ASIA
ELECTRONICS

MODULAR POWER SUPPLIES

ASIA ELECTRONICS IND.CO.,LTD.
アジア電子工業株式会社

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DC－DCコンバータ 縦型オンボードタイプ

アルミ電解コンデンサレス、タンタルコンデンサレスにより高信頼性、長寿命化を実現。
立型実装（SIP）により、省実装面積が可能な、絶縁型DC-DCコンバータです。

シリーズ名 Series Name		出力容量 Output Power (W)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.DC)	出力電圧 Output Voltage (V.DC)	効率 Efficiency (%)	特　長 Feature	ページ Page
LP		1W	14×10×22	5V (4.5～9) 12V (9～18) 24V (18～36) 48V (36～72)	5, 12, 15, 24, 5・5, 12・12, 15・15, 5•12, 5•15	65～75%	縦型実装タイプ 低価格 SIP package Low cost	
TS		2～3W	24.5×8.5×35	5V (4.5～9) 12V (8～18) 24V (16～36) 48V (32～72)	5, 6, 12, 15, 24, ±12, ±15	70～80%	縦型実装タイプ 低価格 SIP package Low cost	

DC－DCコンバータ オンボードタイプ

アルミ電解コンデンサレス、タンタルコンデンサレスにより高信頼性、長寿命化を実現。
入力フィルタを内蔵したオンボード絶縁型DC-DCコンバータです。

シリーズ名 Series Name		出力容量 Output Power (W)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.DC)	出力電圧 Output Voltage (V.DC)	効率 Efficiency (%)	特　長 Feature	ページ Page
SS		2～3W	10×21×33	5V (4.5～9) 12V (8～18) 24V (16～36) 48V (32～72)	5, 6, 12, 15, 24, ±5, ±12, ±15	75～82%	広範囲な入力電圧 高信頼性 Wide input voltage range High reliability	
SSK		2～3W	8.5×21×33			70～81%	高さ 8.5mm 高信頼性 8.5mm in height High reliability	
SSV		5～6W	8.5×21×33	5V (4.5～9) 12V (8～18) 24V (16～36) 48V (32～72) 100V (64～120)	3.3, 5, 6, 12, 15, 24	81～88%	高さ 8.5mm 高信頼性 8.5mm in height High reliability	
SQ		5～6W	10×30×47	5V (4.5～9) 12V (8～18) 24V (16～36) 48V (32～72)	5, 6, 12, 15, 24, ±5, ±12, ±15	79～87%	広範囲な入力電圧 高信頼性 Wide input voltage range High reliability	
SQK		5～6W	8.5×30×47			80～85%	高さ 8.5mm 高信頼性 8.5mm in height High reliability	
SQV		10～12W	8.5×30×47		3.3, 5, 6, 12, 15, 24, 28	81～87%	高さ 8.5mm 高信頼性 8.5mm in height High reliability	
SQT		10～15W	7×31×47		3.3, 5, 5.2, 6, 12, 15, 24, ±12, ±15	85～88%	高さ 7mm ON/OFFコントロール内蔵 7mm in height ON/OFF control function	
BHU		7～15W	8.5×50×55	5V (4.5～9) 12V (8～18) 24V (16～36) 48V (32～76)	3.3, 5, 6, 12, 15, 24, 28, 48, ±5, ±12, ±15	77～88%	高さ 8.5mm ON/OFFコントロール内蔵 8.5mm in height ON/OFF control function	
BRU		23～30W	8.5×50×55	12V (8～18) 24V (16～36) 48V (32～76) 100V (64～144)	3.3, 5, 6, 12, 15, 24, 28, 48	87～90%	高さ 8.5mm ON/OFFコントロール内蔵 8.5mm in height ON/OFF control function	
BPU		20～50W	8.5×50×75	12V (8～18) 24V (16～36) 48V (32～72) 100V (64～144)	3.3, 5, 6, 12, 15, 24, ±3.3, ±5, ±12, ±15	81～90%	高さ 8.5mm ON/OFFコントロール内蔵 8.5mm in height ON/OFF control function	
BTU		80～100W	12.8×50×98		3.3, 5, 6, 12, 15, 24	88～91%	高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function	
KMP		105～200W	20×60×105	12V (8～18) 24V (16～36) 48V (36～76) 100V (64～144) 140V (90～200)	3.3, 5, 6, 12, 13.8, 15, 24, 28, 48	87～91%	高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function	

DC−DCコンバータ ユニットタイプ

アルミ電解コンデンサレス（PD、RDPシリーズを除く）、タンタルコンデンサレスにより高信頼性、長寿命化を実現。
入力フィルタを内蔵した、ユニットタイプ絶縁型DC-DCコンバータです。

シリーズ名 Series Name		出力容量 Output Power (W)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.DC)	出力電圧 Output Voltage (V.DC)	効率 Efficiency (%)	特　長 Feature	ページ Page
BHM		7～15W	12.8×50×75	5V (4.5～9) 12V (8～18) 24V (16～36) 48V (32～76)	3.3, 5, 6, 12, 15, 24, 28, 48, ±5, ±12, ±15	77～88%	高さ 12.8mm ON/OFFコントロール内蔵 12.8mm in height ON/OFF control function	
BRM		23～30W	12.8×50×75	12V (8～18) 24V (16～36) 48V (32～76) 100V (64～144)	3.3, 5, 6, 12, 15, 24, 28, 48	87～90%	高さ 12.8mm ON/OFFコントロール内蔵 12.8mm in height ON/OFF control function	
BPM		20～50W	12.8×50×95	12V (8～18) 24V (16～36) 48V (32～72) 100V (64～144)	3.3, 5, 6, 12, 15, 24, ±3.3, ±5, ±12, ±15	81～90%	高さ 12.8mm ON/OFFコントロール内蔵 12.8mm in height ON/OFF control function	
QD		40～50W	16×50×82	12V (8～18) 24V (16～36) 48V (32～72) 100V (64～144)	3.3, 5, 6, 12, 15, 24	86～90%	高さ 16mm 高効率 16mm in height High efficiency	
BTS		80～100W	12.8×50×118	12V (8～18) 24V (16～36) 48V (32～72) 100V (64～144)	3.3, 5, 6, 12, 15, 24	88～91%	高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function	
BTM		80～100W	12.8×50×118				高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function	
FD		80～100W	20×60×120	12V (8～18) 24V (16～36) 48V (32～72) 100V (64～144) 140V (90～200)	3.3, 5, 6, 12, 13.8, 15, 24	85～92%	高さ 20mm 高効率 20mm in height High efficiency	
PD		85～110W	35×70×158	12V (6～18) 24V (14～40) 48V (28～80) 96V (56～160)	3.3, 5, 12, 13.8, 15, 24, 48, 100, 140, 200, 300	83～90%	高効率 広範囲な入力電圧 High efficiency Wide input voltage range	
FM		105～200W	20×60×120	12V (8～18) 24V (16～36) 48V (36～76) 100V (64～144) 140V (90～200)	3.3, 5, 6, 12, 13.8, 15, 24, 28, 48	87～91%	並列運転可能 高さ 20mm Parallel operation 20mm in height	
KM		105～200W	20×60×135			87～91%	並列運転可能 ON/OFFコントロール内蔵 Parallel operation ON/OFF control function	
PM		240～300W	20×60×120		12, 13.8, 15, 24, 28, 48	89～93%	並列運転可能 高効率 Parallel operation High efficiency	
RDP		130～250W	36×100×220	12V (9～18) 24V (18～36) 48V (36～72) 96V (70～144)	3.3, 5, 12, 13.8, 15, 24, 48, 100, 140, 200, 300	85～92%	並列運転可能 高効率 Parallel operation High efficiency	
VD		500W	40×100×220	12V (9～18) 24V (18～36) 48V (36～75) 96V (70～144) 200V (150～300) 300V (225～450) 400V (300～600)	12, 13.8, 15, 24, 28, 48, 100, 140, 200, 300, 400	89～93%	並列運転可能 高効率 Parallel operation High efficiency	
XD	NEW	1000W	55×120×280	100V (70～144) 200V (150～300) 300V (225～450) 400V (300～600) 600V (420～730)	24	89～93%	並列運転可能 高効率 Parallel operation High efficiency	

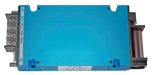
AC－DCスイッチング電源 オンボードタイプ

入力フィルタを内蔵した、オンボード絶縁型AC-DCスイッチング電源です。

シリーズ名 Series Name		出力容量 Output Power (W)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.AC)	出力電圧 Output Voltage (V.DC)	効率 Efficiency (%)	特　長 Feature	ページ Page
LC		12～15W	20×40×60	AC100V (85～132V) AC200V (175～264V)	3.3, 5, 12, 15, 24, ±5, ±12, ±15	75～85%	VCCI クラスB 準拠 VCCI class B	
MC		24～30W	20×50×90	AC100V (85～132V)	3.3, 5, 12, 15, 24	84～85%	VCCI クラスB 準拠 VCCI class B	

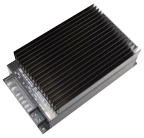
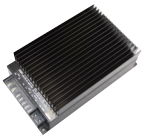
AC－DCスイッチング電源 ユニットタイプ

シャーシや放熱板への取付けにより長寿命化が可能で、入力フィルタを内蔵した、
ユニットタイプ絶縁型AC-DCスイッチング電源です。

シリーズ名 Series Name		出力容量 Output Power (W)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.AC)	出力電圧 Output Voltage (V.DC)	効率 Efficiency (%)	特　長 Feature	ページ Page
QC		15～24W	25×50×82	AC100V (85～132V) AC200V (175～264V)	5, 12, 15, 24, ±5, ±12, ±15	75～80%	VCCI クラスB 準拠 VCCI class B	
AFC		20～25W	30×60×112		5, 12, 15, 24, ±12, ±15, 5•±12, 5•±15	75～80%	高信頼性 High reliability	
AKC		25～35W	30×60×132			75～80%	高信頼性 High reliability	
KC		50W	30×60×132	AC100V (85～132V) AC200V (175～264V)	5, 12, 15, 24	85～88%	力率改善回路内蔵 VCCI クラスB 準拠 Improved Power Factor VCCI class B	
KCW		36W		AC160V (85～264V)		83～86%	力率改善回路内蔵 VCCI クラスB 準拠 Improved Power Factor VCCI class B	
PC		70～100W	35×70×158	AC100V (85～132V) AC200V (175～264V)	5, 12, 15, 24, ±12, ±15	80～87%	VCCI クラスB、FCC クラスB準拠 VCCI class B, FCC class B	
TFC300		300W	30×80×179	AC200V (85～264V) DC240V (110～370V)	12, 24, 48	89～92%	力率改善回路内蔵 VCCI クラスB、FCC クラスB準拠 Improved Power Factor VCCI class B, FCC class B	

DC－ACインバータ フルモールドタイプ

電源内部を完全に樹脂にて充填してある為、耐環境性能、耐振動性能、放熱特性が優れています。
入出力ノイズフィルタを内蔵した、正弦波出力のフルモールド型DC-ACインバータです。

シリーズ名 Series Name		出力容量 Output Power (VA)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.DC)	出力電圧 / 電流 Output Voltage/ Output Current (V.AC) / (A.AC)	効率 Efficiency (%)	特　長 Feature	ページ Page
KA60		60VA	30×60×140	12V (9～18) 24V (18～36) 48V (36～76) 96V (72～144)	100V / 0.6A 200V / 0.3A 220V / 0.27A	81～85%	入出力間絶縁 (AC2000V) 出力電圧調整可能 ±5% Input-Output Isolation (AC2000V) Adjustable Output Volt. ±5%	
KA100		100VA	30×60×139	12V (9～18) 24V (18～36) 48V (36～76) 100V (70～144)	100V / 1.0A 200V / 0.5A 220V / 0.45A	84～88%	入出力間絶縁 (AC2000V) 出力電圧調整可能 ±5% Input-Output Isolation (AC2000V) Adjustable Output Volt. ±5%	
PA100		100VA	35×70×160	12V (9～18) 24V (18～36) 48V (36～76) 96V (72～144)	100V / 1.0A 200V / 0.5A 220V / 0.45A	83～86%	リモートON/OFFコントロール 入出力間絶縁 (AC2000V) 出力電圧調整可能 ±5% Remote ON/OFF control Input-Output Isolation (AC2000V) Adjustable Output Volt. ±5%	
MA250		250VA	55×120×198		100V / 2.5A 200V / 1.25A 220V / 1.1A	85～87%	縦置き、横置き共用 リモートON/OFFコントロール 入出力間絶縁 (AC2000V) Vertical, Horizontal Mount Remote ON/OFF control Input-Output Isolation (AC2000V)	
VA500		400～ 500VA	60×120×220	12V (9～18) 24V (18～36) 48V (36～76) 96V (72～144) 200V (150～300) 300V (225～450) 400V (300～600)	100V / 5A 200V / 2.5A 220V / 2.2A (12V入力品を除く) ※注1参照	86～88%	ファンレス リモートON/OFFコントロール 入出力間絶縁 (AC2000V) Fanless Remote ON/OFF control Input-Output Isolation (AC2000V)	
UBA700		700VA	80×145×260	48V (36～76) 96V (70～140)	100V / 7A	89～90%	入出力間絶縁 (AC2000V) 常時給電インバータ Input-Output Isolation (AC2000V) ON-LINE INVERTER	
UCA700							入出力間絶縁 (AC2000V) 非常時給電インバータ Input-Output Isolation (AC2000V) OFF-LINE INVERTER	
XA1000	NEW	1000VA	100×170×316	48V (36～76) 100V (70～140)	100V / 10A	88～92%	ファンレス 入出力間絶縁 (AC2000V) Fanless Input-Output Isolation (AC2000V)	

※注1：VA500シリーズ12V入力品はディレーティングを設けており、各出力電圧における出力電流値は
100V / 4A, 200V / 2A, 220V / 1.8A　となります。詳しくは製品ページをご参照ください。

DC－ACインバータ ユニットタイプ

ファンにて放熱する正弦波出力のユニット型DC-ACインバータです。

シリーズ名 Series Name		出力容量 Output Power (VA)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.DC)	出力電圧 / 電流 Output Voltage/ Output Current (V.AC) / (A.AC)	効率 Efficiency (%)	特　長 Feature	ページ Page
RA520		400～ 500VA	114×110×310	12V (9～18) 24V (18～36) 48V (36～76) 96V (72～144)	100V / 5A 200V / 2.5A 220V / 2.2A (12V入力品を除く) ※注2参照	86～88%	入出力間絶縁 (AC2000V) リモートON/OFFコントロール Input-Output Isolation (AC2000V) Remote ON/OFF control	
HA1010		800～ 1000VA	165×130×320	12V (9～18) 24V (18～36) 30V (22～44) 48V (36～76) 96V (72～144)	100V / 10A 200V / 5A 220V / 4.5A (12V入力品を除く) ※注3参照	84～88%	入出力間絶縁 (AC2000V) リモートON/OFFコントロール Input-Output Isolation (AC2000V) Remote ON/OFF control	

※注2：RA520シリーズ12V入力品はディレーティングを設けており、各出力電圧における出力電流値は
100V / 4A, 200V / 2A, 220V / 1.8A　となります。詳しくは製品ページをご参照ください。
※注3：HA1010シリーズ12V入力品はディレーティングを設けており、各出力電圧における出力電流値は
100V / 8A, 200V / 4A, 220V / 4A　となります。詳しくは製品ページをご参照ください。

DC－ACインバータ ラックマウントタイプ

入出力ノイズフィルタ内蔵、長寿命ファンを使用し、19インチラックに取付け可能な、正弦波出力のラックマウント型DC-ACインバータです。

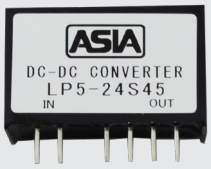
シリーズ名 Series Name		出力容量 Output Power (VA)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.DC)	出力電圧 / 電流 Output Voltage/ Output Current (V.AC) / (A.AC)	効率 Efficiency (%)	特　長 Feature	ページ Page
WA1000		1000VA	44×482×345	24V (18～36) 36V (27～54) 48V (36～76) 96V (72～144)	100V / 10A	86~90%	スイッチによりインバータ給電 ／バイパス給電の給電切替可能 19インチラックサイズ (1U) 6台までの同期並列運転可能 入出力間絶縁 (AC2000V)	
FA1010		1000VA	88×482×295.1			87%	19インチラックサイズ (2U) ON/OFF スイッチ 入出力間絶縁 (AC2000V)	
ZA1000		1000VA	88×482×295			87%	19インチラックサイズ (2U) 10台までの同期並列運転可能 リモートON/OFFコントロール 入出力間絶縁 (AC2000V)	
BA1000		1000VA	88×482×295			87%	19インチラックサイズ (2U) 常時給電インバータ リモートON/OFFコントロール 入出力間絶縁 (AC2000V)	
CA1000		1000VA	88×482×295			87%	19インチラックサイズ (2U) 非常時給電インバータ リモートON/OFFコントロール 入出力間絶縁 (AC2000V)	
ZA2000		2000VA	88×482×395	48V(36～76) 96V(72～144) 144V(108～216)	100V / 20A	87%	19インチラックサイズ (2U) 3台までの同期並列運転可能 リモートON/OFFコントロール 入出力間絶縁 (AC2000V)	

特注品も取り扱っておりますのでお気軽にご相談下さい。
Please consult with us about other specification.

MEMO

LP SERIES

1W DC/DC CONVERTERS
Single Output & Dual Outputs



H14×W10×L22 (mm)

■ Features

- SIP Package
- Input-Output Isolation
- Each Output Isolation
- Wide Input Voltage Range
- High Reliability
- Low Cost
- Operating Ambient Temp. −30℃～+71℃
- Max. Case Temperature +90℃
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor

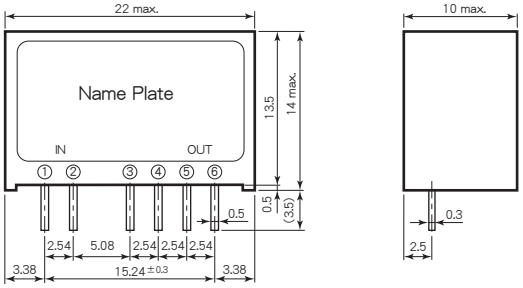
- SIP パッケージ
- 入出力間絶縁
- 各出力間絶縁
- 広範囲な入力電圧
- 高信頼性
- 低価格
- 動作周囲温度 −30℃～+71℃
- 最大ケース温度 +90℃
- RoHS2指令対応
- アルミ電解コンデンサ及び タンタルコンデンサ不使用

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

- Input Voltage, Range: DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current: See Table 1
- Output Voltage Accuracy: ±3%
- Efficiency: See Table 1
- Line Regulation: ±1.5% max. (at Vin Range)
- Load Regulation: ±5% max. (min. Load～max. Load)
- Reflected Input Ripple and Noise: (3% Vin)Vp-p max.
- Output Ripple: 100mVp-p max.
- Output Noise: 300mVp-p max.
- Short Circuit Protection: Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient: 0.06%/℃ max.
- Operating Ambient Temp.: −30℃～+71℃ (See Fig. 1)
- Max. Case Temperature: +90℃
- Storage Temperature: −40℃～+100℃
- Isolation Voltage: AC500V one minute (Input−Output−Case)
- Isolation Impedance: 100MΩ min. (at DC1000V) (Input−Output−Case)
- Switching Frequency: 360kHz typ.
- Weight: 8g max.
- Humidity: 20～95% RH
- Shock: 490m/s² (11msec 3directions)
- Vibration: 10～55Hz 98m/s² (30minutes 3directions)
- Surface Structure: Plastic Case
- Soldering Conditions
  Soldering iron: 360℃, for 5 seconds max.
- MTBF: 1,500,000H (Ta : 25℃, 80% Load, Nominal Vin)
- Warranty: 5 years

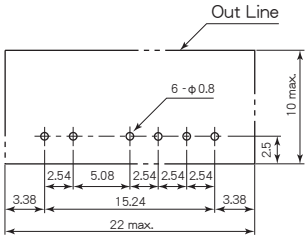
■ Pin Outs & Dimensions (±0.5mm)



Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	0 Vdc in	②	0 Vdc in
③	No Connection	③	+Vdc out 1
④	No Connection	④	0 Vdc out 1
⑤	+Vdc out	⑤	+Vdc out 2
⑥	0 Vdc out	⑥	0 Vdc out 2

■ Hole Configurations on PCB (Top View)



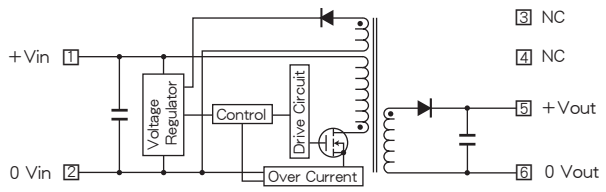
■ Selection Guide

Table 1

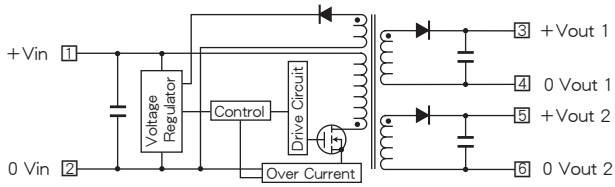
Model Number	Input Volt. (Range) (V. DC)	Output Volt. (V. DC) out 1	Output Volt. (V. DC) out 2	Output Current (mA) out 1	Output Current (mA) out 2	Efficiency (Typical) (%)
LP 5− 5S200	5 (4.5～9)	5	—	20～200	—	65
LP 5−12S 85		12	—	8～85	—	70
LP 5−15S 70		15	—	7～70	—	70
LP 5−24S 45		24	—	4～45	—	70
LP 5− 5D100		5	5	10～100	10～100	65
LP 5−12D 45		12	12	5～45	5～45	70
LP 5−15D 35		15	15	4～35	4～35	70
LP 5− 5S12S		5	12	10～100	5～50	68
LP 5− 5S15S		5	15	10～100	4～40	68
LP12− 5S200	12 (9～18)	5	—	20～200	—	70
LP12−12S 85		12	—	8～85	—	75
LP12−15S 70		15	—	7～70	—	75
LP12−24S 45		24	—	4～45	—	75
LP12− 5D100		5	5	10～100	10～100	70
LP12−12D 45		12	12	5～45	5～45	75
LP12−15D 35		15	15	4～35	4～35	75
LP12− 5S12S		5	12	10～100	5～50	72
LP12− 5S15S		5	15	10～100	4～40	72
LP24− 5S200	24 (18～36)	5	—	20～200	—	70
LP24−12S 85		12	—	8～85	—	75
LP24−15S 70		15	—	7～70	—	75
LP24−24S 45		24	—	4～45	—	75
LP24− 5D100		5	5	10～100	10～100	70
LP24−12D 45		12	12	5～45	5～45	75
LP24−15D 35		15	15	4～35	4～35	75
LP24− 5S12S		5	12	10～100	5～50	72
LP24− 5S15S		5	15	10～100	4～40	72
LP48− 5S200	48 (36～72)	5	—	20～200	—	70
LP48−12S 85		12	—	8～85	—	75
LP48−15S 70		15	—	7～70	—	75
LP48−24S 45		24	—	4～45	—	75
LP48− 5D100		5	5	10～100	10～100	70
LP48−12D 45		12	12	5～45	5～45	75
LP48−15D 35		15	15	4～35	4～35	75
LP48− 5S12S		5	12	10～100	5～50	72
LP48− 5S15S		5	15	10～100	4～40	72

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

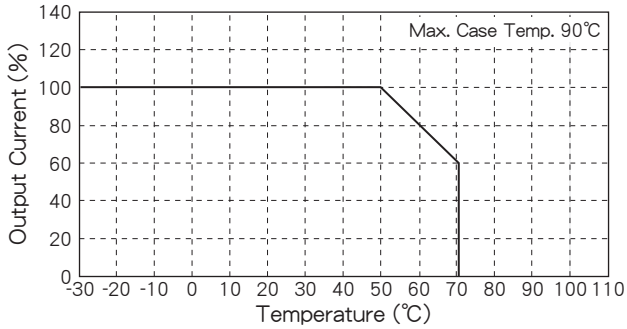


Fig. 2 Short Circuit Operating Area

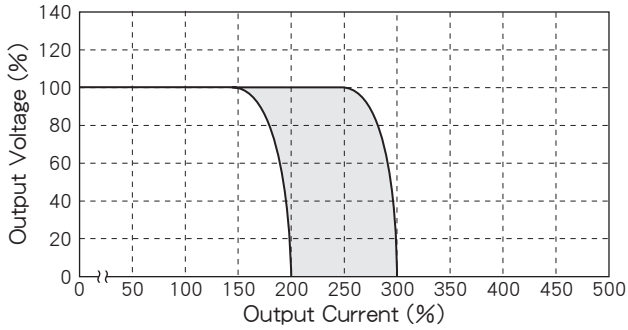


Fig. 3 Temperature Characteristic on Case Surface

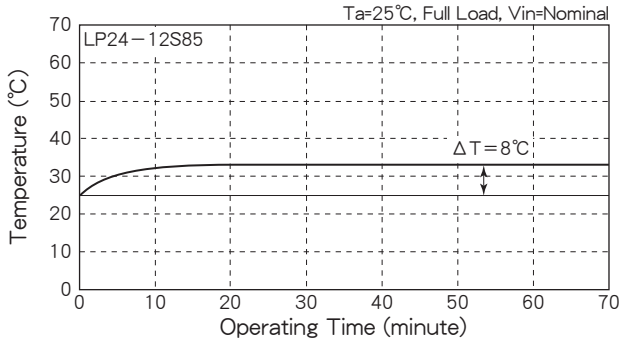


Fig. 4 Output Voltage vs. Output Current

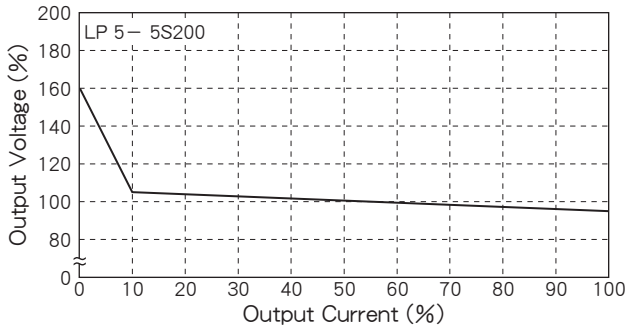


Fig. 5 Efficiency vs. Output Current (Single Output)

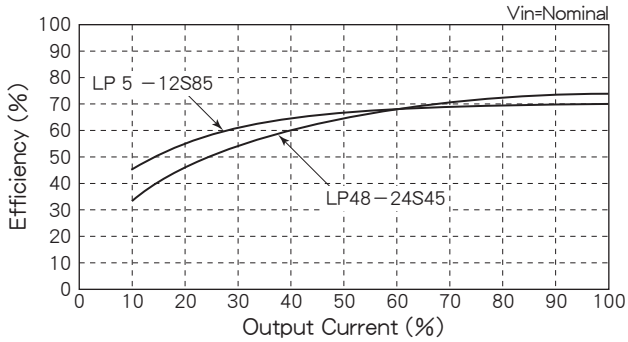
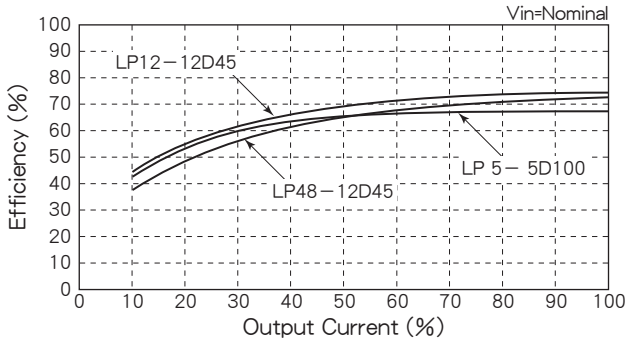


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



TS SERIES

2～3W DC/DC CONVERTERS
Single Output & Dual Outputs

H24.5×W8.5×L35 (mm)

■ Features

- SIP Package ● SIP パッケージ
- Internal Input Filtering ● 入力フィルタ内蔵
- Input-Output Isolation ● 入出力間絶縁
- High Efficiency 70～80% ● 高効率 70～80%
- Wide Input Voltage Range ● 広範囲な入力電圧
- High Reliability ● 高信頼性
- Low No Load Current ● 無負荷電流が少ない
- Operating Ambient Temp. −30℃～+71℃ ● 動作周囲温度 −30℃～+71℃
- Max. Case Temperature +90℃ ● 最大ケース温度 +90℃
- Conformity to RoHS2 Directive ● RoHS2指令対応
- Not built-in aluminum and tantalum electrolytic capacitor ● アルミ電解コンデンサ及びタンタルコンデンサ不使用

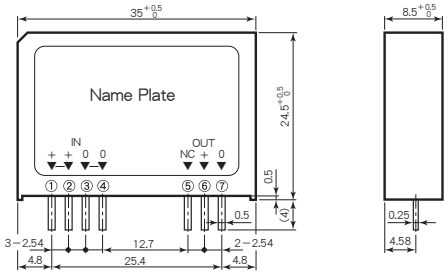
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

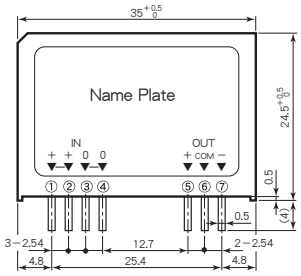
- Input Voltage, Range: DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current: See Table 1
- Output Voltage Accuracy: ±3%
- Efficiency: See Table 1
- Line Regulation: 0.3% max. (at Vin Range)
- Load Regulation: Single : ±0.5% max. (0～100% Load)
  Dual : ±3% max. (0～100% Load)
- Reflected Input Ripple and Noise: (3% Vin)Vp-p max.
- Output Ripple: 20mVp-p max.
- Output Noise: 100mVp-p max.
- Short Circuit Protection: Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient: 0.02%/℃ max.
- Operating Ambient Temp.: −30℃～+71℃ (See Fig. 1)
- Max. Case Temperature: +90℃
- Storage Temperature: −40℃～+100℃
- Isolation Voltage: AC500V one minute (Input−Output−Case)
- Isolation Impedance: 100MΩ min. (at DC1000V) (Input−Output−Case)
- Weight: 15g max.
- Humidity: 20～95% RH
- Shock: 490m/s² (11msec 3directions)
- Vibration: 10～55Hz 98m/s² (30minutes 3directions)
- Surface Structure: Plastic Case
- Soldering Conditions
  Soldering iron: 360℃, for 5 seconds max.
- MTBF: Single : 720,000H
  Dual : 600,000H
  (Ta : 25℃, 80% Load, Nominal Vin)
- Warranty: 5 years

■ Pin Outs & Dimensions (±0.2mm)

Single Output



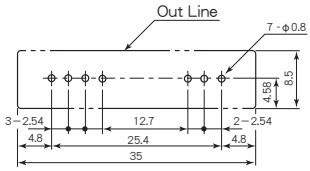
Dual Outputs



Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	+Vdc in	②	+Vdc in
③	0 Vdc in	③	0 Vdc in
④	0 Vdc in	④	0 Vdc in
⑤	No Connection	⑤	+Vdc out
⑥	+Vdc out	⑥	Common
⑦	0 Vdc out	⑦	−Vdc out

■ Hole Configurations on PCB (Top View)



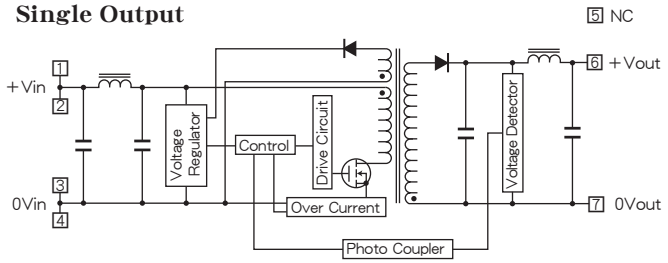
■ Selection Guide

Table 1

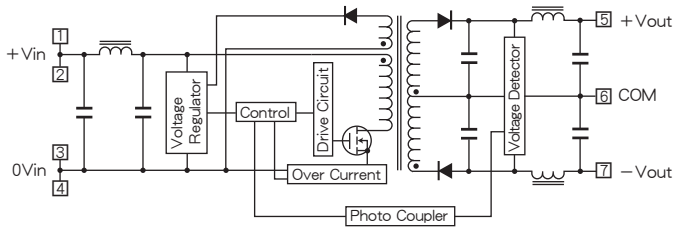
Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
TS 5− 5S400	5 (4.5～9)	5	400	70
TS 5− 6S350		6	350	70
TS 5−12S200		12	200	72
TS 5−15S160		15	160	72
TS 5−24S100		24	100	72
TS 5−12D100		±12	±100	72
TS 5−15D 80		±15	± 80	72
TS12− 5S500	12 (8～18)	5	500	75
TS12− 6S450		6	450	75
TS12−12S250		12	250	78
TS12−15S200		15	200	78
TS12−24S125		24	125	78
TS12−12D125		±12	±125	78
TS12−15D100		±15	±100	78
TS24− 5S500	24 (16～36)	5	500	75
TS24− 6S450		6	450	75
TS24−12S250		12	250	80
TS24−15S200		15	200	80
TS24−24S125		24	125	80
TS24−12D125		±12	±125	80
TS24−15D100		±15	±100	80
TS48− 5S500	48 (32～72)	5	500	75
TS48− 6S450		6	450	75
TS48−12S250		12	250	80
TS48−15S200		15	200	80
TS48−24S125		24	125	80
TS48−12D125		±12	±125	80
TS48−15D100		±15	±100	80

