VAC)			0.95	0.98	--	--
	Start-up Delay Time	△ 230VAC (Y 400VAC), rated load			--	2200	--	ms
	Input Fuse	Built-in fuse			--	16	--	A
	Input Under-voltage Protection	Under-voltage protection start (Input voltage drops from high to low)			170	--	--	VAC
		Under-voltage protection release (Input voltage rises from low to high)			--	--	196	
	Hot Plug				Unavailable			
Output Specifications	Output Voltage Accuracy	Full load range (normal temperature)			--	±1	--	%
		Full load range (High and Low temperature)			--	±3	--	
	Line Regulation	Rated load			--	±0.5	--	

	Load Regulation	0% - 100% load			--	±0.5	--	%
	Minimum Load				0	--	--	
	Stand-by Power Consumption				--	20	--	W
	Ripple & Noise*	20MHz bandwidth (peak-peak value)	24V	230VAC-3W+PE △	--	--	150	mV
				400VAC-3W+N+PE Y	--	--	150	
			36/48V	230VAC-3W+PE △	--	--	200	
				400VAC-3W+N+PE Y	--	--	200	
	Temperature Coefficient				--	±0.03	--	%/℃
	Hold-up Time	230VAC, 75% load			20	--	--	ms
		230VAC, rated load			14	--	--	
	Short Circuit Protection	Restart and restore after the short circuit disappear			Turn off the output after 5s (typ.) of constant current operation, and restore after restart			
	Over-current Protection	230VAC, rated load		Normal temperature	110% - 150% Io, two protection modes are available for self-recovery: A. Constant current B. The output voltage will be turned off after constant current lasting for 5s and will recover after restarting.			
				Low temperature, high temperature	≥110%Io, two protection modes are available for self-recovery: A. Constant current B. The output voltage will be turned off after constant current lasting for 5s and will recover after restarting.			
	Over-voltage Protection	24V			≤35V (Output voltage off, restart after recovery)			
		36V			≤51V (Output voltage off, restart after recovery)			
		48V			≤68V (Output voltage off, restart after recovery)			
	Over-temperature Protection	230VAC, 100% full load		Over-temperature protection start	--	--	95	℃
				Over-temperature protection release	50	--	--	
	Auxiliary power	12V			12V/0.1A (Used as a signal power supply only)			
General Specifications	Isolation Test*	Input - ⏚		Electric strength test for 1min., leakage current <15mA	2000	--	--	VAC
		Input - output		Electric strength test for 1min., leakage current <20mA	4000	--	--	
		Output - ⏚		Electric strength test for 1min., leakage current <15mA	500	--	--	
	Insulation Resistance *	Input - ⏚		Ambient temperature: 25 ± 5℃ Relative humidity: < 95%RH, no condensation Test voltage: 500VDC	100	--	--	MΩ
		Input - output			100	--	--	
		Output - ⏚			100	--	--	
	Operating Temperature				-40	--	+70	℃
	Storage Temperature				-40	--	+85	
	Storage Humidity	Non-condensing			10	--	95	%RH
	Operating Humidity				20	--	90	
	Switching Frequency	PFC			--	65	--	KHz
		DC-DC			62	--	110	

		Auxiliary source		--	65	--	
	Power Derating	Operating temperature derating	-40℃ to -30℃	6	--	--	%/℃
			+50℃ to +70℃	2.5	--	--	
	Leakage Current	277VAC, 60Hz	Touch current	< 3.5mA			
	Safety Class			CLASS I			
	MTBF	MIL-HDBK-217F@25℃		658,3979 h			
	Warranty	Ambient temperature: <40℃		5 years			
Functional Specifications	PS_ON Input Signal*	Power on	PS_ON high	5	--	18	V
		Power off	PS_ON low	0	--	0.8	
	Accuracy Of Current sharing*	3+1 When multiple machines are connected in parallel, the sub-module shunt more than 50% of the rated load of every machine		--	±5	--	%
	Remote Compensation	The total compensated voltage value when VS+ and VS- (Pin 7 and Pin 5 of CON2 or CON3) are shorted to both ends of the output load ((VS+ to +Vo, VS- to -Vo), respectively		--	0.3	--	V
	LED Signal	Main output status indication	Normal output	Green on			
			Abnormal output, protected	Red on			
			Power off (AC without Input)	Light off			
	External Output Voltage Adjustment*	The output voltage can be adjusted by the external DC power supply. The DC power supply voltage ranges from 1 to 6VDC, corresponding to the output voltage range of 20%-120%Io	24V	4.8	--	28.8	V
			36V	7.2	--	43.2	
			48V	9.6	--	57.6	
	External Output Current Adjustment*	The output current can be adjusted by the external DC power supply. The DC power supply voltage ranges from 1 to 6VDC, corresponding to the output voltage range of 20%-120%Io	24V	40	--	240	A
			36V	27.6	--	165.6	
			48V	21	--	126	
	Select The Over-current Protection Mode*	Different over-current protection modes can be selected by adjusting the DIP Switch 1 of the product		By default, the output is turned off after 5s of over-current and the output is restored after restart			
				When the DIP Switch 1 is selected ON, the output voltage is not less than 50% Vo, which is a long-term constant current. When the output voltage is below 50% Vo, the output will be turned off after 5 seconds and restored after restarting.			
	AC_FAIL			Input voltage loss alarm signal			
	FAN_FAIL			Fan fault alarm signal			
	DC_OK			A normal alarm signal is generated			
	485 Communication			RS485 A and RS485 B communicate			

Environmental Characteristics	High And Low Temperature Working	+70℃, -40℃	GB2423.1, IEC60068-2-1
	Sinusoidal Vibration	10 - 500Hz, 2g, three directions of X, Y, Z axis	GB2423.10, IEC60068-2-6
	Alternating Hot And Humid	+25℃, 95%RH ±60℃, 95%RH	GB2423.4, IEC60068-2-30
	Low Temperature Storage	-40℃	GB2423.1, IEC60068-2-1
	High Temperature Storage	+85℃	GB2423.2, IEC60068-2-2
	High Temperature Aging	+50℃	GB2423.2, IEC60068-2-2
	Normal Temperature Aging	+25℃	GB2423.1, IEC60068-2-1
	Temperature Shock	-40℃ to +70℃	GB2423.22, IEC60068-2-14
	Packaging Drop	1m, one corner, three edges and six sides	GB2423.8, IEC68-2-32
Mechanical Specifications	Case Material	Metal (AL5052, SPCC, SGCC)	
	Dimensions	460.00mm × 211.00mm × 83.50mm	
	Weight	7300g (Typ.)	
	Cooling Method	Built-in fan, forced air cooling	

Note: 1.*Some performance of the product may not be satisfied in single-phase input and DC input, such as output ripple&noise, hold time, etc;
2.*Without special instructions, all performance of the product are measured at 230V (Y 400VAC), room temperature 25℃ and rated load.
3.*The "parallel cable" is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 0.1uF ceramic capacitor.
4.*when testing the isolation voltage and insulation resistance, the discharge tube screw on the side of the casing should be removed, and after the test is completed, the screw should be installed back to its original position.
5.*The voltage difference between each prototype should not exceed 0.2V during current sharing test.
6.*When the DC power supply is adjusted from high to low voltage, the floating OVP protection may be triggered under light load or no load.
7.*When the output voltage and current are adjusted, the actual output voltage and current will have a precision difference of about 10% from the given value of the external power supply. The output voltage or current can be adjusted to the set value by continuing to adjust the external power supply value. 9.When the constant currernt value is >100%Io, long-term work may start OTP protection.
8.*When selecting the external voltage regulation, external current regulation and over-current protection modes, it is required to wait until the auxiliary power is completely powered off before switching the switch.
9.*The status of PS_ON is off when it is suspended.

Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC)	Emissions (EMI)	CE (Input port)	CISPR32 EN55032 150K - 30MHz		CLASS A
		RE	CISPR32 EN55032 30MHz -1GHz		CLASS A
		Harmonic current	IEC/EN61000-3-2		CLASS A and CLASS D
		Voltage flicker	EN61000-3-3		perf. Criteria B
	Immunity (EMS)	ESD	IEC/EN61000-4-2 Contact1±8KV/Air ±15KV		perf. Criteria A
		RS	IEC/EN61000-4-3 10V/m		
		EFT (Input port)	IEC/EN61000-4-4 ±4KV		
		Surge (Input port)	IEC/EN61000-4-5 line-line ±2KV/line-PE ±4KV		
		MS	IEC/EN61000-4-8 30A/m		
		CS	IEC/EN61000-4-6 0.15 - 80MHz 10Vr.m.s		
		Voltage dips	IEC/EN61000-4-11	>95% dip 0.5 periods	perf. Criteria B
				30% dip 25 periods	perf. Criteria B
		Voltage interruption	IEC/EN61000-4-11 >95% interruptions 250 periods		perf. Criteria B

Note:1. *perf. Criteria:

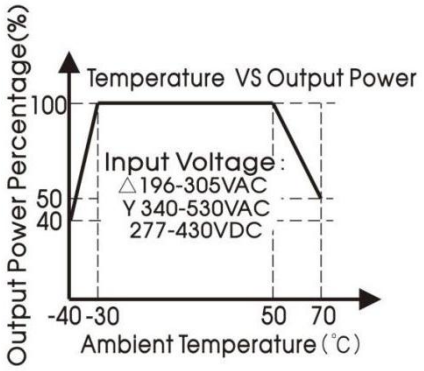
A: The equipment shall continue to operate as intended without operator intervention;

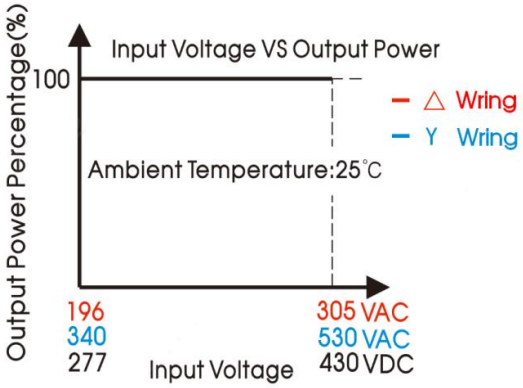
B: After the test, the equipment shall continue to operate as intended without operator intervention;

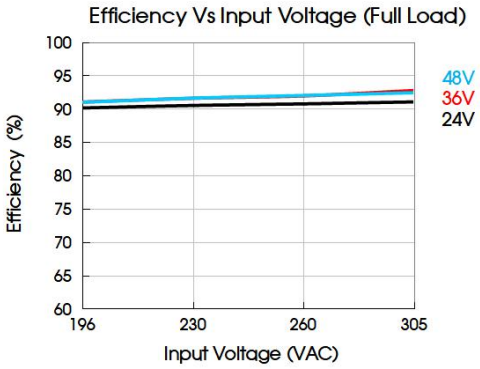
C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.

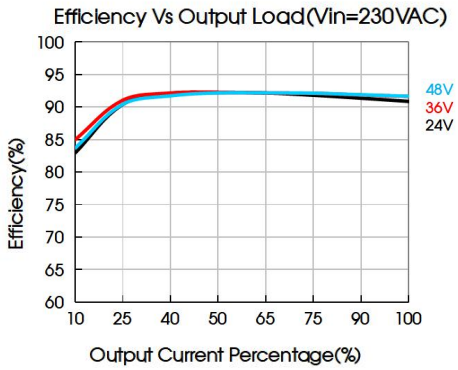
2. *An additional 100cm*80cm*2mm iron plate is required for EMI testing.

Characteristic Curve

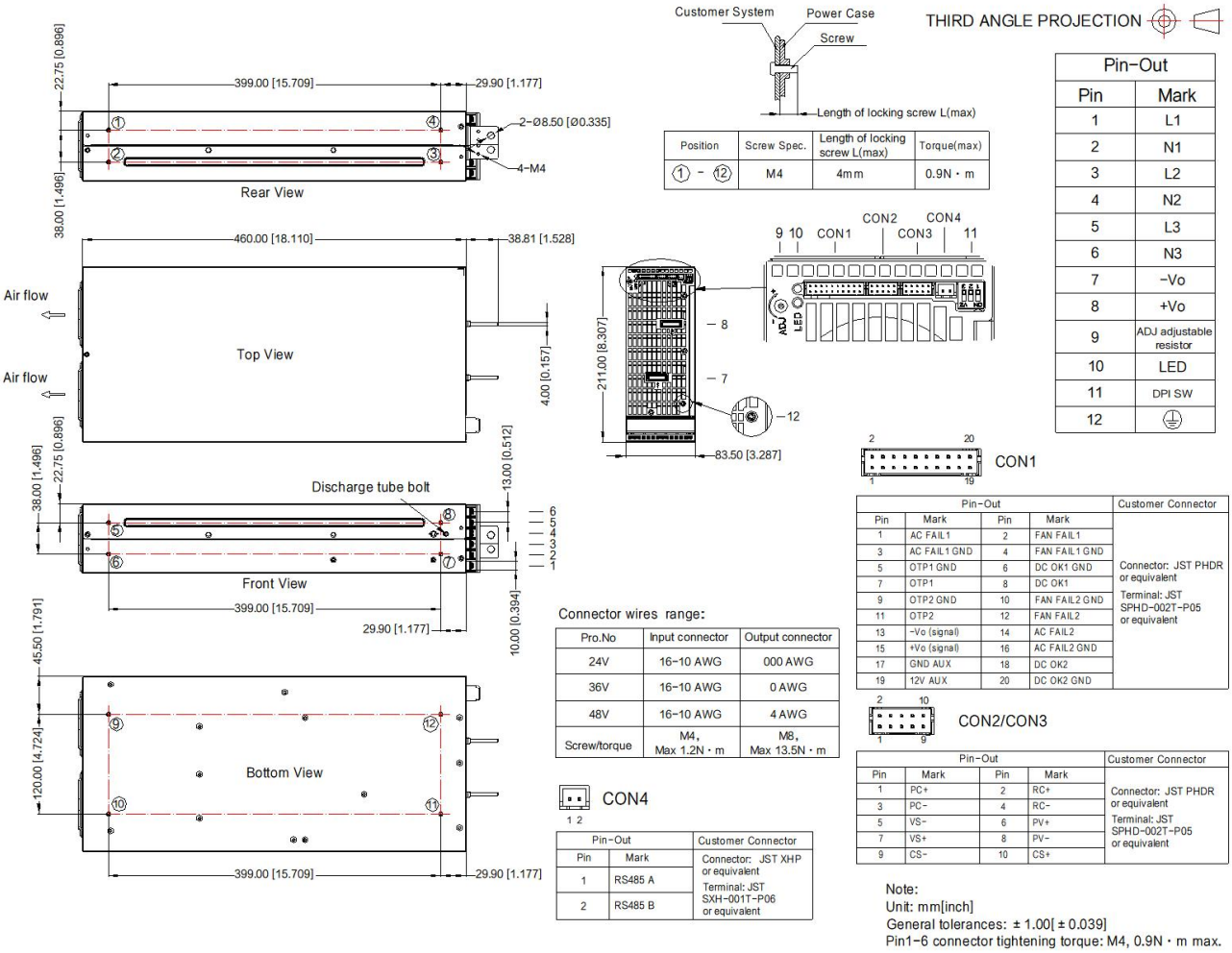








Dimensions and Recommended



Position	Screw Spec.	Length of locking screw L(max)	Torque(max)
① - ⑫	M4	4mm	0.9N · m

Pin-Out	
Pin	Mark
1	L1
2	N1
3	L2
4	N2
5	L3
6	N3
7	-Vo
8	+Vo
9	ADJ adjustable resistor
10	LED
11	DPI SW
12	⏚

Connector wires range:

Pro.No	Input connector	Output connector
24V	16-10 AWG	000 AWG
36V	16-10 AWG	0 AWG
48V	16-10 AWG	4 AWG
Screw/torque	M4, Max 1.2N · m	M8, Max 13.5N · m

