AC-DC Power Supplies Bus Converter・Power Module Type

TUNS300F

Ordering information

TUN	S	300	F	48	-□
①	②	③	④	⑤	⑧

①Series name
②Single output
③Output wattage
④Universal Input
⑤Output voltage
⑧Optional
T : with Mounting hole (φ3.4 thru)
Y1: Outputvoltage adjustment range ±20% (Only 48V)
R1: with Remote ON/OFF (Negative logic control)
R2: with Remote ON/OFF (Negative logic and Low standby power)
R3: with Remote ON/OFF (Positive logic control)
N1: Auto restart from thermal protection

RoHS

✻Avoid short circuit between +BC/R and -BC. It may cause the failure of inside components.
✻Keep TRM open, if output voltage adjustment is not necessary.
✻If remote sensing is not necessary, connect between +Vout & +S and between -Vout & -S.

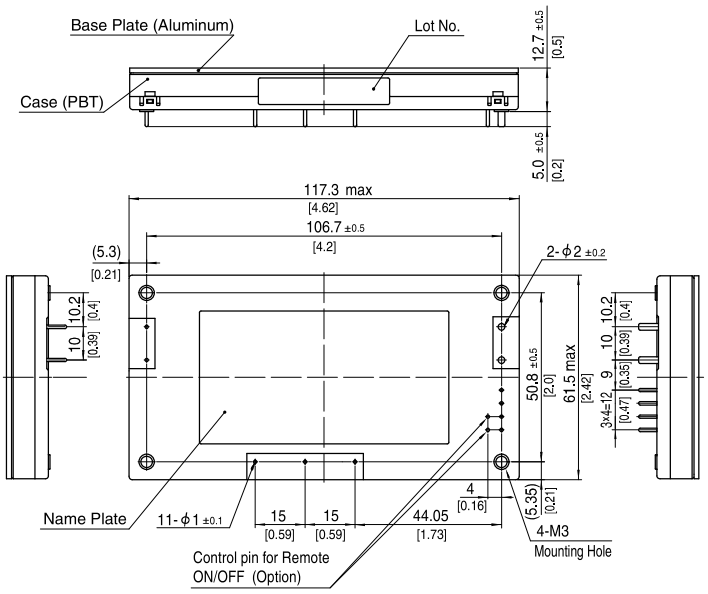
MODEL	TUNS300F12	TUNS300F28	TUNS300F48
MAX OUTPUT WATTAGE[W]	300	308	312
DC OUTPUT	12V 25A	28V 11A	48V 6.5A

