SERIES: VOF-450C | DESCRIPTION: AC-DC POWER SUPPLY

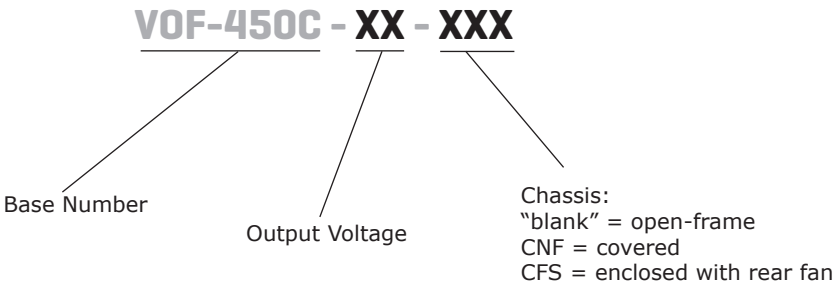
FEATURES

- 90~264 Vac and 127~370 Vdc input voltage range
- 3" x 5" open-frame footprint
- 250 W under natural convection, 450 W with airflow
- -40 ~ 70 °C temperature range
- active PFC
- 5 Vsby, 12 Vfan, power good, remote sense
- certified to 62368 safety standard
- designed to meet 60335 & 61558 safety requirements

MODEL	output voltage (Vdc)	output voltage range[1] (Vdc)	output current max (A)	output power[2] max (W)	ripple and noise[3] max (mVp-p)	efficiency[4] typ (%)
VOF-450C-12	12	11.4~12.6	33.3	400	200	91.0
VOF-450C-15	15	14.25~15.75	26.70	400	200	92.0
VOF-450C-24	24	22.8~25.2	18.75	450	200	93.0
VOF-450C-27	27	25.65~28.35	16.70	450	200	93.5
VOF-450C-36	36	34.2~37.8	12.50	450	200	93.0
VOF-450C-48	48	45.6~50.4	9.40	450	200	94.0

Notes:
1. When adjusting the output voltage care should be taken never to exceed the stated output power or output current of the unit.
2. With 25 CFM of forced air cooling.
3. At full load, nominal input, 20 MHz bandwidth oscilloscope, tip & barrel method, output terminated with 47 uF electrolytic and 0.1 uF ceramic capacitors.
4. At 230 Vac.

PART NUMBER KEY



INPUT

parameter	conditions/description		min	typ	max	units
voltage	ac input dc input		90 127		264 370	Vac Vdc
frequency			47		63	Hz
current	at 90/115 Vac at 230 Vac				5.2 2.6	A A
inrush current	at 115 Vac, cold start at 230 Vac, cold start			40 80		A A
leakage current	at 264 Vac contact leakage current earth leakage current				0.1 0.5	mA mA
power factor correction	at 115 Vac, full load at 230 Vac, full load		0.98 0.95			
no load power consumption	at 230 Vac, PS-ON signal held low (output disabled)				0.5	W
PS_ON input signal	power ON	PS_ON high	2		5	V
	power OFF	PS_ON low	0		0.5	V

OUTPUT

parameter	conditions/description		min	typ	max	units
output capacitance	12, 15, 24 Vdc output models 27 Vdc output model 36 Vdc output model 48 Vdc output model				6,000 4,000 3,000 2,000	µF µF µF µF
initial set point accuracy	full load 12,15, 24 Vdc output models all other output models			±2 ±1		% %
line regulation	rated load			±0.5		%
load regulation	0 ~ 100% load			±1		%
hold-up time	at 115 Vac, 25°C, full load at 230 Vac, 25°C, full load		12 16			ms ms
temperature coefficient				±0.03		%/°C
fan power	output power of 12 Vdc/0.5A				6	W
VSTBY[5]				5		V
PG signal	power ON	The PG signal goes high with 10ms~500ms delay after power set up.	10		500	ms
	power OFF/power FAIL	The TTL signal goes low at least 1ms before output below 90% at rated value.	1		-	ms
	HIGH level	high	2		6	V
	LOW level	low	0		6	V

Note: 5. The load capacity is 0.6A without fan; the load capacity is 1A with fan 25CFM, tolerance2%, ripple: 120mVp-p(max.)