Pin-Out		Customer Connector
Pin	Mark	
1	RS485 A	Connector: JST XHP or equivalent Terminal: JST SXH-001T-P06 or equivalent
2	RS485 B	

Pin-Out				Customer Connector
Pin	Mark	Pin	Mark	
1	AC FAIL1	2	FAN FAIL1	Connector: JST PHDR or equivalent Terminal: JST SPHD-002T-P05 or equivalent
3	AC FAIL1 GND	4	FAN FAIL1 GND	
5	OTP1 GND	6	DC OK1 GND	
7	OTP1	8	DC OK1	
9	OTP2 GND	10	FAN FAIL2 GND	
11	OTP2	12	FAN FAIL2	
13	-Vo (signal)	14	AC FAIL2	
15	+Vo (signal)	16	AC FAIL2 GND	
17	GND AUX	18	DC OK2	
19	12V AUX	20	DC OK2 GND	

Pin-Out				Customer Connector
Pin	Mark	Pin	Mark	
1	PC+	2	RC+	Connector: JST PHDR or equivalent Terminal: JST SPHD-002T-P05 or equivalent
3	PC-	4	RC-	
5	VS-	6	PV+	
7	VS+	8	PV-	
9	CS-	10	CS+	

Note:
Unit: mm[inch]
General tolerances: ± 1.00[± 0.039]
Pin1-6 connector tightening torque: M4, 0.9N · m max.

Note:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% RH with nominal input voltage and rated output load;
2. The room temperature derating of 5℃/1000m is needed for operating altitude greater than 2000m;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. In order to improve the efficiency at high input voltage, there will be audible noise generated, but it does not affect product performance and reliability;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating;
7. The output voltage can be adjusted by the ADJ, clockwise to increase;
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
9. The power supply is considered a component which will be installed into a terminal equipment. All EMC tests should be confirmed with the final equipment.

AEF5000-5B-xx Power Supply Application Manual

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1. Appearance

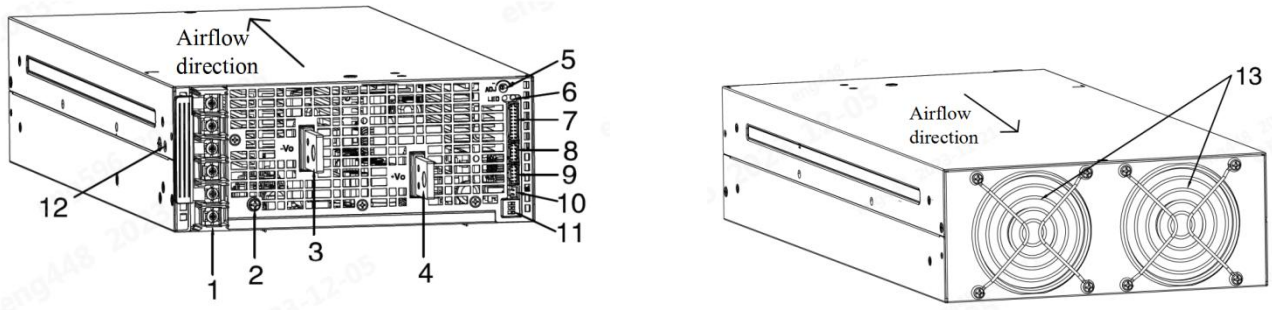


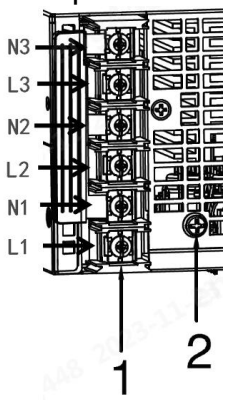
Figure 1: AEF5000-5B-xx appearance information

Composition description:

1. Input terminal (J1)
2. Ground screw (PE)
3. Output terminal negative (J2)
4. Output terminal positive (J3)
5. Output voltage regulation (ADJ)
6. Green and red status display LED lights
7. Signal connection terminal (CON1)
8. Signal connection terminal (CON2)
9. Signal connection terminal (CON3)
10. 485 Communication terminal (CON4)
11. Working mode selection switch
12. Discharge tube screw
13. Fan

1.1 Input terminal (J1)

The input terminal J1 uses standard 6-pin fence-welded terminal with covers.

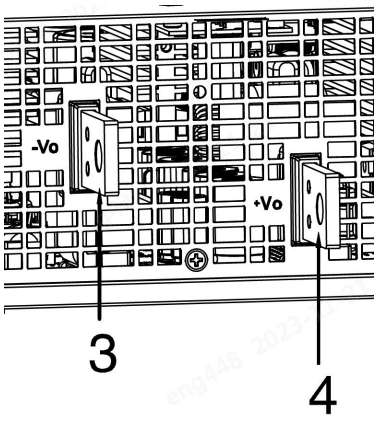


Number	PIN	Function
1	L1/L2/L3	Line (Phase)
	N1/N2/N3	Neutral
2	⏚	Ground/Earth

Wire size: 16-10AWG
Torque: 1.2Nm

1.2 Main output terminal (J2, J3)

The output terminal adopts two metal copper bar terminals J2 and J3.

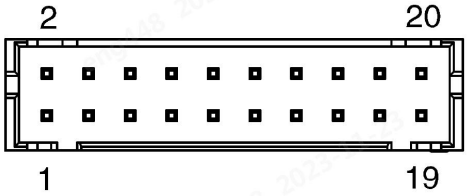


Wire size: 000 AWG
Torque: 13.5Nm

Number	PIN	Function
3	-Vo	Main output -
4	+Vo	Main output +

1.3 Signal connection terminal

(1) CON1 signal terminal

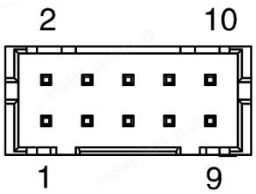


Connector	JST PHDR series or equivalent
Terminal	JST SPD-002T-P05 or equivalent

PIN	Function	Description
1	AC_FAIL1	AC fail warning signal+
2	FAN_FAIL1	Fan fail warning signal+
3	AC_FAIL1_GND	AC fail warning signal-
4	FAN_FAIL1_GND	Fan fail warning signal-
5	OTP1_GND	Over temperature protection warning signal-
6	DC_OK1_GND	DC_OK warning function-
7	OTP1	Over temperature protection warning signal+
8	DC_OK1	DC_OK warning function+
9	OTP2_GND	Over temperature protection warning signal-
10	FAN_FAIL2_GND	Fan fail warning signal-
11	OTP2	Over temperature protection warning signal+

12	FAN_FAIL2	Fan fail warning signal+
13	-Vo (signal)	Output voltage negative, for signal sampling only
14	AC_FAIL2	AC fail warning signal+
15	+Vo (signal)	Output voltage positive, for signal sampling only
16	AC_FAIL2_GND	AC fail warning signal-
17	GND_AUX	12V auxiliary power supply-
18	DC_OK2	DC_OK warning function+
19	12V_AUX	12V auxiliary power supply+
20	DC_OK2_GND	DC_OK warning function-

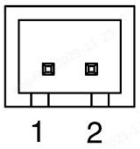
(2) CON2 and CON3 signal terminal (Internal connection)



Connector	JST PHDR series or equivalent
Terminal	JST SPD-002T-P05 or equivalent

PIN	Function	Description
1	PC+	External current regulation signal+
2	RC+	Remote on-off signal+
3	PC-	External current regulation signal-
4	RC-	Remote on-off signal-
5	VS-	Remote compensation signal-
6	PV+	External voltage regulation signal+
7	VS+	Remote compensation signal+
8	PV-	External voltage regulation signal-
9	CS-	Current sharing bus signal-
10	CS+	Current sharing bus signal+