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

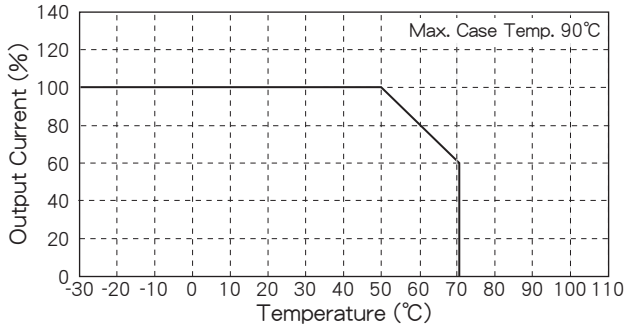


Fig. 2 Short Circuit Operating Area

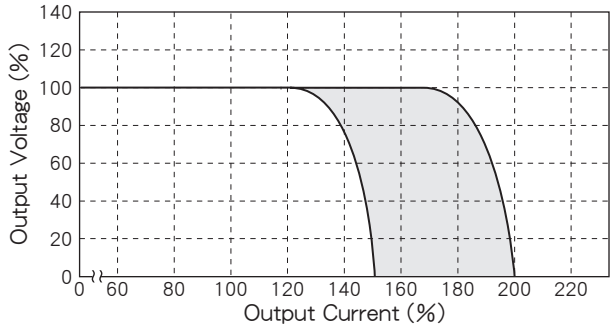


Fig. 3 Temperature Characteristic on Case Surface

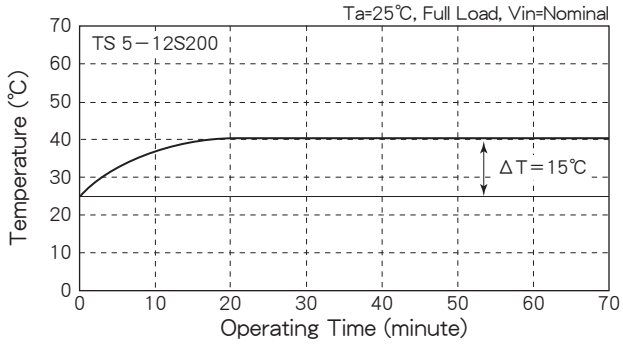


Fig. 4 No Load Current vs. Input Voltage

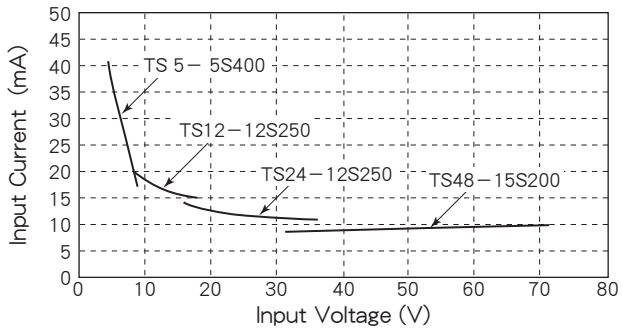


Fig. 5 Efficiency vs. Output Current

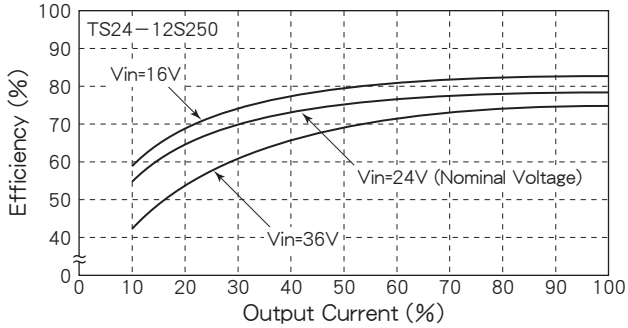
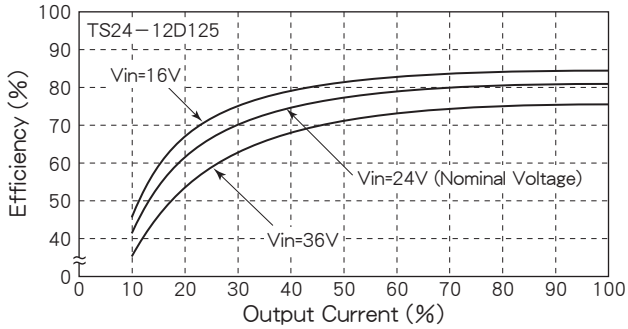


Fig. 6 Efficiency vs. Output Current



SS SERIES

2～3W DC/DC CONVERTERS
Single Output & Dual Outputs

H10×W21×L33 (mm)

■ Features

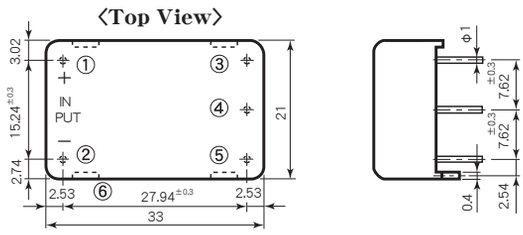
- ● 10mm in Height ●高さ10mm
- ● Built-in Input Filter ●入力フィルタ内蔵
- ● Input-Output Isolation ●入出力間絶縁
- ● High Efficiency 75～82% ●高効率 75～82%
- ● Wide Input Voltage Range ●広範囲な入力電圧
- ● High Reliability ●高信頼性
- ● Low No Load Current ●無負荷電流が少ない
- ● 5 Sided Metal Shielding ●５面メタルシールド
- ● Operating Ambient Temp. −40℃～+85℃ ●動作周囲温度 −40℃～+85℃
- ● Max. Case Temperature +100℃ ●最大ケース温度 +100℃
- ● Conformity to RoHS2 Directive ●RoHS2指令対応
- ● Not built-in aluminum and tantalum electrolytic capacitor ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

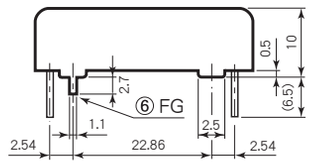
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

- ● Input Voltage, Range: DC5, 12, 24, 48V (See Table 1)
- ● Output Voltage, Current: See Table 1
- ● Output Voltage Accuracy: ±2%, ±3%(5, 6V Vout only)
- ● Efficiency: See Table 1
- ● Line Regulation: 0.3% max. (at Vin Range)
- ● Load Regulation: Single : ±0.5% max. (0～100% Load); Dual : ±3% max. (0～100% Load)
- ● Reflected Input Ripple and Noise: (3% Vin)Vp-p max.
- ● Output Ripple: 20mVp-p max.
- ● Output Noise: 100mVp-p max.
- ● Short Circuit Protection: Built-in, Auto-restart (See Fig. 2)
- ● Temperature Coefficient: 0.02%/℃ max.
- ● Operating Ambient Temp.: −40℃～+85℃ (See Fig. 1); −30℃～+85℃ (5V Vin only)
- ● Storage Temperature: −40℃～+100℃
- ● Isolation Voltage: AC500V one minute (Input−Output−Case)
- ● Isolation Impedance: 100MΩ min. (at DC1000V) (Input−Output−Case)
- ● Weight: 18g max.
- ● Humidity: 20～95% RH
- ● Shock: 490m/s² (11msec 3directions)
- ● Vibration: 10～55Hz 98m/s² (30minutes 3directions)
- ● Surface Structure: 5 Sided Steel Case
- ● Soldering Conditions
  - Soldering DIP: 260℃, for 15 seconds max.
  - Soldering iron: 360℃, for 5 seconds max.
- ● MTBF: Single : 1,200,000H; Dual : 1,000,000H (Ta : 25℃, 80% Load, Nominal Vin)
- ● Warranty: 5 years

■ Pin Outs & Dimensions (±0.5mm)

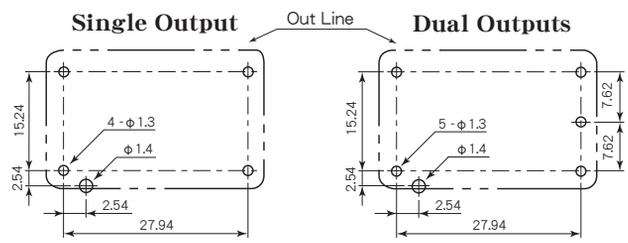




Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	−Vdc in	②	−Vdc in
③	+Vdc out	③	+Vdc out
④	No Pin	④	Common
⑤	−Vdc out	⑤	−Vdc out
⑥	Frame Ground	⑥	Frame Ground

■ Hole Configurations on PCB (Top View)



■ Selection Guide

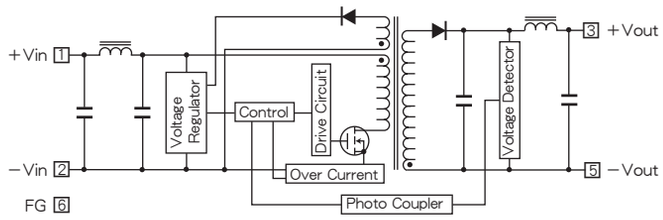
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SS 5− 5S400	5 (4.5～9)	5	400	76
SS 5− 6S350		6	350	76
SS 5−12S200		12	200	78
SS 5−15S160		15	160	79
SS 5−24S100		24	100	75
SS 5− 5D200		±5	±200	75
SS 5−12D100		±12	±100	76
SS 5−15D 80		±15	± 80	78
SS12− 5S500	12 (8～18)	5	500	79
SS12− 6S450		6	450	79
SS12−12S250		12	250	80
SS12−15S200		15	200	80
SS12−24S125		24	125	80
SS12− 5D250		±5	±250	75
SS12−12D125		±12	±125	82
SS12−15D100		±15	±100	80
SS24− 5S500	24 (16～36)	5	500	79
SS24− 6S450		6	450	79
SS24−12S250		12	250	81
SS24−15S200		15	200	80
SS24−24S125		24	125	80
SS24− 5D250		±5	±250	75
SS24−12D125		±12	±125	82
SS24−15D100		±15	±100	82
SS48− 5S500	48 (32～72)	5	500	78
SS48− 6S450		6	450	78
SS48−12S250		12	250	80
SS48−15S200		15	200	80
SS48−24S125		24	125	80
SS48− 5D250		±5	±250	75
SS48−12D125		±12	±125	80
SS48−15D100		±15	±100	80

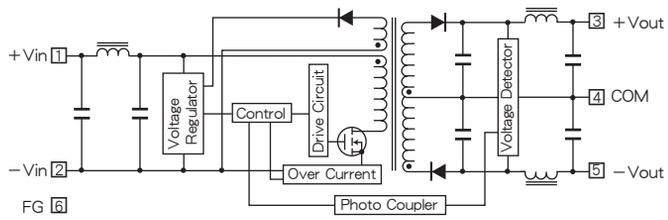
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

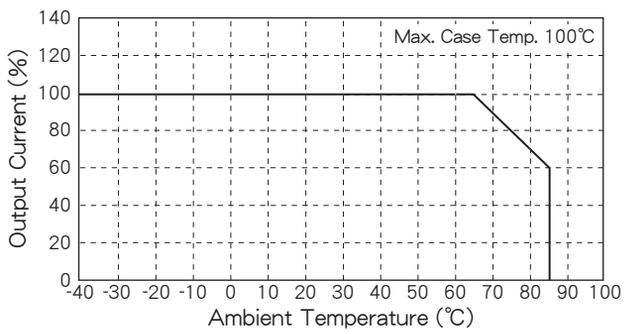


Fig. 2 Short Circuit Operating Area

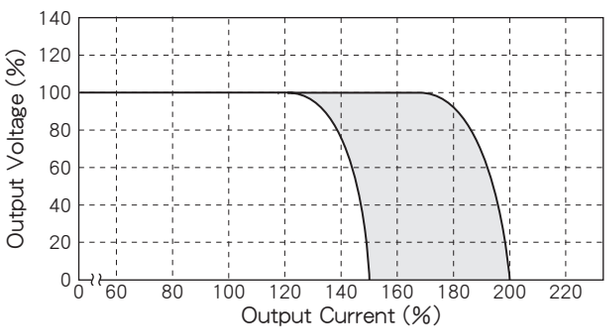


Fig. 3 Temperature Characteristic on Case Surface

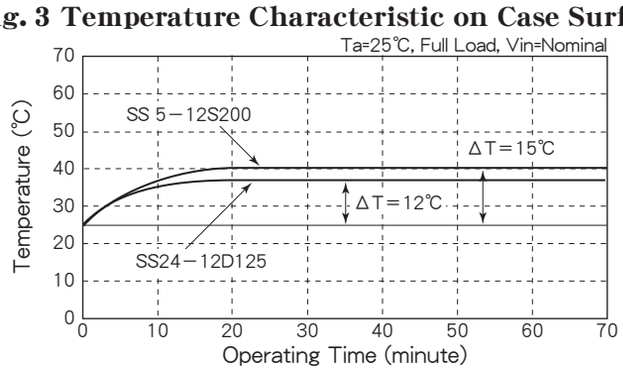


Fig. 4 No Load Current vs. Input Voltage

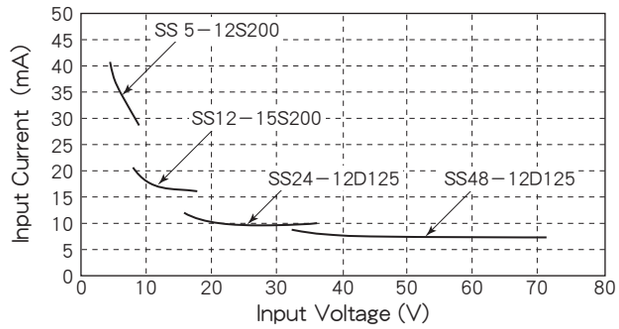


Fig. 5 Efficiency vs. Output Current (Single Output)

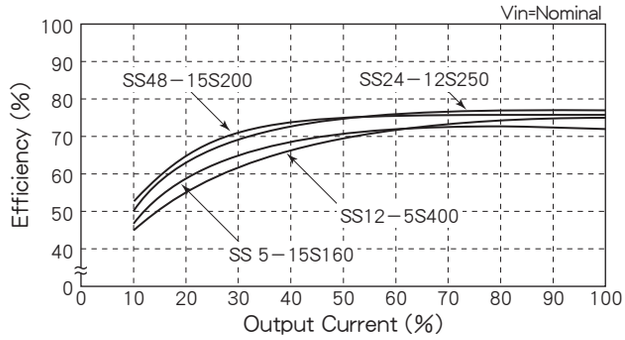
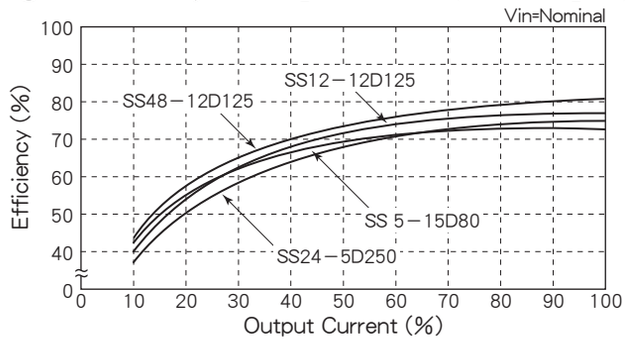


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



SSK SERIES

2～3W DC/DC CONVERTERS
Single Output & Dual Outputs

H8.5×W21×L33 (mm)

■ Features

- Low Profile 8.5mm ●薄型 8.5mm
- Built-in Input Filter ●入力フィルタ内蔵
- Input-Output Isolation ●入出力間絶縁
- High Efficiency 70～81% ●高効率 70～81%
- Wide Input Voltage Range ●広範囲な入力電圧
- High Reliability ●高信頼性
- Low No Load Current ●無負荷電流が少ない
- 5 Sided Metal Shielding ●５面メタルシールド
- Operating Ambient Temp. −40℃～+85℃ ●動作周囲温度 −40℃～+85℃
- Max. Case Temperature +100℃ ●最大ケース温度 +100℃
- Conformity to RoHS2 Directive ●RoHS2指令対応
- Not built-in aluminum and tantalum electrolytic capacitor ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

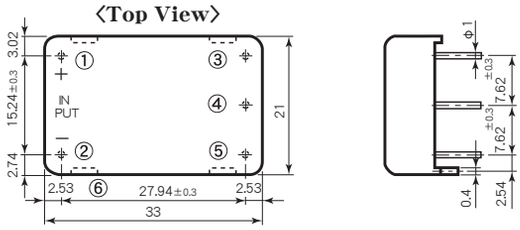
■ General Characteristics

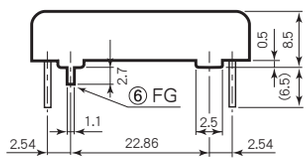
(at Ta : 25℃, Full Load, Nominal Vin)

- Input Voltage, Range: DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current: See Table 1
- Output Voltage Accuracy: ±3%
- Efficiency: See Table 1
- Line Regulation: 0.3% max. (at Vin Range)
- Load Regulation: Single : ±0.5% max. (0～100% Load)
  Dual : ±3% max. (10～100% Load)
- Reflected Input Ripple and Noise: (3% Vin)Vp-p max.
- Output Ripple: 20mVp-p max.
- Output Noise: 100mVp-p max.
- Short Circuit Protection: Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient: 0.02%/℃ max.
- Operating Ambient Temp.: −40℃～+85℃ (See Fig. 1)
  −30℃～+85℃ (5V Vin only)
- Storage Temperature: −40℃～+100℃
- Isolation Voltage: AC500V one minute (Input−Output−Case)
- Isolation Impedance: 100MΩ min. (at DC1000V) (Input−Output−Case)
- Weight: 15g max.
- Humidity: 20～95% RH
- Shock: 490m/s² (11msec 3directions)
- Vibration: 10～55Hz 98m/s² (30minutes 3directions)
- Surface Structure: 5 Sided Steel Case
- Soldering Conditions
  - Soldering DIP: 260℃, for 15 seconds max.
  - Soldering iron: 360℃, for 5 seconds max.
- MTBF: Single : 720,000H
  Dual : 600,000H
  (Ta : 25℃, 80% Load, Nominal Vin)
- Warranty: 5 years

■ Pin Outs & Dimensions (±0.5mm)

〈Top View〉

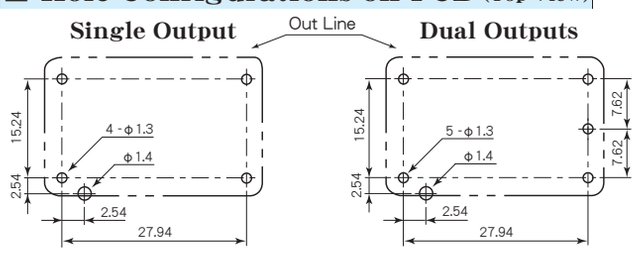




Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	−Vdc in	②	−Vdc in
③	+Vdc out	③	+Vdc out
④	No Pin	④	Common
⑤	−Vdc out	⑤	−Vdc out
⑥	Frame Ground	⑥	Frame Ground

■ Hole Configurations on PCB (Top View)



■ Selection Guide

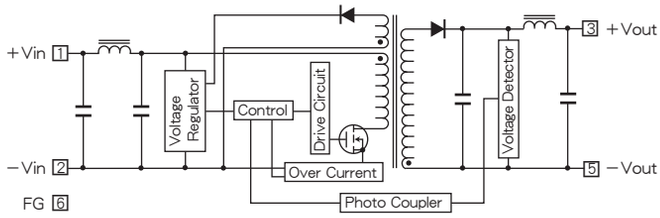
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SSK 5− 5S400	5 (4.5～9)	5	400	70
SSK 5− 6S350		6	350	70
SSK 5−12S200		12	200	74
SSK 5−15S160		15	160	72
SSK 5−24S100		24	100	72
SSK 5− 5D200		±5	±200	74
SSK 5−12D100		±12	±100	74
SSK 5−15D 80		±15	± 80	74
SSK12− 5S500	12 (8～18)	5	500	78
SSK12− 6S450		6	450	77
SSK12−12S250		12	250	80
SSK12−15S200		15	200	78
SSK12−24S125		24	125	78
SSK12− 5D250		±5	±250	81
SSK12−12D125		±12	±125	81
SSK12−15D100		±15	±100	78
SSK24− 5S500	24 (16～36)	5	500	76
SSK24− 6S450		6	450	76
SSK24−12S250		12	250	80
SSK24−15S200		15	200	81
SSK24−24S125		24	125	80
SSK24− 5D250		±5	±250	80
SSK24−12D125		±12	±125	80
SSK24−15D100		±15	±100	80
SSK48− 5S500	48 (32～72)	5	500	75
SSK48− 6S450		6	450	75
SSK48−12S250		12	250	80
SSK48−15S200		15	200	80
SSK48−24S125		24	125	80
SSK48− 5D250		±5	±250	75
SSK48−12D125		±12	±125	80
SSK48−15D100		±15	±100	81

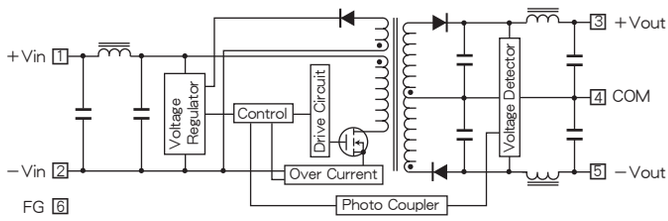
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

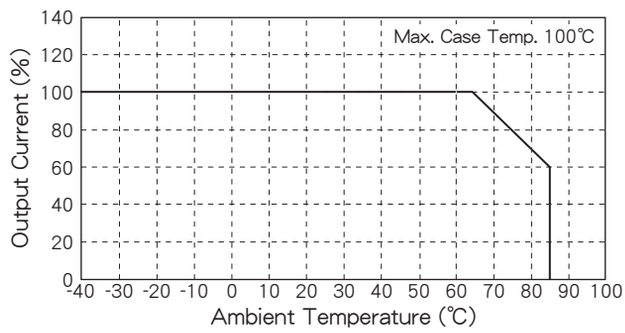


Fig. 2 Short Circuit Operating Area

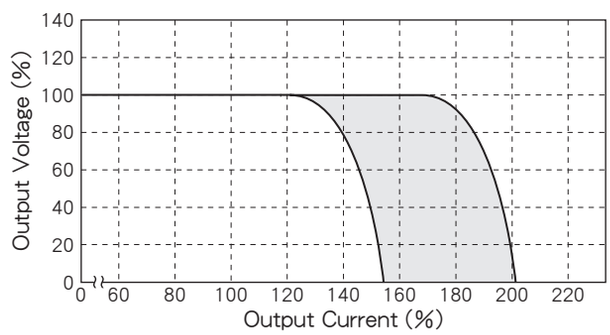


Fig. 3 Temperature Characteristic on Case Surface

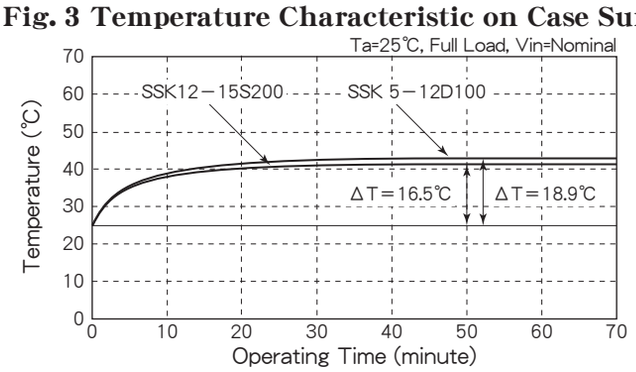


Fig. 4 No Load Current vs. Input Voltage

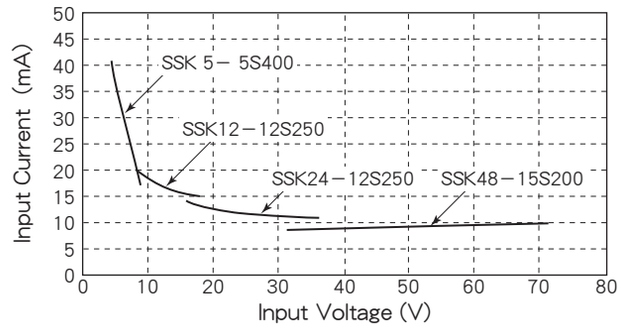


Fig. 5 Efficiency vs. Output Current (Single Output)

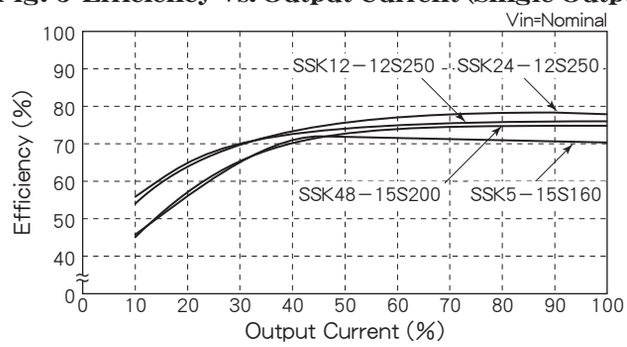
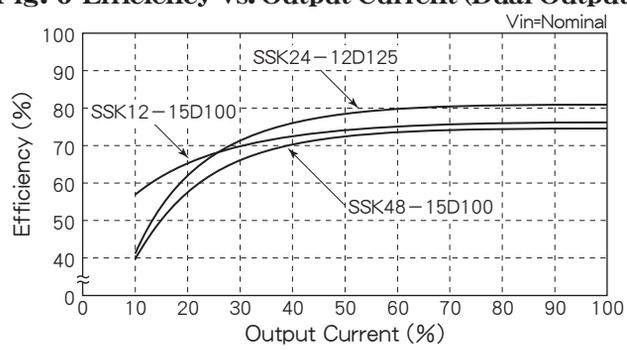


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



SSV SERIES

5～6W DC/DC CONVERTERS
Single Output

H8.5×W21×L33 (mm)

■ Features

- ● High Efficiency 81～88%
- ● 8.5mm in Height
- ● Compact, Light Weight
- ● Built-in Input Filter
- ● Wide Input Voltage Range
- ● Input-Output Isolation
- ● Low No Load Current
- ● 5 Sided Metal Shielding
- ● High Reliability
- ● Operating Ambient Temperature −40℃～+85℃
- ● Max. Case Temperature +100℃
- ● Conformity to RoHS2 Directive
- ● Not built-in aluminum and tantalum electrolytic capacitor

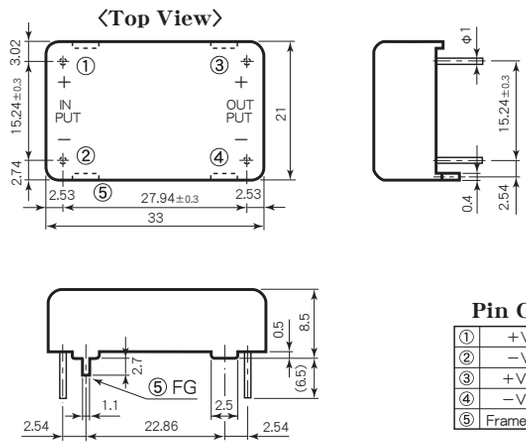
- ●高効率 81～88%
- ●高さ8.5mm
- ●小形、軽量
- ●入力フィルタ内蔵
- ●広範囲な入力電圧
- ●入出力間絶縁
- ●無負荷電流が少ない
- ●５面メタルシールド
- ●高信頼性
- ●動作周囲温度 −40℃～+85℃
- ●最大ケース温度 +100℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC5, 12, 24, 48, 100V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Accuracy	±2% (12, 15, 24V Vout) ±3% (3.3, 5, 6V Vout)
●Efficiency	See Table 1
●Line Regulation	0.3% max. (at Vin Range)
●Load Regulation	±0.5% max. (0～100% Load)
●Reflected Input Ripple, Noise	(3% Vin)Vp-p max.
●Output Ripple	20mVp-p max.
●Output Noise	80mVp-p max. (0～20MHz) 150mVp-p max. (0～100MHz)
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1) −30℃～+85℃ (5V Vin only)
●Max. Case Temperature	+100℃
●Storage Temperature	−40℃～+100℃
●Isolation Voltage	AC500V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	15g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	5 Sided Steel Case
●Soldering Conditions	
Soldering DIP	260℃, for 15 seconds max.
Soldering iron	360℃, for 5 seconds max.
●MTBF	1,000,000H (Ta：25℃, 80% Load, Nominal Vin)
●Warranty	5 years

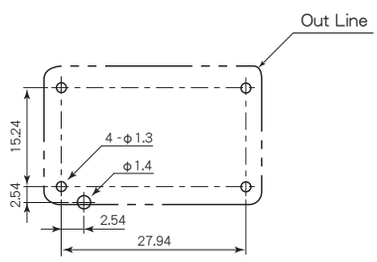
■ Pin Outs & Dimensions (±0.5mm)



Pin Outs

①	+Vdc in
②	−Vdc in
③	+Vdc out
④	−Vdc out
⑤	Frame Ground

■ Hole Configurations on PCB (Top View)



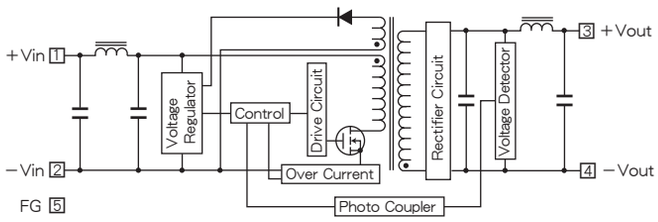
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SSV 5 − 3.3 S 1500	5 (4.5～9)	3.3	1500	81
SSV 5 − 5 S 1000		5	1000	83
SSV 5 − 6 S 800		6	800	83
SSV 5 − 12 S 400		12	400	83
SSV 5 − 15 S 320		15	320	83
SSV 5 − 24 S 200		24	200	83
SSV 12 − 3.3 S 1500	12 (8～18)	3.3	1500	83
SSV 12 − 5 S 1000		5	1000	85
SSV 12 − 6 S 900		6	900	85
SSV 12 − 12 S 500		12	500	87
SSV 12 − 15 S 400		15	400	87
SSV 12 − 24 S 250		24	250	87
SSV 24 − 3.3 S 1500	24 (16～36)	3.3	1500	83
SSV 24 − 5 S 1000		5	1000	85
SSV 24 − 6 S 900		6	900	85
SSV 24 − 12 S 500		12	500	87
SSV 24 − 15 S 400		15	400	87
SSV 24 − 24 S 250		24	250	87
SSV 48 − 3.3 S 1500	48 (32～72)	3.3	1500	84
SSV 48 − 5 S 1000		5	1000	86
SSV 48 − 6 S 900		6	900	86
SSV 48 − 12 S 500		12	500	88
SSV 48 − 15 S 400		15	400	88
SSV 48 − 24 S 250		24	250	88
SSV 100 − 12 S 500	100 (64～120)	12	500	88
SSV 100 − 15 S 400		15	400	88
SSV 100 − 24 S 250		24	250	88