PROTECTIONS

parameter	conditions/description	min	typ	max	units
over voltage protection	output shutdown, latching 12 Vdc output model 15 Vdc output model 24 Vdc output model 27 Vdc output model 36 Vdc output model 48 Vdc output model			 15.6 19.5 31.2 35.1 46.8 60.0	 Vdc Vdc Vdc Vdc Vdc Vdc
over current protection	auto recovery, hiccup	105			%
short circuit protection	continuous, auto recovery, hiccup, recovery time <5s				
over temperature protection	output shutdown, auto recovery				

SAFETY & COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output, 1 min, <5mA input to ground, 1 min, <5mA output to ground, 1 min, <5mA	4,000 2,000 1,500			Vac Vac Vac
safety approvals	certified to 62368: EN/UL designed to meet 60335: EN designed to meet 61558: EN				
safety class	Class I				
conducted emissions[5]	EN55032(CISPR32) CLASS B				
radiated emissions[5]	EN55032(CISPR32) CLASS B				
harmonic current	IEC/EN61000-3-2 CLASS A and CLASS D				
flicker	IEC/EN61000-3-3				
ESD	IEC/EN61000-4-2 Contact ±8KV/Air ±15KV, perf. Criteria A				
radiated immunity	IEC/EN61000-4-3 10V/m, perf. Criteria A				
EFT/burst	IEC/EN61000-4-4 ±2KV, perf. Criteria A				
surge	IEC/EN61000-4-5 line to line ±2KV, line to ground ±4KV, perf. Criteria A				
conducted immunity	IEC/EN61000-4-6 10Vr.m.s, perf. Criteria A				
voltage dips and interruptions	IEC/EN61000-4-11 0%, 70% perf. Criteria B				
MTBF	as per MIL-HDBK-217F at 25°C	200,000			hours
RoHS	yes				

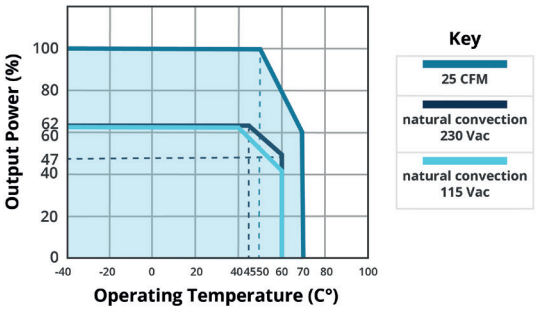
Notes: 5. The power supply isconsidered a component of the end system. All EMC performance has been tested on a metal plate with the dimensions 360 x 360 x 1 mm. The power supply must be integrated into the end system for proper electromagnetic compatibility testing.

ENVIRONMENTAL

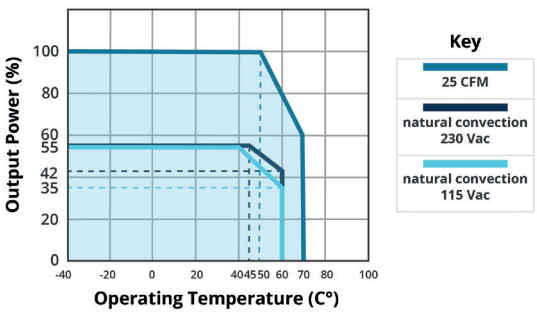
parameter	conditions/description	min	typ	max	units
operating temperature	see derating curves	-40		70	°C
storage temperature		-40		85	°C
operating humidity	non-condensing	20		90	%
storage humidity	non-condensing	10		95	%

DERATING CURVES

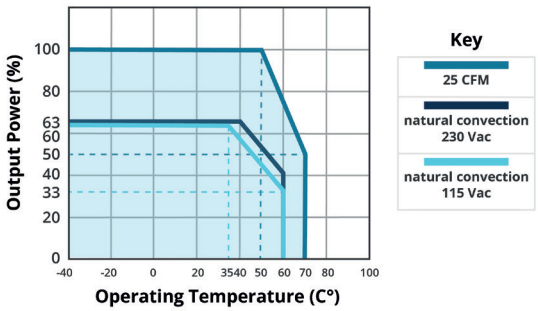
TEMPERATURE DERATING CURVE (full load 400W with 25 CFM) VOF-450C-12, VOF-450C-15