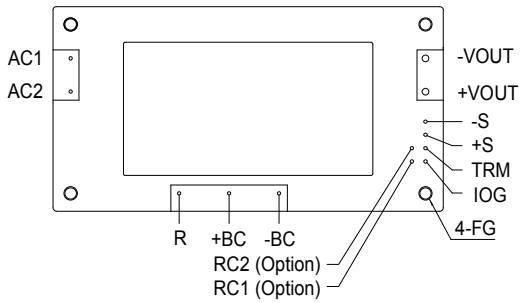
SPECIFICATIONS

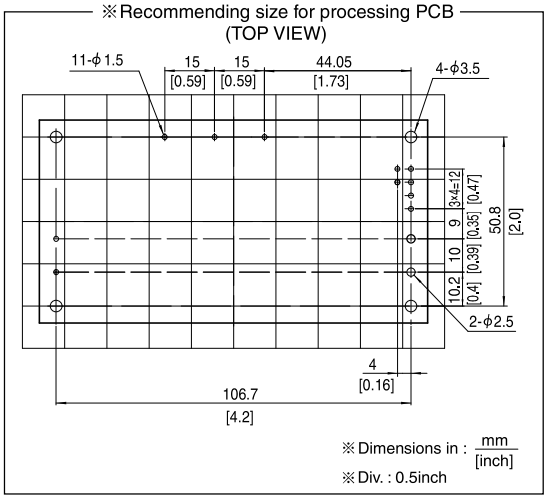
	MODEL		TUNS300F12	TUNS300F28	TUNS300F48
INPUT	VOLTAGE[V]		AC85 - 264 1φ		
	CURRENT[A]	ACIN 100V	3.6typ (Io=100%)		
		ACIN 200V	1.8typ (Io=100%)		
	FREQUENCY[Hz]		50/60 (47 - 63)		
	EFFICIENCY[%]	ACIN 100V	84typ	87typ	87typ
		ACIN 200V	86typ	89typ	90typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ		
		ACIN 200V	0.93typ		
	INRUSH CURRENT		Limited by external resistance		
	LEAKAGE CURRENT[mA]		0.75max (ACIN 240V 60Hz, Io=100%, According to IEC62368-1)		
OUTPUT	VOLTAGE[V]		12	28	48
	CURRENT[A]		25	11	6.5
	LINE REGULATION[mV]		24max	56max	96max
	LOAD REGULATION[mV]		24max	56max	96max
	RIPPLE[mVp-p]	0 to +100℃ ✻1	120max	180max	250max
		-40 to 0℃ ✻1	150max	200max	300max
	RIPPLE NOISE[mVp-p]	0 to +100℃ ✻1	150max	200max	300max
		-40 to 0℃ ✻1	200max	300max	450max
	TEMPERATURE REGULATION[mV]	0 to +65℃	120max	280max	480max
		-40 to +100℃	240max	560max	960max
	DRIFT[mV]	✻2	40max	90max	180max
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		Fixed (TRM pin open), adjustable by external resistor or external signal		
			9.60 - 14.40	22.40 - 33.60	38.40 - 52.80 (-Y1 Option : 38.4 - 57.6)
	OUTPUT VOLTAGE SETTING[V]		11.91 - 12.29	27.56 - 28.44	47.24 - 48.76
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically		
	OVERVOLTAGE PROTECTION[V]		15.00 - 16.80	35.00 - 39.20	55.20 - 64.80 (-Y1 Option : 60.0 - 67.2)
	REMOTE SENSING		Provided		
	REMOTE ON/OFF		Optional (External power supply is required)		
ISOLATION	INPUT-OUTPUT・RC	✻4	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15℃)		
	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15℃)		
	OUTPUT・RC-FG	✻4	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15℃)		
	OUTPUT-RC	✻4	AC100V 1minute, Cutoff current = 100mA, DC100V 10MΩ min (20±15℃)		
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE		-40 to +100℃ (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to “Derating”), 3,000m (10,000 feet) max		
	STORAGE TEMP.,HUMID.AND ALTITUDE		-40 to +100℃, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max		
	VIBRATION		10 - 55Hz, 49.0m/s² (5G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT		196.1m/s² (20G), 11ms, once each along X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS		UL60950-1, C-UL (CSA60950-1), EN62368-1		
	HARMONIC ATTENUATOR		Complies with IEC61000-3-2 (Class A) ✻3		
OTHERS	CASE SIZE/WEIGHT		117.3×12.7×61.5mm [4.62×0.5×2.42 inches] (W×H×D) / 190g max		
	COOLING METHOD		Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)		

✻1 Refer to instruction manual for measuring method of electric characteristics.
✻2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
✻3 Please contact us about another class.
✻4 "RC" is applicable when remote control (optional) is added.

External view



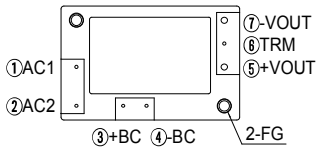




※Tolerance : ±0.3 [±0.012]
※Weight : 190g max
※Dimensions in mm, [ ]=inches
※Mounting hole screwing torque : 0.49N・m (5.0kgf・cm) max

Pin Configuration

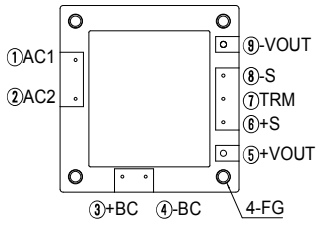
● TUNS50F



＊bottom view

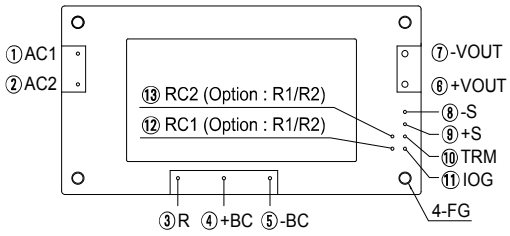
No.		Pin Connection	Function
TUNS50F	TUNS100F		
①	①	AC1	AC input
②	②	AC2	
③	③	+BC	+BC output
④	④	-BC	-BC output
⑤	⑤	+VOUT	+DC output
⑦	⑨	-VOUT	-DC output
–	⑧	-S	Remote sensing (-)
–	⑥	+S	Remote sensing (+)
⑥	⑦	TRM	Adjustment of output voltage
–	–	FG	Mounting hole (FG)

