



1U

Power
Factor
CorrectionSafety
Approvals

EMI

Inrush
current
limiting

OCP

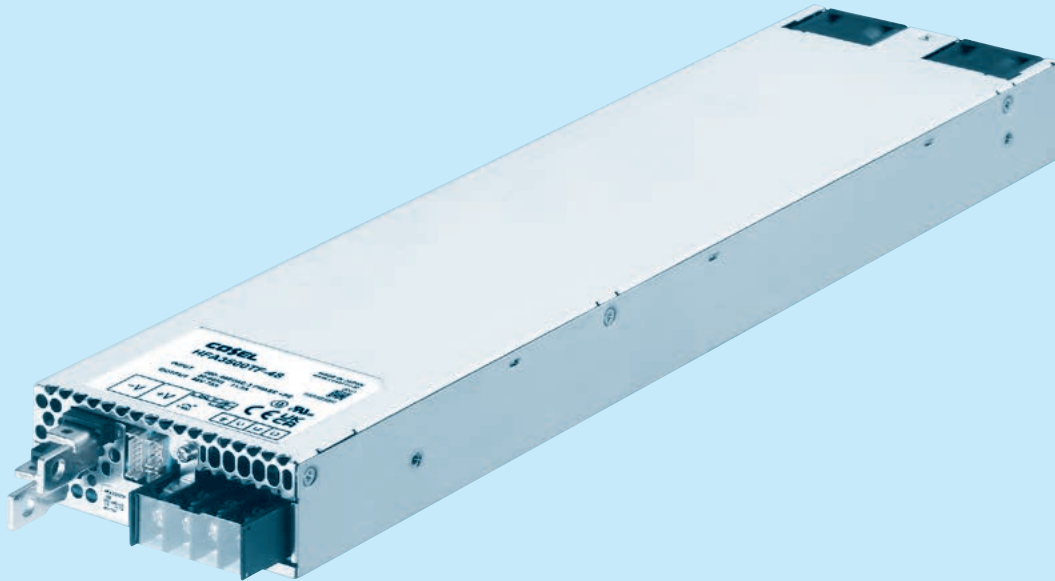


OVP

Remote
ON/OFFParallel
Operation

Worldwide

HFA-series



Feature

Low profile (41mm, 1.61 inch = Meet 1U height)
Wide input voltage range : 3 ϕ 180 · 528VAC
Built-in AUX power 12V 1A
Complies with SEMI F47
Parallel Operation / N+1 Parallel Redundancy Operation
High efficiency 94% (at 400VAC input and 65V output)
Built-in Alarms
Built-in ORING MOSFET

Safety agency approvals

UL62368-1, C-UL (CSA62368-1), EN62368-1

5-year warranty (Refer to Instruction Manual)

CE marking

Low voltage Directive
RoHS Directive

UKCA marking

Electrical Equipment Safety Regulations
RoHS Regulations

EMI

Complies with FCC Part 15-A, FCC Part18-A, CISPR11-A,
CISPR32-A, EN55011-A, EN55032-A, VCCI-A

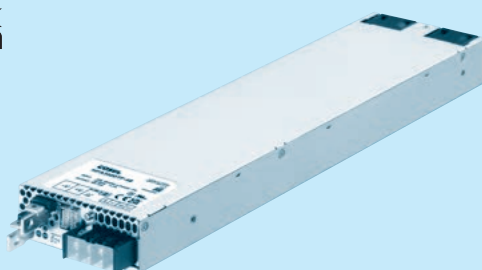
EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2
EN61000-4-3
EN61000-4-4
EN61000-4-5
EN61000-4-6
EN61000-4-8
EN61000-4-11

HFA3500TF

HF A 3500 TF -□□ -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ 3 phase full range input
- ⑤ Output voltage
- ⑥ Optional
 - R : with Remote ON/OFF Positive logic control
 - G : Low leakage current
 - I4 : with MODBUS interface