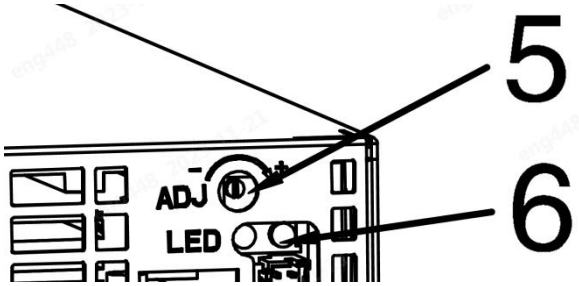
(3) CON4 signal terminal



Connector	JST XHP series or equivalent
Terminal	JST SXH-001T-P06 or equivalent

PIN	Function	Description
1	RS485_A	485 Communication A
2	RS485_B	485 Communication B

1.4 Output voltage regulation and LED light



The adjustable range of the output voltage adjustment resistor (clockwise rotation increases the output voltage)

ID	Model number	Rated output voltage	Output voltage adjustable range
5	AEF5000-5B-24	24V	23.5 - 28.8V
	AEF5000-5B-36	36V	35 - 43.2V
	AEF5000-5B-48	48V	47 - 57.6V

Two types of LED lights indicate different working statuses of the power supply:

ID	Green light	Red light	Status
6	ON	OFF	Normal operation
	OFF	ON	Main road or auxiliary load alarm
	OFF	OFF	No AC input

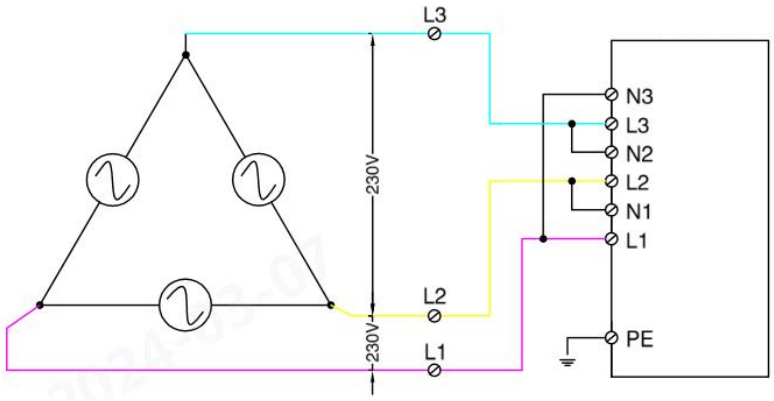
2. Function manual

2.1 Input requirement

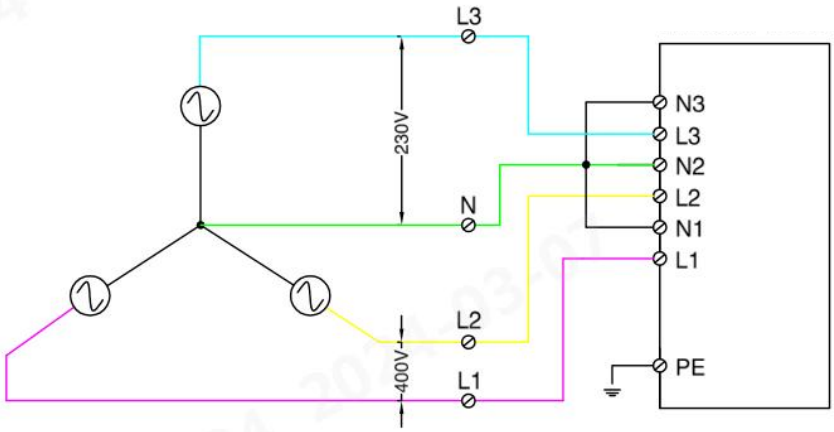
The AC input voltage and DC input voltage must be within the defined voltage range (refer to the data sheet), otherwise the power supply may not work properly or even malfunction.

The internal L line of the power module have been connected in series with a 600VAC 16A fuse. For better protection, it is recommended that customers use a circuit breaker not exceeding 16A for enhanced protection (non-mandatory requirement).

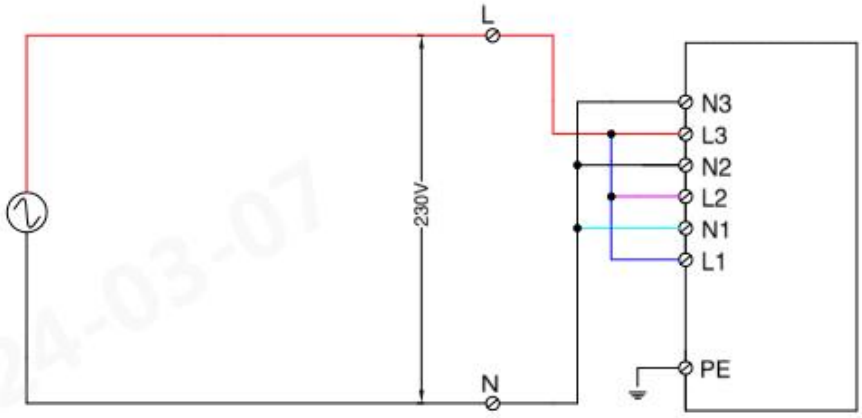
(1) 3-phase 3-wire/△ 230VAC wiring method



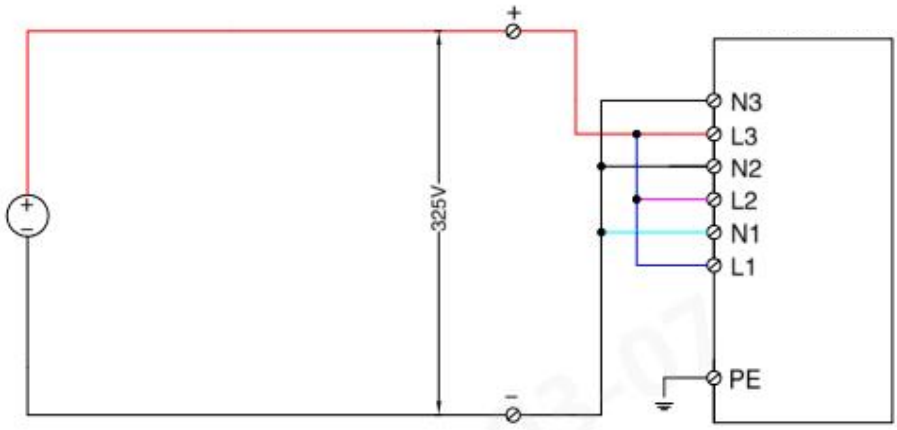
(2) 3-phase 4-wire/Y 400VAC wiring method



(3) 1-phase 2-wire/230VAC wiring method: AEF5000-5B-xx product can also work with 1-phase 2-wire 196-305VAC input, please refer to the following wiring method. When working in the 1-phase 2-wire wiring method, some specification characteristics may not meet the defined specification values (such as ripple, etc). If any problems occur, please contact our FAE.



(4) DC input wiring method: AEF5000-5B-xx product can also support DC input 277-430VDC to work, as shown in the figure below of DC input wiring method.