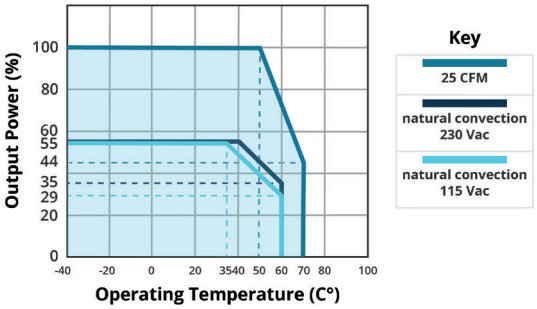
TEMPERATURE DERATING CURVE (full load 450W with 25 CFM) VOF-450C-24, VOF-450C-27 VOF-450C-36, VOF-450C-48



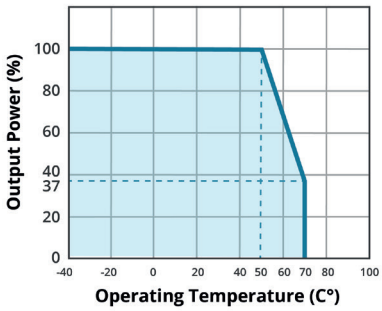
TEMPERATURE DERATING CURVE (full load 400W with 25 CFM) VOF-450C-12-CNF, VOF-450C-15-CNF



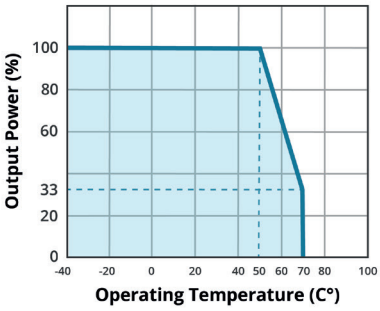
TEMPERATURE DERATING CURVE (full load 450W with 25 CFM) VOF-450C-24-CNF, VOF-450C-27-CNF VOF-450C-36-CNF, VOF-450C-48-CNF



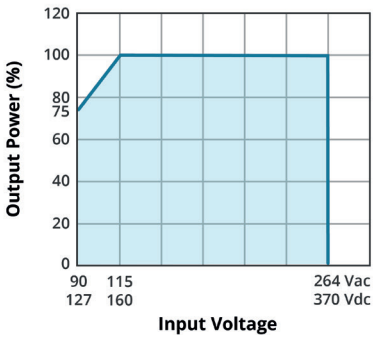
TEMPERATURE DERATING CURVE (full load 400W with 25 CFM) VOF-450C-12-CFS, VOF-450C-15-CFS



TEMPERATURE DERATING CURVE (full load 450W with 25 CFM) VOF-450C-24-CFS, VOF-450C-27-CFS VOF-450C-36-CFS, VOF-450C-48-CFS



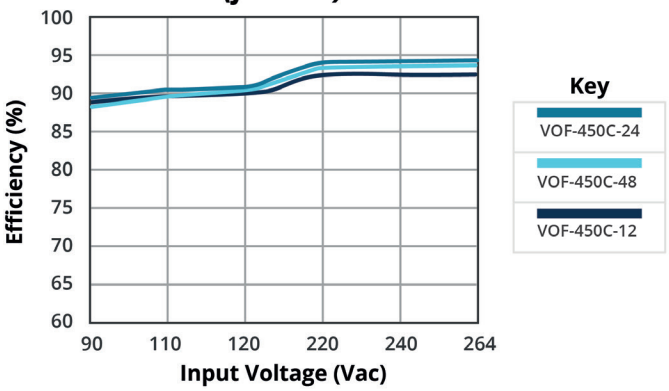
INPUT VOLTAGE DERATING CURVE (25°C)



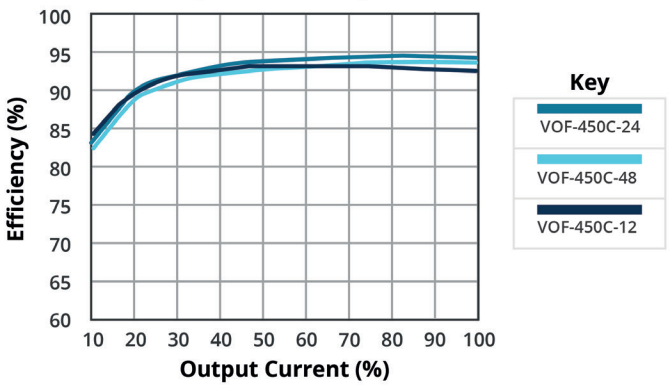
Note: With an AC input voltage between 90 ~ 115 Vac and a DC input between 127 ~ 160 Vdc the output power must be derated as per the temperature derating curves.