● TUNS100F



＊bottom view

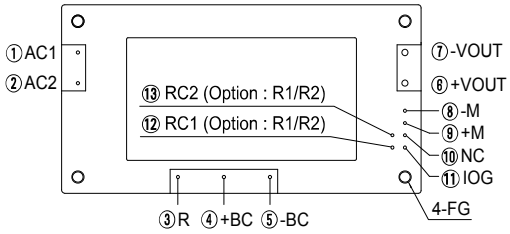
● TUNS300F/TUNS500F/TUNS700F



＊bottom view

No.	Pin Connection	Function
①	AC1	AC input
②	AC2	
③	R	External resistor for inrush current protection
④	+BC	+BC output
⑤	–BC	–BC output
⑥	+VOUT	+DC output
⑦	–VOUT	–DC output
⑧	–S	Remote sensing (–)
⑨	+S	Remote sensing (+)
⑩	TRM	Adjustment of output voltage
⑪	IOG	Inverter operation monitor
⑫	RC1	Remote ON/OFF (Option)
⑬	RC2	
—	FG	Mounting hole (FG)

● TUNS700F□□-P (OPTION)

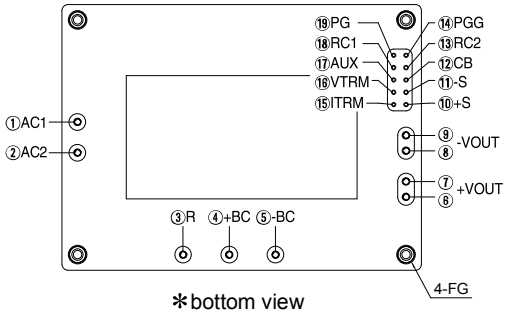


＊bottom view

No.	Pin Connection	Function
⑧	–M	Output voltage monitor terminal
⑨	+M	
⑩	NC	No connection

Other than the above are the same as standard products.

● TUNS1200F



＊bottom view

No.	Pin Connection	Function
①	AC1	AC input
②	AC2	
③	R	External resistor for inrush current protection
④	+BC	+BC output
⑤	-BC	-BC output
⑥⑦	+VOUT	+DC output
⑧⑨	-VOUT	-DC output
⑩	+S	Remote sensing (+)
⑪	-S	Remote sensing (-)
⑫	CB	Current balance
⑬	RC2	Remote ON/OFF ground
⑭	PGG	Power good output ground
⑮	ITRM	Adjustment of output current
⑯	VTRM	Adjustment of output voltage
⑰	AUX	Auxiliary output
⑱	RC1	Remote ON/OFF
⑲	PG	Power good output
—	FG	Mounting hole (FG)

Implementation • Mounting Method

Mounting method

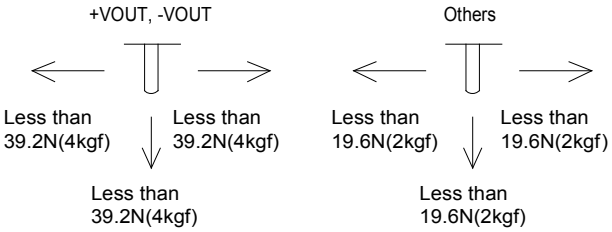
■Use with the conduction cooling (e.g. heat dissipation from the aluminum base plate to the attached heat sink).
■Use a heat sink that larger than the power supply and has a large thickness so that the alminum base plate can be cooled uniformly.
■The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Aluminum base plate temperature of each power supply should not exceed the temperature range shown in "derating".
■Avoid placing the AC input line pattern layout underneath the unit. It will increase the line conducted noise. Make sure to leave an ample distance between the line pattern layout and the unit. Also avoid placing the DC output line pattern underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.
■Avoid placing the signal line pattern layout underneath the unit because the power supply might become unstable. Lay out the pattern away from the unit.
■High-frequency noise radiates directly from the unit to the atmosphere. Therefore, design the shield pattern on the printed circuit board and connect it to FG or -BC.The shield pattern prevents noise radiation.
■When a heat sink cannot be fixed on the base plate side, order the power module with "-T"option. A heat sink can be mounted by affixing a M3 tap on the heat sink. Please make sure a mounting hole will be connected to a grounding capacitor CY.