2.2 Output requirement

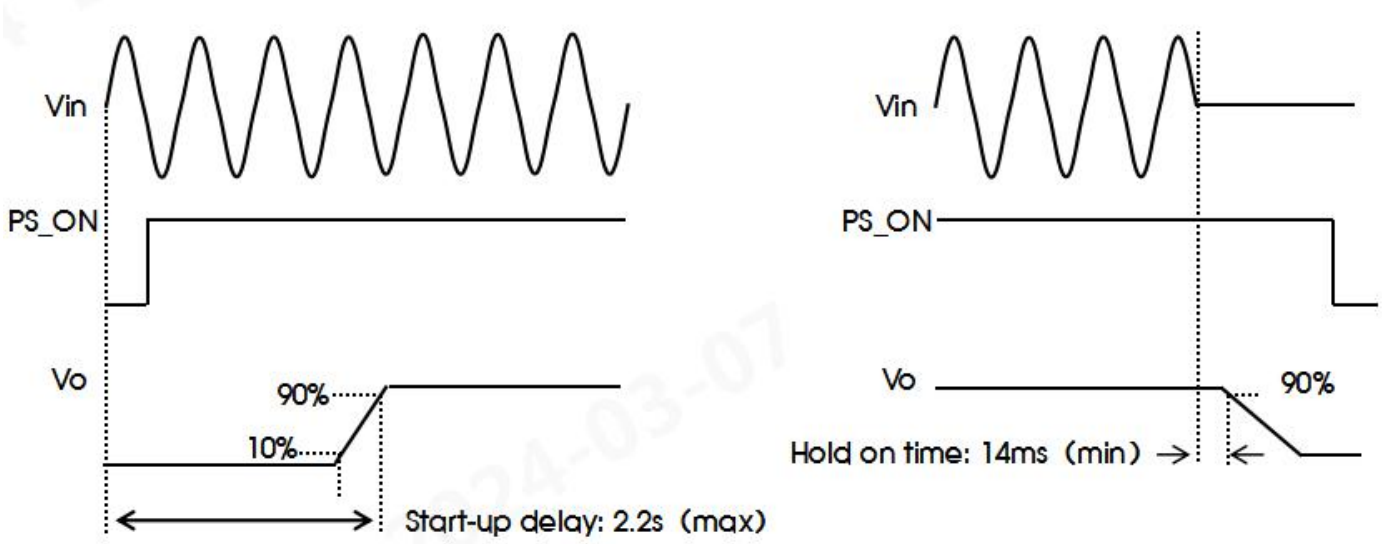
Main output

At any input voltage, the maximum output current and power must not exceed the rated/specified value. The output current must not exceed the maximum output current value.

Auxiliary output

The auxiliary circuit supports a maximum current of 0.1A and is only used to supply power to the switch signal.

2.3 Start-up/Shut-down process



Item	Operating Conditions		Min.	Typ.	Max.	Unit
Power-off Hold Time	230VAC at room temperature and full load	75% Io	20	--	--	ms
		100% Io	14	--	--	
Start Delay Time	230VAC at room temperature and full load		--	--	2.2	s

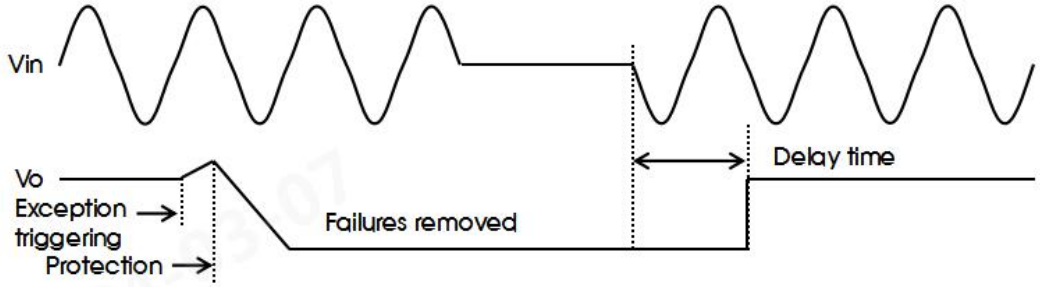
2.4 Fan speed control

The speed of the fan is jointly determined by the ambient temperature, output current, and output power and is linearly adjusted. To ensure the reliability of the product, the fan will continue to rotate at a minimum speed of 35%. The fan speed will increase with the increase of current, and the maximum adjustment can be up to 100%. The maximum speed adjustment of power compensation is 70%, and the maximum compensation value of power compensation and current compensation is taken. When the temperature is greater than 50℃, the fan temperature compensation reaches the maximum, and the fan will rotate at full speed.

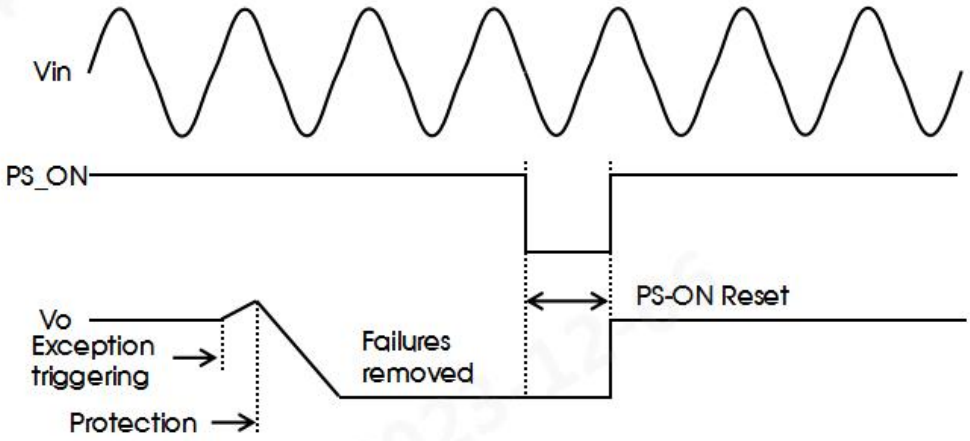
2.5 Output over voltage protection (OVP)

The over-voltage protection function is to turn off the main output when the output voltage reaches the protection voltage value. When the main circuit over voltage protection occurs, the main output

voltage of the module will be shut off, and the auxiliary circuit output will not be affected. After the fault is rectified, restart the main power supply to restart the main power supply to restore the output.

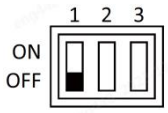


In addition, it can also be quickly restarted and restored by PS_ON signal:



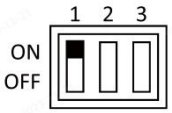
2.6 Output over current protection (OCP)

(1) Continuous constant current mode

Switch DIP-SW position-1 is set to mode 

, When the output is overloaded or the output voltage is 50% higher than the rated output voltage, it works in long-term constant current mode (long-term constant current may trigger OTP protection).

(2) Delayed shutdown mode

Switch DIP-SW position-1 is set to mode 

, when the output is overloaded or short-circuited, the output is turned off after 5s(typ), and the output is restarted after the fault is rectified.

2.7 Output short-circuit protection (SCP)

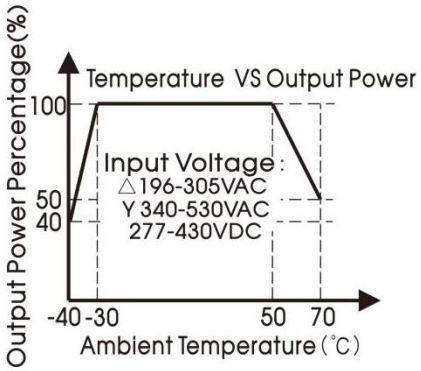
When a short circuit occurs in the output, the constant current protection is triggered. The output will be turned off after 5s (typ), and the output will restart after the fault is rectified.

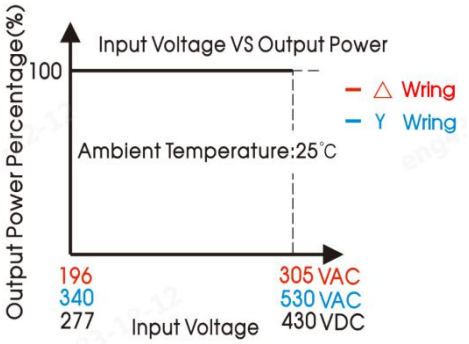
2.8 Over temperature protection (OTP)

When the ambient temperature of the power supply exceeds the rated temperature for a period of time, the power output will be turned off. When the ambient temperature decreases to set value, the power supply will resume normal operation.