EFFICIENCY CURVES

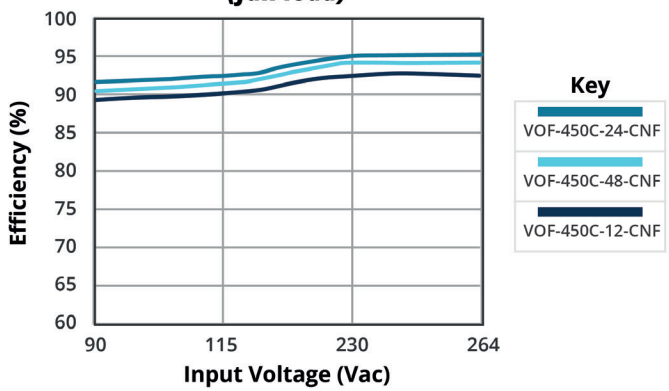
EFFICIENCY VS INPUT VOLTAGE (full load)



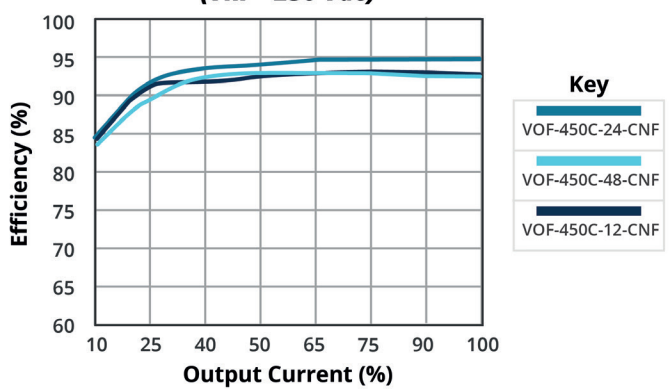
EFFICIENCY VS OUTPUT LOAD (Vin = 230 Vac)



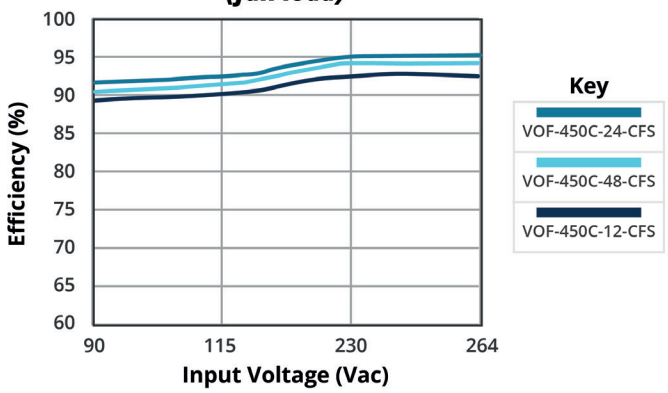
EFFICIENCY VS INPUT VOLTAGE (full load)



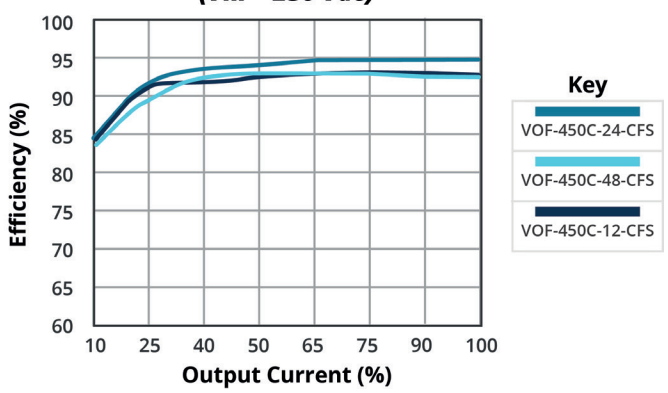
EFFICIENCY VS OUTPUT LOAD (Vin = 230 Vac)



EFFICIENCY VS INPUT VOLTAGE (full load)