	Mounting hole
Standard	M3 tapped
Optional : -T	ϕ3.4 thru

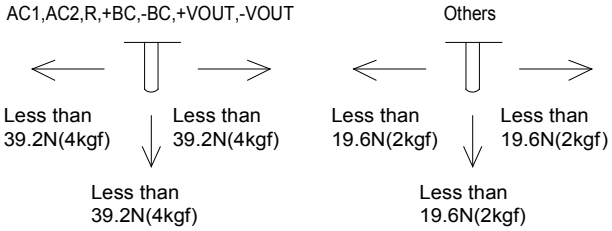
Stress onto the pins

■When too much stress is applied to the pins may damage internal connections. Avoid applying stress in excess of that shown in right figure.
■The pins are soldered onto the internal PCB.
Therefore, Do not bend or pull the leads with excessive force.
■Mounting hole diameter of PCB should be 3.5mm to reduce the stress to the pins.
■Fix the unit on PCB (fixing fittings) by screws to reduce the stress to the pins. Be sure to mount the unit first, then solder the unit.

● TUNS50F/100F/300F/500F/700F



● TUNS1200F



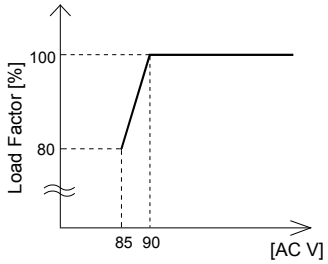
Soldering temperature

■Flow soldering : 260℃ for up to 15 seconds.
■Soldering iron (26W) : 450℃for up to 5 seconds.

Derating

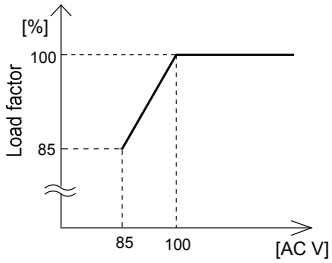
Input voltage derating curve

● TUNS50F/100F



● TUNS700F/1200F

✻TUNS1200F12 has no input voltage derating.



● TUNS300F/500F

✻TUNS300F/500F has no input voltage derating.

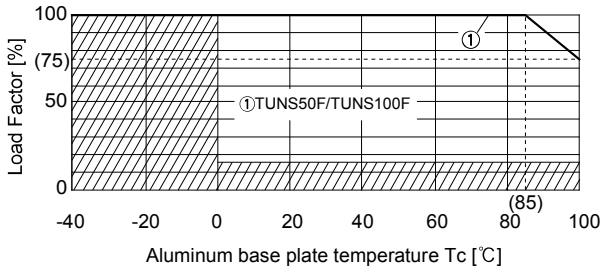
Derating

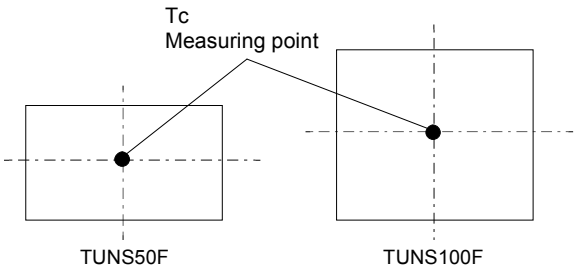
Output voltage derating curve

■Use the power modules with conduction cooling (e.g. heat dissipation from the aluminum base plate to the attached heat sink).
Below shows the derating curves with respect to the aluminum base plate temperature. Note that operation within the hatched areas will cause a significant level of ripple and ripple noise.