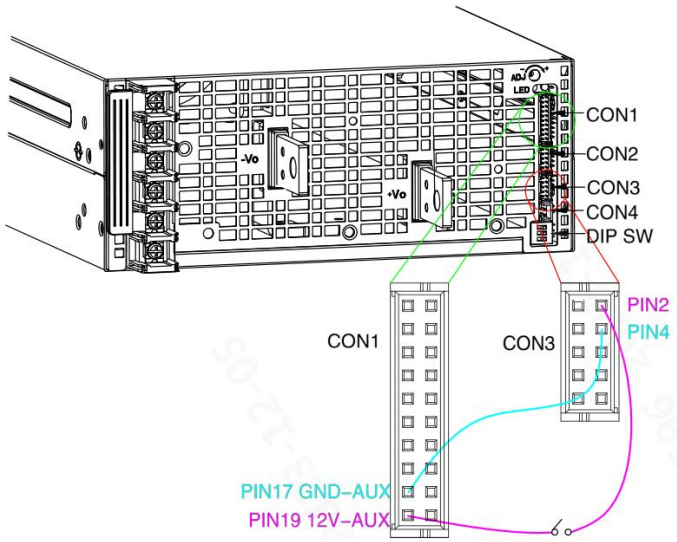
2.9 Output power derates

When ambient temperature is higher than 50℃ or lower than -30℃, perform power derating according to the derating curve;





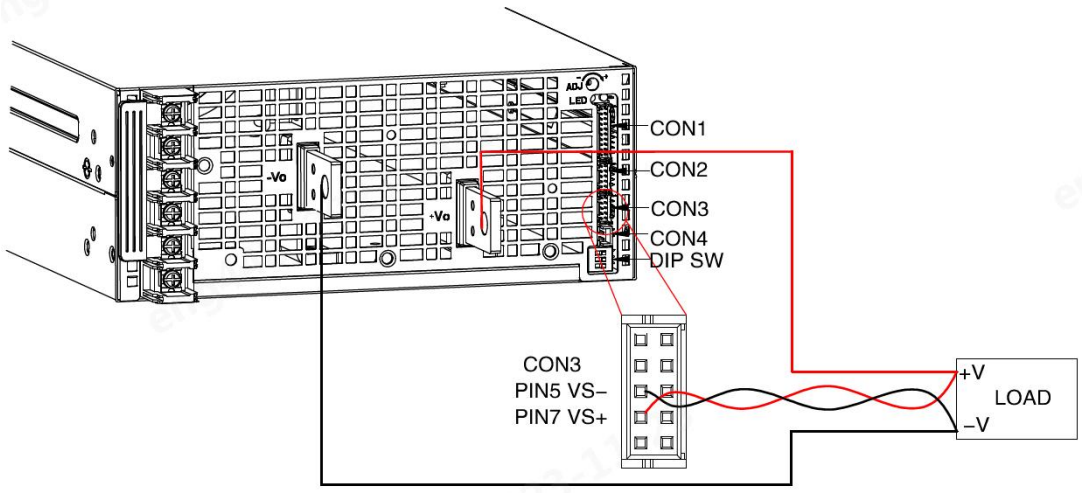
2.10 Remote switch



Between on/off (CON2 or CON3 PIN2) and 12V-AUX (CON1 PIN19)	Output state
Switch on (short circuit)	Output on
Switch off (open circuit)	Output off

In addition, the PS_ON function of the power module can also directly add 5V-18V voltage between PIN2 and PIN4 of CON2 or CON3 through the external control voltage, and the power module starts; when the external voltage ranges from 0V-0.8V, the power module shuts down.

2.11 Remote compensation



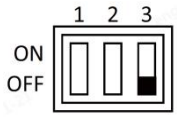
The PIN7 and PIN5 pins of signal terminal CON2 or CON3 compensate the voltage drop on the output cable up to 0.3V.

Note: (1) VS+ and VS- cannot be shorted or reversed, otherwise the power module will be damaged. If the remote compensation function is required, the signal pin needs to be connected to the load terminal using a twisted pair.

(2) If the remote compensation function is not necessary, the connection of the VS+ and VS- terminals should be protected from noise and interference signal (VS+ and VS- are connected to the output +Vo and -Vo by default).

2.12 Output voltage adjustment

(1) Adjust by semi-fixed variable resistor (ADJ)

(a) Switch DIP-SW position-3 sets mode 

.

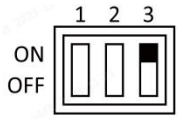
(b) The output voltage can be adjusted by ADJ, and the adjustment range is:

23.5V - 28.8V @AEF5000-5B-24

35V - 43.2V @AEF5000-5B-36

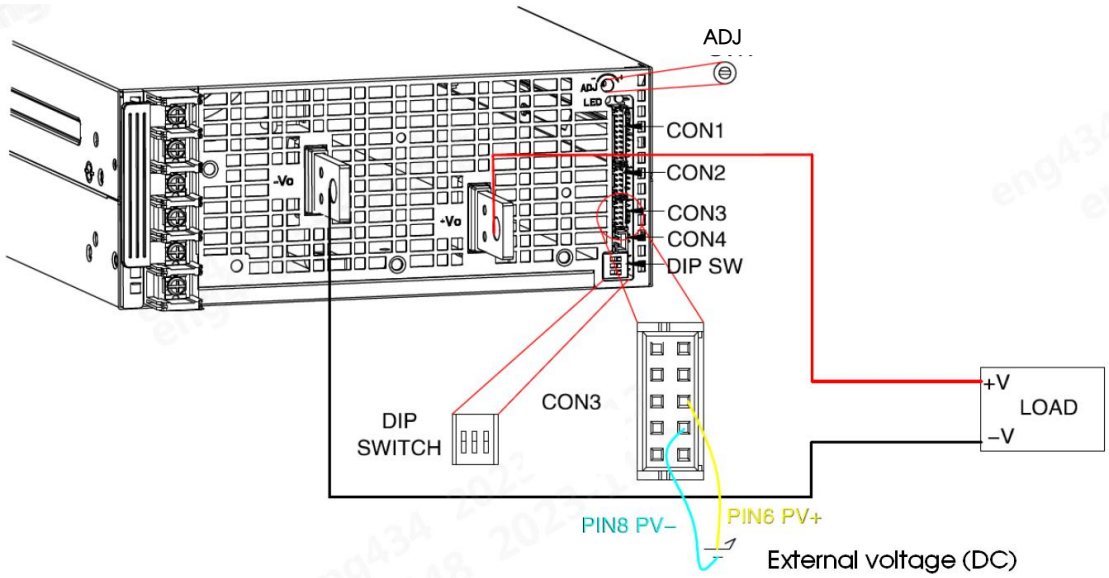
47V - 57.6V @AEF5000-5B-48

(2) Adjust by external voltage

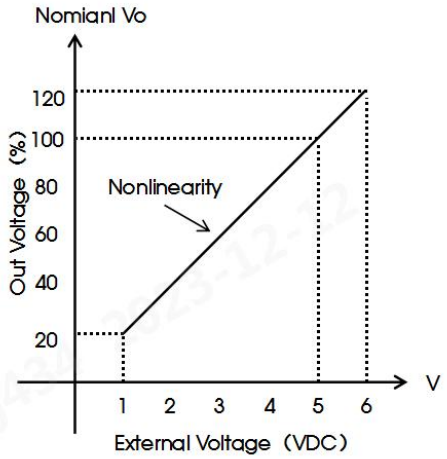
(a) Switch DIP-SW position-3 sets mode 

.

(b) By adding an external voltage between PIN6 PV+ and PIN8 PV- of CON2 or CON3 , the output voltage is adjustable from 20% to 120% of the rated voltage.

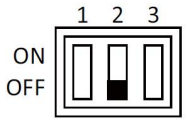


Note: In light load or no load, the product floating OVP protection may be triggered when the external voltage is adjusted from high to low. It is advised to shut down the external voltage to the lowest level and then adjust it upward. When the external voltage is the lowest or highest, the corresponding output constant current value and the voltage on the curve have a certain accuracy difference. To obtain the corresponding output current, it is recommended to fine-tune the external voltage.



2.13 Output current adjustment

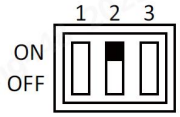
(1) Default overload constant current protection value

(a) Switch DIP-SW position-2 sets mode 

.