EFFICIENCY VS OUTPUT LOAD (Vin = 230 Vac)

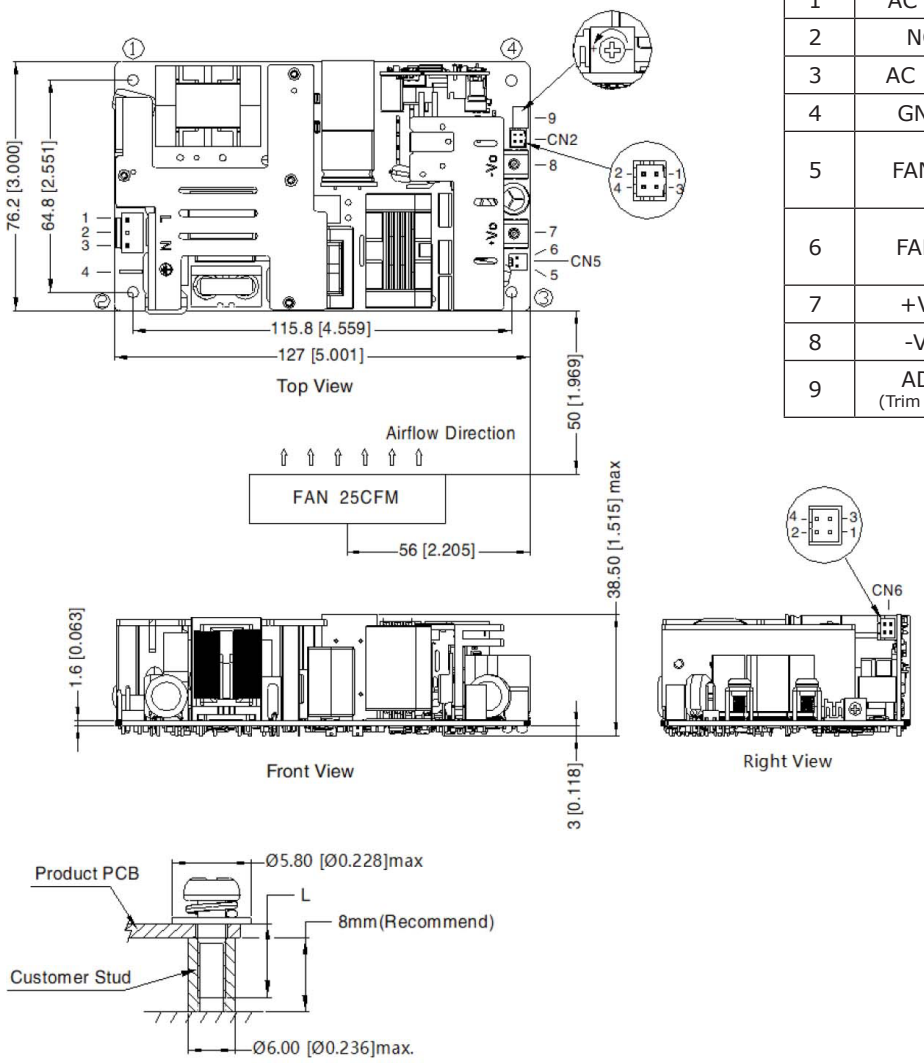


MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	open frame models: 127 × 76.2 × 38.5 [5.0 x 3.0 x 1.515 inch] covered models: 130.0 × 86.0 × 43.0 [5.118 x 3.385 x 1.692 inch] with rear fan: 160.0 × 86.0 × 43.0 [6.299 x 3.385 x 1.692 inch]				mm mm mm
weight	open frame models covered models with rear fan		400 605 645		g g g
cooling	natural convection or 25 CFM forced air				

MECHANICAL DRAWING

Open-frame
units: mm [inch]
general tolerance: ±1.00 [±0.039]
pin 7,8 connector tightening torque: M4, 1.2N·m (max)



PIN-OUT		
PIN	Function	Mating Connector
1	AC (L)	Housing: JST VHR or equivalent Contact: JST SVH-21T-P1.1 or equivalent
2	NC	
3	AC (N)	
4	GND	Contact: JST SPS-21T-250
5	FAN+	CN5: Fan power output port Housing: TKP 2502 or equivalent Contact: TKP 8811 or equivalent
6	FAN-	
7	+Vo	
8	-Vo	
9	ADJ (Trim POT)	