MODEL	HFA3500TF-48	HFA3500TF-65
MAX OUTPUT WATTAGE[W]	3504	3510
DC OUTPUT	48V 73A	65V 54A

SPECIFICATIONS

	MODEL	HFA3500TF-48	HFA3500TF-65
INPUT	VOLTAGE[VAC]	*1 180 - 528 3 φ 3-wire (Available to 3 φ 4-wire as well (without N phase))	
	CURRENT[A]	ACIN 200V	11.7typ
		ACIN 400V	5.9typ
	FREQUENCY[Hz]	50 / 60 (45 - 66)	
	EFFICIENCY[%]	ACIN 200V (Io=100%)	91typ
		ACIN 400V (Io=100%)	93typ
	POWER FACTOR	ACIN 200V (Io=100%)	0.95typ
		ACIN 400V (Io=100%)	0.94typ
	INRUSH CURRENT[A]	ACIN 200V *2	20 / 30 typ (Io=100%) (Primary / Secondary inrush current)(At cold start) (Ta=25℃)
		ACIN 400V *2	40 / 30 typ (Io=100%) (Primary / Secondary inrush current)(At cold start) (Ta=25℃)
	LEAKAGE CURRENT[ma]	3 max (ACIN 480V 60Hz, Io=100%, Complies with IEC62368-1)	
OUTPUT	VOLTAGE[V]	48	65
	CURRENT[A]	73	54
	LINE REGULATION[mV]	192max	260max
	LOAD REGULATION[mV]	300max	450max
	RIPPLE[mVp-p]	0 to +70℃ *3	360max
		-10 to 0℃ *3	480max
	RIPPLE NOISE[mVp-p]	0 to +70℃ *3	600max
		-10 to 0℃ *3	720max
	TEMPERATURE REGULATION[mV]	0 to +50℃	390max
		-10 to +0℃	480max
	START-UP TIME[ms]	400 typ (ACIN 200/400V, Io=100%)	
	HOLD-UP TIME[ms]	20 typ (ACIN 200V, Io=55%) / 10 typ (ACIN 200V, Io=100%)	
PROTECTION CIRCUIT AND OTHERS	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	24.00 to 55.20	32.50 to 74.75
	OUTPUT VOLTAGE SETTING[V]	48.00 to 48.48	65.00 to 65.65
	OVERCURRENT PROTECTION	Works over 105% of rating (Recovers automatically, Hiccup overcurrent)	
	OVERVOLTAGE PROTECTION[V]	57.60 to 67.20	78.00 to 91.00
	REMOTE SENSING	Provided	
	REMOTE ON/OFF	Provided	
ISOLATION	DC_OK LAMP	LED (Blue)	
	ALARM LAMP	LED (Amber)	
	Input - Output,CN1, CN2, CN3	4,243VAC 1minute, Cutoff current = 20mA, 500VDC 50MΩ min (At room temperature)	
	Input - FG	2,829VAC 1minute, Cutoff current = 20mA, 500VDC 50MΩ min (At room temperature)	
	Output, CN1, CN2 - FG	2,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At room temperature)	
	Output, CN1, CN2 - CN3	500VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At room temperature)	
ENVIRONMENT	CN3 - FG	500VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At room temperature)	
	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +70℃ (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max	
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75℃, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max	
	VIBRATION	10 - 55Hz, 19.6m/s ² (2G), 3minutes period, 60minutes each along X, Y and Z axis	
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s ² (20G), 11ms, once each along X, Y and Z axis	
	AGENCY APPROVALS	UL62368-1, EN62368-1, C-UL (equivalent to CAN/CSA-C22.2 No.62368-1)	
	CONDUCTED NOISE	Complies with FCC Part 15-A, FCC Part18-A, CISPR11-A, CISPR32-A, EN55011-A, EN55032-A, VCCI-A	
OTHERS	CASE SIZE/WEIGHT	110×41×468mm [4.33×1.61×18.43 inches] (without terminal block and screw) (W×H×D) / 3kg max	
	COOLING METHOD	Forced cooling (internal fan)	

*1 Output derating is required at 180 - 200VAC. Refer to "Derating".

*2 The value is primary surge. The current of input surge to a built-in EMI/EMS Filter (0.2ms or less) is excluded. More than 3 sec. to re-start.

*3 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKUGIKEN : RM104). Please refer to the instruction manual 1.7.