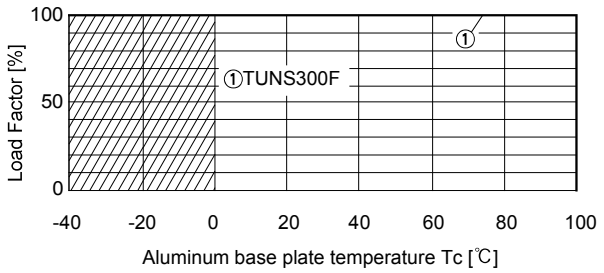
■Please measure the temperature on the aluminum base plate edge side when you cannot measure the temperature of the center part of the aluminum base plate.In this case, please take 5deg temperature margin from the derating characteristics shown in below. Please reduce the temperature fluctuation range as much as possible when the up and down of the temperature are frequently generated. Contact us for more information on cooling methods.

● TUNS50F/100F

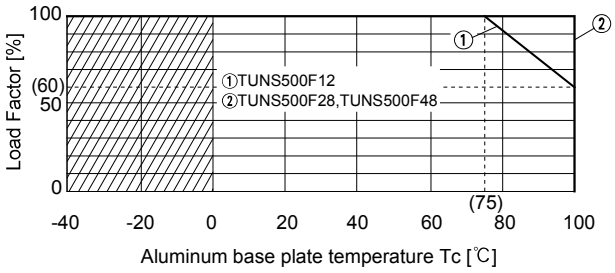




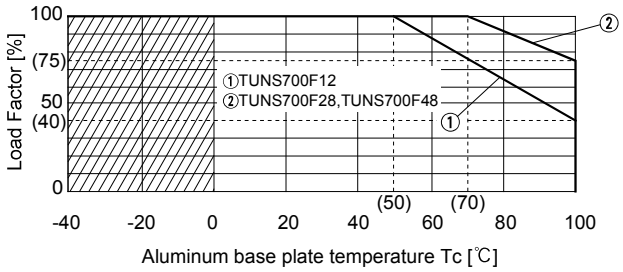
● TUNS300F

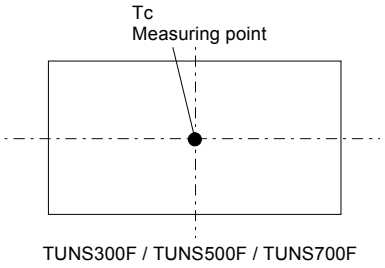


● TUNS500F

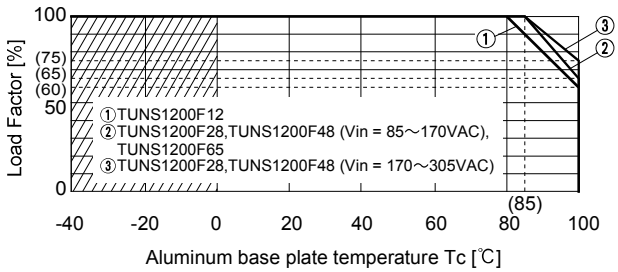


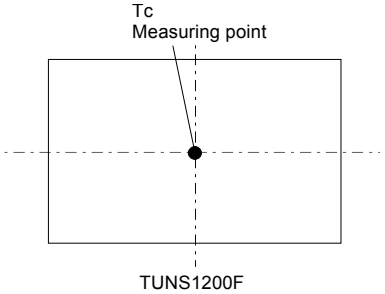
● TUNS700F





● TUNS1200F





Instruction Manual

◆ It is neccessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A] ＊1	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
TUNS50F	Active filter	80-600	0.67	Thermistor	Aluminum	Yes		Yes	＊2
	Flyback converter	100-300							
TUNS100F	Active filter	80-600	1.3	Thermistor	Aluminum	Yes		Yes	＊2
	Forward converter	300							
TUNS300F	Active filter	100	3.6	SCR	Aluminum	Yes		Yes	＊2
	Half-bridge converter	400							
TUNS500F	Active filter	100	6.0	SCR	Aluminum	Yes		Yes	＊2
	Half-bridge converter	400							
TUNS700F	Active filter	100	8.6	SCR	Aluminum	Yes		Yes	＊2
	Half-bridge converter	400							
TUNS1200F	Active filter	100	14	SCR	Aluminum	Yes		Yes	Yes
	Full-bridge converter	400							

＊1 The value of input current is at ACIN 100V and rated load.
＊2 Refer to instruction manual.