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

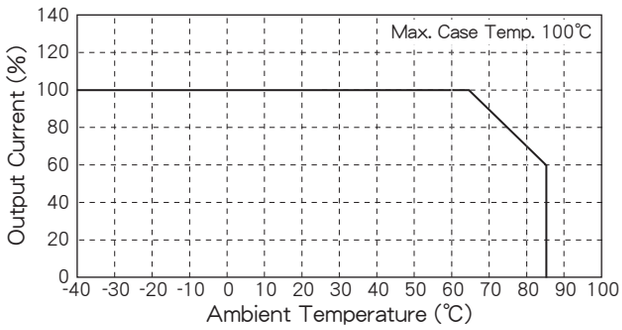


Fig. 2 Short Circuit Operating Area

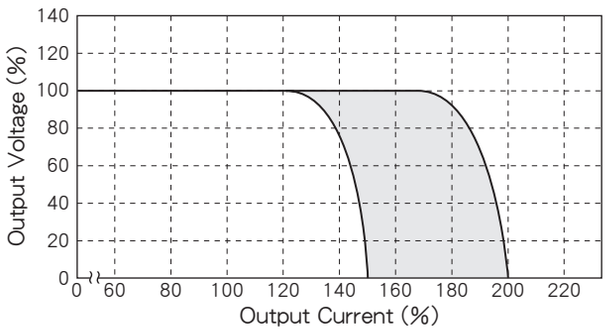


Fig. 3 Temperature Characteristic on Case Surface

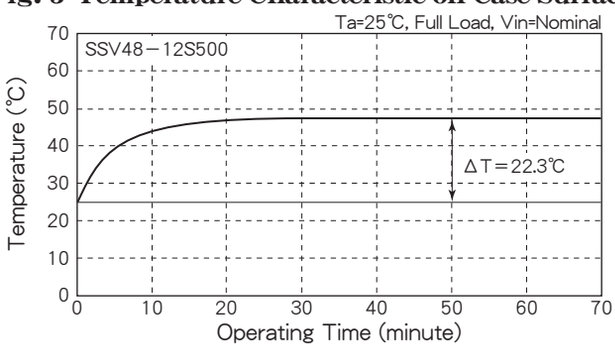


Fig. 4 Efficiency vs. Output Current

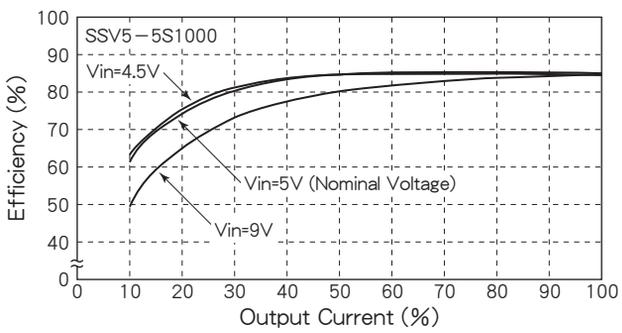


Fig. 5 Efficiency vs. Output Current

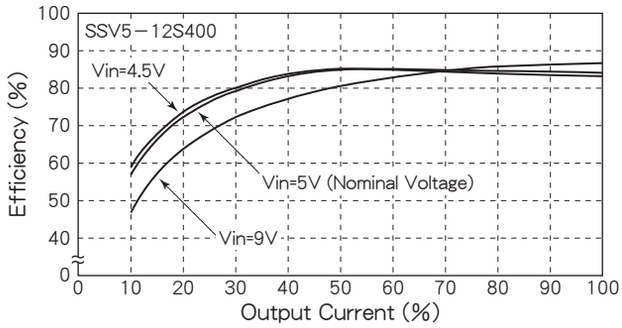


Fig. 6 Efficiency vs. Output Current

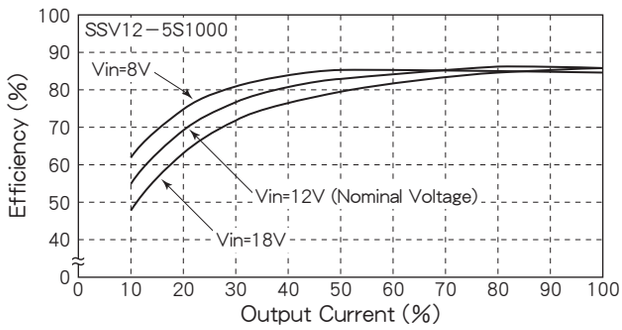


Fig. 7 Efficiency vs. Output Current

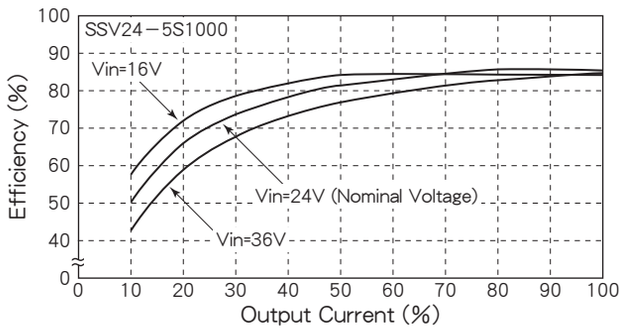


Fig. 8 Efficiency vs. Output Current

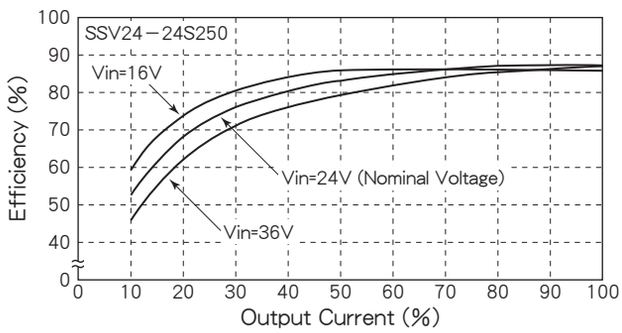
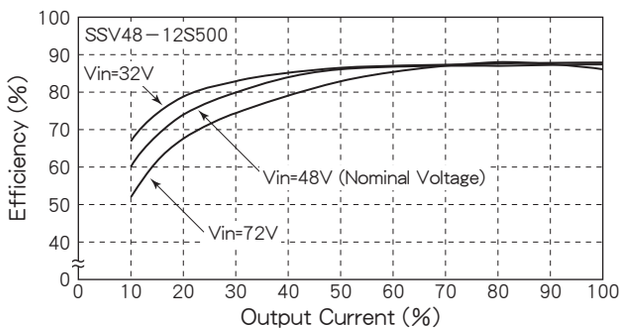


Fig. 9 Efficiency vs. Output Current



SQ SERIES

5～6W DC/DC CONVERTERS
Single Output & Dual Outputs

H10×W30×L47 (mm)

■ Features

- ● 10mm in Height ●高さ10mm
- ● Built-in Input Filter ●入力フィルタ内蔵
- ● Input-Output Isolation ●入出力間絶縁
- ● High Efficiency 79～87% ●高効率 79～87%
- ● Wide Input Voltage Range ●広範囲な入力電圧
- ● High Reliability ●高信頼性
- ● Low No Load Current ●無負荷電流が少ない
- ● 5 Sided Metal Shielding ●５面メタルシールド
- ● Operating Ambient Temp. −40℃～+85℃ ●動作周囲温度 −40℃～+85℃
- ● Max. Case Temperature +100℃ ●最大ケース温度 +100℃
- ● Conformity to RoHS2 Directive ●RoHS2指令対応
- ● Not built-in aluminum and tantalum electrolytic capacitor ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

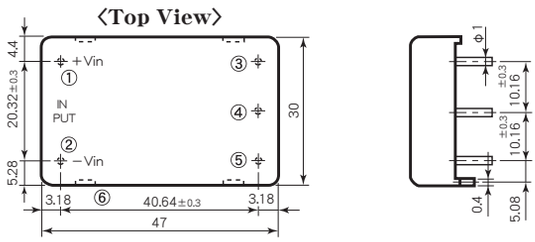
■ General Characteristics

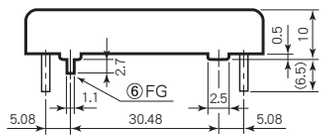
(at Ta : 25℃, Full Load, Nominal Vin)

- ●Input Voltage, Range: DC5, 12, 24, 48V (See Table 1)
- ●Output Voltage, Current: See Table 1
- ●Output Voltage Accuracy: ±2%; ±3%(5, 6V Vout only)
- ●Efficiency: See Table 1
- ●Line Regulation: 0.3% max. (at Vin Range)
- ●Load Regulation: Single : ±0.5% max. (0～100% Load); Dual : ±3% max. (0～100% Load)
- ●Reflected Input Ripple and Noise: (2% Vin)Vp-p max.
- ●Output Ripple: 20mVp-p max.
- ●Output Noise: 100mVp-p max.
- ●Short Circuit Protection: Built-in, Auto-restart (See Fig. 2)
- ●Temperature Coefficient: 0.02%/℃ max.
- ●Operating Ambient Temp.: −40℃～+85℃ (See Fig. 1); −30℃～+85℃ (5V Vin only)
- ●Storage Temperature: −40℃～+100℃
- ●Isolation Voltage: AC500V one minute (Input−Output−Case)
- ●Isolation Impedance: 100MΩ min. (at DC1000V) (Input−Output−Case)
- ●Switching Frequency: 230kHz typ.
- ●Weight: 35g max.
- ●Humidity: 20～95% RH
- ●Shock: 490m/s² (11msec 3directions)
- ●Vibration: 10～55Hz 98m/s² (30minutes 3directions)
- ●Surface Structure: 5 Sided Steel Case
- ●Soldering Conditions
  - Soldering DIP: 260℃, for 15 seconds max.
  - Soldering iron: 360℃, for 5 seconds max.
- ●MTBF: Single : 1,200,000H; Dual : 1,000,000H (Ta : 25℃, 80% Load, Nominal Vin)
- ●Warranty: 5 years

■ Pin Outs & Dimensions (±0.5mm)

〈Top View〉

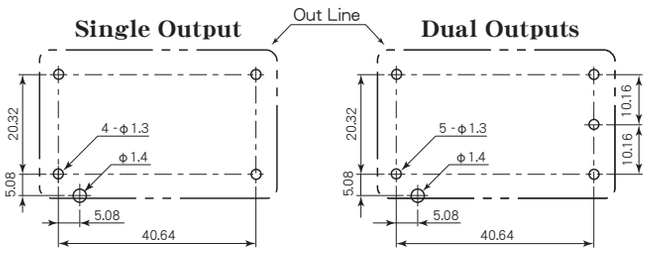




Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	−Vdc in	②	−Vdc in
③	+Vdc out	③	+Vdc out
④	No Pin	④	Common
⑤	−Vdc out	⑤	−Vdc out
⑥	Frame Ground	⑥	Frame Ground

■ Hole Configurations on PCB (Top View)



■ Selection Guide

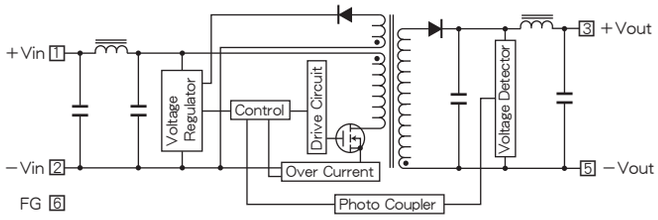
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SQ 5− 5S1000	5 (4.5～9)	5	1000	79
SQ 5− 6S 900		6	900	79
SQ 5−12S 500		12	500	83
SQ 5−15S 400		15	400	83
SQ 5−24S 250		24	250	83
SQ 5− 5D 500		±5	±500	79
SQ 5−12D 250		±12	±250	83
SQ 5−15D 200		±15	±200	83
SQ12− 5S1000	12 (8～18)	5	1000	83
SQ12− 6S 900		6	900	83
SQ12−12S 500		12	500	85
SQ12−15S 400		15	400	87
SQ12−24S 250		24	250	85
SQ12− 5D 500		±5	±500	82
SQ12−12D 250		±12	±250	86
SQ12−15D 200		±15	±200	86
SQ24− 5S1000	24 (16～36)	5	1000	81
SQ24− 6S 900		6	900	82
SQ24−12S 500		12	500	85
SQ24−15S 400		15	400	85
SQ24−24S 250		24	250	85
SQ24− 5D 500		±5	±500	81
SQ24−12D 250		±12	±250	85
SQ24−15D 200		±15	±200	85
SQ48− 5S1000	48 (32～72)	5	1000	81
SQ48− 6S 900		6	900	81
SQ48−12S 500		12	500	85
SQ48−15S 400		15	400	85
SQ48−24S 250		24	250	85
SQ48− 5D 500		±5	±500	81
SQ48−12D 250		±12	±250	85
SQ48−15D 200		±15	±200	85

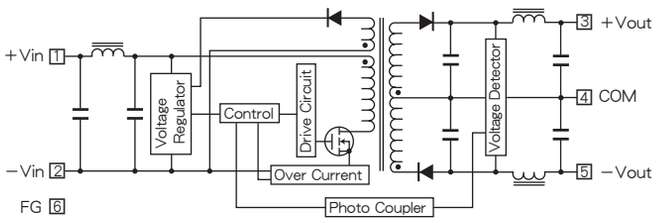
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

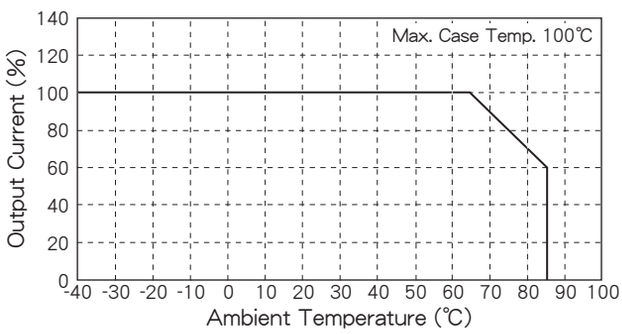


Fig. 2 Short Circuit Operating Area

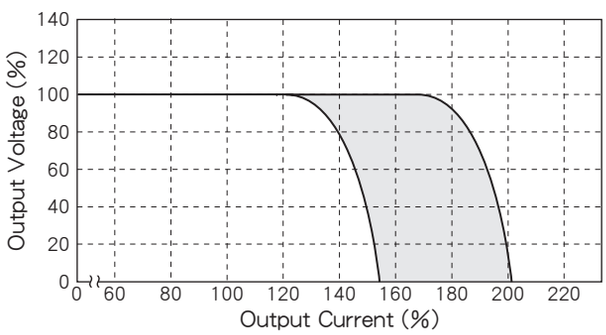


Fig. 3 Temperature Characteristic on Case Surface

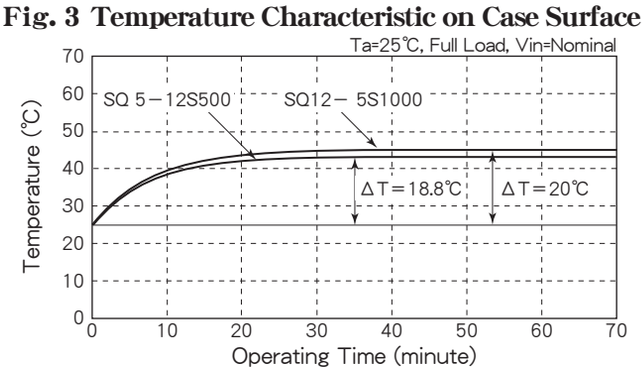


Fig. 4 No Load Current vs. Input Voltage

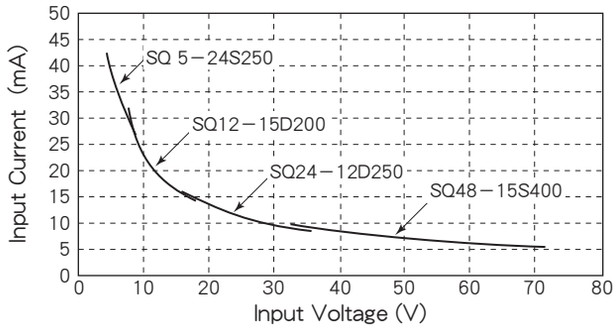


Fig. 5 Efficiency vs. Output Current

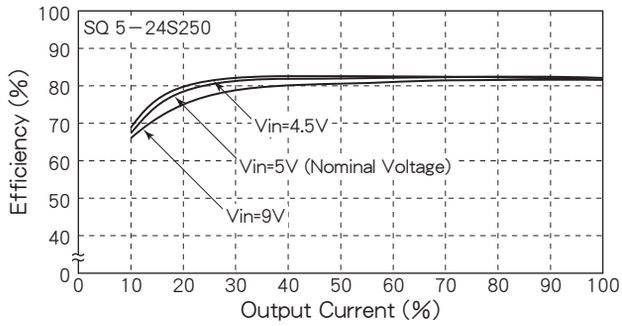


Fig. 6 Efficiency vs. Output Current

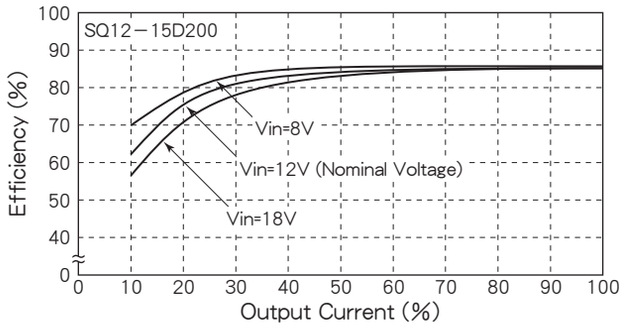


Fig. 7 Efficiency vs. Output Current

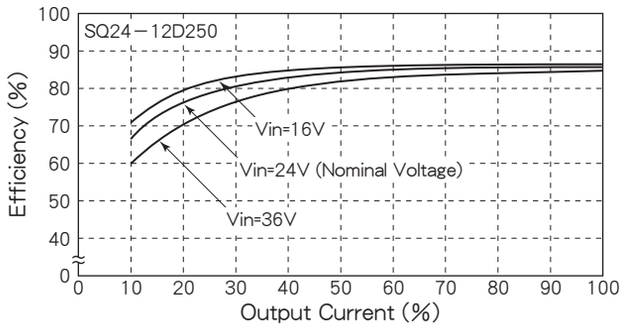
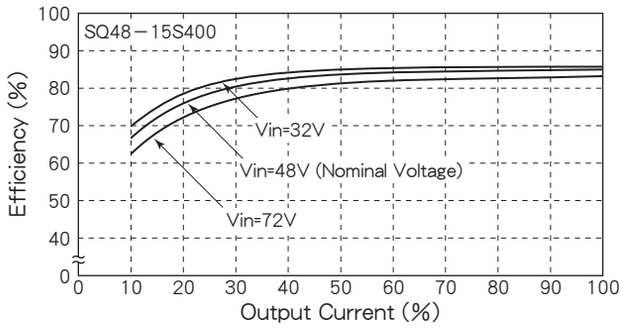


Fig. 8 Efficiency vs. Output Current



SQK SERIES

5～6W DC/DC CONVERTERS
Single Output & Dual Outputs

H8.5×W30×L47 (mm)

■ Features

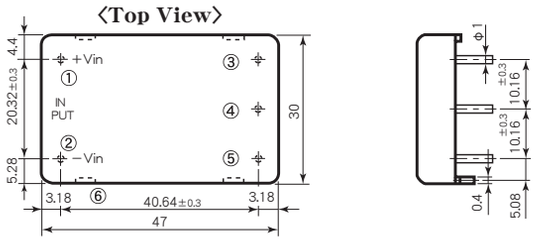
- ● Low Profile 8.5mm ●薄型 8.5mm
- ● Built-in Input Filter ●入力フィルタ内蔵
- ● Input-Output Isolation ●入出力間絶縁
- ● High Efficiency 80～85% ●高効率 80～85%
- ● Wide Input Voltage Range ●広範囲な入力電圧
- ● High Reliability ●高信頼性
- ● Low No Load Current ●無負荷電流が少ない
- ● 5 Sided Metal Shielding ●５面メタルシールド
- ● Operating Ambient Temp. −40℃～+85℃ ●動作周囲温度 −40℃～+85℃
- ● Max. Case Temperature +100℃ ●最大ケース温度 +100℃
- ● Conformity to RoHS2 Directive ●RoHS2指令対応
- ● Not built-in aluminum and tantalum electrolytic capacitor ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

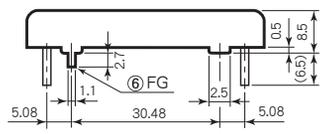
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

- ●Input Voltage, Range: DC5, 12, 24, 48V (See Table 1)
- ●Output Voltage, Current: See Table 1
- ●Output Voltage Accuracy: ±3%
- ●Efficiency: See Table 1
- ●Line Regulation: 0.3% max. (at Vin Range)
- ●Load Regulation: Single : ±0.5% max. (0～100% Load)
  Dual : ±3% max.
  ±5% max. (±5V Vout only) (10～100% Load)
- ●Reflected Input Ripple and Noise: (2% Vin)Vp-p max.
- ●Output Ripple: 20mVp-p max.
- ●Output Noise: 100mVp-p max.
- ●Short Circuit Protection: Built-in, Auto-restart (See Fig. 2)
- ●Temperature Coefficient: 0.02%/℃ max.
- ●Operating Ambient Temp.: −40℃～+85℃ (See Fig. 1)
  −30℃～+85℃ (5V Vin only)
- ●Storage Temperature: −40℃～+100℃
- ●Isolation Voltage: AC500V one minute (Input−Output−Case)
- ●Isolation Impedance: 100MΩ min. (at DC1000V) (Input−Output−Case)
- ●Weight: 30g max.
- ●Humidity: 20～95% RH
- ●Shock: 490m/s² (11msec 3directions)
- ●Vibration: 10～55Hz 98m/s² (30minutes 3directions)
- ●Surface Structure: 5 Sided Steel Case
- ●Soldering Conditions
  Soldering DIP: 260℃, for 15 seconds max.
  Soldering iron: 360℃, for 5 seconds max.
- ●MTBF: Single : 720,000H
  Dual : 600,000H
  (Ta : 25℃, 80% Load, Nominal Vin)
- ●Warranty: 5 years

■ Pin Outs & Dimensions (±0.5mm)

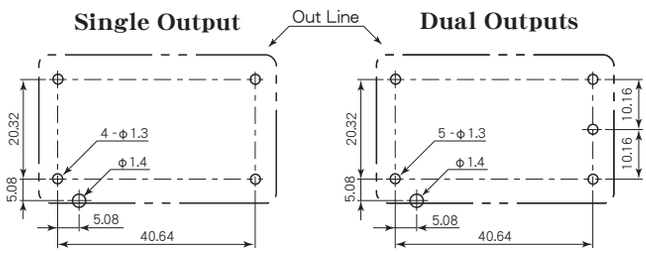




Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	−Vdc in	②	−Vdc in
③	+Vdc out	③	+Vdc out
④	No Pin	④	Common
⑤	−Vdc out	⑤	−Vdc out
⑥	Frame Ground	⑥	Frame Ground

■ Hole Configurations on PCB (Top View)



■ Selection Guide

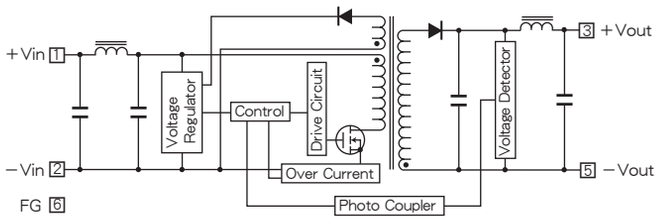
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SQK 5− 5S1000	5 (4.5～9)	5	1000	84
SQK 5− 6S 900		6	900	84
SQK 5−12S 500		12	500	84
SQK 5−15S 400		15	400	85
SQK 5−24S 250		24	250	85
SQK 5− 5D 500		±5	±500	81
SQK 5−12D 250		±12	±250	85
SQK 5−15D 200		±15	±200	85
SQK12− 5S1000	12 (8～18)	5	1000	80
SQK12− 6S 900		6	900	80
SQK12−12S 500		12	500	83
SQK12−15S 400		15	400	83
SQK12−24S 250		24	250	83
SQK12− 5D 500		±5	±500	81
SQK12−12D 250		±12	±250	83
SQK12−15D 200		±15	±200	83
SQK24− 5S1000	24 (16～36)	5	1000	80
SQK24− 6S 900		6	900	80
SQK24−12S 500		12	500	84
SQK24−15S 400		15	400	84
SQK24−24S 250		24	250	83
SQK24− 5D 500		±5	±500	80
SQK24−12D 250		±12	±250	83
SQK24−15D 200		±15	±200	83
SQK48− 5S1000	48 (32～72)	5	1000	80
SQK48− 6S 900		6	900	80
SQK48−12S 500		12	500	84
SQK48−15S 400		15	400	84
SQK48−24S 250		24	250	84
SQK48− 5D 500		±5	±500	81
SQK48−12D 250		±12	±250	83
SQK48−15D 200		±15	±200	83

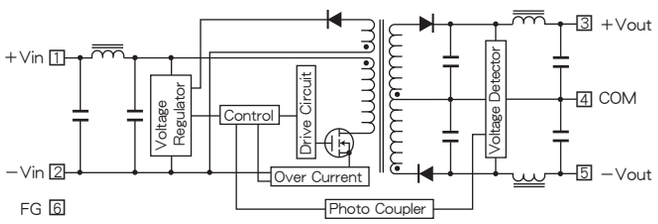
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

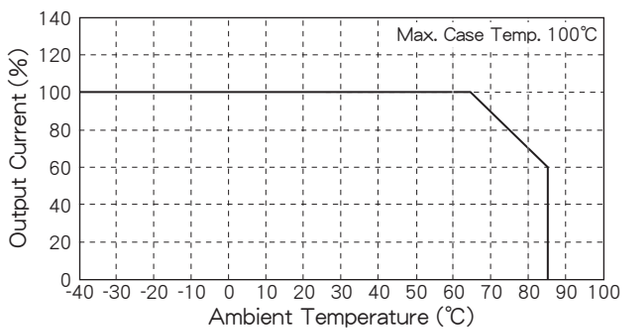


Fig. 2 Short Circuit Operating Area

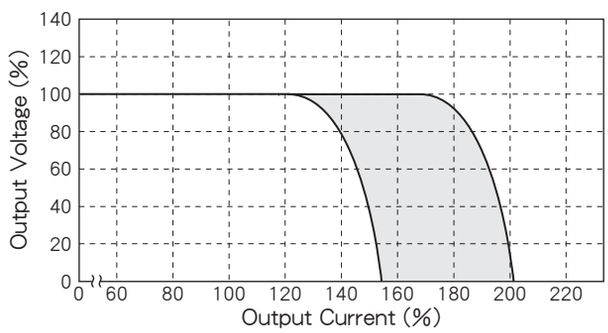


Fig. 3 Temperature Characteristic on Case Surface

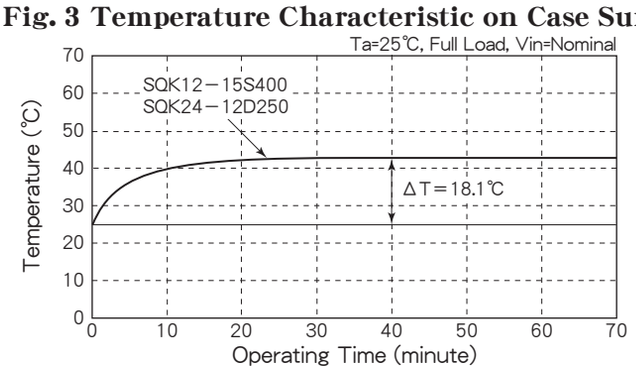


Fig. 4 No Load Current vs. Input Voltage

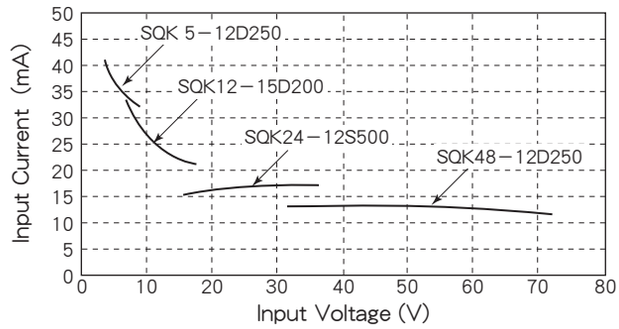


Fig. 5 Efficiency vs. Output Current (Single Output)

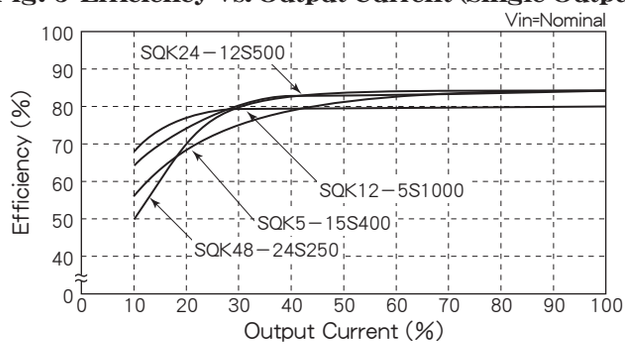
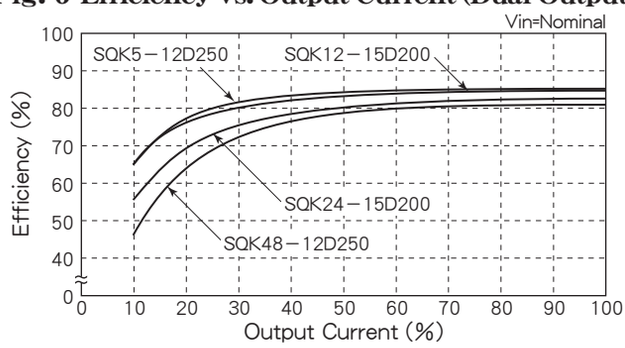


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



SQV SERIES

10～12W DC/DC CONVERTERS Single Output

H8.5×W30×L47 (mm)

■ Features

- High Efficiency 81～87%
- 8.5mm in Height
- Compact, Light Weight
- Built-in Input Filter
- Wide Input Voltage Range
- Input-Output Isolation
- Low No Load Current
- 5 Sided Metal Shielding
- High Reliability
- Operating Ambient Temperature −40℃～+85℃
- Max. Case Temperature +100℃
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor

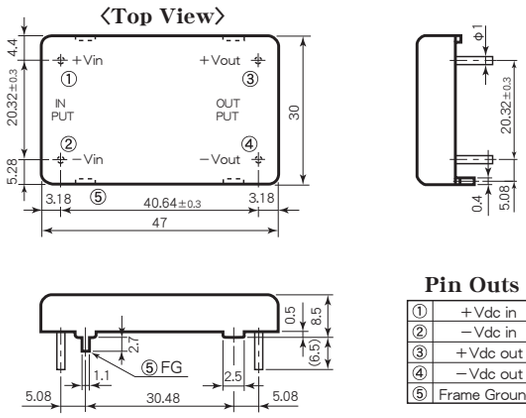
- 高効率 81～87%
- 高さ8.5mm
- 小形、軽量
- 入力フィルタ内蔵
- 広範囲な入力電圧
- 入出力間絶縁
- 無負荷電流が少ない
- ５面メタルシールド
- 高信頼性
- 動作周囲温度 −40℃～+85℃
- 最大ケース温度 +100℃
- RoHS2指令対応
- アルミ電解コンデンサ及び タンタルコンデンサ不使用

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC5, 12, 24, 48V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Accuracy	±2% (12, 15, 24, 28V Vout) ±3% (3.3, 5, 6V Vout)
●Efficiency	See Table 1
●Line Regulation	0.3% max. (at Vin Range)
●Load Regulation	±0.5% max. (0～100% Load)
●Reflected Input Ripple, Noise	(2% Vin)Vp-p max.
●Output Ripple	20mVp-p max.
●Output Noise	80mVp-p max. (0～20MHz) 150mVp-p max. (0～100MHz)
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1) −30℃～+85℃ (5V Vin only)
●Max. Case Temperature	+100℃
●Storage Temperature	−40℃～+100℃
●Isolation Voltage	AC500V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	30g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	5 Sided Steel Case
●Soldering Conditions	
Soldering DIP	260℃, for 15 seconds max.
Soldering iron	360℃, for 5 seconds max.
●MTBF	1,000,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

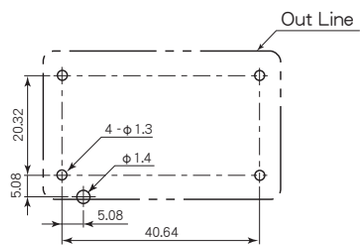
■ Pin Outs & Dimensions (±0.5mm)



Pin Outs

①	+Vdc in
②	−Vdc in
③	+Vdc out
④	−Vdc out
⑤	Frame Ground

■ Hole Configurations on PCB (Top View)