CN6: PS_ON signal input port (3-4) 5Vdc standby (1-2)		
PIN	Function	Mating Connector
1	+5V	Housing: JST PHD-2*2Y or equivalent Contact: JST PHD-TE or equivalent
2	GND	
3	PS-ON	
4	GND	

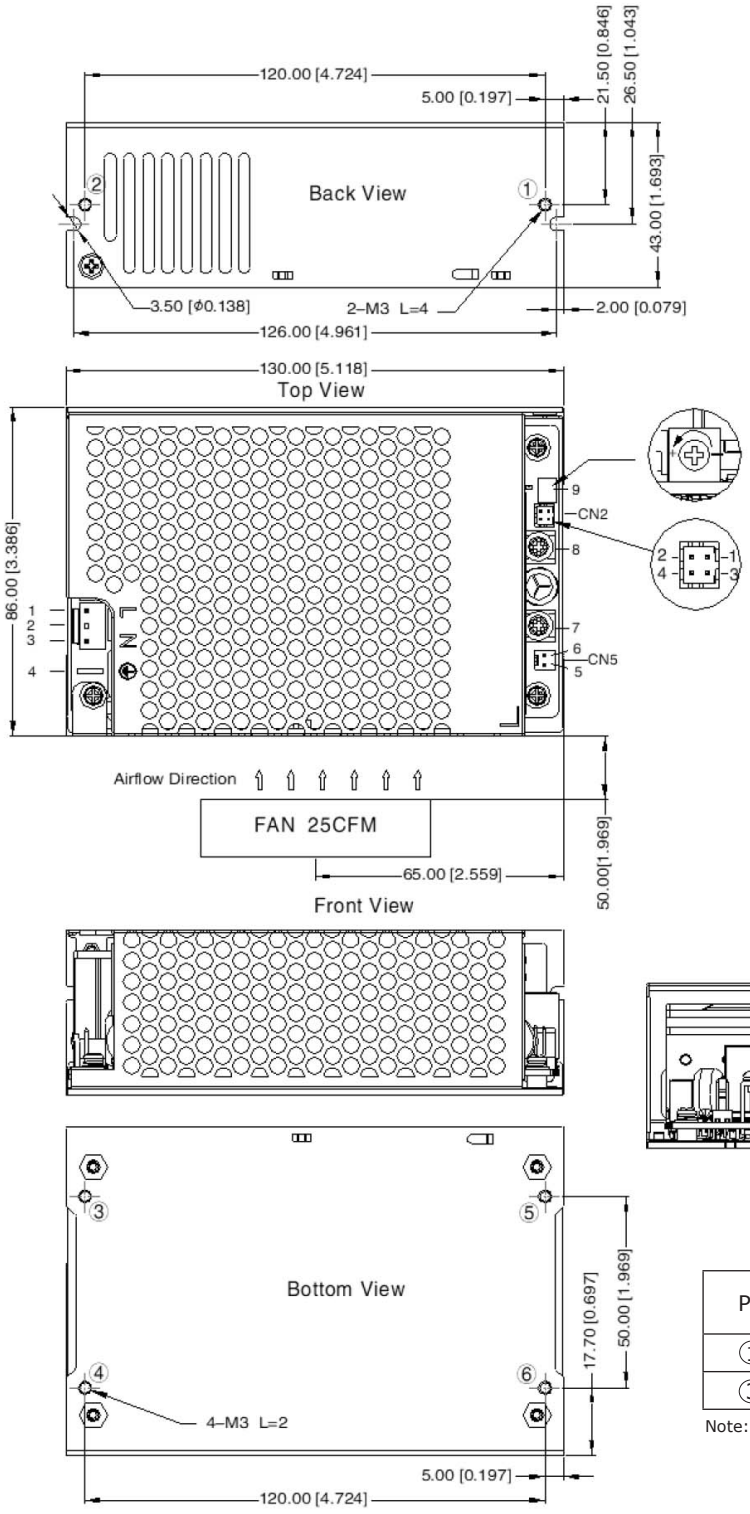
CN2: remote sensing signal input port (1-2) PG signal (3-4)		
PIN	Function	Mating Connector
1	RS-	Housing: JST PHD-2*2Y or equivalent Contact: JST PHD-TE or equivalent
2	RS+	
3	GND	
4	PG	

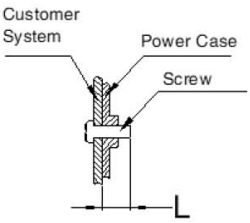
Position	Screw Spec.	L (recommended)	Torque (max)
①~④	M3	6mm	0.4 N·m

Note: 1. Class I system ①, ②, ③ positions must be connected to the protective earth ground (⏚).
2. It is recommended that a minimum distance of 10mm be placed between the PCB edge and all other components.