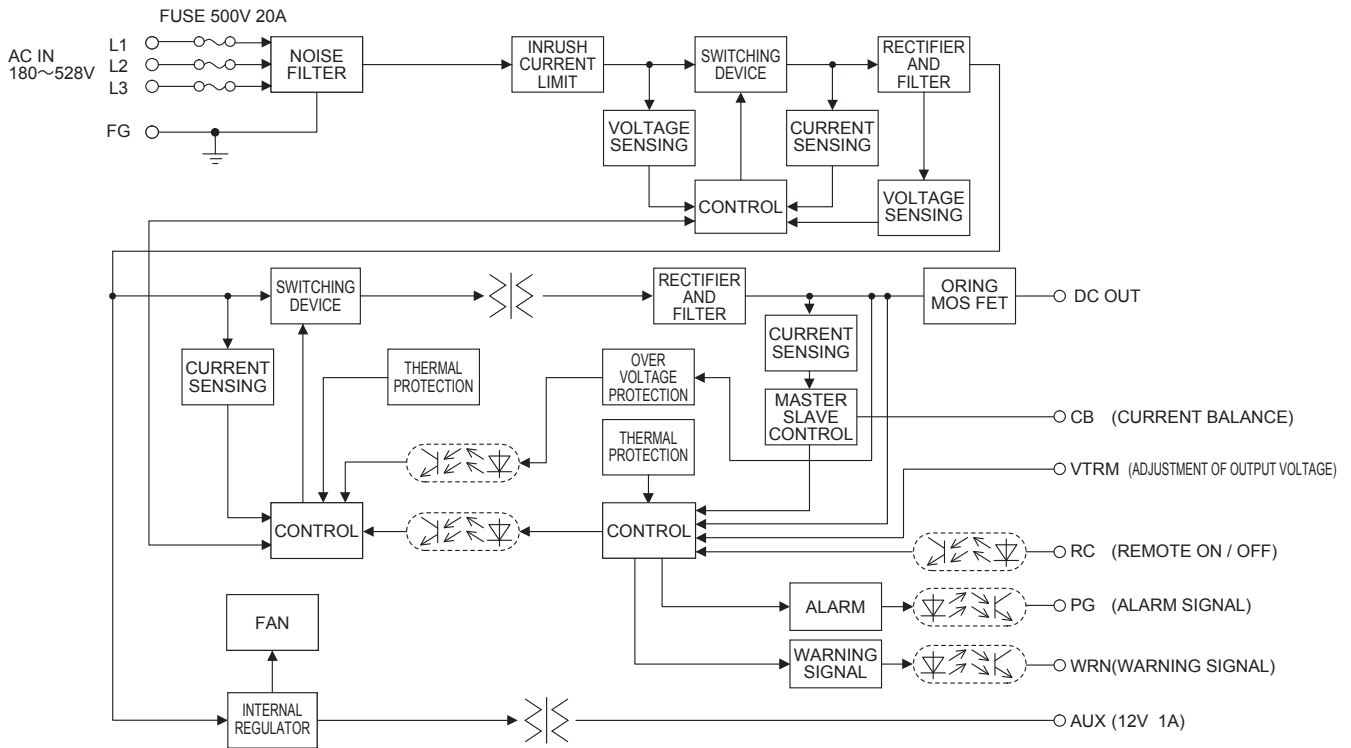
* Sound noise may be generated by power supply in case of pulse load.

Features

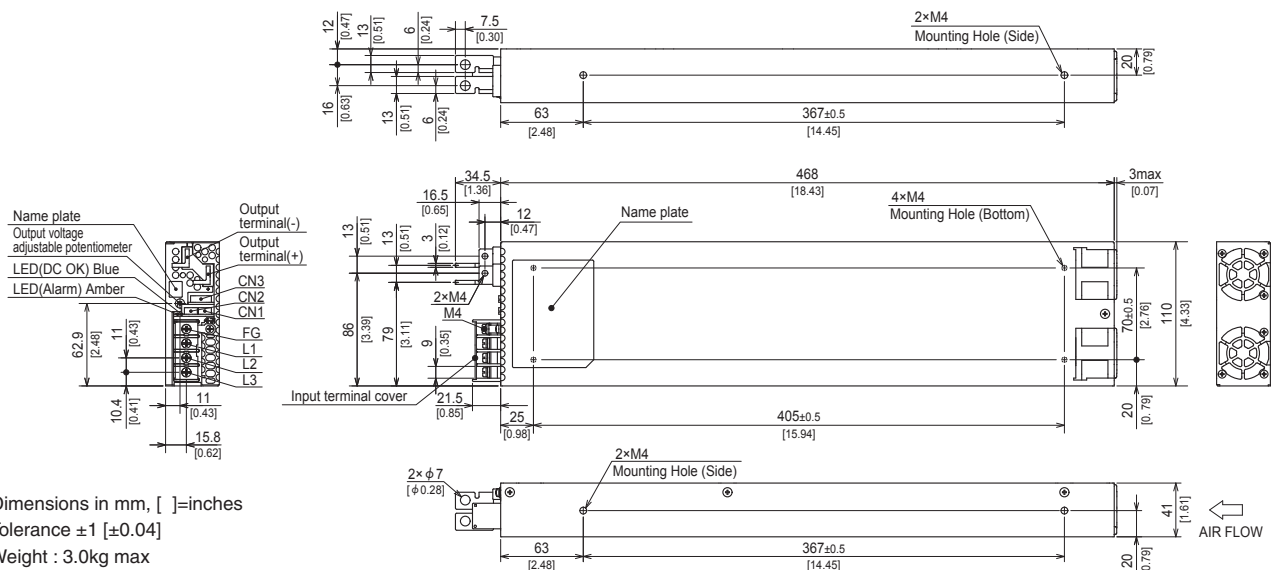
- Low profile (41mm, 1.61 inch = Meet 1U height)
- Wide input voltage range : 3 ϕ 180 – 528VAC
- Built-in AUX power 12V 1A
- Complies with SEMI F47