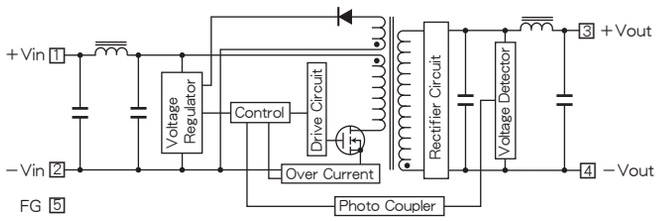
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SQV 5 − 3.3 S 3000	5 (4.5～9)	3.3	3000	81
SQV 5 − 5 S 2000		5	2000	82
SQV 5 − 6 S 1600		6	1600	82
SQV 5 − 12 S 800		12	800	85
SQV 5 − 15 S 640		15	640	83
SQV 5 − 24 S 400		24	400	83
SQV 5 − 28 S 350		28	350	83
SQV 12 − 3.3 S 3000	12 (8～18)	3.3	3000	83
SQV 12 − 5 S 2200		5	2200	85
SQV 12 − 6 S 2000		6	2000	85
SQV 12 − 12 S 1000		12	1000	87
SQV 12 − 15 S 800		15	800	87
SQV 12 − 24 S 500		24	500	87
SQV 12 − 28 S 400		28	400	87
SQV 24 − 3.3 S 3000	24 (16～36)	3.3	3000	83
SQV 24 − 5 S 2200		5	2200	85
SQV 24 − 6 S 2000		6	2000	85
SQV 24 − 12 S 1000		12	1000	87
SQV 24 − 15 S 800		15	800	87
SQV 24 − 24 S 500		24	500	87
SQV 24 − 28 S 400		28	400	87
SQV 48 − 3.3 S 3000	48 (32～72)	3.3	3000	83
SQV 48 − 5 S 2200		5	2200	85
SQV 48 − 6 S 2000		6	2000	85
SQV 48 − 12 S 1000		12	1000	87
SQV 48 − 15 S 800		15	800	87
SQV 48 − 24 S 500		24	500	87
SQV 48 − 28 S 400		28	400	87

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

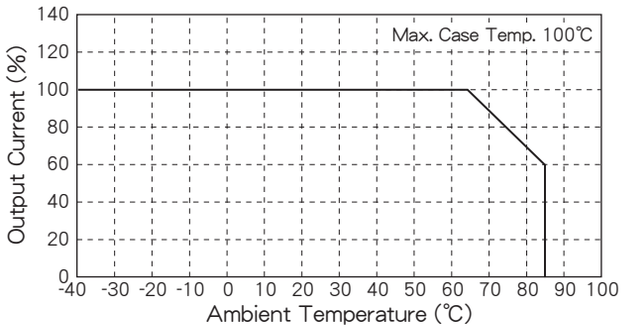


Fig. 2 Short Circuit Operating Area

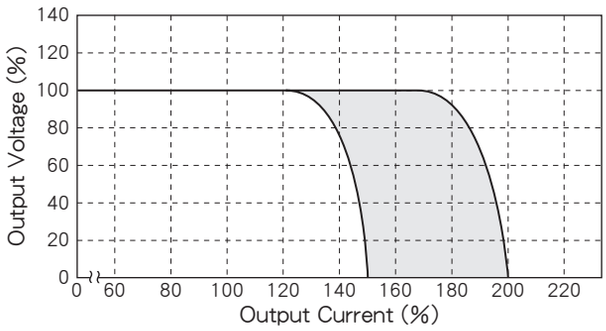


Fig. 3 Temperature Characteristic on Case Surface

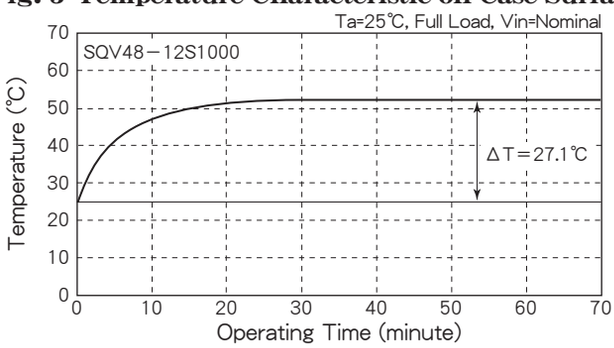


Fig. 4 Efficiency vs. Output Current

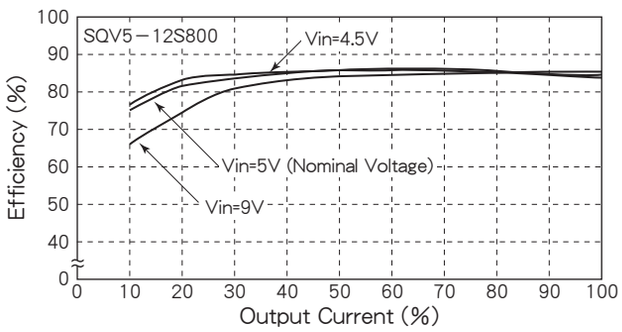


Fig. 5 Efficiency vs. Output Current

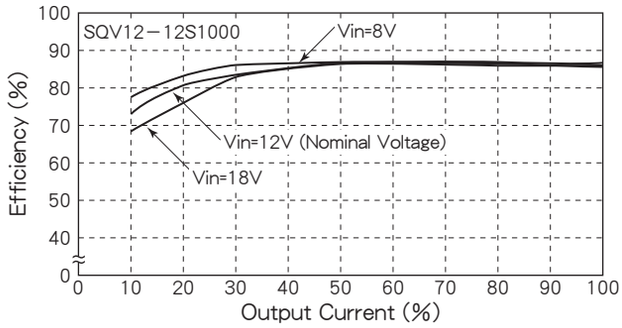


Fig. 6 Efficiency vs. Output Current

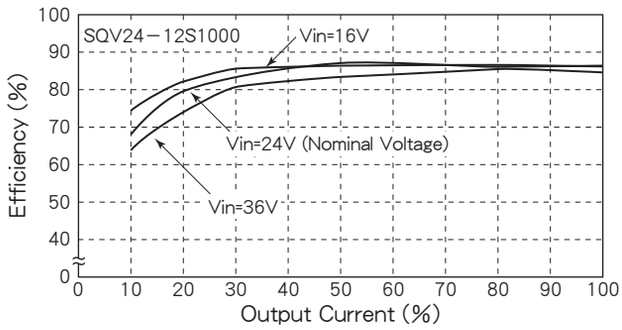


Fig. 7 Efficiency vs. Output Current

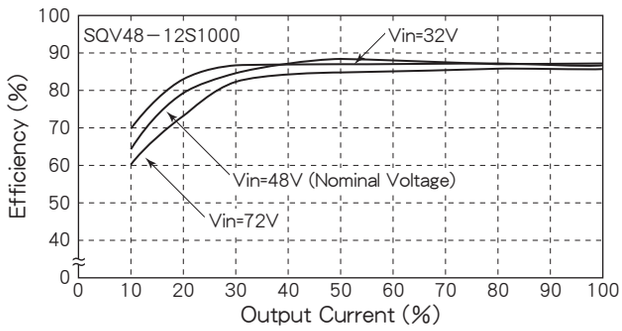
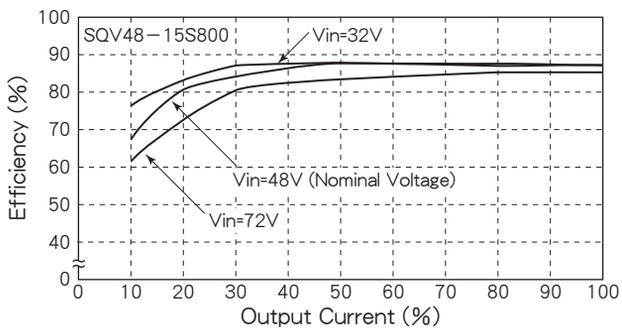


Fig. 8 Efficiency vs. Output Current



SQT SERIES

10～15W DC/DC CONVERTERS
Single Output & Dual Outputs

H7×W31×L47 (mm)

■ Features

- 7mm in Height
- High Efficiency 85～88%
- Built-in Input Filter
- Wide Input Voltage Range
- Input-Output Isolation AC1500V
- Low No Load Current
- 5 Sided Metal Shielding
- Remote ON/OFF Control
- Operating Ambient Temperature −40℃～+85℃
- Adjustable Output Voltage ±5% (Single Output Only)
- Max. Case Temperature +100℃
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor

- 高さ7mm
- 高効率 85～88%
- 入力フィルタ内蔵
- 広範囲な入力電圧
- 入出力間絶縁 AC1500V
- 無負荷電流が少ない
- ５面メタルシールド
- ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- 動作周囲温度 −40℃～+85℃
- 出力電圧調整可能 ±5% (単出力のみ)
- 最大ケース温度 +100℃
- RoHS2指令対応
- アルミ電解コンデンサ及び タンタルコンデンサ不使用

■ Specifications

(at Ta : 25℃, Full Load, Nominal Vin)

● Input

• Input Voltage, Range	DC5, 12, 24, 48V (See Table 1)
• Input Current (No Load)	5V : 30mA typ. 12V : 18mA typ. 24V : 10mA typ. 48V : 7mA typ.
• Reflected Input Ripple, Noise	(3% Vin)Vp-p max.

● Output

• Output Voltage, Current	See Table 1
• Output Voltage Accuracy	Single : ±2% Dual : ±3%
• Output Voltage Range	±5% Adjustable (Used trimmer) (Single Output only)
• Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between pin ②～③)
• Efficiency	See Table 1
• Line Regulation	0.3% max. (at Vin Range)
• Load Regulation	Single : ±0.5% max. (0～100% Load) Dual : ±3% max. (10～100% Load)
• Output Ripple	20mVp-p max.
• Output Noise	80mVp-p max. (0～20MHz) 150mVp-p max. (0～100MHz)
• Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
• Temperature Coefficient	0.02%/℃ max.

● General

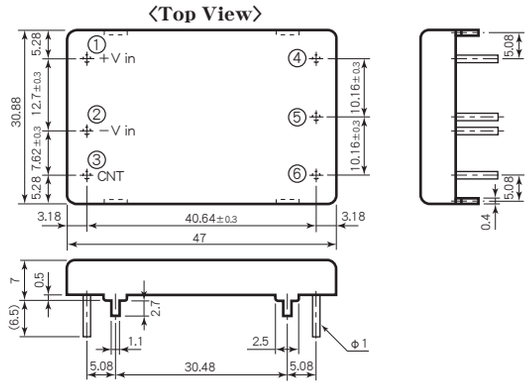
• Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
• Max. Case Temperature	+100℃
• Storage Temperature	−55℃～+100℃
• Isolation Voltage	AC1500V one minute (Input−Output−Case)
• Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
• Humidity	20～95% RH
• MTBF	1,000,000H (Ta : 25℃, 80% Load, Nominal Vin)
• Switching Frequency	210kHz (±10%)

● Physical

• Weight	30g max.
• Shock	490m/s² (11msec 3directions)
• Vibration	10～55Hz 98m/s² (30minutes 3directions)
• Surface Structure	5 Sided Steel Case
• Soldering Conditions	
Soldering DIP	260℃, for 15 seconds max.
Soldering iron	360℃, for 5 seconds max.
• Warranty	5 years

■ Pin Outs & Dimensions (±0.5mm)

〈Top View〉

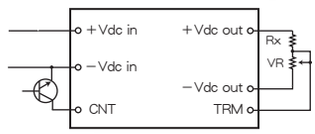


Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	−Vdc in	②	−Vdc in
③	CNT	③	CNT
④	+Vdc out	④	+Vdc out
⑤	−Vdc out	⑤	COM
⑥	TRM	⑥	−Vdc out

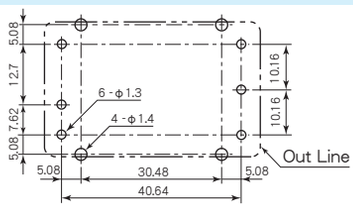
Application

ON/OFF Control and Vout Adjustment (Single Output)



Vout (V)	VR (Ω)	Rx (Ω)
3.3V	50k	13k
5V	50k	3k
5.2V	50k	3k
6V	50k	6.8k
12V	50k	43k
15V	50k	62k
24V	50k	150k

■ Holes on PCB (Top View)



■ Selection Guide

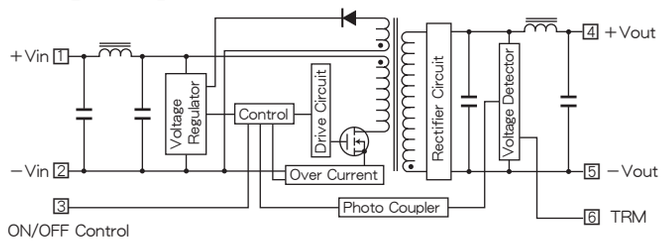
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency 20% Load (typ.)(%)	Efficiency 80% Load (typ.)(%)
SQT 5−3.3S 3A	5 (4.5～9)	3.3	3	81	85
SQT 5− 5S 2.2A		5	2.2	81	85
SQT 5−5.2S 2.1A		5.2	2.1	81	85
SQT 5− 6S 1.9A		6	1.9	83	85
SQT 5− 12S 1A		12	1	84	85
SQT 5− 15S 0.8A		15	0.8	84	85
SQT 5− 24S 0.5A		24	0.5	84	85
SQT 5− 12D 0.5A		±12	±0.5	86	86
SQT 5− 15D 0.4A		±15	±0.4	86	85
SQT12−3.3S 3.6A	12 (8～18)	3.3	3.6	80	85
SQT12− 5S 2.6A		5	2.6	82	86
SQT12−5.2S 2.5A		5.2	2.5	82	85
SQT12− 6S 2.3A		6	2.3	85	86
SQT12− 12S 1.3A		12	1.3	85	87
SQT12− 15S 1A		15	1	85	88
SQT12− 24S 0.6A		24	0.6	84	87
SQT12− 12D 0.6A		±12	±0.6	85	87
SQT12− 15D 0.5A		±15	±0.5	84	87
SQT24−3.3S 3.6A	24 (16～36)	3.3	3.6	82	85
SQT24− 5S 2.6A		5	2.6	82	87
SQT24−5.2S 2.5A		5.2	2.5	83	87
SQT24− 6S 2.3A		6	2.3	83	87
SQT24− 12S 1.3A		12	1.3	86	88
SQT24− 15S 1A		15	1	84	87
SQT24− 24S 0.6A		24	0.6	84	87
SQT24− 12D 0.6A		±12	±0.6	85	87
SQT24− 15D 0.5A		±15	±0.5	86	87
SQT48−3.3S 3.6A	48 (32～72)	3.3	3.6	80	85
SQT48− 5S 2.6A		5	2.6	82	87
SQT48−5.2S 2.5A		5.2	2.5	82	87
SQT48− 6S 2.3A		6	2.3	82	87
SQT48− 12S 1.3A		12	1.3	84	87
SQT48− 15S 1A		15	1	84	87
SQT48− 24S 0.6A		24	0.6	84	87
SQT48− 12D 0.6A		±12	±0.6	84	87
SQT48− 15D 0.5A		±15	±0.5	84	87

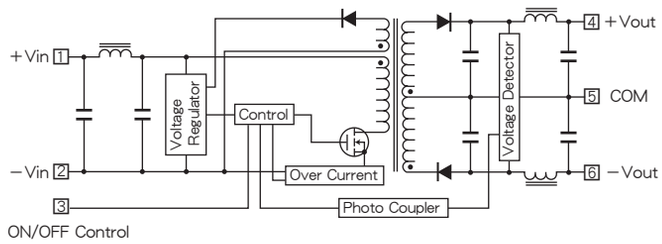
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

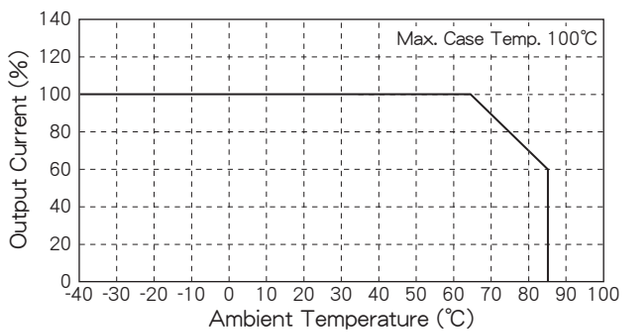


Fig. 2 Short Circuit Operating Area

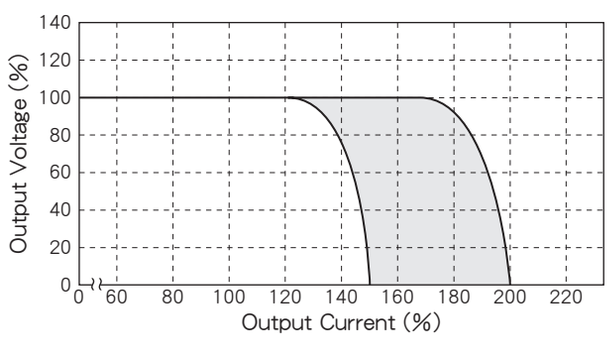


Fig. 3 Temperature Characteristic on Case Surface

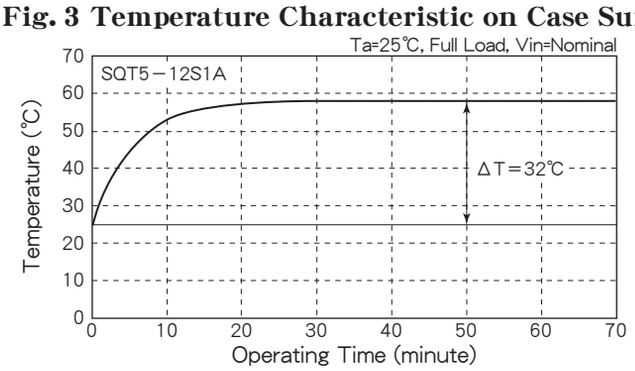


Fig. 4 Efficiency vs. Output Current

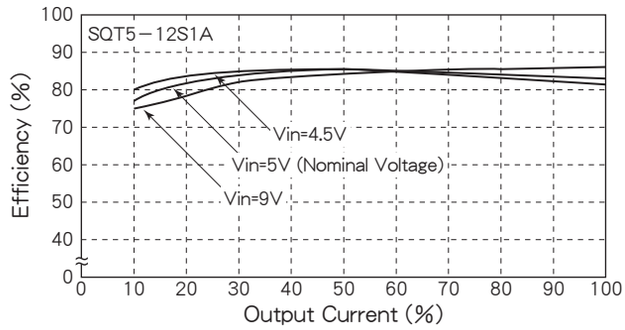


Fig. 5 Efficiency vs. Output Current

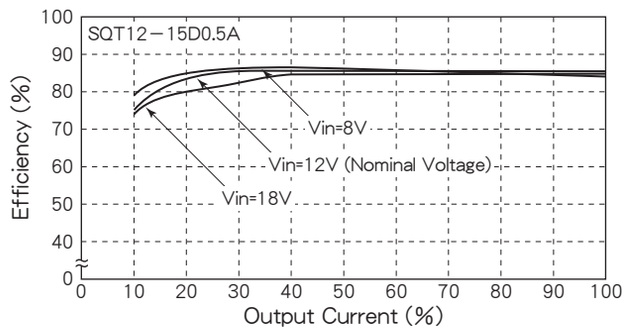
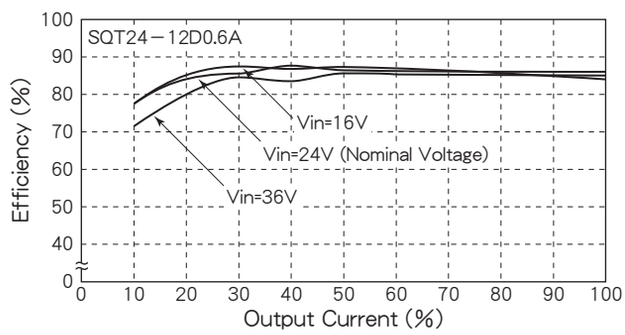
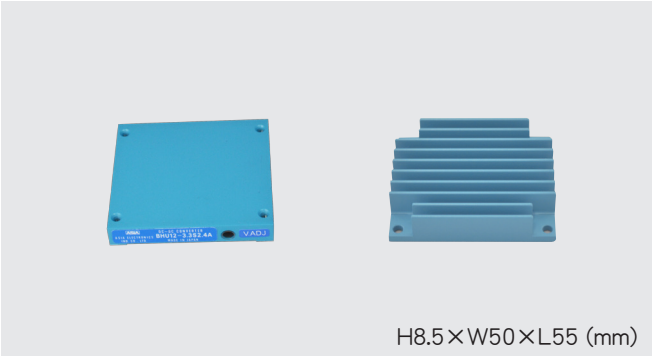


Fig. 6 Efficiency vs. Output Current



BHU SERIES

7～15W DC/DC CONVERTERS
Single Output & Dual Outputs



H8.5×W50×L55 (mm)

■ Features

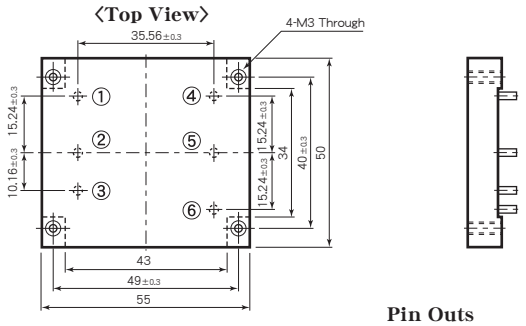
- ●Low Profile 8.5mm ●薄型 8.5mm
- ●Built-in Input Filter ●入力フィルタ内蔵
- ●Input-Output Isolation ●入出力間絶縁
- ●High Efficiency 77～88% ●高効率 77～88%
- ●Wide Input Voltage Range ●広範囲な入力電圧
- ●High Reliability ●高信頼性
- ●6 Sided Metal Shielding ●６面メタルシールド
- ●Remote ON/OFF Control ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●Adjustable Output Volt. ±5% ●可変出力電圧 ±5%
- ●Output Over Voltage Protection 115～140% Operation ●出力過電圧保護回路内蔵 115～140% 動作
- ●Operating Ambient Temperature −40℃～+85℃ ●動作周囲温度 −40℃～+85℃
- ●Max. Case Temperature +105℃ ●最大ケース温度 +105℃
- ●Conformty to RoHS2 Directive ●RoHS2指令対応
- ●Not built-in aluminum and tantalum electrolytic capacitor ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

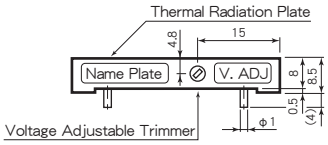
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC5, 12, 24, 48V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±5% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	Single : ±0.5% max. (0～100% Load) Dual : ±3% max. (10～100% Load)
●Reflected Input Ripple, Noise	(3% Vin)Vp-p max.
●Output Ripple	40mVp-p max. 100mVp-p max. (48V Vout only)
●Output Noise	100mVp-p max. 200mVp-p max. (48V Vout only)
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between pin ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1) −30℃～+85℃ (5V Vin only)
●Max. Case Temperature	+105℃
●Storage Temperature	−40℃～+115℃
●Isolation Voltage	AC1500V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 60g max. Heat Sink : 40g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	6 Sided Aluminum Case
●Soldering Conditions	
Soldering DIP	260℃, for 15 seconds max.
Soldering iron	360℃, for 5 seconds max.
●MTBF	Single : 1,000,000H Dual : 700,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Pin Outs & Dimensions (±0.5mm)

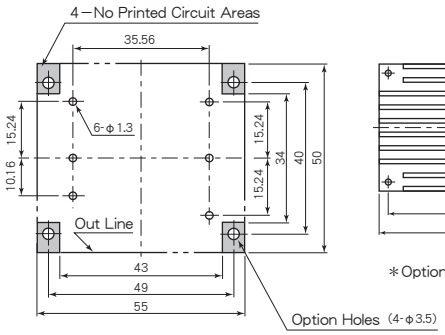




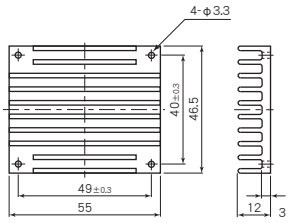
Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	0 Vdc in	②	0 Vdc in
③	ON/OFF Control	③	ON/OFF Control
④	+Vdc out	④	+Vdc out
⑤	0 Vdc out	⑤	Common
⑥	No Connection	⑥	−Vdc out

■ Holes on PCB (Top View)



■ Option Heat Sink



＊Option Heat Sink Model : A4-3080

■ Selection Guide

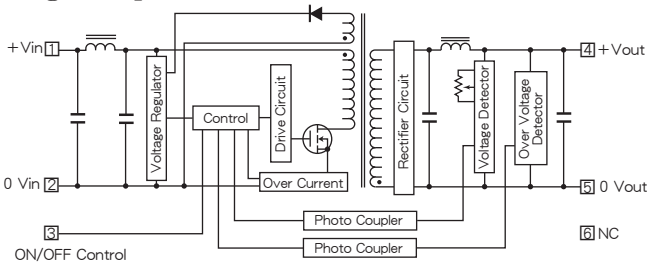
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
BHU 5−3.3S 2A	5 (4.5～9)	3.3	2	83
BHU 5− 5S 2A		5	2	82
BHU 5− 6S 1.8A		6	1.8	82
BHU 5−12S 1A		12	1	84
BHU 5−15S 0.8A		15	0.8	83
BHU 5−24S 0.5A		24	0.5	83
BHU 5−28S 0.4A		28	0.4	83
BHU 5− 5D 1A		±5	±1	77
BHU 5−12D 0.5A		±12	±0.5	81
BHU 5−15D 0.4A		±15	±0.4	81
BHU12−3.3S 2.4A	12 (8～18)	3.3	2.4	83
BHU12− 5S 2.4A		5	2.4	85
BHU12− 6S 2.2A		6	2.2	85
BHU12−12S 1.3A		12	1.3	85
BHU12−15S 1A		15	1	85
BHU12−24S 0.65A		24	0.65	85
BHU12−28S 0.5A		28	0.5	85
BHU12−48S 0.3A		48	0.3	85
BHU12− 5D 1.2A		±5	±1.2	78
BHU12−12D 0.65A		±12	±0.65	83
BHU12−15D 0.5A		±15	±0.5	83
BHU24−3.3S 2.4A	24 (16～36)	3.3	2.4	84
BHU24− 5S 2.4A		5	2.4	86
BHU24− 6S 2.2A		6	2.2	86
BHU24−12S 1.3A		12	1.3	86
BHU24−15S 1A		15	1	86
BHU24−24S 0.65A		24	0.65	86
BHU24−28S 0.5A		28	0.5	86
BHU24−48S 0.3A		48	0.3	85
BHU24− 5D 1.2A		±5	±1.2	78
BHU24−12D 0.65A		±12	±0.65	83
BHU24−15D 0.5A		±15	±0.5	83
BHU48−3.3S 2.4A	48 (32～76)	3.3	2.4	83
BHU48− 5S 2.4A		5	2.4	86
BHU48− 6S 2.2A		6	2.2	86
BHU48−12S 1.3A		12	1.3	88
BHU48−15S 1A		15	1	88
BHU48−24S 0.65A		24	0.65	86
BHU48−28S 0.5A		28	0.5	86
BHU48− 5D 1.2A		±5	±1.2	80
BHU48−12D 0.65A		±12	±0.65	85
BHU48−15D 0.5A		±15	±0.5	85

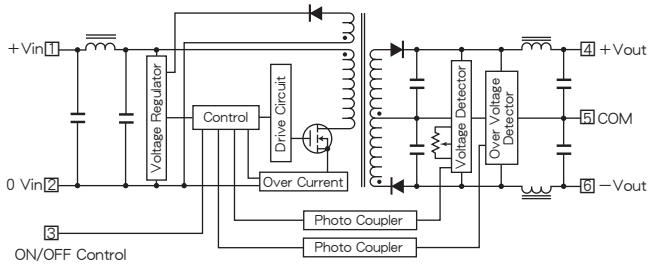
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

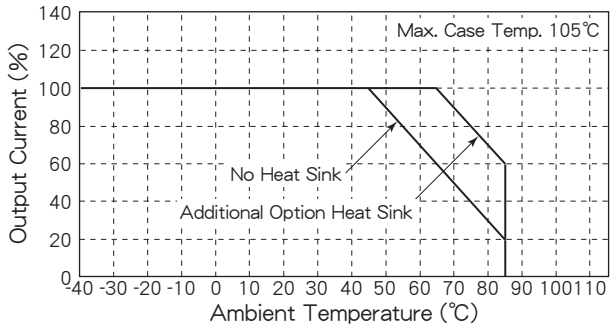


Fig. 2 Short Circuit Operating Area

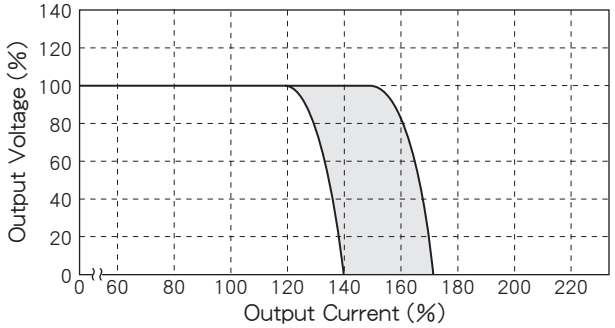


Fig. 3 Temperature Characteristic on Case Surface

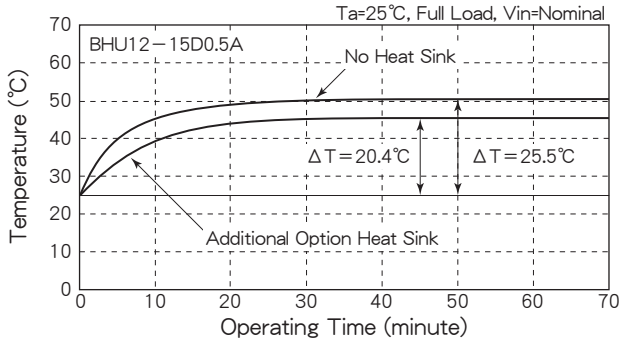


Fig. 4 Efficiency vs. Output Current

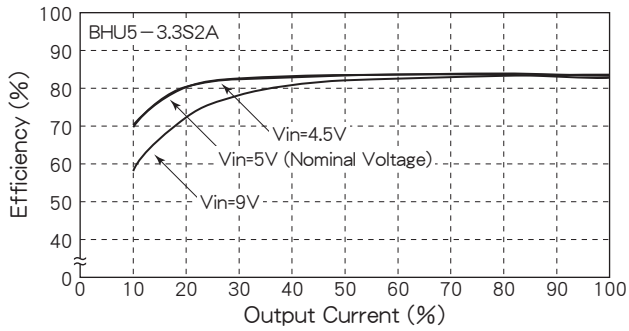


Fig. 5 Efficiency vs. Output Current

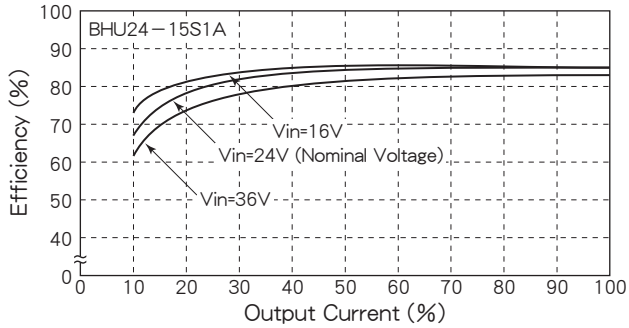


Fig. 6 Efficiency vs. Output Current

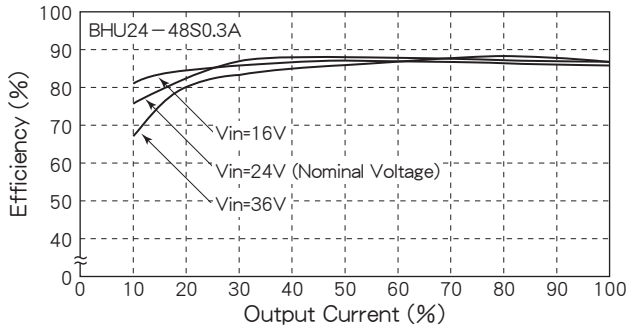


Fig. 7 Efficiency vs. Output Current

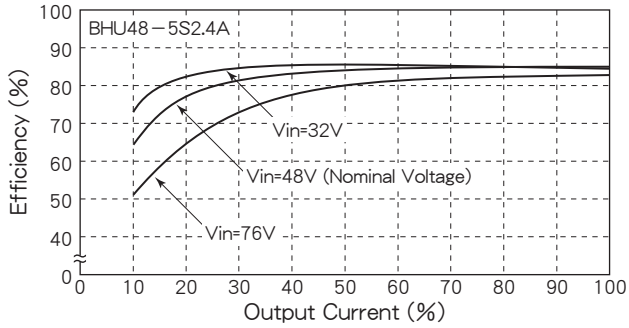
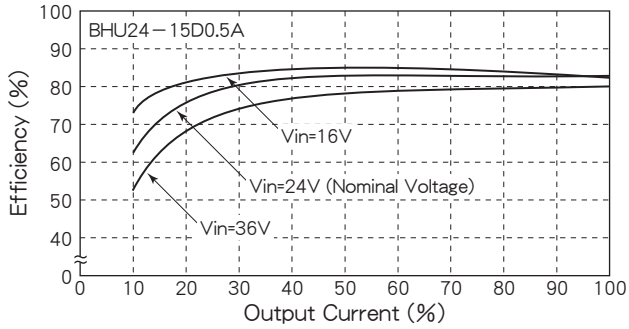