MECHANICAL DRAWING (CONTINUED)

Covered
units: mm [inch]
general tolerance: ±1.00 [±0.039]
pin 7,8 connector tightening torque: M4, 1.2N·m (max)





PIN-OUT		
PIN	Function	Mating Connector
1	AC (L)	Housing: JST VHR or equivalent Contact: JST SVH-21T-P1.1 or equivalent
2	NC	
3	AC (N)	
4	GND	Contact: JST SPS-21T-250
5	FAN+	CN5: Fan power output port Housing: TKP 2502 or equivalent Contact: TKP 8811 or equivalent
6	FAN-	
7	+Vo	
8	-Vo	
9	ADJ (Trim POT)	

CN6: PS_ON signal input port (3-4) 5Vdc standby (1-2)		
PIN	Function	Mating Connector
1	+5V	Housing: JST PHD-2*2Y or equivalent Contact: JST PHD-TE or equivalent
2	GND	
3	PS-ON	
4	GND	

CN2: remote sensing signal input port (1-2) PG signal (3-4)		
PIN	Function	Mating Connector
1	RS-	Housing: JST PHD-2*2Y or equivalent Contact: JST PHD-TE or equivalent
2	RS+	
3	GND	
4	PG	

Position	Screw Spec.	L (max)	Torque (max)
①~②	M3	4mm	0.4 N·m
③~⑥	M3	2mm	0.4 N·m

Note: Safety Class I integrations require the metal case to be securely fastened to protective earth ground (⏚).

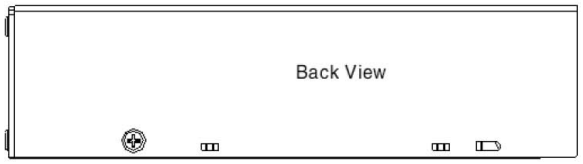
MECHANICAL DRAWING (CONTINUED)

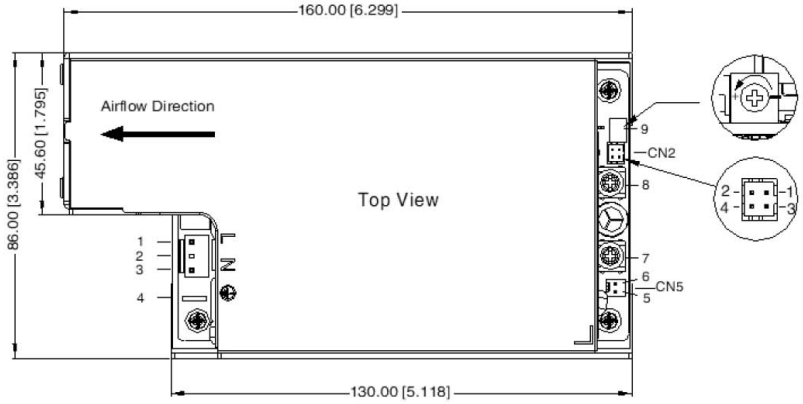
with rear fan:
units: mm [inch]
general tolerance: ±1.00 [±0.039]
pin 7,8 connector tightening torque: M4, 1.2N·m (max)

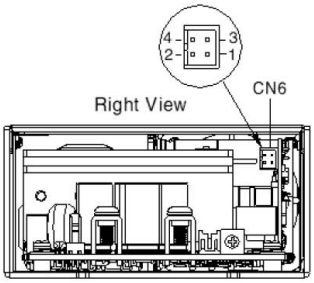
Position	Screw Spec.	L (max)	Torque (max)
①~④	M3	2mm	0.4 N·m

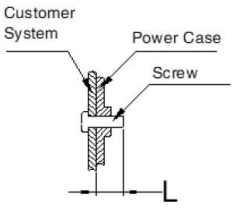
Note: Safety Class I integrations require the metal case to be securely fastened to protective earth ground (⏚).