- Parallel Operation / N+1 Parallel Redundancy Operation
- High efficiency 94% (at 400VAC input and 65V output)
- Built-in Alarms
- Built-in ORING MOSFET

Block diagram



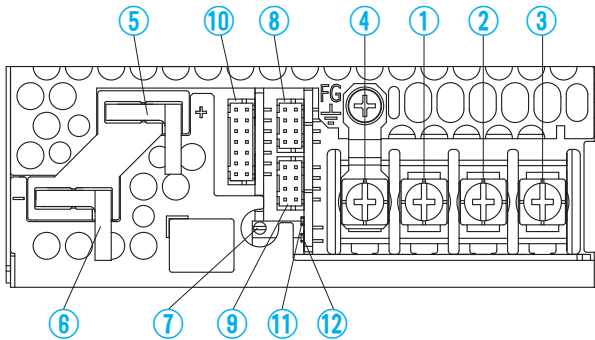
External view



- * Dimensions in mm, [] = inches
- * Tolerance ± 1 [± 0.04]
- * Weight : 3.0kg max
- * PCB Material / thickness : FR-4 / 1.6mm [0.06]
- * Chassis Material : Stainless
- * Mounting torque : M4 1.2N-m max
- * Input and output terminal screw tightening torque: M4 1.6N-m max
- * Please connect safety ground to FG terminal on the unit.

Terminal Blocks

● HFA3500TF



- ①AC (L1)
②AC (L2)
③AC (L3)
- Input Terminals 180—528VAC 3 ϕ 45—66Hz (M4)

④Frame ground (M4 \perp)

⑤+ Output

⑥- Output

⑦Output voltage adjustable potentiometer

⑧CN1

⑨CN2

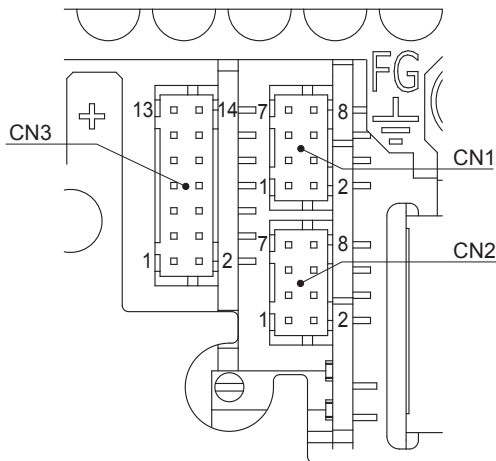
⑩CN3

Connectors

⑪LED for output voltage confirmation (DC_OK) Color : Blue

⑫LED for fault condition detection (ALARM) Color : Amber

● Pin Configuration and Functions



Pin Configuration and Functions of CN1, CN2

Pin No.	Function	Ground level
1	+S : +Remote sensing	COM
2,3	N.C. : No connection	-
4	-S : -Remote sensing	COM
5	CB : Current Balance	COM
6	N.C. : No connection	-
7	VTRM : Adjustment of output voltage	COM
8	COM : Common ground (for signal)	COM

* Each terminal of CN1 and CN2 are connected inside the power supply.

* Do not connect anything to N.C. pins.

Pin Configuration and Functions of CN3

Pin No.	Function	Ground level
1	AUXG : Auxiliary output ground (Same potential as SGND)	AUXG
2	SGND : Signal ground (Same potential as AUXG)	SGND
3	AUX : Auxiliary output	AUXG
4	B : RS485 differential signal (-, Inverted) *1	SGND
5	A : RS485 differential signal (+, Non-Inverting) *1	SGND
6	ADDR1 : Address bit 1 *1	SGND
7	SLV_EN : Enable Slave mode	SGND
8	ADDR0 : Address bit 0 *1	SGND
9	RC : Remote ON/OFF	RCG
10	RCG : Remote ON/OFF ground	RCG
11	WRN : Warning signal	WRNG
12	WRNG : Warning signal ground	WRNG
13	PG : Alarm signal	PGG
14	PGG : Alarm signal ground	PGG

*1 For -I4 option.