Fig. 8 Efficiency vs. Output Current



BRU SERIES

23～30W DC/DC CONVERTERS Single Output

H8.5×W50×L55 (mm)

■ Features

- ●Low Profile 8.5mm
- ●Built-in Input Filter
- ●Input-Output Isolation (AC2000V)
- ●High Efficiency 87～90%
- ●Wide Input Voltage Range
- ●High Reliability
- ●6 Sided Metal Shielding
- ●Remote ON/OFF Control
- ●Adjustable Output Volt. ±5%
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection 115～140% Operation
- ●Thermal Protection +110℃～+120℃
- ●Operating Ambient Temperature −40℃～+85℃
- ●Max. Case Temperature +105℃
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

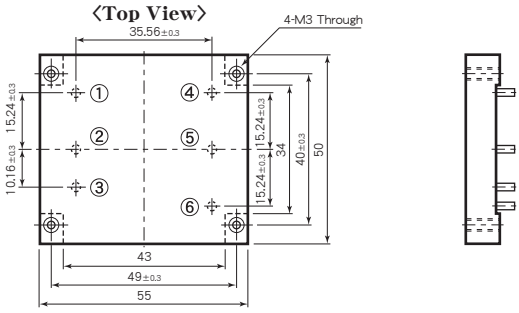
- ●薄型 8.5mm
- ●入力フィルタ内蔵
- ●入出力間絶縁 (AC2000V)
- ●高効率 87～90%
- ●広範囲な入力電圧
- ●高信頼性
- ●６面メタルシールド
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●可変出力電圧 ±5%
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵 115～140% 動作
- ●過熱保護回路内蔵 +110℃～+120℃
- ●動作周囲温度 −40℃～+85℃
- ●最大ケース温度 +105℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

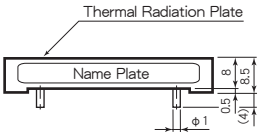
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Accuracy	±2% ±3% (3.3, 5, 6V Vout only)
●Output Voltage Range	±5% Adjustable (Used trimmer)
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	±0.5% max. (0～100% Load)
●Reflected Input Ripple, Noise	(3% Vin)Vp-p max.
●Output Ripple	40mVp-p max. 100mVp-p max. (48V Vout only)
●Output Noise	100mVp-p max. 200mVp-p max. (48V Vout only)
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between pin ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
●Max. Case Temperature	+105℃
●Storage Temperature	−50℃～+115℃
●Isolation Voltage	AC2000V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 60g max. Heat Sink : 40g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	6 Sided Aluminum Case
●Soldering Conditions	
Soldering DIP	260℃, for 15 seconds max.
Soldering iron	360℃, for 5 seconds max.
●MTBF	500,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Pin Outs & Dimensions (±0.5mm)



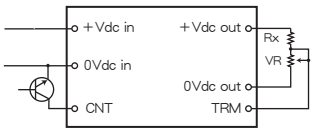


Pin Outs

①	+Vdc in
②	0 Vdc in
③	ON/OFF Control
④	+Vdc out
⑤	0 Vdc out
⑥	TRM

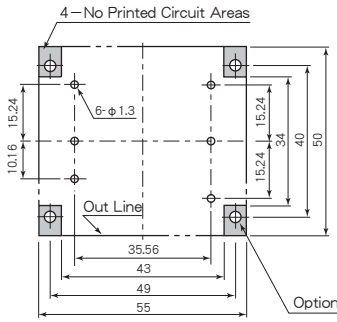
Application

ON/OFF Control and Vout Adjustment

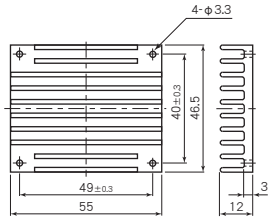


Vout (V)	3.3V	5V	6V	12V	15V	24V	28V	48V
VR (Ω)	50k	50k	50k	50k	50k	50k	50k	50k
Rx (Ω)	10k	33k	47k	47k	62k	110k	130k	220k

■ Holes on PCB (Top View)



■ Option Heat Sink



＊Option Heat Sink Model : A4-3080

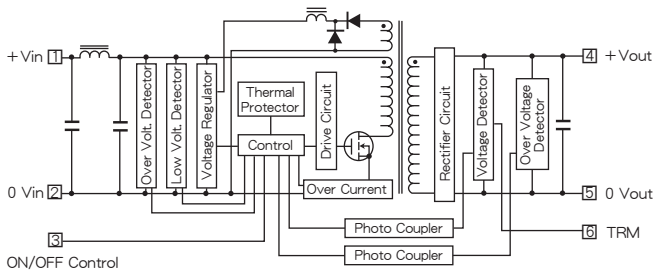
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	80% Load
BRU12−3.3S 7A	12 (8～18)	3.3	7	84	87
BRU12− 5S 6A		5	6	84	90
BRU12− 6S 5A		6	5	84	90
BRU12−12S 2.5A		12	2.5	84	90
BRU12−15S 2A		15	2	84	90
BRU12−24S 1.25A		24	1.25	84	90
BRU12−28S 1.07A		28	1.07	84	90
BRU12−48S 0.6A		48	0.6	84	90
BRU24−3.3S 7A	24 (16～36)	3.3	7	84	87
BRU24− 5S 6A		5	6	84	90
BRU24− 6S 5A		6	5	84	90
BRU24−12S 2.5A		12	2.5	84	90
BRU24−15S 2A		15	2	84	90
BRU24−24S 1.25A		24	1.25	84	90
BRU24−28S 1.07A		28	1.07	84	90
BRU24−48S 0.6A		48	0.6	84	90
BRU48−3.3S 7A	48 (32～76)	3.3	7	84	87
BRU48− 5S 6A		5	6	84	90
BRU48− 6S 5A		6	5	84	90
BRU48−12S 2.5A		12	2.5	84	90
BRU48−15S 2A		15	2	84	90
BRU48−24S 1.25A		24	1.25	84	90
BRU48−28S 1.07A		28	1.07	84	90
BRU100−3.3S 7A	100 (64～144)	3.3	7	84	87
BRU100− 5S 6A		5	6	84	90
BRU100− 6S 5A		6	5	84	90
BRU100−12S 2.5A		12	2.5	84	90
BRU100−15S 2A		15	2	84	90
BRU100−24S 1.25A		24	1.25	84	90
BRU100−28S 1.07A		28	1.07	84	90

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

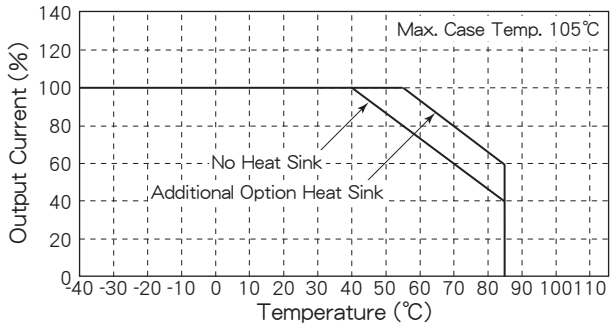


Fig. 2 Short Circuit Operating Area

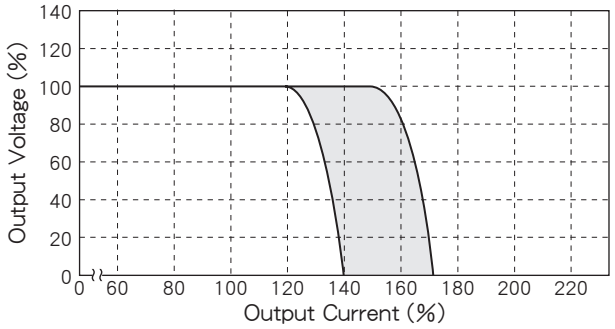


Fig. 3 Temperature Characteristic on Case Surface

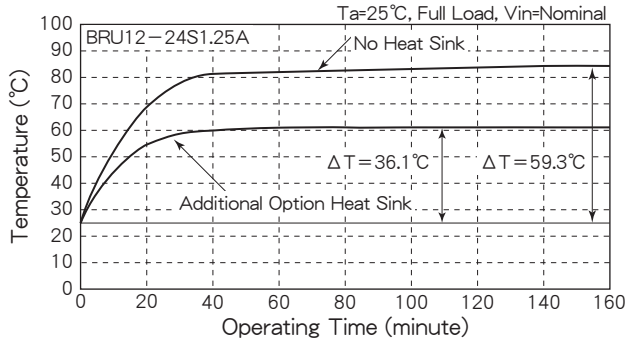


Fig. 4 Efficiency vs. Output Current

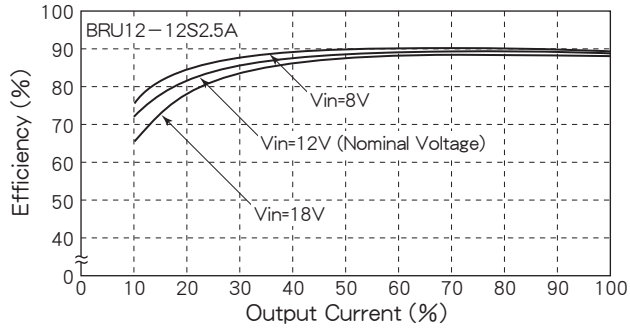


Fig. 5 Efficiency vs. Output Current

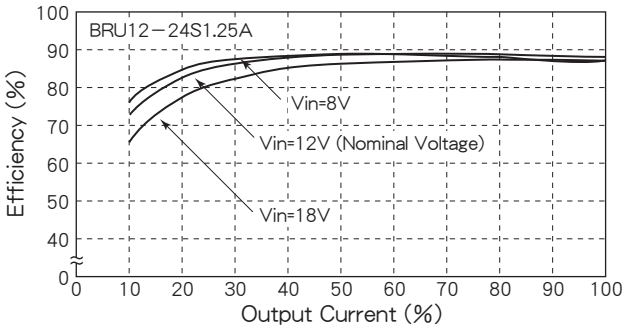


Fig. 6 Efficiency vs. Output Current

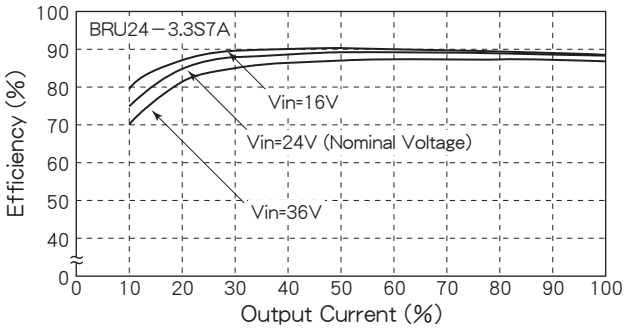


Fig. 7 Efficiency vs. Output Current

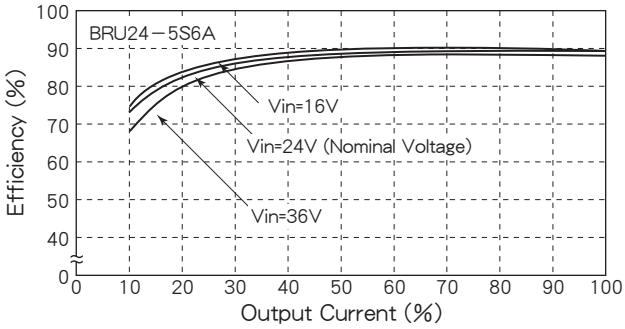


Fig. 8 Efficiency vs. Output Current

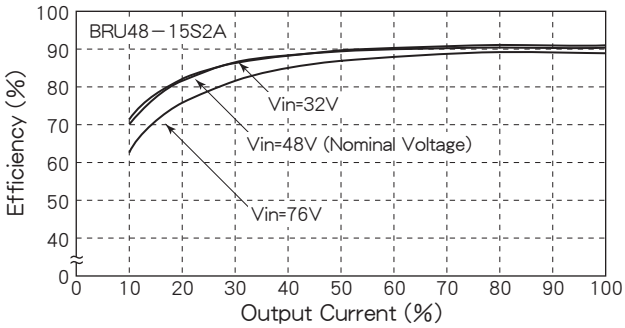
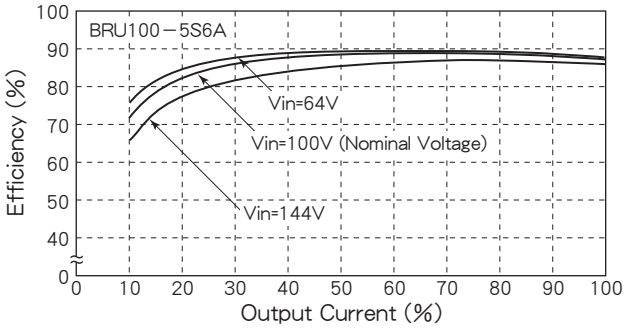


Fig. 9 Efficiency vs. Output Current



BPU SERIES

20～50W DC/DC CONVERTERS
Single Output & Dual Outputs

H8.5×W50×L75 (mm)

■ Features

- ●Low Profile 8.5mm
- ●6 Sided Metal Shielding
- ●Built-in Input Filter
- ●Wide Input Voltage Range
- ●Input-Output Isolation
- ●Adjustable Output Volt. ±5%
- ●High Efficiency 81～90%
- ●Remote ON/OFF Control
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection 115～140% Operation
- ●Thermal Protection +110℃～+120℃
- ●Operating Ambient Temperature −40℃～+85℃
- ●Max. Case Temperature +105℃
- ●High Reliability
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

- ●薄型 8.5mm
- ●６面メタルシールド
- ●入力フィルタ内蔵
- ●広範囲な入力電圧
- ●入出力間絶縁
- ●可変出力電圧 ±5%
- ●高効率 81～90%
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵 115～140% 動作
- ●過熱保護回路内蔵 +110℃～+120℃
- ●動作周囲温度 −40℃～+85℃
- ●最大ケース温度 +105℃
- ●高信頼性
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

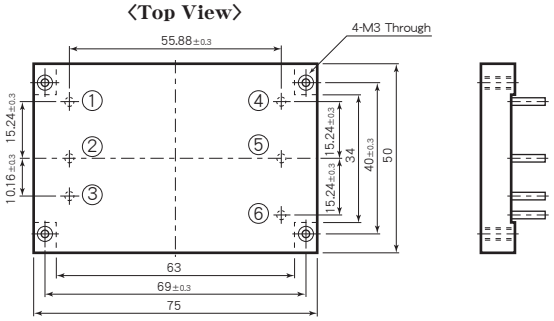
■ General Characteristics

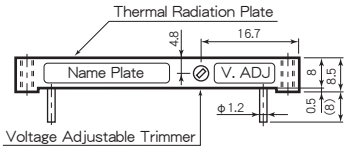
(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±5% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	Single : ±0.5% max. (0～100% Load) Dual : ±3% max. (10～100% Load)
●Reflected Input Ripple, Noise	(3% Vin)Vp-p max.
●Output Ripple	40mVp-p max.
●Output Noise	100mVp-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between pin ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
●Max. Case Temperature	+105℃
●Storage Temperature	−40℃～+115℃
●Isolation Voltage	AC1500V 1 min. AC2000V 1 min. (100V Vin only) (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 100g max. Heat Sink : 55g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	6 Sided Aluminum Case
●Soldering Conditions	
Soldering DIP	260℃, for 15 seconds max.
Soldering iron	360℃, for 5 seconds max.
●MTBF	Single : 500,000H Dual : 600,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Pin Outs & Dimensions (±0.5mm)

〈Top View〉

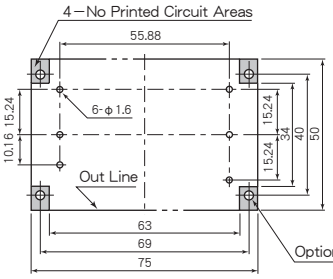




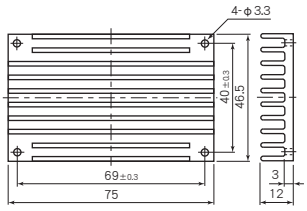
Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	0 Vdc in	②	0 Vdc in
③	ON/OFF Control	③	ON/OFF Control
④	+Vdc out	④	+Vdc out
⑤	0 Vdc out	⑤	Common
⑥	No Connection	⑥	−Vdc out

■ Holes on PCB (Top View)



■ Option Heat Sink



＊Option Heat Sink Model : A4-3079

■ Selection Guide

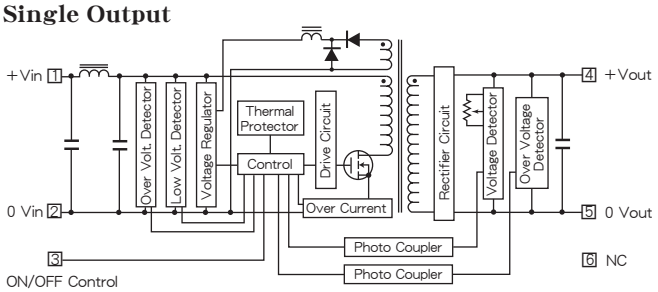
Table 1

Model Number	Input Voltage (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%) 30% Load	Efficiency (typ.) (%) 80% Load
BPU12−3.3S 12A	12 (8～18)	3.3	12	87	85
BPU12− 5S 10A		5	10	86	89
BPU12− 6S 8.4A		6	8.4	87	87
BPU12−12S 4.2A		12	4.2	84	88
BPU12−15S 3.3A		15	3.3	83	88
BPU12−24S 2.1A		24	2.1	83	88
BPU12−3.3D 3A		±3.3	±3	80	81
BPU12− 5D 3A		±5	±3	80	82
BPU12−12D 1.5A		±12	±1.5	81	83
BPU12−15D 1.2A		±15	±1.2	81	84
BPU24−3.3S 12A	24 (16～36)	3.3	12	84	85
BPU24− 5S 10A		5	10	85	88
BPU24− 6S 8.4A		6	8.4	87	89
BPU24−12S 4.2A		12	4.2	84	89
BPU24−15S 3.3A		15	3.3	85	89
BPU24−24S 2.1A		24	2.1	84	89
BPU24−3.3D 3A		±3.3	±3	80	81
BPU24− 5D 3A		±5	±3	80	82
BPU24−12D 1.5A		±12	±1.5	81	84
BPU24−15D 1.2A		±15	±1.2	82	85
BPU48−3.3S 12A	48 (32～72)	3.3	12	85	86
BPU48− 5S 10A		5	10	85	88
BPU48− 6S 8.4A		6	8.4	85	88
BPU48−12S 4.2A		12	4.2	85	88
BPU48−15S 3.3A		15	3.3	85	90
BPU48−24S 2.1A		24	2.1	85	90
BPU48−3.3D 3A		±3.3	±3	80	81
BPU48− 5D 3A		±5	±3	80	82
BPU48−12D 1.5A		±12	±1.5	81	84
BPU48−15D 1.2A		±15	±1.2	82	85
BPU100−3.3S 12A	100 (64～144)	3.3	12	84	87
BPU100− 5S 10A		5	10	86	89
BPU100− 6S 8.4A		6	8.4	84	89
BPU100−12S 4.2A		12	4.2	85	90
BPU100−15S 3.3A		15	3.3	85	90
BPU100−24S 2.1A		24	2.1	85	90
BPU100−3.3D 3A		±3.3	±3	80	81
BPU100− 5D 3A		±5	±3	80	82
BPU100−12D 1.5A		±12	±1.5	81	84
BPU100−15D 1.2A		±15	±1.2	82	85

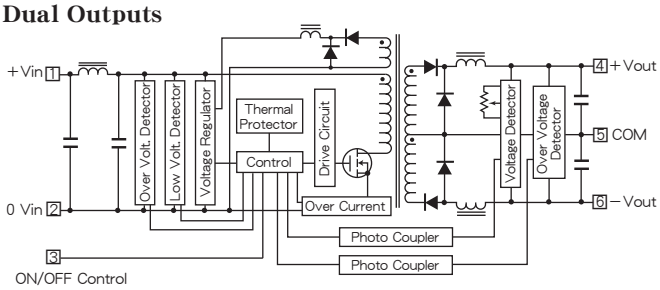
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

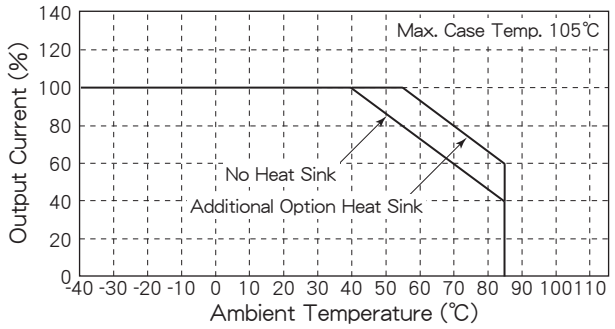


Fig. 2 Short Circuit Operating Area

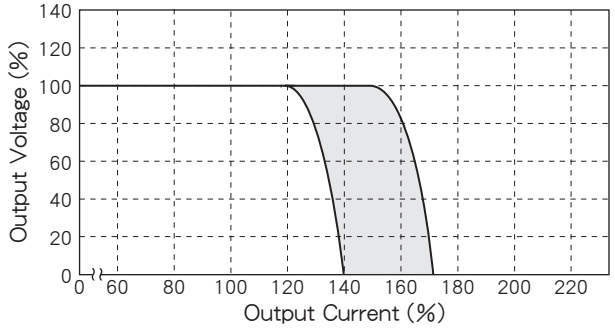


Fig. 3 Temperature Characteristic on Case Surface

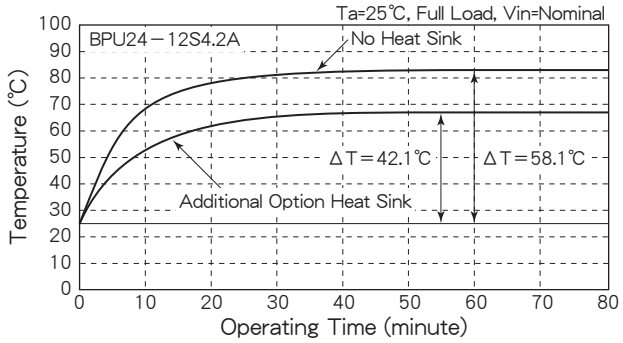


Fig. 4 Efficiency vs. Output Current

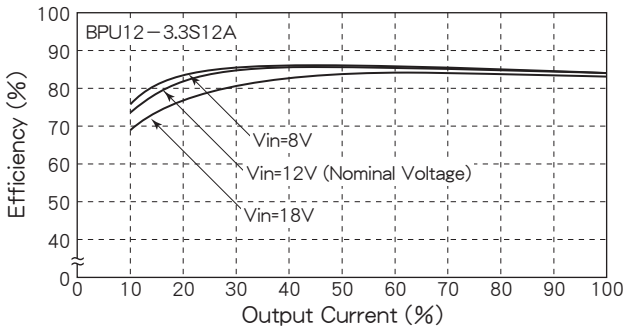


Fig. 5 Efficiency vs. Output Current

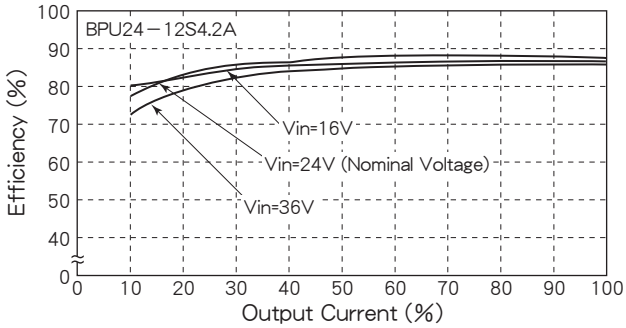


Fig. 6 Efficiency vs. Output Current

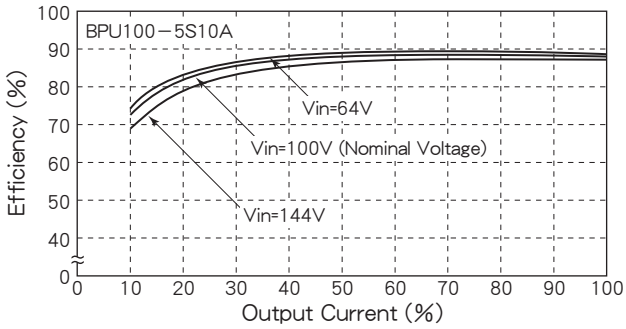


Fig. 7 Efficiency vs. Output Current

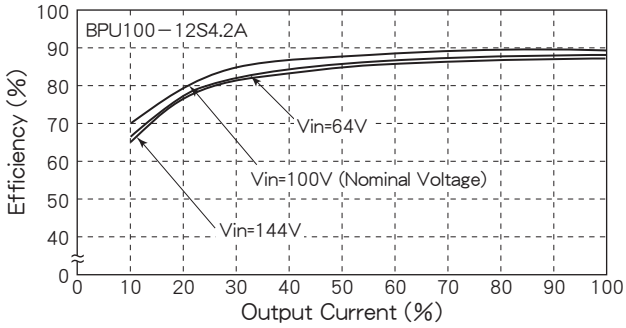
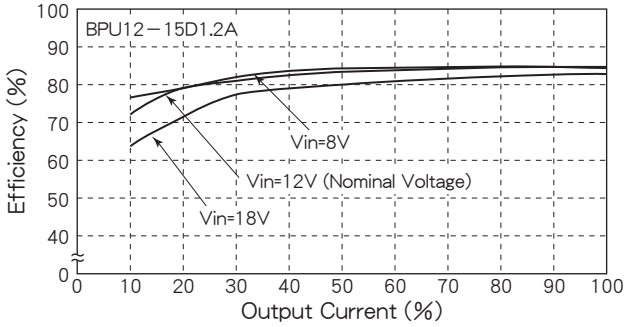
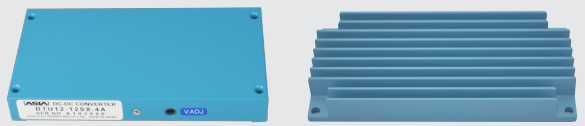


Fig. 8 Efficiency vs. Output Current



BTU SERIES

80～100W DC/DC CONVERTERS Single Output



H12.8×W50×L98 (mm)

■ Features

- ●Low Profile 12.8mm
- ●Built-in Input Filter
- ●Input-Output Isolation
- ●High Efficiency 88～91%
- ●Wide Input Voltage Range
- ●High Reliability
- ●6 Sided Metal Shielding
- ●Remote ON/OFF Control
- ●Adjustable Output Voltage ±5%
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection 115～140% Operation
- ●Thermal Protection +110℃～+120℃
- ●Operating Ambient Temperature −40℃～+85℃
- ●Max. Case Temperature +105℃
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

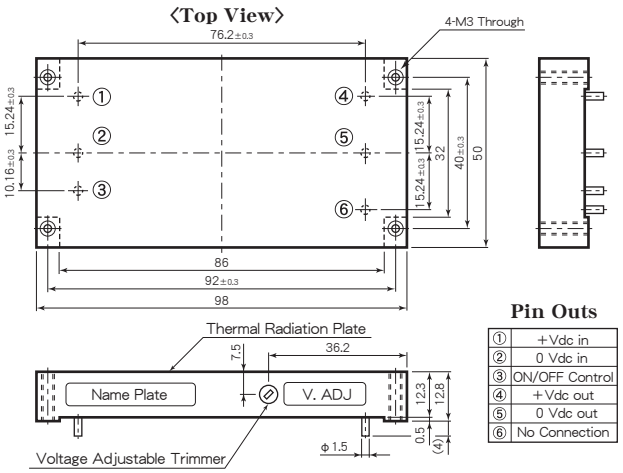
- ●薄型 12.8mm
- ●入力フィルタ内蔵
- ●入出力間絶縁
- ●高効率 88～91%
- ●広範囲な入力電圧
- ●高信頼性
- ●６面メタルシールド
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●可変出力電圧 ±5%
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵 115～140% 動作
- ●過熱保護回路内蔵 +110℃～+120℃
- ●動作周囲温度 −40℃～+85℃
- ●最大ケース温度 105℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±5% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	±0.5% max. (0～100% Load)
●Reflected Input Ripple, Noise	(3% Vin)Vp-p max.
●Output Ripple	40mVp-p max.
●Output Noise	100mVp-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between pin ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
●Max. Case Temperature	+105℃
●Storage Temperature	−55℃～+125℃
●Isolation Voltage	AC1500V 1 min. AC2000V 1 min. (100V Vin only) (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 170g max. Heat Sink : 73g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	6 Sided Aluminum Case
●Soldering Conditions	
Soldering DIP	260℃, for 15 seconds max.
Soldering iron	360℃, for 5 seconds max.
●MTBF	400,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

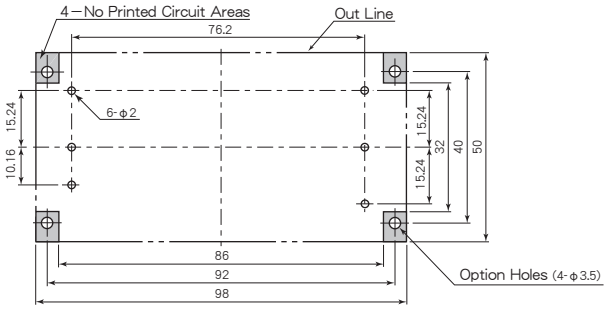
■ Pin Outs & Dimensions (±0.5mm)



Pin Outs

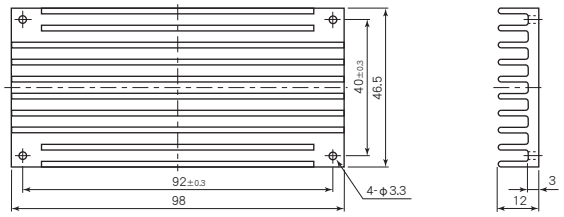
①	+Vdc in
②	0 Vdc in
③	ON/OFF Control
④	+Vdc out
⑤	0 Vdc out
⑥	No Connection

■ Holes on PCB (Top View)



■ Option Heat Sink

＊Option Heat Sink Model : A3-7292



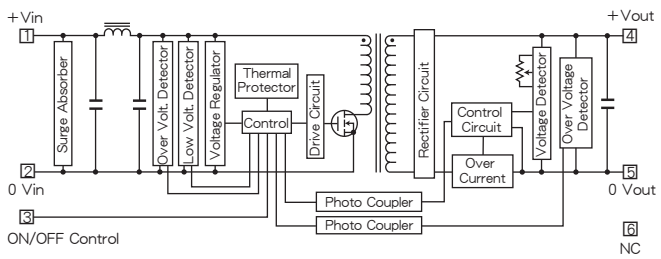
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	80% Load
BTU 12− 3.3S 24A	12 (8～18)	3.3	24	88	88
BTU 12− 5S 20A		5	20	87	89
BTU 12− 6S16.7A		6	16.7	87	89
BTU 12− 12S 8.4A		12	8.4	87	89
BTU 12− 15S 6.7A		15	6.7	86	89
BTU 12− 24S 4.2A		24	4.2	85	89
BTU 24− 3.3S 24A	24 (16～36)	3.3	24	88	88
BTU 24− 5S 20A		5	20	88	90
BTU 24− 6S16.7A		6	16.7	88	90
BTU 24− 12S 8.4A		12	8.4	86	90
BTU 24− 15S 6.7A		15	6.7	86	90
BTU 24− 24S 4.2A		24	4.2	86	90
BTU 48− 3.3S 24A	48 (32～72)	3.3	24	87	88
BTU 48− 5S 20A		5	20	87	90
BTU 48− 6S16.7A		6	16.7	87	90
BTU 48− 12S 8.4A		12	8.4	87	91
BTU 48− 15S 6.7A		15	6.7	86	91
BTU 48− 24S 4.2A		24	4.2	86	91
BTU100− 3.3S 24A	100 (64～144)	3.3	24	85	88
BTU100− 5S 20A		5	20	86	90
BTU100− 6S16.7A		6	16.7	86	90
BTU100− 12S 8.4A		12	8.4	86	91
BTU100− 15S 6.7A		15	6.7	86	91
BTU100− 24S 4.2A		24	4.2	86	89