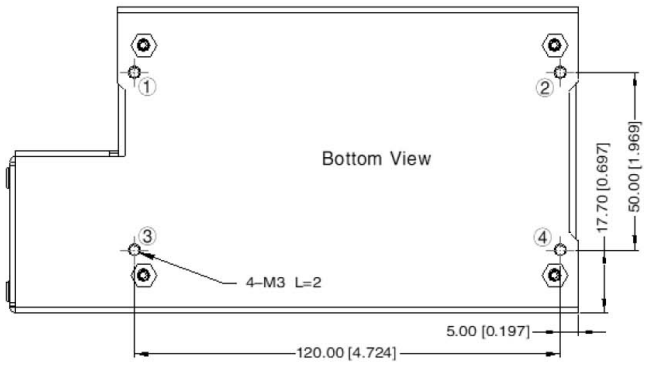
PIN-OUT		
PIN	Function	Mating Connector
1	AC (L)	Housing: JST VHR or equivalent Contact: JST SVH-21T-P1.1 or equivalent
2	NC	
3	AC (N)	
4	GND	Contact: JST SPS-21T-250
5	FAN+	CN5: Fan power output port Housing: TKP 2502 or equivalent Contact: TKP 8811 or equivalent
6	FAN-	
7	+Vo	
8	-Vo	
9	ADJ (Trim POT)	









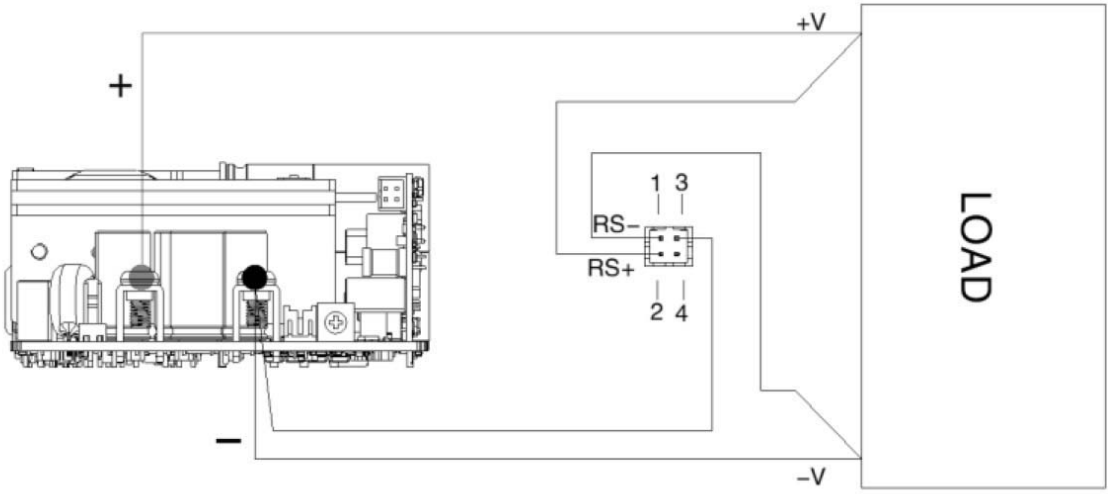


CN6: PS_ON signal input port (3-4) 5Vdc standby (1-2)		
PIN	Function	Mating Connector
1	+5V	Housing: JST PHD-2*2Y or equivalent Contact: JST PHD-TE or equivalent
2	GND	
3	PS-ON	
4	GND	

CN2: remote sensing signal input port (1-2) PG signal (3-4)		
PIN	Function	Mating Connector
1	RS-	Housing: JST PHD-2*2Y or equivalent Contact: JST PHD-TE or equivalent
2	RS+	
3	GND	
4	PG	

REMOTE SENSE

Remote Sense signals (RS+ and RS-) can be used to compensate for voltage drops that occur within the output power cables. RS+ and RS- should always be routed as a twisted pair and never shorted together or reversed otherwise permanent damage may occur.



REVISION HISTORY

rev.	description	date
1.0	initial release	12/21/2021
1.01	PG, REM, STDBY, and trim updated	04/06/2022

The revision history provided is for informational purposes only and is believed to be accurate.

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