Mating connector and terminal

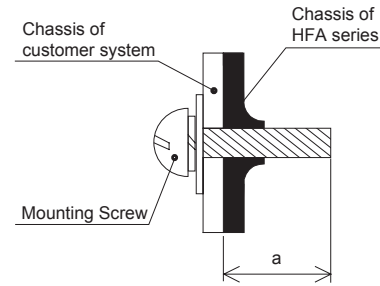
Connector	Housing	Terminal	Mfr.
CN1	S8B-PHDSS	PHDR-8VS	J.S.T.
CN2		Reel : SPHD-001T-P0.5 SPHD-002T-P0.5	
CN3	S14B-PHDSS	Loose : BPHD-001T-P0.5 * BPHD-002T-P0.5 *	

* The manufacturer prepares only the ratchet hand.

Assembling and Installation Method

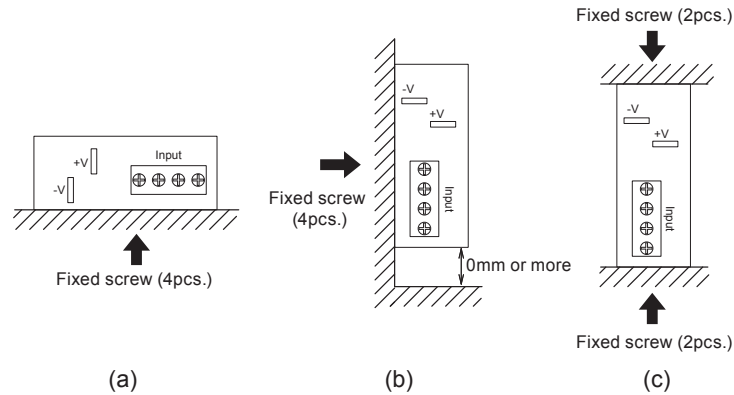
Installation Method

- Screw mounting requires considering the product weight for safety fixtures.
- To keep enough insulation distance between screws and internal components, length of the mounting screw should not exceed recommendation as shown in right figure.

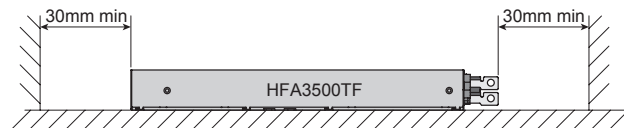


Mounting hole	a (Max penetration length)
Bottom	6mm max
Side	4.5mm max

- When mounting the power supply with screws, it is recommended that this be done as shown below. If other methods are used, be sure the weight of the power supply is taken into account.

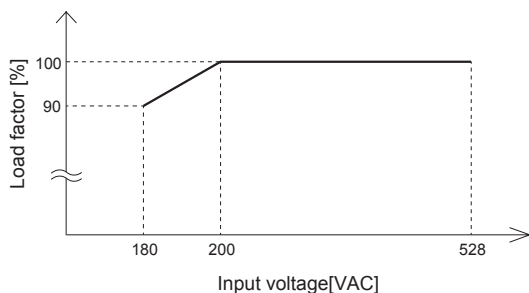


- The power supplies have a built-in forced cooling fan. Do not block ventilation at the suction side and its opposite side.
- If you use a power supply in a dusty environment, it can cause a failure. Please consider taking such countermeasures as installing an air filter near the suction area of the system to prevent a failure.



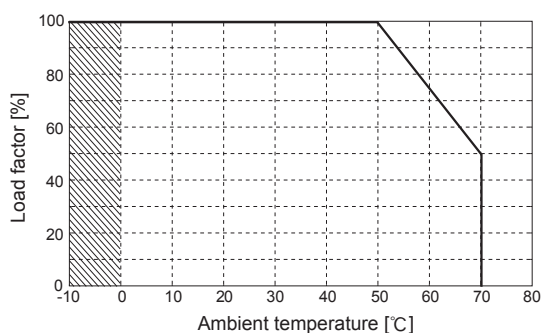
Derating

Derating curve depends on Input voltage



Derating curve depends on Output voltage

Specifications for ripple and ripple noise changes in the shaded area.



Instruction Manual

It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://www.cosel.co.jp/redirect/catalog/en/HFA/>
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

HFA



NOTICE



Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A] *	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
HFA3500TF	Active filter	130	11.7	Thermistor + IGBT + Relay	FR-4		Yes	Yes	Yes
	Phase-shift Full-bridge converter	(Primary) 95							
		(Secondary) 190							

* The value of input current is at 200VAC input and rated load.