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

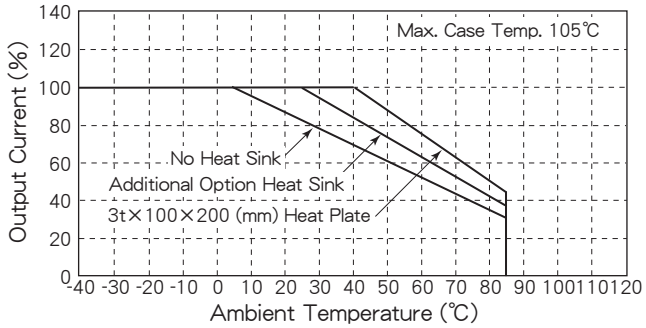


Fig. 2 Short Circuit Operating Area

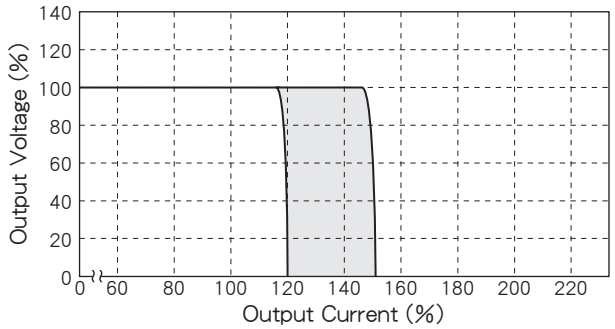


Fig. 3 Temperature Characteristic on Case Surface

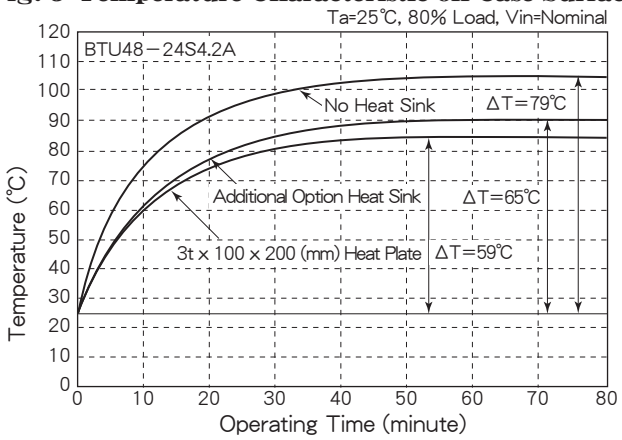


Fig. 4 Efficiency vs. Output Current

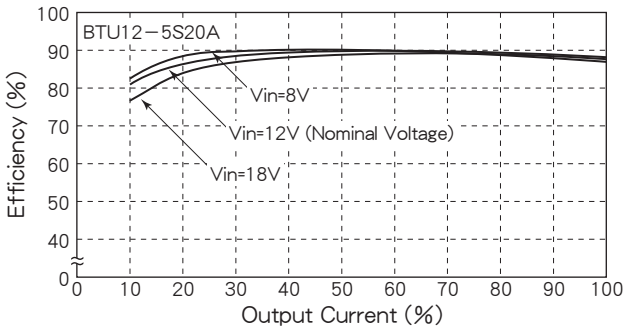


Fig. 5 Efficiency vs. Output Current

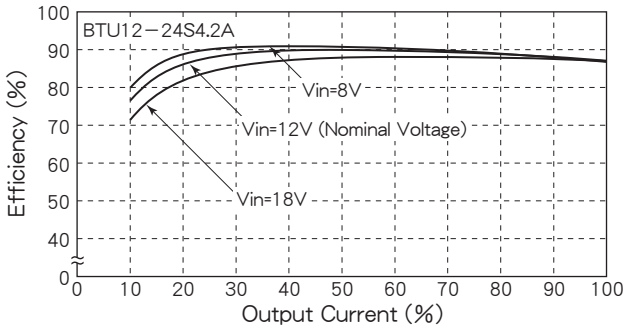


Fig. 6 Efficiency vs. Output Current

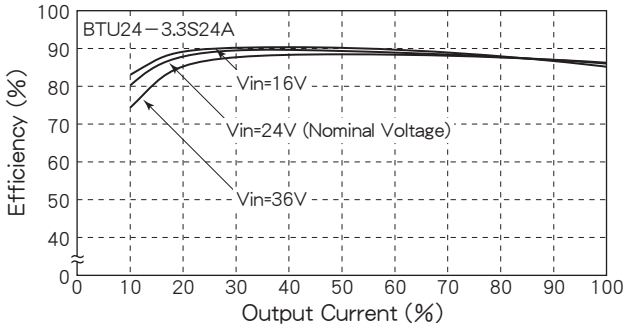


Fig. 7 Efficiency vs. Output Current

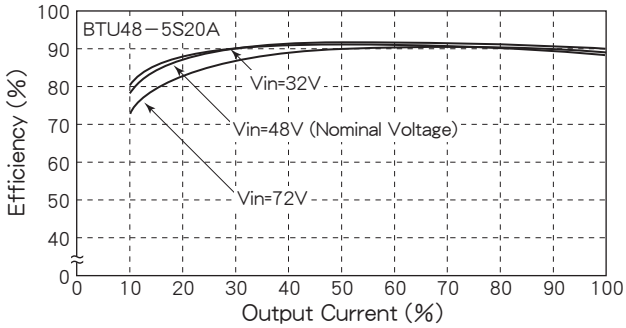
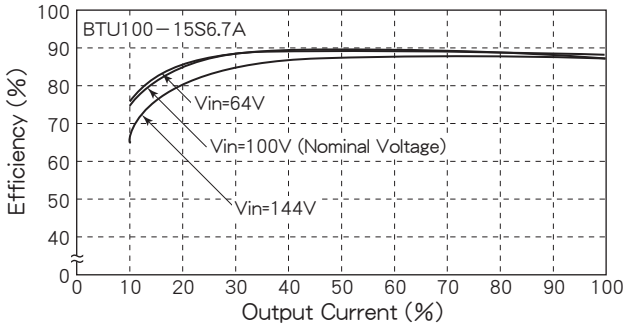


Fig. 8 Efficiency vs. Output Current

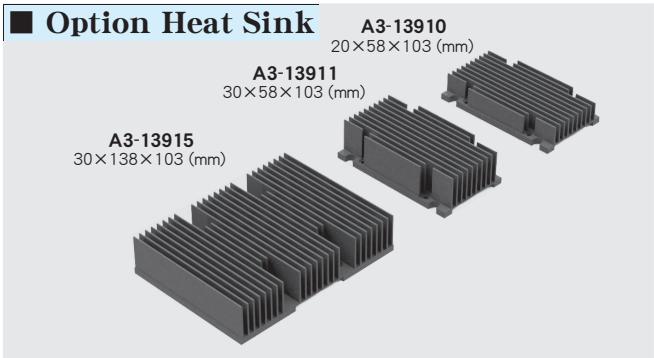


KMP SERIES

105～200W DC/DC CONVERTERS Single Output

H20×W60×L105 (mm)

■ Option Heat Sink



■ Features

- ●Built-in Input Filter ●入力フィルタ内蔵
- ●Input-Output Isolation ●入出力間絶縁
- ●High Efficiency 87～91% ●高効率 87～91%
- ●Wide Input Voltage Range ●広範囲な入力電圧
- ●High Reliability ●高信頼性
- ●6 Sided Metal Shielding ●6面メタルシールド
- ●Adjustable Output Volt. ±8% ●可変出力電圧 ±8%
- ●Input Low Voltage Protection ●入力低電圧保護回路内蔵
- ●Input Over Voltage Protection ●入力過電圧保護回路内蔵
- ●Output Over Voltage Protection ●出力過電圧保護回路内蔵
- ●Thermal Protection +110℃～+120℃ ●過熱保護回路内蔵 +110℃～+120℃
- ●Remote ON/OFF Control ●リモートON/OFFコントロール
- ●Operating Ambient Temperature −40℃～+85℃ ●動作周囲温度 −40℃～+85℃
- ●Conformity to RoHS2 Directive ●RoHS2指令対応
- ●Not built-in aluminum and tantalum electrolytic capacitor ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100, 140V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Accuracy	±2% ±3% (3.3, 5, 6V Vout only)
●Output Voltage Range	±8% Adjustable (Used trimmer)
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	±1% max. ±1.5% max. (3.3, 5, 6V Vout only) (0～100% Load)
●Reflected Input Ripple, Noise	(5% Vin)Vp-p max.
●Output Ripple	80mVp-p max.
●Output Noise	(0.5% Vout+100mV)p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 5)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between pin ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
●Max. Case Temperature	+105℃
●Storage Temperature	−55℃～+125℃
●Isolation Voltage	AC2000V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 300g max. Heat Sink A3-13910 : 135g max. A3-13911 : 175g max. A3-13915 : 425g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●Soldering Conditions	
Soldering DIP	260℃, for 15 seconds max.
Soldering iron	360℃, for 5 seconds max.
●MTBF	400,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

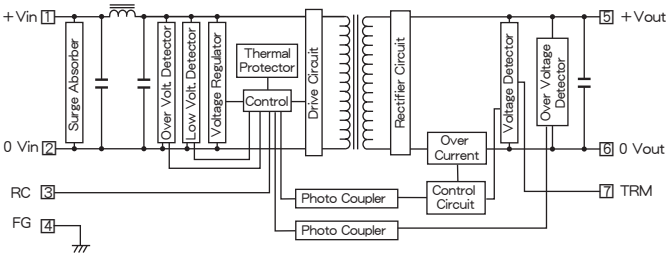
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	50% Load	80% Load
KMP12 − 3.3S 32A	12 (8～18) at 50% Load (9～18) at 100% Load	3.3	32	85	88	87
KMP12 − 5S 28A		5	28	86	90	88
KMP12 − 6S23.3A		6	23.3	86	90	88
KMP12 − 12S13.4A		12	13.4	87	90	89
KMP12 − 13.8S11.6A		13.8	11.6	87	90	89
KMP12 − 15S10.7A		15	10.7	87	90	89
KMP12 − 24S 6.7A		24	6.7	87	90	89
KMP12 − 28S 5.8A		28	5.8	87	90	89
KMP12 − 48S 3.4A		48	3.4	87	90	89
KMP24 − 3.3S 40A	24 (16～36)	3.3	40	88	91	90
KMP24 − 5S 32A		5	32	90	92	91
KMP24 − 6S26.6A		6	26.6	90	92	91
KMP24 − 12S16.7A		12	16.7	90	92	91
KMP24 − 13.8S14.5A		13.8	14.5	90	92	91
KMP24 − 15S13.4A		15	13.4	90	92	91
KMP24 − 24S 8.4A		24	8.4	90	92	91
KMP24 − 28S 7.2A		28	7.2	90	92	91
KMP24 − 48S 4.2A		48	4.2	90	92	91
KMP48 − 3.3S 40A	48 (36～76)	3.3	40	88	91	90
KMP48 − 5S 32A		5	32	91	92	91
KMP48 − 6S26.6A		6	26.6	91	92	91
KMP48 − 12S16.7A		12	16.7	91	92	91
KMP48 − 13.8S14.5A		13.8	14.5	91	92	91
KMP48 − 15S13.4A		15	13.4	91	92	91
KMP48 − 24S 8.4A		24	8.4	91	92	91
KMP48 − 28S 7.2A		28	7.2	91	92	91
KMP48 − 48S 4.2A		48	4.2	91	92	91
KMP100− 3.3S 40A	100 (64～144)	3.3	40	85	91	90
KMP100− 5S 32A		5	32	87	92	91
KMP100− 6S26.6A		6	26.6	87	92	91
KMP100− 12S16.7A		12	16.7	87	92	91
KMP100− 13.8S14.5A		13.8	14.5	87	92	91
KMP100− 15S13.4A		15	13.4	87	92	91
KMP100− 24S 8.4A		24	8.4	87	92	91
KMP100− 28S 7.2A		28	7.2	87	92	91
KMP100− 48S 4.2A		48	4.2	87	92	91
KMP140− 3.3S 40A	140 (90～200)	3.3	40	85	91	90
KMP140− 5S 32A		5	32	87	92	91
KMP140− 6S26.6A		6	26.6	87	92	91
KMP140− 12S16.7A		12	16.7	87	92	91
KMP140− 13.8S14.5A		13.8	14.5	87	92	91
KMP140− 15S13.4A		15	13.4	87	92	91
KMP140− 24S 8.4A		24	8.4	87	92	91
KMP140− 28S 7.2A		28	7.2	87	92	91
KMP140− 48S 4.2A		48	4.2	87	92	91

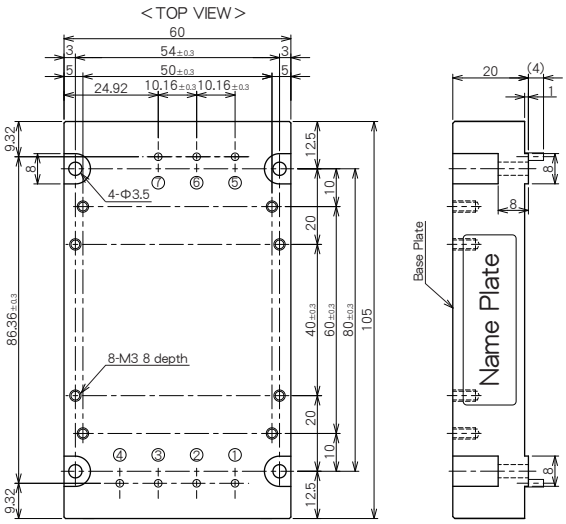
＊上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

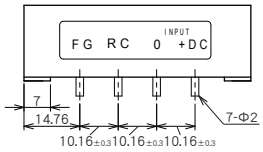
■ Block Diagram



KMP SERIES DATA SHEET

■ Pin Outs & Dimensions (±0.5mm)



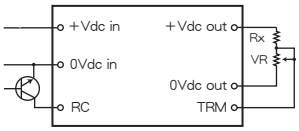


Pin Outs

①	+Vdc in
②	0 Vdc in
③	RC
④	FG
⑤	+Vdc out
⑥	0 Vdc out
⑦	TRM

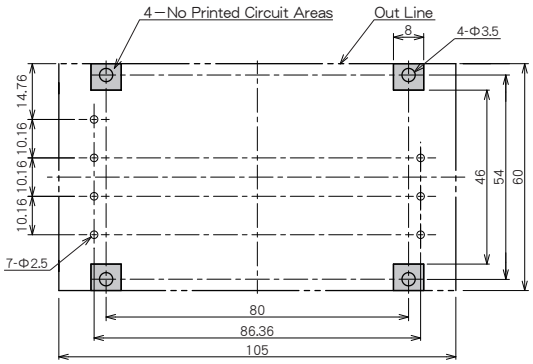
Application

ON/OFF Control and Vout Adjustment



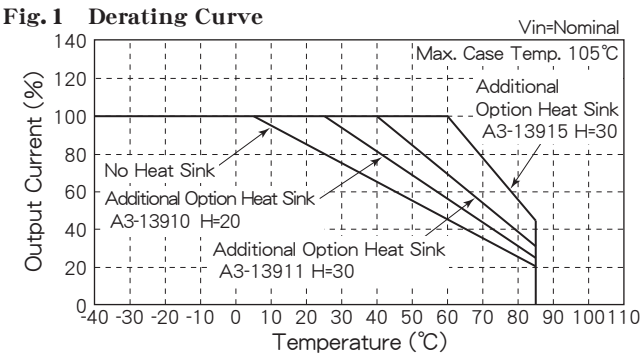
Vout (V)	3.3V	5V	6V	12V	13.8V	15V	24V	28V	48V
VR (Ω)	50k	50k	50k	50k	50k	50k	50k	50k	50k
Rx (Ω)	6.2k	3k	6.8k	13k	16k	20k	39k	51k	150k

■ Holes on PCB (Top View)



■ Characteristic Curves

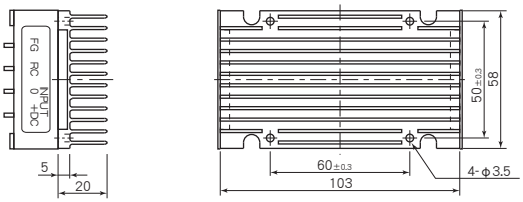
Fig. 1 Derating Curve



■ Option Heat Sink

Fig. 2 Temperature Characteristic on Case Surface

＊Option Heat Sink Model : A3-13910



KMP24-12S16.7A Additonal Heat Sink A3-13910
Ta=25℃, 100% Load, Vin=Nominal

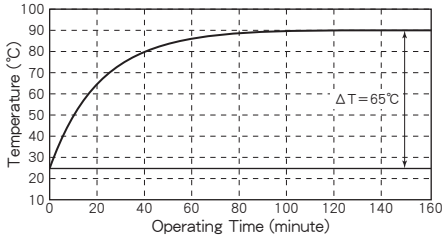
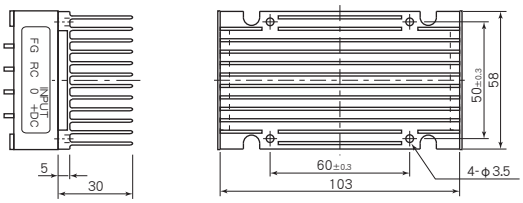


Fig. 3 Temperature Characteristic on Case Surface

＊Option Heat Sink Model : A3-13911



KMP24-12S16.7A Additonal Heat Sink A3-13911
Ta=25℃, 100% Load, Vin=Nominal

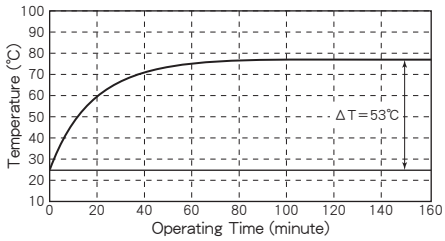
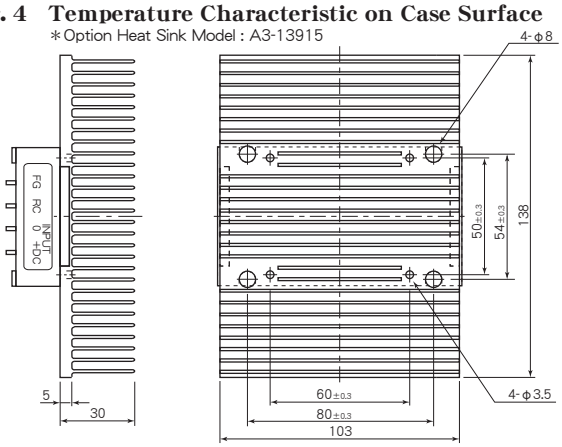


Fig. 4 Temperature Characteristic on Case Surface

＊Option Heat Sink Model : A3-13915



KMP24-12S16.7A Additonal Heat Sink A3-13915
Ta=25℃, 100% Load, Vin=Nominal

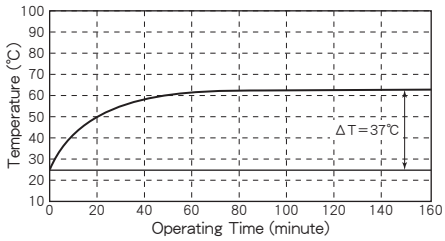


Fig. 5 Short Circuit Operating Area

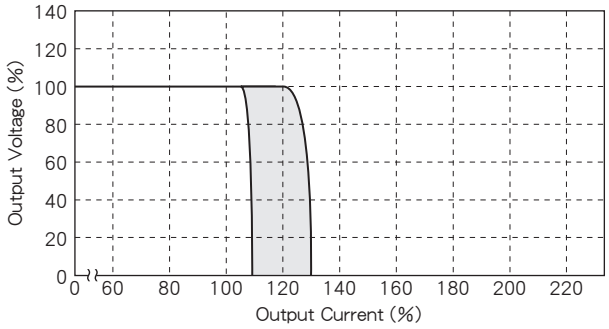


Fig. 6 Efficiency vs. Output Current

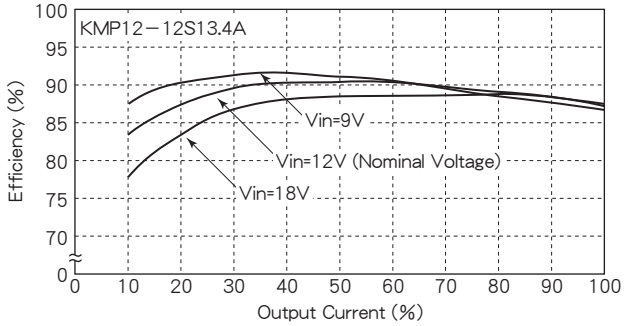


Fig. 7 Efficiency vs. Output Current

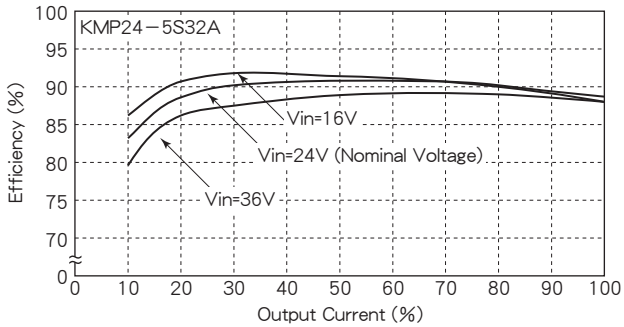


Fig. 8 Efficiency vs. Output Current

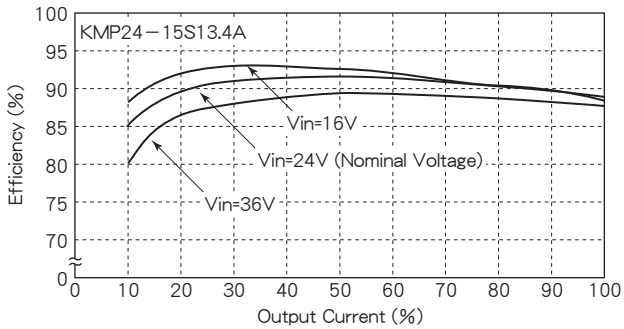


Fig. 9 Efficiency vs. Output Current

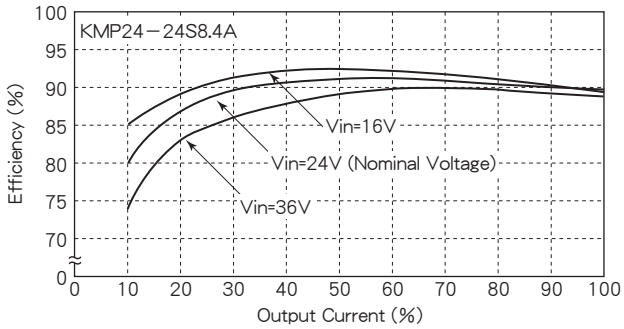


Fig. 10 Efficiency vs. Output Current

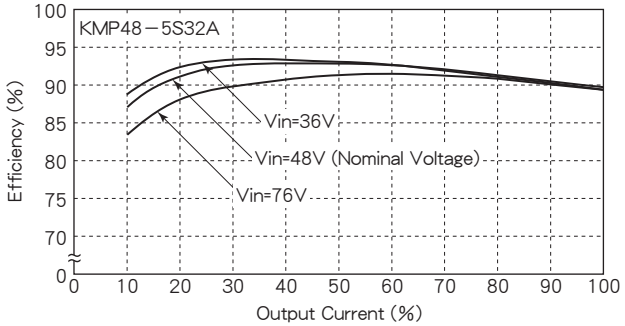


Fig. 11 Efficiency vs. Output Current

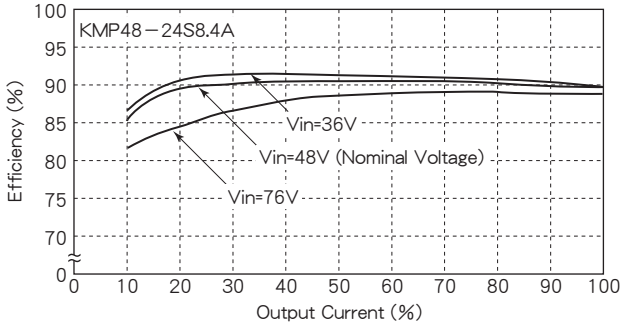
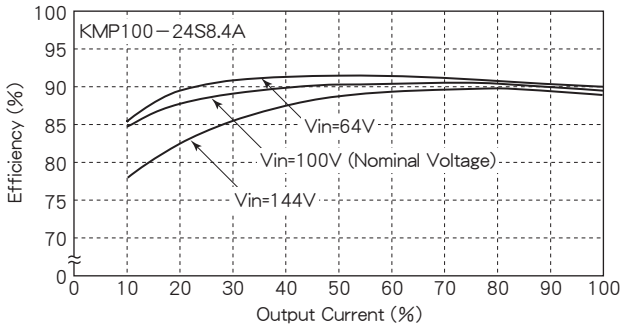
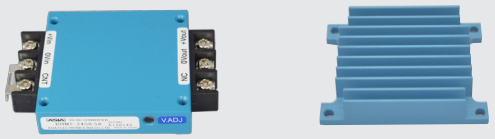


Fig. 12 Efficiency vs. Output Current



BHM SERIES

7～15W DC/DC CONVERTERS
Single Output & Dual Outputs



H12.8×W50×L75 (mm)

■ Features

- ●Low Profile 12.8mm
- ●Built-in Input Filter
- ●Input-Output Isolation
- ●High Efficiency 77～88%
- ●Wide Input Voltage Range
- ●High Reliability
- ●6 Sided Metal Shielding
- ●Remote ON/OFF Control
- ●Adjustable Output Volt. ±5%
- ●Output Over Voltage Protection 115～140% Operation
- ●Operating Ambient Temperature −40℃～+85℃
- ●Max. Case Temperature +105℃
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

- ●薄型 12.8mm
- ●入力フィルタ内蔵
- ●入出力間絶縁
- ●高効率 77～88%
- ●広範囲な入力電圧
- ●高信頼性
- ●６面メタルシールド
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●可変出力電圧 ±5%
- ●出力過電圧保護回路内蔵 115～140% 動作
- ●動作周囲温度 −40℃～+85℃
- ●最大ケース温度 +105℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

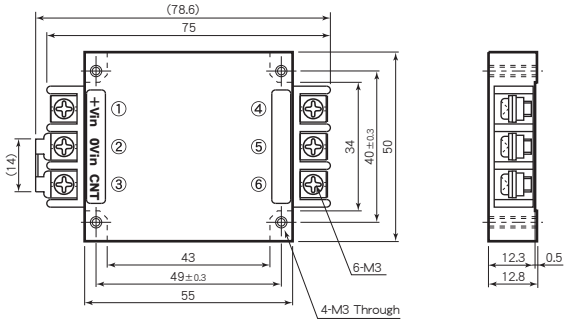
■ General Characteristics

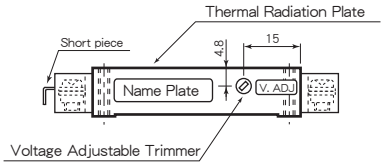
(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC5, 12, 24, 48V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±5% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	Single : ±0.5% max. (0～100% Load) Dual : ±3% max. (10～100% Load)
●Reflected Input Ripple, Noise	(3% Vin) Vp-p max.
●Output Ripple	40mVp-p max. 100mVp-p max. (48V Vout only)
●Output Noise	100mVp-p max. 200mVp-p max. (48V Vout only)
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between terminal ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1) −30℃～+85℃ (5V Vin only)
●Max. Case Temperature	+105℃
●Storage Temperature	−40℃～+115℃
●Isolation Voltage	AC1500V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 100g max. Heat Sink : 40g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	6 Sided Aluminum Case
●MTBF	Single : 1,000,000H Dual : 700,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

〈Top View〉

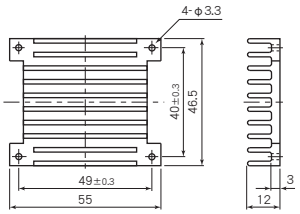




Terminal Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	0 Vdc in	②	0 Vdc in
③	ON/OFF Control	③	ON/OFF Control
④	+Vdc out	④	+Vdc out
⑤	0 Vdc out	⑤	Common
⑥	No Connection	⑥	−Vdc out

■ Option Heat Sink



＊Option Heat Sink Model : A3-13988

■ Selection Guide

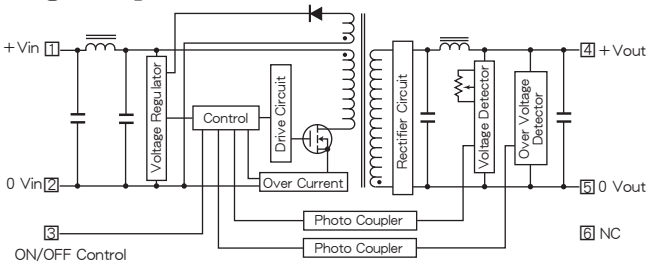
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
BHM 5 −3.3 S 2 A	5 (4.5～9)	3.3	2	83
BHM 5 − 5 S 2 A		5	2	82
BHM 5 − 6 S 1.8 A		6	1.8	82
BHM 5 −12 S 1 A		12	1	84
BHM 5 −15 S 0.8 A		15	0.8	83
BHM 5 −24 S 0.5 A		24	0.5	83
BHM 5 −28 S 0.4 A		28	0.4	83
BHM 5 − 5 D 1 A		±5	±1	77
BHM 5 −12 D 0.5 A		±12	±0.5	81
BHM 5 −15 D 0.4 A		±15	±0.4	81
BHM12 −3.3 S 2.4 A	12 (8～18)	3.3	2.4	83
BHM12 − 5 S 2.4 A		5	2.4	85
BHM12 − 6 S 2.2 A		6	2.2	85
BHM12 −12 S 1.3 A		12	1.3	85
BHM12 −15 S 1 A		15	1	85
BHM12 −24 S 0.65 A		24	0.65	85
BHM12 −28 S 0.5 A		28	0.5	85
BHM12 −48 S 0.3 A		48	0.3	85
BHM12 − 5 D 1.2 A		±5	±1.2	78
BHM12 −12 D 0.65 A		±12	±0.65	83
BHM12 −15 D 0.5 A		±15	±0.5	83
BHM24 −3.3 S 2.4 A	24 (16～36)	3.3	2.4	84
BHM24 − 5 S 2.4 A		5	2.4	86
BHM24 − 6 S 2.2 A		6	2.2	86
BHM24 −12 S 1.3 A		12	1.3	86
BHM24 −15 S 1 A		15	1	86
BHM24 −24 S 0.65 A		24	0.65	86
BHM24 −28 S 0.5 A		28	0.5	86
BHM24 −48 S 0.3 A		48	0.3	85
BHM24 − 5 D 1.2 A		±5	±1.2	78
BHM24 −12 D 0.65 A		±12	±0.65	83
BHM24 −15 D 0.5 A		±15	±0.5	83
BHM48 −3.3 S 2.4 A	48 (32～76)	3.3	2.4	83
BHM48 − 5 S 2.4 A		5	2.4	86
BHM48 − 6 S 2.2 A		6	2.2	86
BHM48 −12 S 1.3 A		12	1.3	88
BHM48 −15 S 1 A		15	1	88
BHM48 −24 S 0.65 A		24	0.65	86
BHM48 −28 S 0.5 A		28	0.5	86
BHM48 − 5 D 1.2 A		±5	±1.2	80
BHM48 −12 D 0.65 A		±12	±0.65	85
BHM48 −15 D 0.5 A		±15	±0.5	85

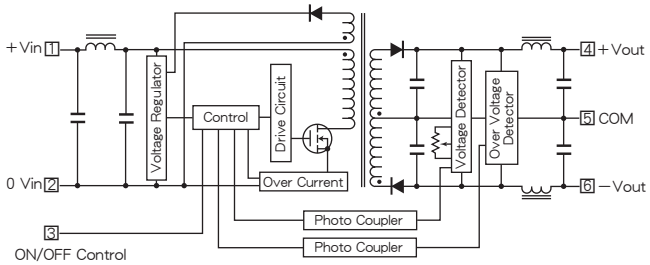
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