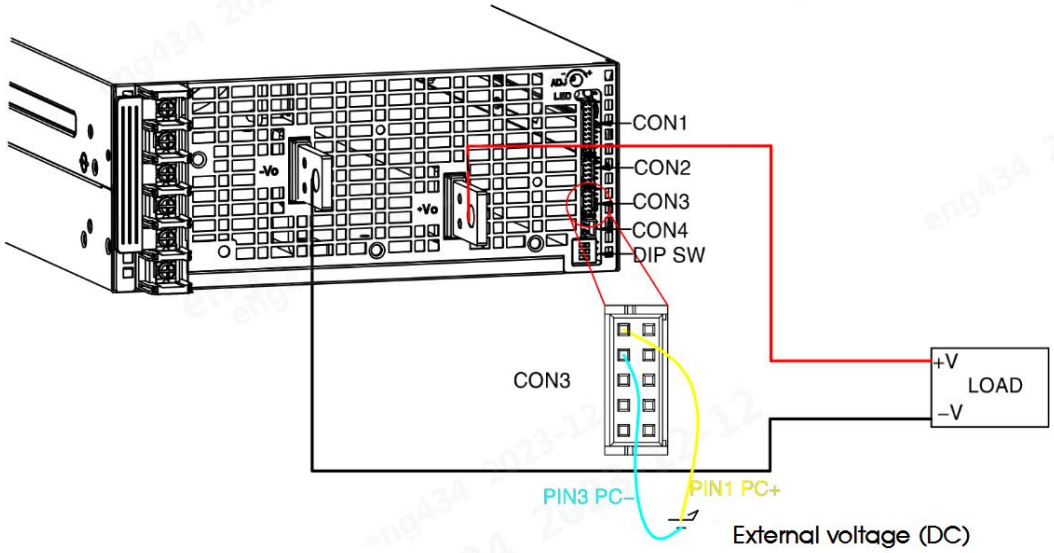
(b) The output constant current value is the default value.

(2) External constant current adjustment

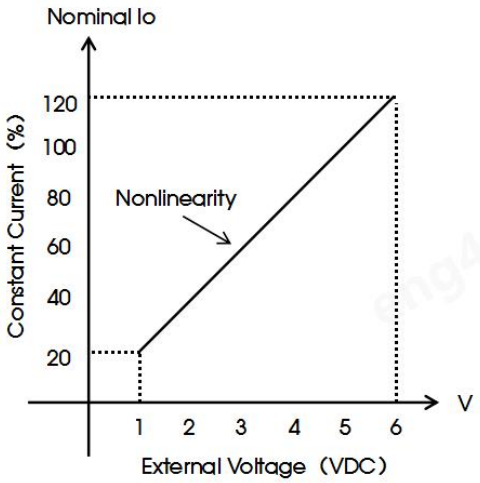
(a) Switch DIP-SW position-2 sets mode 

.

(b) By adding an external voltage between PIN1 PC+ and PIN3 PC- of CON2 or CON3 , the output voltage is adjustable from 20% to 120% of the rated current.



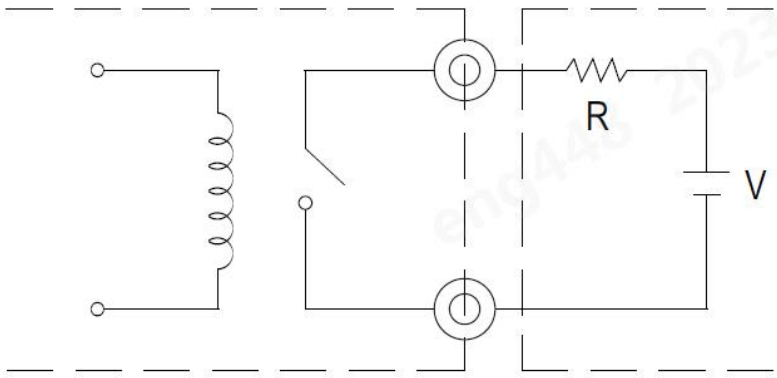
Note: When the external voltage is at the lowest or highest, the corresponding output constant current value and the voltage on the curve have a certain accuracy difference. To obtain the corresponding output current, it is recommended to fine-tune the external voltage.



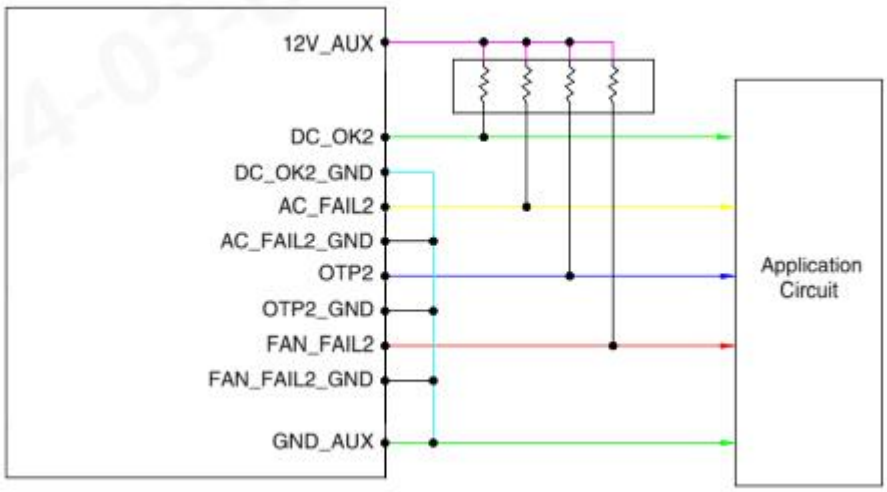
2.14 Alarm signal output

There are four alarm signals in CON1, and two output circuits can be selected for each signal.

(1) Relay contact output {(OTP1, OTP1-GND); (DC-OK1, DC-OK1-GND); (AC-FAIL1, AC-FAIL1-GND); (FAN-FAIL1, FAN-FAIL1-GND)} normally open contact. An alarm is generated when a short circuit occurs. The maximum capacity of the relay contact is 30V/1A.



(2) Open collector output {(OTP2, OTP2-GND); (DC-OK2, DC-OK2-GND); (AC-FAIL2, AC-FAIL2-GND); (FAN-FAIL2, FAN-FAIL2-GND)} as shown in the figure below. This function requires an external voltage source (The recommended pull-up resistance between the external voltage source and each signal is 10KΩ). These signals are isolated from the output, with a maximum absorbed current of 10mA and a maximum external voltage of 20V (there is a 24V regulator inside the circuit).



2.15 Parallel current sharing

(1) The power module has an active current sharing function and supports a maximum of 4 parallel outputs. In parallel operation, the output voltage difference between each power module must be meet≤0.2V.

(2) When power modules are connected in parallel, there is an active current-sharing circuit inside to ensure that the current between each module is balanced. Each power module has a current-sharing bus, and when connected in parallel, all current-sharing buses of the power modules must be connected together. The current-sharing bus signal is located on the PIN10 CS+ and PIN9 CS- pins of CON2 or CON3.

After the output load of each power module exceeds 50% of the rated load , the current sharing accuracy is required to be ±5%. The current sharing calculation formula is:

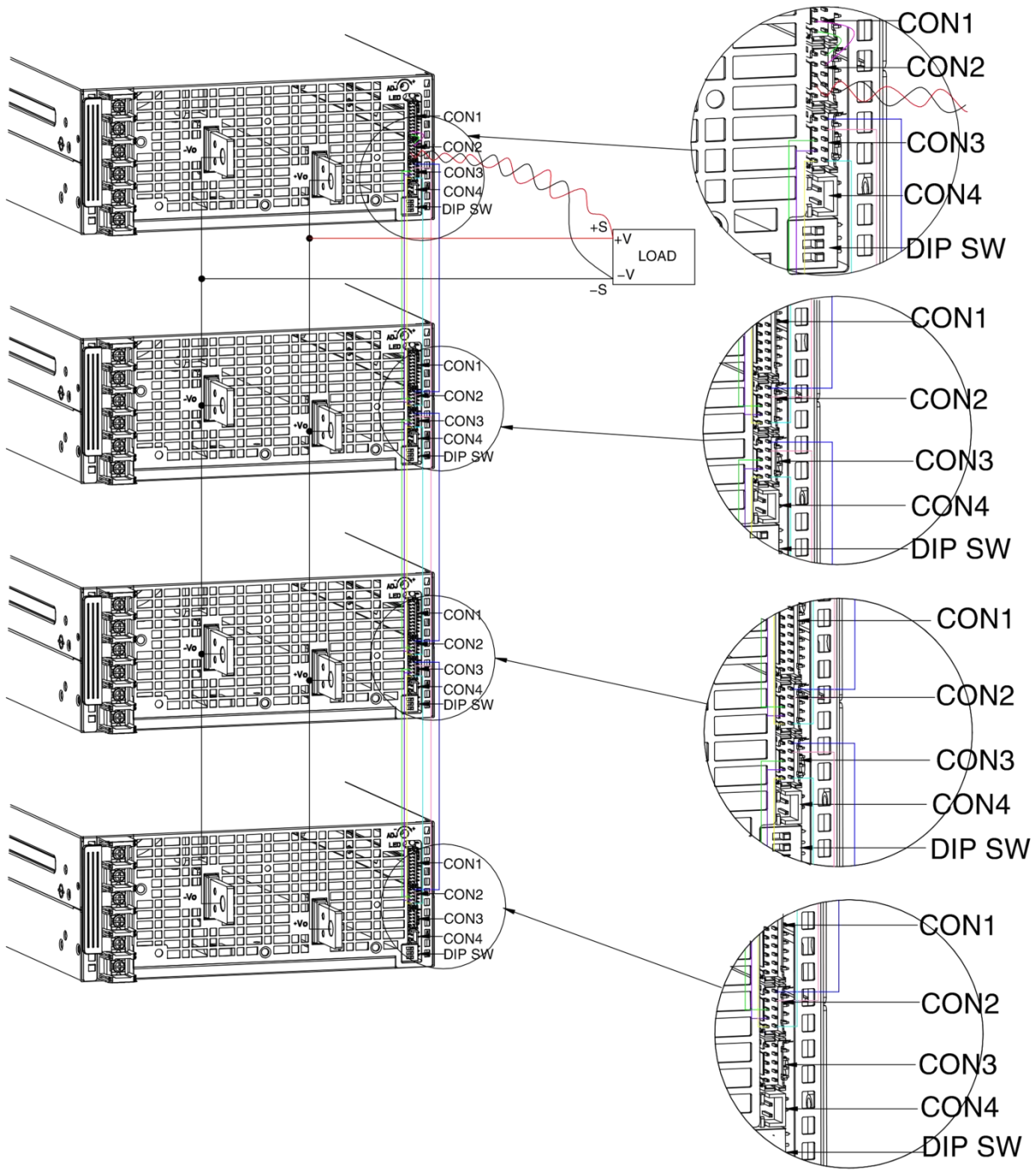
$$\text{Current sharing accuracy}=\frac{Io\max - Io\min}{Io\max + Io\min}*100\%$$

Iomax: Maximum output current value of power modules connected in parallel

Iomin: Minimum output current value of power modules connected in parallel

(3) VS+, VS-, CS+, CS- and RC+, RC- need to be connected in parallel to each other.

(4) When power modules are connected in parallel, the remote compensation sampling line must be connected to the main power module. And the remote compensation sampling line needs to be at least 30cm away from the input line.



3. Installation requirements

3.1 Safety introduction

Warning

Risk of electric shock

During high voltage operating

- The power supply module is disconnected from the input DC or the AC power and placed for at least one minute before starting to operate it.
- When installing the input wire to the power module, please connect the ground terminal first, and then connect the L line and the N line.
- When removing the input wire, please remove the L wire and the N wire first, and then remove the ground wire.
- When disassembling, make sure that no objects fall into the power module.
- Pay attention to high temperature.
- After the power module is working in a high temperature environment, wait for its shell to cool down before operating.
- This product needs to be installed by professionals and needs to be used with other equipment

3.2 Safety requirement

When installing, pay attention to the primary side and the protective ground, the creep distance and the electrical clearance of the primary side and the secondary side refer to EN62368.

4. Communication protocol

The AEF5000-5B-xx power supply adopts the standard Modbus communication protocol, and can read the product information, real-time working status and fault information of the power supply through the Modbus command. The AEF5000-5B-xx power communication hardware circuit uses RS485 bus. The receiving and sending terminals must be consistent. If they are inconsistent, add hardware circuits for level conversion.

Baud rate: 38400 Baud/S (default)

Data bits: 8 bits

Start bit: 1 bit

Stop bit: 1 bit

Parity check bit: No

The maximum delay allowed between bytes within a frame is 20ms, and incomplete data frames received beyond this delay time will be discarded.

The delay time between frames should be greater than 200 ms.

4.1 Register definition table

Register address	Parameter	Read or Write	Parameter description
0-63	Product information	Read	0-17 bytes for product manufacturer information; 18-35 bytes indicates the product model information; 36-53 bytes for product origin information; 54-71 bytes is the production data of the product; 72-89 bytes indicates the bar-code information of the product; 92-109 bytes indicates the firmware version information; The above information is character data. Before modifying the parameter, it is required to write 0xBC to the write protection Enable register (address 68) and modify the parameter.
66	Communication address	Write	The IP address ranges from 1 to 254. Before modifying the parameter, it is required to write 0xAC to the write protection Enable register (address 68) and modify the parameter（default address:1）.
67	Baud rate setting	Write	0:9600bit/s 1:19200bit/s 2:38400bit/s 3:76800bit/s Before modifying the parameter, it is required to write 0xAC to the write protection Enable register (address 68) and modify the parameter.
68	Write protection enable	Write	Enable parameter modification when the register is written to the secret key.
69	Preceding state	Read	Bit0: AC input state 0--Abnormal 1--Normal Bit2: BUS voltage state 0--Abnormal 1--Normal
70	Post state	Read	Bit0: AC input state--relay output 1--Abnormal 0--Normal Bit1: Over temperature protection--relay output 1--Abnormal 0--Normal Bit2: Fan fault--relay output 1--Abnormal 0--Normal Bit5: Output voltage state 0--Abnormal 1--Normal

			Bit11: PS_ON signal state 0--Power off 1--Power on Bit13: Output voltage state--relay output 0--Abnormal 1--Normal Bit14: Modbus switch control state 0--Power off 1--Power on
71	Trouble code	Read	Bit0: Output over voltage--hardware 0--Normal 1--Fail Bit1: Output over voltage--software 0--Normal 1--Fail Bit2: Constant current--delay protection 0--Normal 1--Fail Bit3: Long-term constant current exception protection 0--Normal 1--Fail Bit4: External regulating voltage signal 0--Normal 1--Fail Bit5: External regulating current signal 0--Normal 1--Fail Bit6: Over temperature protection 0--Normal 1--Fail Bit7: Fan fault 0--Normal 1--Fail
74-75	Set voltage	Read	The value is a single-precision floating-point number and the data format is big-endian, unit V
80-81	Output voltage	Read	The value is a single-precision floating-point number and the data format is big-endian, unit V
82-83	Output current	Read	The value is a single-precision floating-point number and the data format is big-endian, unit A
84-85	Output power	Read	The value is a single-precision floating-point number and the data format is big-endian, unit W
86-87	Ambient temperature	Read	The value is a single-precision floating-point number and the data format is big-endian, unit ℃
88-89	Hot spot temperature	Read	The value is a single-precision floating-point number and the data format is big-endian, unit ℃

4.2 Instruction data format description

(1) The upper computer sends instructions

Address	Function code	Register origin address (high type)	Register origin address (low type)	Number of registers (high type)	Number of registers (low type)	CRC16 checking (low type)	CRC16 checking (high type)
01	03	XX	XX	XX	XX	XX	XX

(2) Power return data

Address	Function code	Number of bytes	The value of register 0 (high type)	The value of register 0 (low type)	...	The value of register x (high type)	The value of register x (low type)	CRC16 checking (low type)	CRC16 checking (high type)
01	03	XX	XX	XX	...	XX	XX	XX	XX

Note：The data in the preceding commands is hexadecimal.