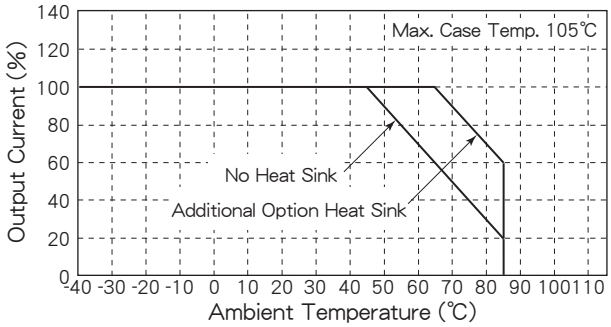


Fig. 2 Short Circuit Operating Area

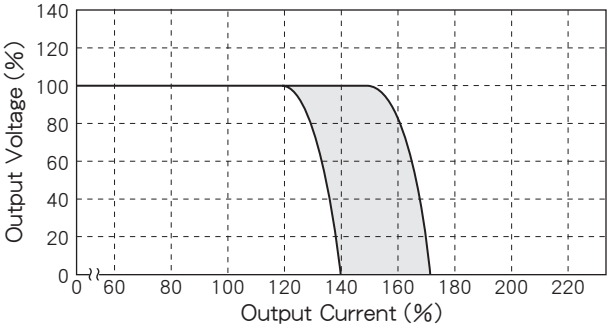


Fig. 3 Temperature Characteristic on Case Surface

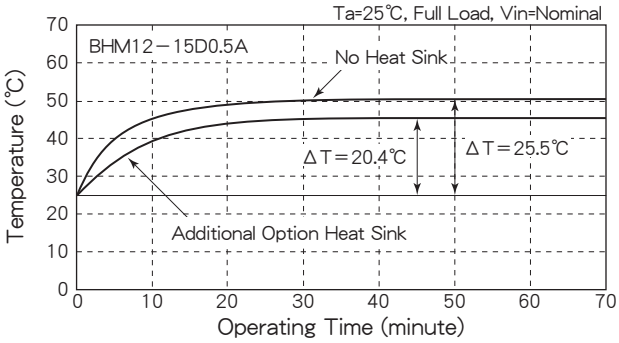


Fig. 4 Efficiency vs. Output Current

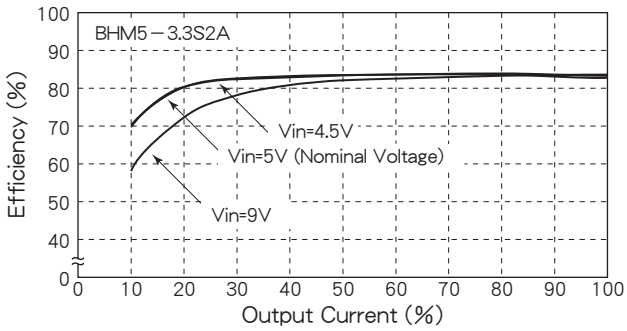


Fig. 5 Efficiency vs. Output Current

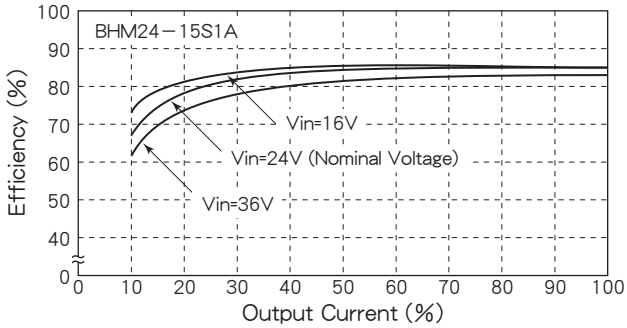


Fig. 6 Efficiency vs. Output Current

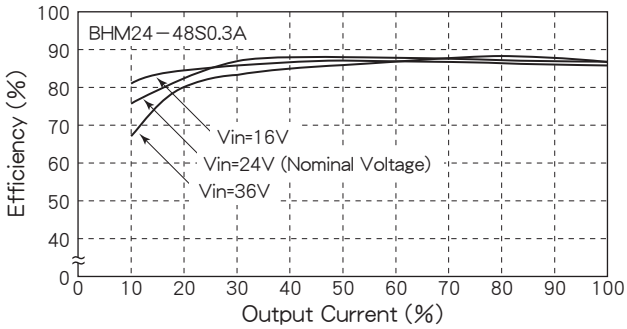


Fig. 7 Efficiency vs. Output Current

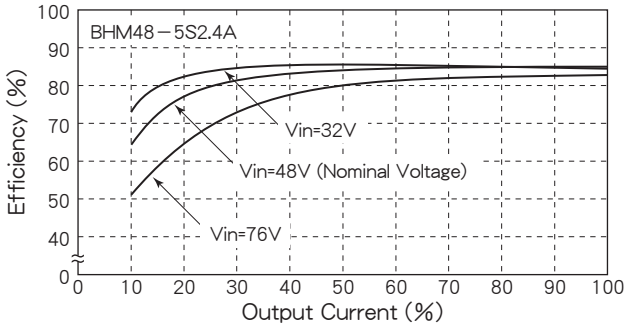
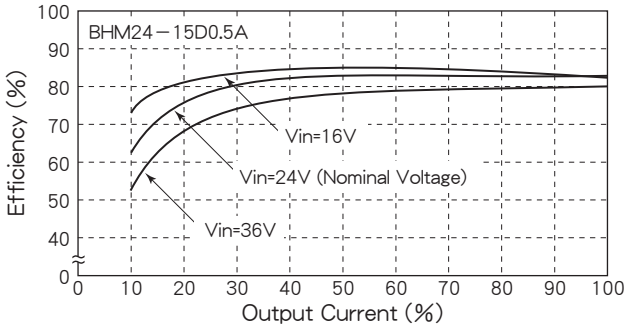


Fig. 8 Efficiency vs. Output Current

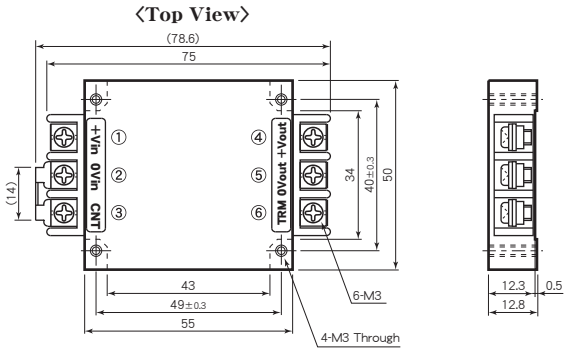


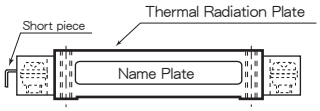
BRM SERIES

23～30W DC/DC CONVERTERS Single Output

H12.8×W50×L75 (mm)

■ Terminal Outs & Dimensions (±0.5mm)



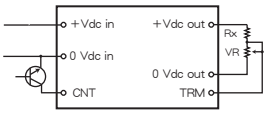


Terminal Outs

①	+Vdc in
②	0 Vdc in
③	ON/OFF Control
④	+Vdc out
⑤	0 Vdc out
⑥	TRM

Application

ON/OFF Control and Vout Adjustment



Vout (V)	3.3V	5V	6V	12V	15V	24V	28V	48V
VR (Ω)	50k	50k	50k	50k	50k	50k	50k	50k
Rx (Ω)	10k	33k	47k	47k	62k	110k	130k	220k

■ Features

- ●Low Profile 12.8mm
- ●Built-in Input Filter
- ●Input-Output Isolation (AC2000V)
- ●High Efficiency 87～90%
- ●Wide Input Voltage Range
- ●High Reliability
- ●6 Sided Metal Shielding
- ●Remote ON/OFF Control
- ●Adjustable Output Volt. ±5%
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection 115～140% Operation
- ●Thermal Protection +110℃～+120℃
- ●Operating Ambient Temperature −40℃～+85℃
- ●Max. Case Temperature +105℃
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

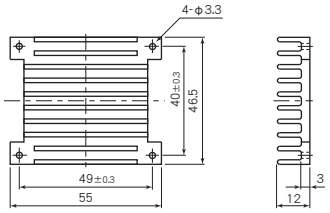
- ●薄型 12.8mm
- ●入力フィルタ内蔵
- ●入出力間絶縁 (AC2000V)
- ●高効率 87～90%
- ●広範囲な入力電圧
- ●高信頼性
- ●６面メタルシールド
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●可変出力電圧 ±5%
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵 115～140% 動作
- ●過熱保護回路内蔵 +110℃～+120℃
- ●動作周囲温度 −40℃～+85℃
- ●最大ケース温度 +105℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48,100V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Accuracy	±2% ±3% (3.3, 5, 6V Vout only)
●Output Voltage Range	±5% Adjustable (Used trimmer)
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	±0.5% max. (0～100% Load)
●Reflected Input Ripple, Noise	(3% Vin) Vp-p max.
●Output Ripple	40mVp-p max. 100mVp-p max. (48V Vout only)
●Output Noise	100mVp-p max. 200mVp-p max. (48V Vout only)
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between terminal ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
●Max. Case Temperature	+105℃
●Storage Temperature	−50℃～+115℃
●Isolation Voltage	AC2000V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 100g max. Heat Sink : 40g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	6 Sided Aluminum Case
●MTBF	500,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Option Heat Sink



＊Option Heat Sink Model : A3-13988

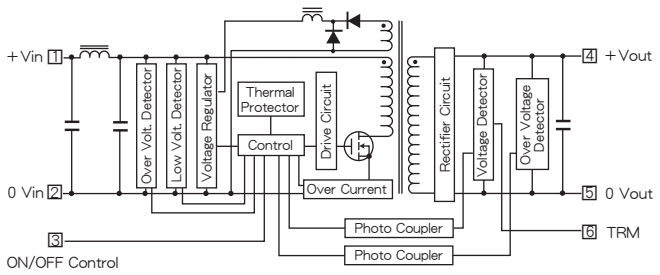
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	80% Load
BRM12−3.3S 7A	12 (8～18)	3.3	7	84	87
BRM12− 5S 6A		5	6	84	90
BRM12− 6S 5A		6	5	84	90
BRM12−12S 2.5A		12	2.5	84	90
BRM12−15S 2A		15	2	84	90
BRM12−24S 1.25A		24	1.25	84	90
BRM12−28S 1.07A		28	1.07	84	90
BRM12−48S 0.6A		48	0.6	84	90
BRM24−3.3S 7A	24 (16～36)	3.3	7	84	87
BRM24− 5S 6A		5	6	84	90
BRM24− 6S 5A		6	5	84	90
BRM24−12S 2.5A		12	2.5	84	90
BRM24−15S 2A		15	2	84	90
BRM24−24S 1.25A		24	1.25	84	90
BRM24−28S 1.07A		28	1.07	84	90
BRM24−48S 0.6 A		48	0.6	84	90
BRM48−3.3S 7 A	48 (32～76)	3.3	7	84	87
BRM48− 5S 6 A		5	6	84	90
BRM48− 6S 5 A		6	5	84	90
BRM48−12S 2.5A		12	2.5	84	90
BRM48−15S 2 A		15	2	84	90
BRM48−24S 1.25A		24	1.25	84	90
BRM48−28S 1.07A		28	1.07	84	90
BRM100−3.3S 7 A	100 (64～144)	3.3	7	84	87
BRM100− 5S 6 A		5	6	84	90
BRM100− 6S 5 A		6	5	84	90
BRM100−12S 2.5 A		12	2.5	84	90
BRM100−15S 2 A		15	2	84	90
BRM100−24S 1.25A		24	1.25	84	90
BRM100−28S 1.07A		28	1.07	84	90

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

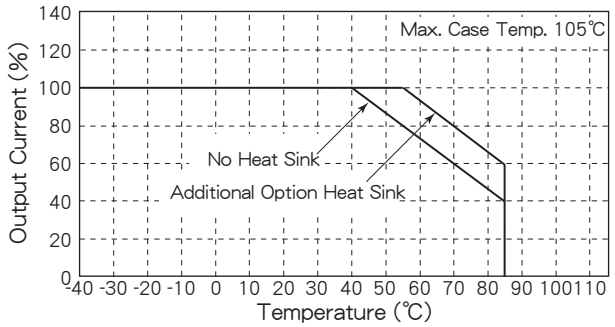


Fig. 2 Short Circuit Operating Area

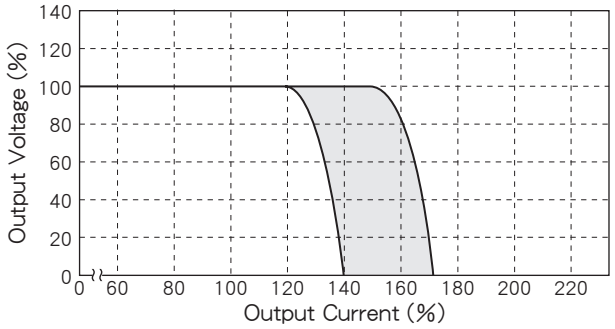


Fig. 3 Temperature Characteristic on Case Surface

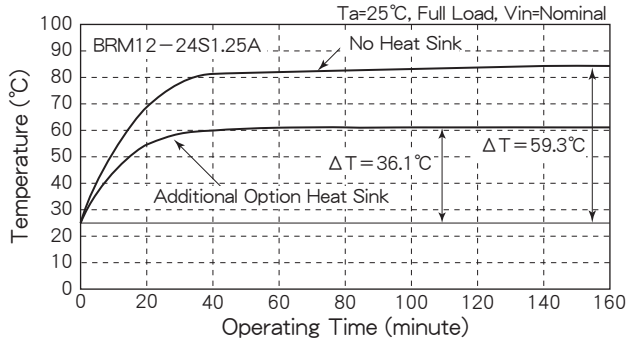


Fig. 4 Efficiency vs. Output Current

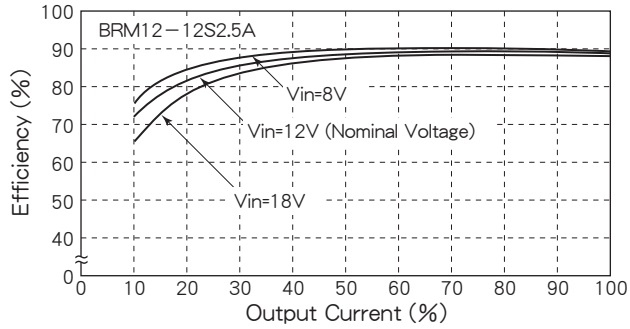


Fig. 5 Efficiency vs. Output Current

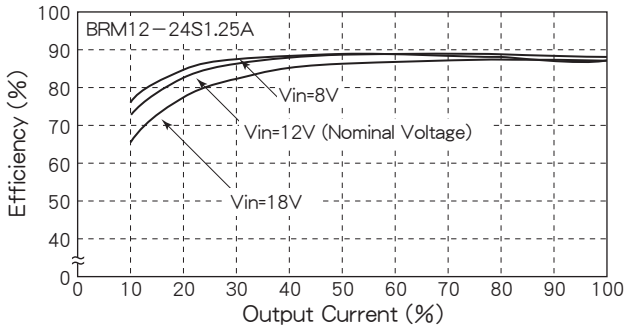


Fig. 6 Efficiency vs. Output Current

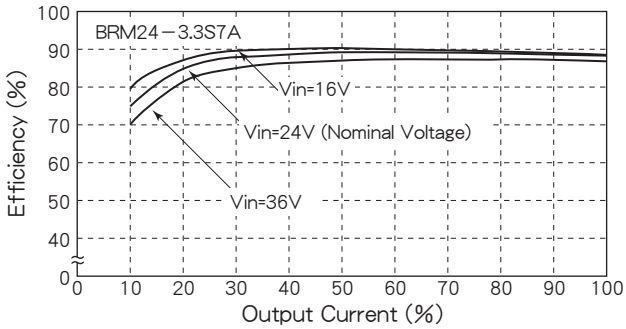


Fig. 7 Efficiency vs. Output Current

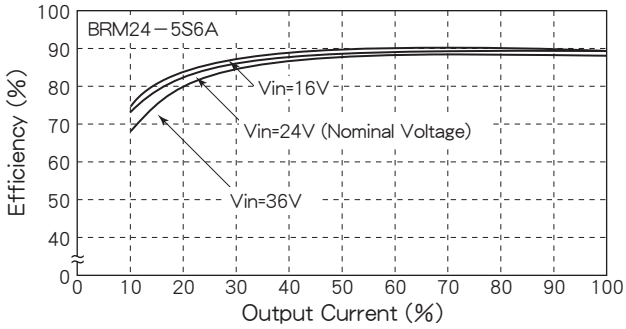


Fig. 8 Efficiency vs. Output Current

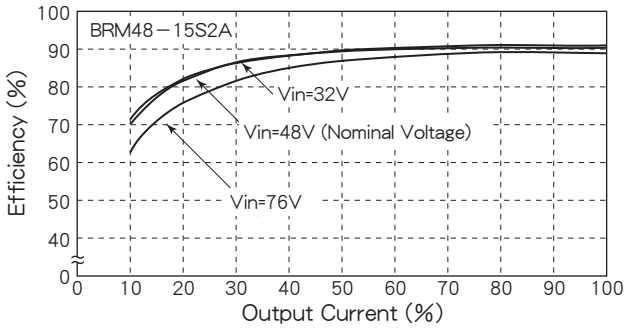
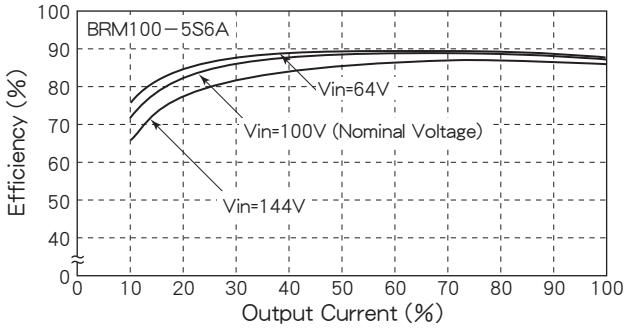


Fig. 9 Efficiency vs. Output Current



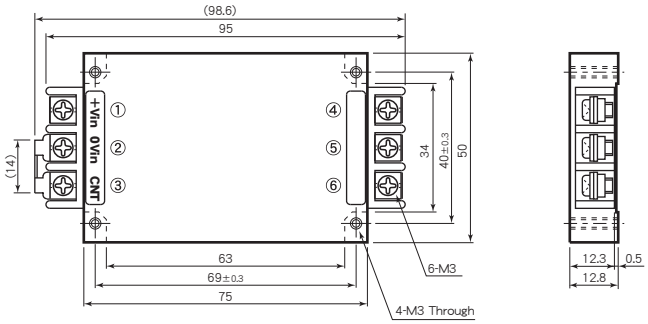
BPM SERIES

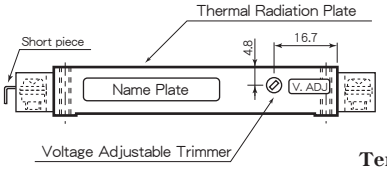
20～50W DC/DC CONVERTERS
Single Output & Dual Outputs

H12.8×W50×L95 (mm)

■ Terminal Outs & Dimensions (±0.5mm)

〈Top View〉





Terminal Outs

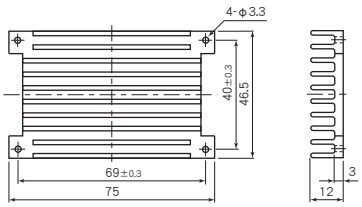
Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	0 Vdc in	②	0 Vdc in
③	ON/OFF Control	③	ON/OFF Control
④	+Vdc out	④	+Vdc out
⑤	0 Vdc out	⑤	Common
⑥	No Connection	⑥	−Vdc out

■ Features

- ●Low Profile 12.8mm
- ●6 Sided Metal Shielding
- ●Built-in Input Filter
- ●Wide Input Voltage Range
- ●Input-Output Isolation
- ●Adjustable Output Volt. ±5%
- ●High Efficiency 81～90%
- ●Remote ON/OFF Control
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection 115～140% Operation
- ●Thermal Protection +110℃～+120℃
- ●Operating Ambient Temperature −40℃～+85℃
- ●Max. Case Temperature +105℃
- ●High Reliability
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

- ●薄型 12.8mm
- ●６面メタルシールド
- ●入力フィルタ内蔵
- ●広範囲な入力電圧
- ●入出力間絶縁
- ●可変出力電圧 ±5%
- ●高効率 81～90%
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵 115～140% 動作
- ●過熱保護回路内蔵 +110℃～+120℃
- ●動作周囲温度 −40℃～+85℃
- ●最大ケース温度 +105℃
- ●高信頼性
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

■ Option Heat Sink



＊Option Heat Sink Model : A3-13987

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±5% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	Single : ±0.5% max. (0～100% Load) Dual : ±3% max. (10～100% Load)
●Reflected Input Ripple, Noise	(3% Vin) Vp-p max.
●Output Ripple	40mVp-p max.
●Output Noise	100mVp-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between terminal ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
●Max. Case Temperature	+105℃
●Storage Temperature	−40℃～+115℃
●Isolation Voltage	AC1500V 1 min. AC2000V 1 min. (100V Vin only) (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 150g max. Heat Sink : 55g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	6 Sided Aluminum Case
●MTBF	Single : 500,000H Dual : 600,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Selection Guide

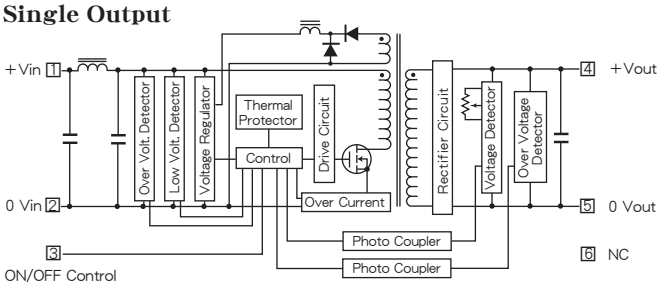
Table 1

Model Number	Input Voltage (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%) 30% Load	Efficiency (typ.) (%) 80% Load
BPM12−3.3S 12A	12 (8～18)	3.3	12	87	85
BPM12− 5S 10A		5	10	86	89
BPM12− 6S 8.4A		6	8.4	87	87
BPM12−12S 4.2A		12	4.2	84	88
BPM12−15S 3.3A		15	3.3	83	88
BPM12−24S 2.1A		24	2.1	83	88
BPM12−3.3D 3A		±3.3	±3	80	81
BPM12− 5D 3A		±5	±3	80	82
BPM12−12D 1.5A		±12	±1.5	81	83
BPM12−15D 1.2A		±15	±1.2	81	84
BPM24−3.3S 12A	24 (16～36)	3.3	12	84	85
BPM24− 5S 10A		5	10	85	88
BPM24− 6S 8.4A		6	8.4	87	89
BPM24−12S 4.2A		12	4.2	84	89
BPM24−15S 3.3A		15	3.3	85	89
BPM24−24S 2.1A		24	2.1	84	89
BPM24−3.3D 3A		±3.3	±3	80	81
BPM24− 5D 3A		±5	±3	80	82
BPM24−12D 1.5A		±12	±1.5	81	84
BPM24−15D 1.2A		±15	±1.2	82	85
BPM48−3.3S 12A	48 (32～72)	3.3	12	85	86
BPM48− 5S 10A		5	10	85	88
BPM48− 6S 8.4A		6	8.4	85	88
BPM48−12S 4.2A		12	4.2	85	88
BPM48−15S 3.3A		15	3.3	85	90
BPM48−24S 2.1A		24	2.1	85	90
BPM48−3.3D 3A		±3.3	±3	80	81
BPM48− 5D 3A		±5	±3	80	82
BPM48−12D 1.5A		±12	±1.5	81	84
BPM48−15D 1.2A		±15	±1.2	82	85
BPM100−3.3S 12A	100 (64～144)	3.3	12	84	87
BPM100− 5S 10A		5	10	86	89
BPM100− 6S 8.4A		6	8.4	84	89
BPM100−12S 4.2A		12	4.2	85	90
BPM100−15S 3.3A		15	3.3	85	90
BPM100−24S 2.1A		24	2.1	85	90
BPM100−3.3D 3A		±3.3	±3	80	81
BPM100− 5D 3A		±5	±3	80	82
BPM100−12D 1.5A		±12	±1.5	81	84
BPM100−15D 1.2A		±15	±1.2	82	85

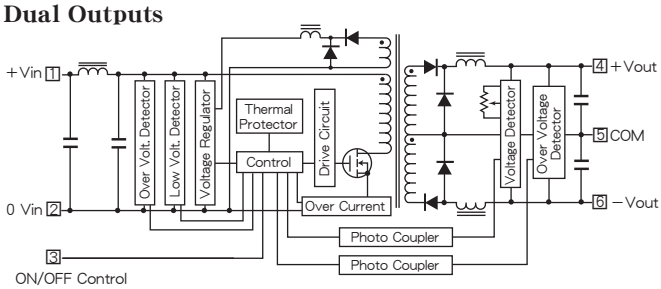
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

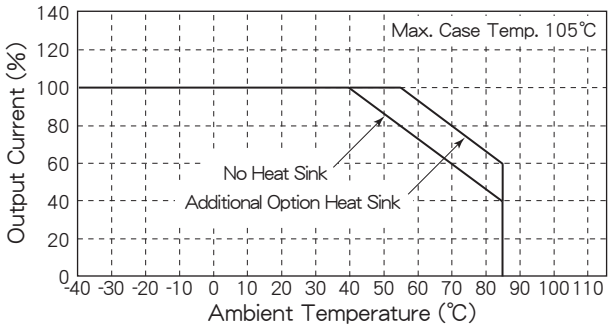


Fig. 2 Short Circuit Operating Area

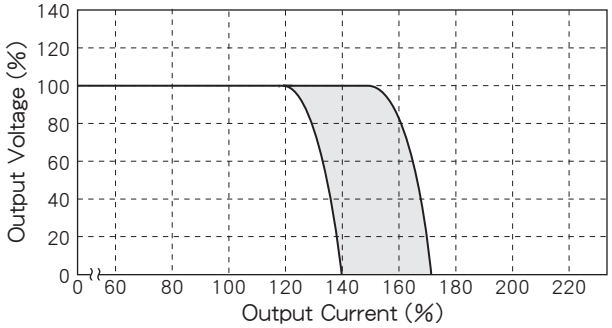


Fig. 3 Temperature Characteristic on Case Surface

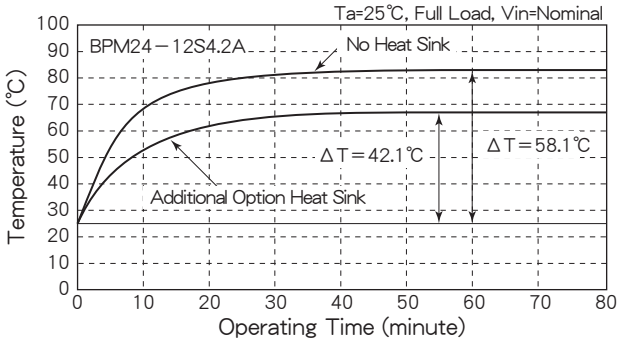


Fig. 4 Efficiency vs. Output Current

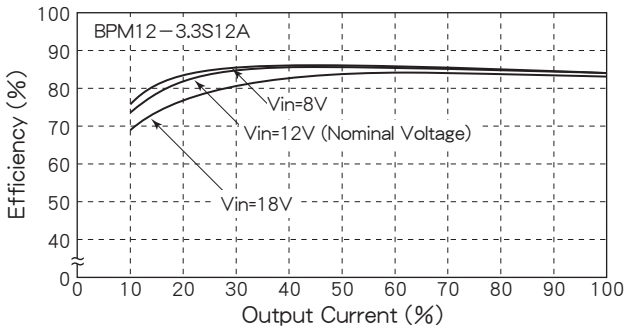


Fig. 5 Efficiency vs. Output Current

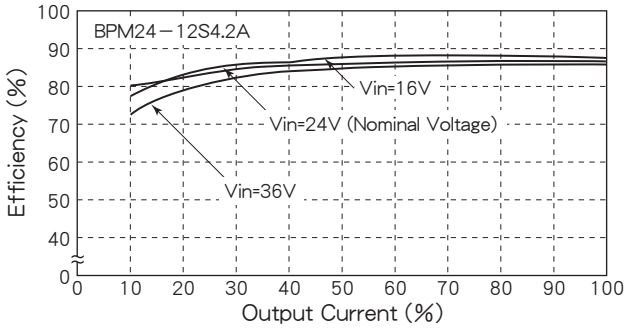


Fig. 6 Efficiency vs. Output Current

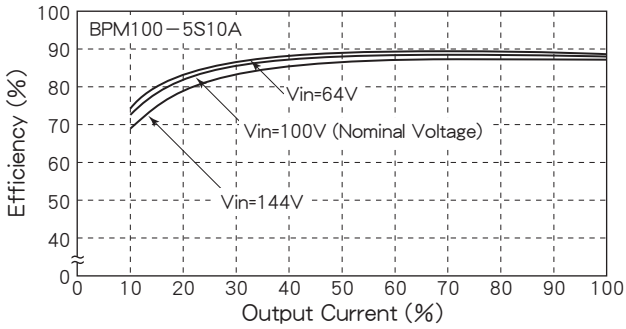


Fig. 7 Efficiency vs. Output Current

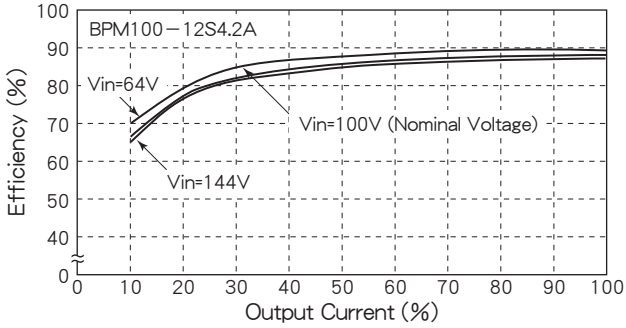
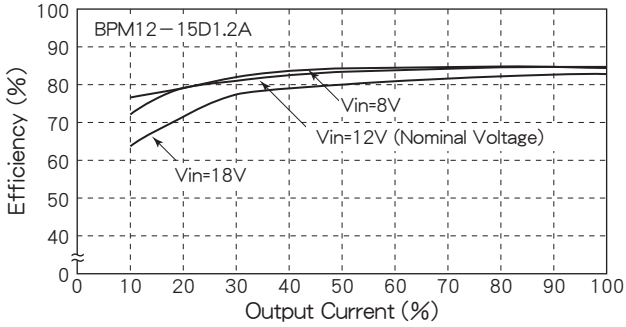


Fig. 8 Efficiency vs. Output Current



QD SERIES

40～50W DC/DC CONVERTERS Single Output

QDU type

H16×W50×L82 (mm)

QDS type

H16×W50×L82 (mm)

■ Features

- ●Low Profile 16mm ●薄型 16mm
- ●Built-in Input Filter ●入力フィルタ内蔵
- ●Wide Input Voltage Range ●広範囲な入力電圧
- ●Input-Output Isolation ●入出力間絶縁
- ●Adjustable Output Volt. ±5% ●可変出力電圧 ±5%
- ●Input Low Voltage Protection ●入力低電圧保護回路内蔵
- ●Input Over Voltage Protection ●入力過電圧保護回路内蔵
- ●Output Over Voltage Protection 115～140% Operation ●出力過電圧保護回路内蔵 115～140%にて動作
- ●High Efficiency 86～90% ●高効率 86～90%
- ●Thermal Protection +110℃～+120℃ ●過熱保護回路内蔵 +110℃～+120℃
- ●Operating Ambient Temperature −40℃～+85℃ ●動作周囲温度 −40℃～+85℃
- ●Conformity to RoHS2 Directive ●RoHS2指令対応
- ●Not built-in aluminum and tantalum electrolytic capacitor ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

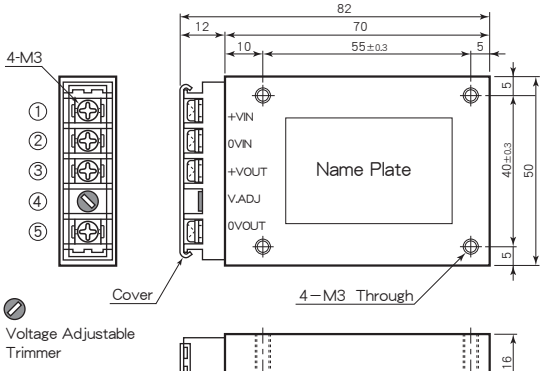
■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±5% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	±0.5% max. (0～100% Load)
●Reflected Input Ripple, Noise	(3% Vin)Vp-p max.
●Output Ripple	40mVp-p max.
●Output Noise	100mVp-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115~140% Output Voltage
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
●Storage Temperature	−40℃～+115℃
●Isolation Voltage	AC1500V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	150g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	6 Sided Aluminum Case
●MTBF	500,000H (Ta：25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

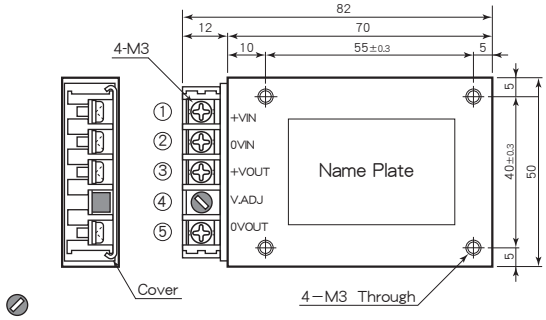
QDU type



Terminal Outs

①	+Vdc in
②	0 Vdc in
③	+Vdc out
④	Vout Adjustment
⑤	0 Vdc out

QDS type



Terminal Outs

①	+Vdc in
②	0 Vdc in
③	+Vdc out
④	Vout Adjustment
⑤	0 Vdc out

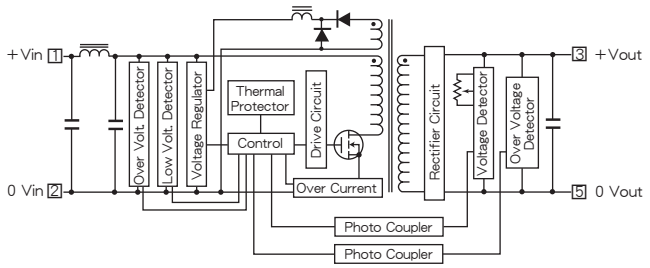
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	80% Load
QDU(QDS) 12−3.3S 12A	12 (8～18)	3.3	12	81	86
QDU(QDS) 12− 5S 10A		5	10	82	88
QDU(QDS) 12− 6S 8.4A		6	8.4	82	88
QDU(QDS) 12− 12S 4.2A		12	4.2	83	88
QDU(QDS) 12− 15S 3.3A		15	3.3	83	88
QDU(QDS) 12− 24S 2.1A		24	2.1	83	88
QDU(QDS) 24−3.3S 12A	24 (16～36)	3.3	12	81	86
QDU(QDS) 24− 5S 10A		5	10	85	88
QDU(QDS) 24− 6S 8.4A		6	8.4	85	88
QDU(QDS) 24− 12S 4.2A		12	4.2	84	89
QDU(QDS) 24− 15S 3.3A		15	3.3	84	89
QDU(QDS) 24− 24S 2.1A		24	2.1	84	89
QDU(QDS) 48−3.3S 12A	48 (32～72)	3.3	12	81	86
QDU(QDS) 48− 5S 10A		5	10	83	88
QDU(QDS) 48− 6S 8.4A		6	8.4	83	88
QDU(QDS) 48− 12S 4.2A		12	4.2	85	90
QDU(QDS) 48− 15S 3.3A		15	3.3	85	90
QDU(QDS) 48− 24S 2.1A		24	2.1	79	89
QDU(QDS)100−3.3S 12A	100 (64～144)	3.3	12	82	87
QDU(QDS)100− 5S 10A		5	10	84	89
QDU(QDS)100− 6S 8.4A		6	8.4	84	89
QDU(QDS)100− 12S 4.2A		12	4.2	85	90
QDU(QDS)100− 15S 3.3A		15	3.3	85	90
QDU(QDS)100− 24S 2.1A		24	2.1	79	89

＊上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

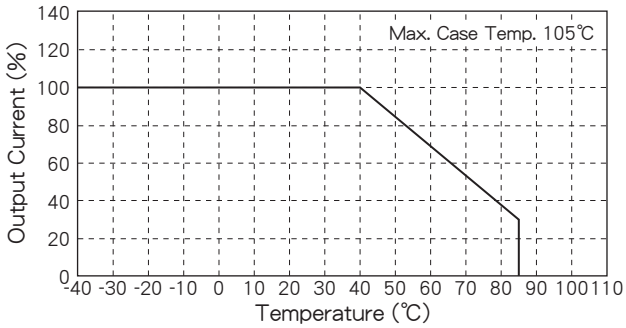


Fig. 2 Short Circuit Operating Area

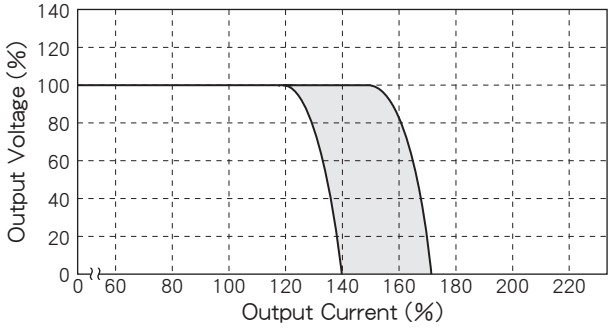


Fig. 3 Temperature Characteristic on Case Surface

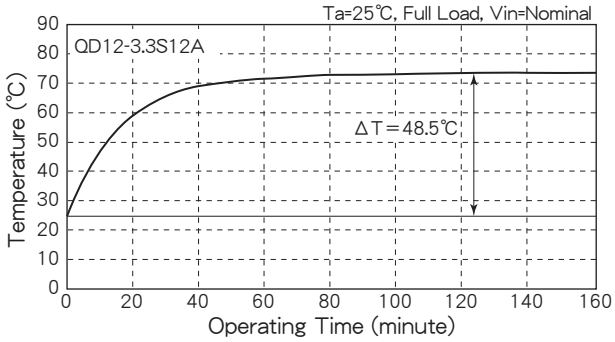


Fig. 4 Efficiency vs. Output Current

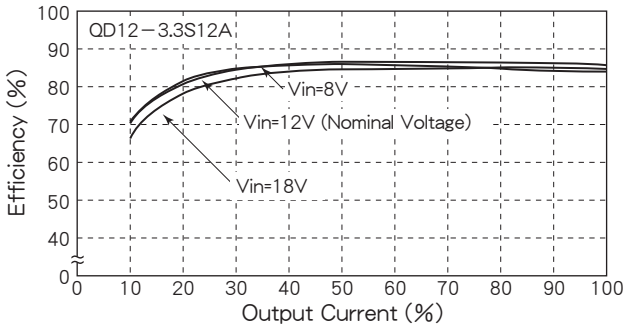


Fig. 5 Efficiency vs. Output Current

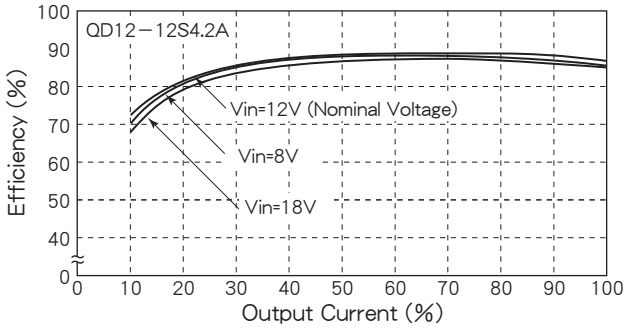


Fig. 6 Efficiency vs. Output Current

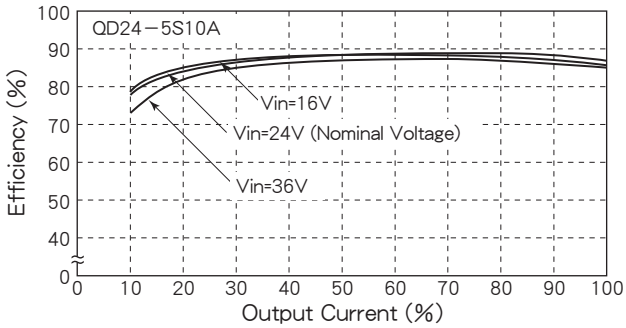


Fig. 7 Efficiency vs. Output Current

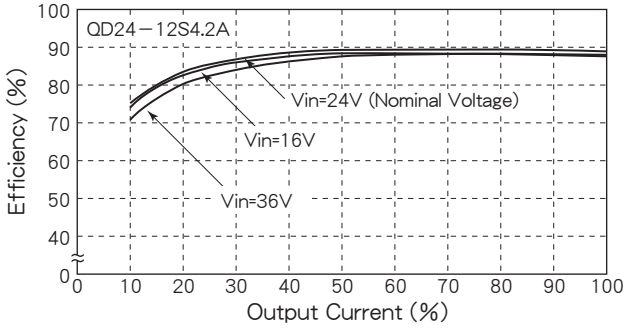


Fig. 8 Efficiency vs. Output Current

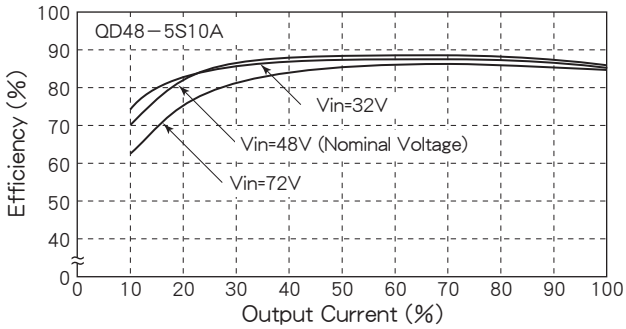
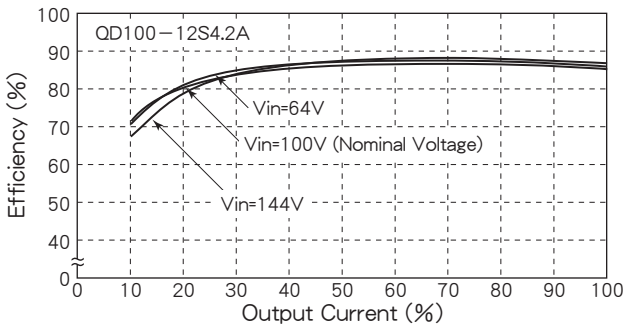


Fig. 9 Efficiency vs. Output Current

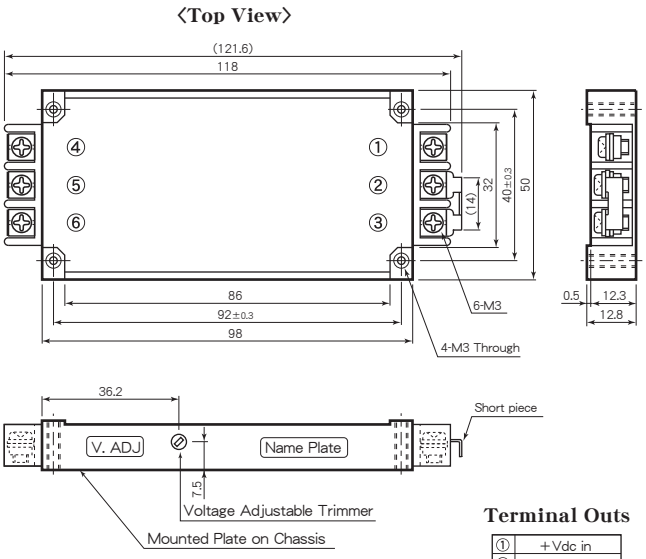


BTS SERIES

80～100W DC/DC CONVERTERS Single Output

H12.8×W50×L118 (mm)

■ Terminal Outs & Dimensions (±0.5mm)



Terminal Outs

①	+Vdc in
②	0 Vdc in
③	ON/OFF Control
④	+Vdc out
⑤	0 Vdc out
⑥	No Connection

■ Features

- ●Low Profile 12.8mm
- ●Built-in Input Filter
- ●Input-Output Isolation
- ●High Efficiency 88～91%
- ●Wide Input Voltage Range
- ●High Reliability
- ●6 Sided Metal Shielding
- ●Remote ON/OFF Control
- ●Adjustable Output Voltage ±5%
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection 115～140% Operation
- ●Thermal Protection +110℃～+120℃
- ●Operating Ambient Temperature −40℃～+85℃
- ●Max. Case Temperature +105℃
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

- ●薄型 12.8mm
- ●入力フィルタ内蔵
- ●入出力間絶縁
- ●高効率 88～91%
- ●広範囲な入力電圧
- ●高信頼性
- ●６面メタルシールド
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●可変出力電圧 ±5%
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵 115～140% 動作
- ●過熱保護回路内蔵 +110℃～+120℃
- ●動作周囲温度 −40℃～+85℃
- ●最大ケース温度 +105℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	80% Load
BTS 12−3.3S 24 A	12 (8～18)	3.3	24	88	88
BTS 12− 5S 20 A		5	20	87	89
BTS 12− 6S 16.7A		6	16.7	87	89
BTS 12− 12S 8.4 A		12	8.4	87	89
BTS 12− 15S 6.7 A		15	6.7	86	89
BTS 12− 24S 4.2 A		24	4.2	85	89
BTS 24−3.3S 24 A	24 (16～36)	3.3	24	88	88
BTS 24− 5S 20 A		5	20	88	90
BTS 24− 6S 16.7A		6	16.7	88	90
BTS 24− 12S 8.4 A		12	8.4	86	90
BTS 24− 15S 6.7 A		15	6.7	86	90
BTS 24− 24S 4.2 A		24	4.2	86	90
BTS 48−3.3S 24 A	48 (32～72)	3.3	24	87	88
BTS 48− 5S 20 A		5	20	87	90
BTS 48− 6S 16.7A		6	16.7	87	90
BTS 48− 12S 8.4 A		12	8.4	87	91
BTS 48− 15S 6.7 A		15	6.7	86	91
BTS 48− 24S 4.2 A		24	4.2	86	91
BTS100−3.3S 24 A	100 (64～144)	3.3	24	85	88
BTS100− 5S 20 A		5	20	86	90
BTS100− 6S 16.7A		6	16.7	86	90
BTS100− 12S 8.4 A		12	8.4	86	91
BTS100− 15S 6.7 A		15	6.7	86	91
BTS100− 24S 4.2 A		24	4.2	86	89

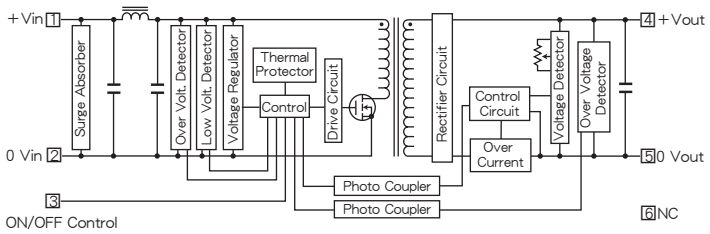
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

- ●Input Voltage, Range — DC12, 24, 48, 100V (See Table 1)
- ●Output Voltage, Current — See Table 1
- ●Output Voltage Range — ±5% Adjustable
- ●Efficiency — See Table 1
- ●Line Regulation — ±0.3% max. (at Vin Range)
- ●Load Regulation — ±0.5% max. (0～100% Load)
- ●Reflected Input Ripple, Noise — (3% Vin) Vp-p max.
- ●Output Ripple — 40mVp-p max.
- ●Output Noise — 100mVp-p max.
- ●Short Circuit Protection — Built-in, Auto-restart (See Fig. 2)
- ●Over Voltage Protection — 115～140% Output Voltage
- ●Remote ON/OFF Control — ON : Short or 0～0.8V; OFF : Open or 2～10V (Between terminal ② ～ ③)
- ●Temperature Coefficient — 0.02%/℃ max.
- ●Operating Ambient Temp. — −40℃～+85℃ (See Fig. 1)
- ●Max. Case Temperature — +105℃
- ●Storage Temperature — −55℃～+125℃
- ●Isolation Voltage — AC1500V 1 min. AC2000V 1 min. (100V Vin only) (Input−Output−Case)
- ●Isolation Impedance — 100MΩ min. (at DC1000V) (Input−Output−Case)
- ●Weight — Main Body : 170g max.
- ●Humidity — 20～95% RH
- ●Shock — 490m/s² (11msec 3directions)
- ●Vibration — 10～55Hz 98m/s² (30minutes 3directions)
- ●Surface Structure — 6 Sided Aluminum Case
- ●MTBF — 400,000H (Ta : 25℃, 80% Load, Nominal Vin)
- ●Warranty — 5 years

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

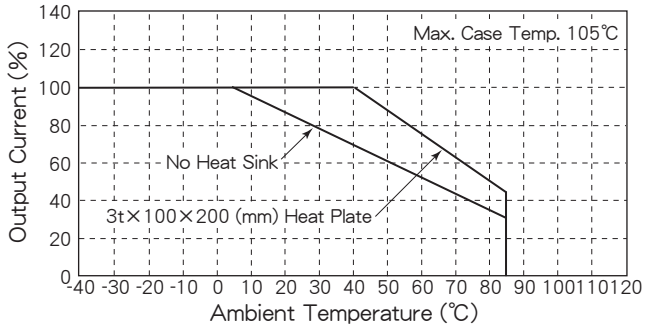


Fig. 2 Short Circuit Operating Area

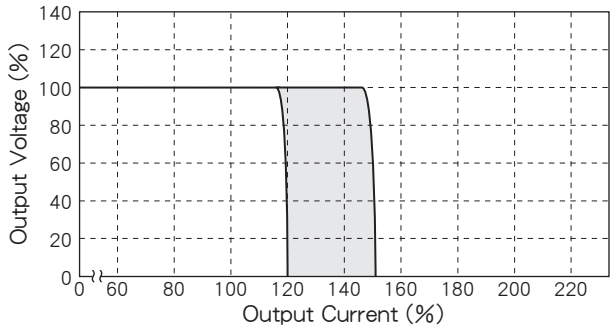


Fig. 3 Temperature Characteristic on Case Surface

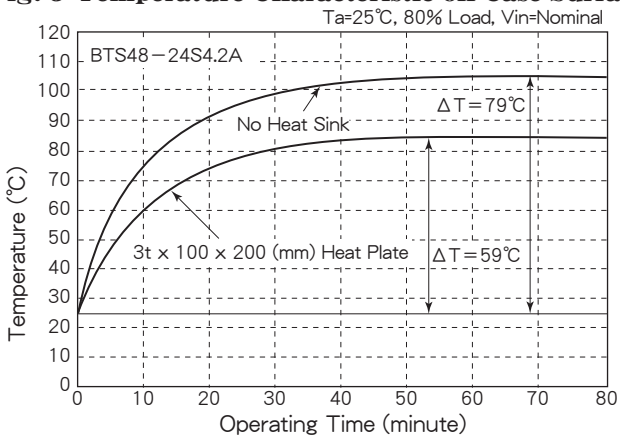


Fig. 4 Efficiency vs. Output Current

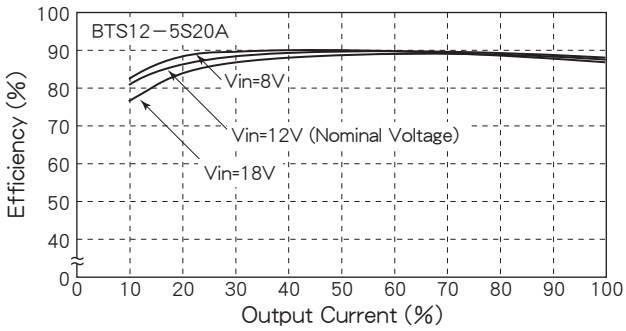


Fig. 5 Efficiency vs. Output Current

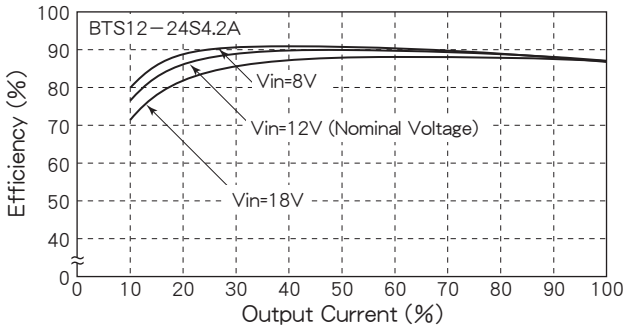


Fig. 6 Efficiency vs. Output Current

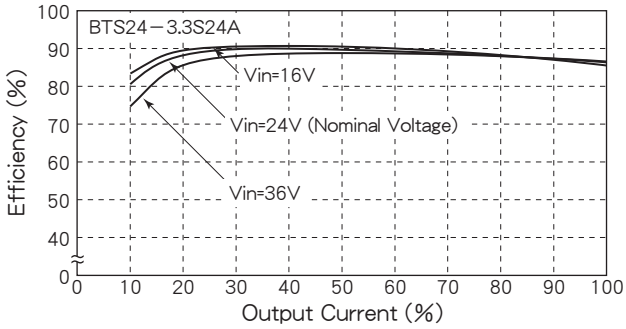


Fig. 7 Efficiency vs. Output Current

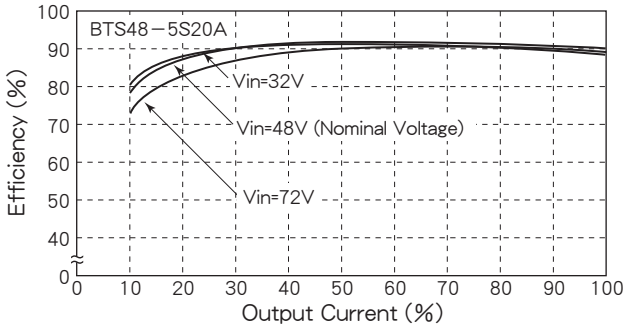
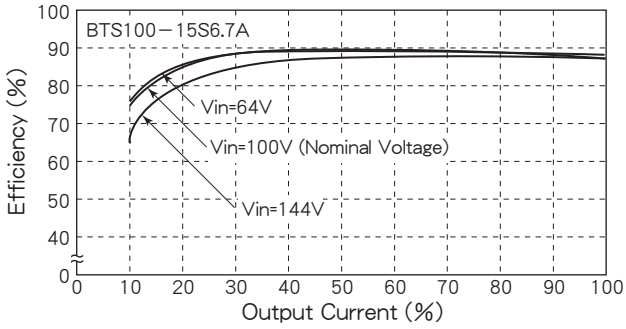


Fig. 8 Efficiency vs. Output Current



BTM SERIES

80～100W DC/DC CONVERTERS Single Output

H12.8×W50×L118 (mm)

■ Features

- ●Low Profile 12.8mm ●薄型 12.8mm
- ●Built-in Input Filter ●入力フィルタ内蔵
- ●Input-Output Isolation ●入出力間絶縁
- ●High Efficiency 88～91% ●高効率 88～91%
- ●Wide Input Voltage Range ●広範囲な入力電圧
- ●High Reliability ●高信頼性
- ●6 Sided Metal Shielding ●６面メタルシールド
- ●Remote ON/OFF Control ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●Adjustable Output Voltage ±5% ●可変出力電圧 ±5%
- ●Input Low Voltage Protection ●入力低電圧保護回路内蔵
- ●Input Over Voltage Protection ●入力過電圧保護回路内蔵
- ●Output Over Voltage Protection 115～140% Operation ●出力過電圧保護回路内蔵 115～140% 動作
- ●Thermal Protection ＋110℃～＋120℃ ●過熱保護回路内蔵 ＋110℃～＋120℃
- ●Operating Ambient Temperature －40℃～＋85℃ ●動作周囲温度 －40℃～＋85℃
- ●Max. Case Temperature ＋105℃ ●最大ケース温度 ＋105℃
- ●Conformity to RoHS2 Directive ●RoHS2指令対応
- ●Not built-in aluminum and tantalum electrolytic capacitor ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

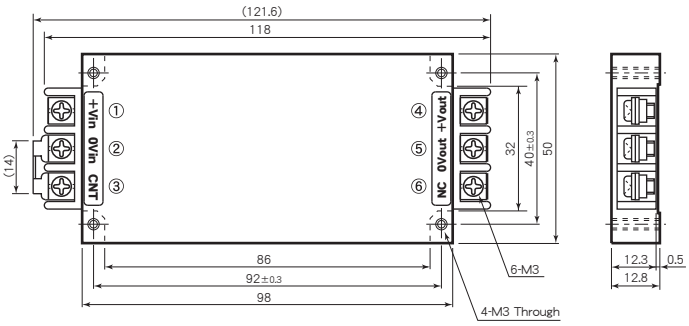
■ General Characteristics

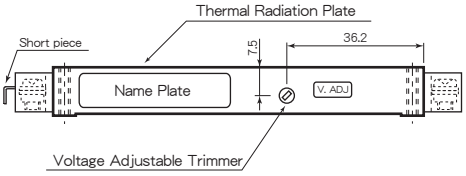
(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±5% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	±0.5% max. (0～100% Load)
●Reflected Input Ripple, Noise	(3% Vin) Vp-p max.
●Output Ripple	40mVp-p max.
●Output Noise	100mVp-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between terminal ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	－40℃～＋85℃ (See Fig. 1)
●Max. Case Temperature	＋105℃
●Storage Temperature	－55℃～＋125℃
●Isolation Voltage	AC1500V 1 min. AC2000V 1 min. (100V Vin only) (Input－Output－Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
●Weight	Main Body : 170g max. Heat Sink : 73g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	6 Sided Aluminum Case
●MTBF	400,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

〈Top View〉

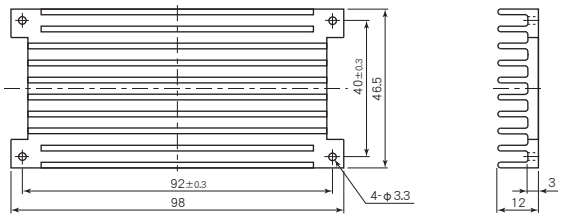




Terminal Outs

①	＋Vdc in
②	0 Vdc in
③	ON/OFF Control
④	＋Vdc out
⑤	0 Vdc out
⑥	No Connection

■ Option Heat Sink



＊Option Heat Sink Model : A3-13986

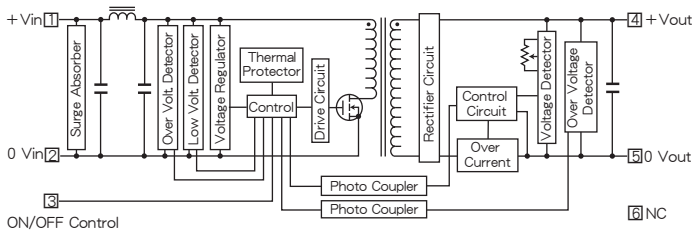
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	80% Load
BTM 12－3.3S 24 A	12 (8～18)	3.3	24	88	88
BTM 12－ 5S 20 A		5	20	87	89
BTM 12－ 6S 16.7A		6	16.7	87	89
BTM 12－ 12S 8.4 A		12	8.4	87	89
BTM 12－ 15S 6.7 A		15	6.7	86	89
BTM 12－ 24S 4.2 A		24	4.2	85	89
BTM 24－3.3S 24 A	24 (16～36)	3.3	24	88	88
BTM 24－ 5S 20 A		5	20	88	90
BTM 24－ 6S 16.7A		6	16.7	88	90
BTM 24－ 12S 8.4 A		12	8.4	86	90
BTM 24－ 15S 6.7 A		15	6.7	86	90
BTM 24－ 24S 4.2 A		24	4.2	86	90
BTM 48－3.3S 24 A	48 (32～72)	3.3	24	87	88
BTM 48－ 5S 20 A		5	20	87	90
BTM 48－ 6S 16.7A		6	16.7	87	90
BTM 48－ 12S 8.4 A		12	8.4	87	91
BTM 48－ 15S 6.7 A		15	6.7	86	91
BTM 48－ 24S 4.2 A		24	4.2	86	91
BTM100－3.3S 24 A	100 (64～144)	3.3	24	85	88
BTM100－ 5S 20 A		5	20	86	90
BTM100－ 6S 16.7A		6	16.7	86	90
BTM100－ 12S 8.4 A		12	8.4	86	91
BTM100－ 15S 6.7 A		15	6.7	86	91
BTM100－ 24S 4.2 A		24	4.2	86	89

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

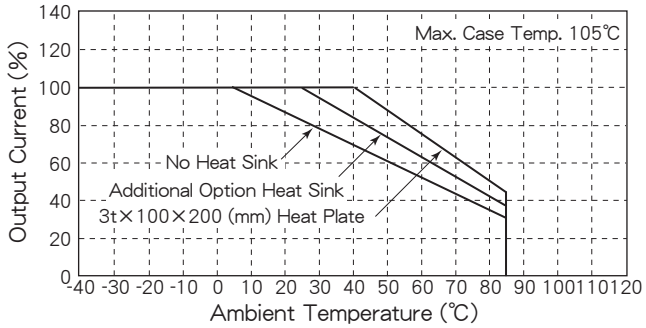


Fig. 2 Short Circuit Operating Area

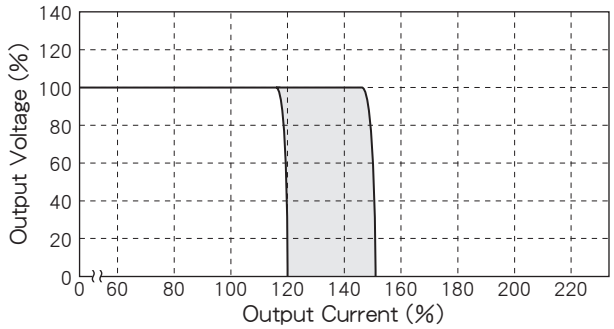


Fig. 3 Temperature Characteristic on Case Surface

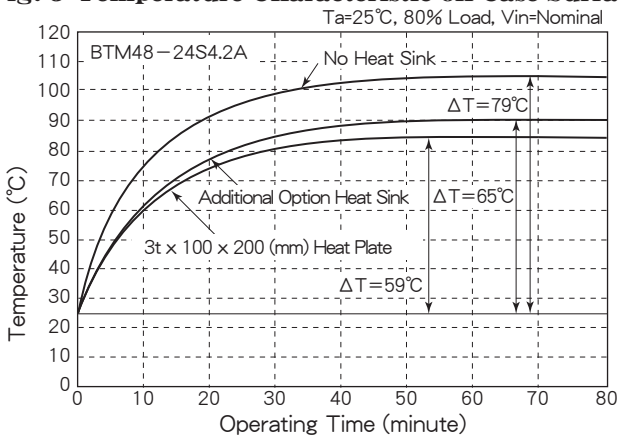


Fig. 4 Efficiency vs. Output Current

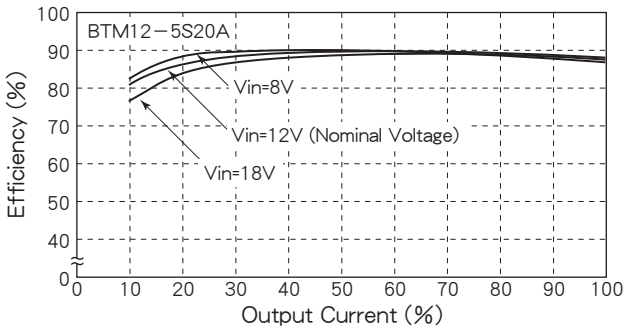


Fig. 5 Efficiency vs. Output Current

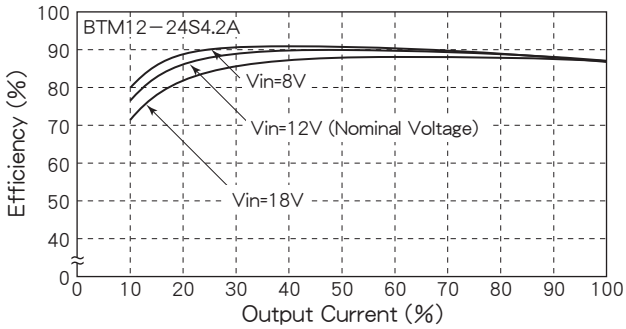


Fig. 6 Efficiency vs. Output Current

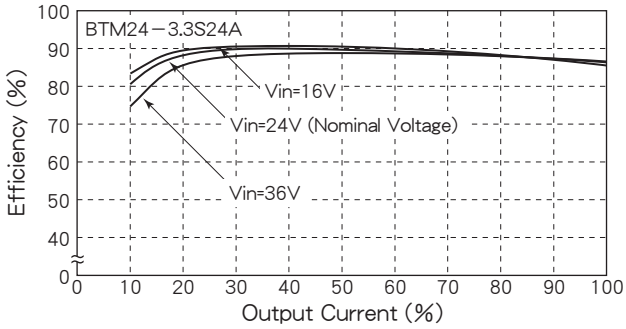


Fig. 7 Efficiency vs. Output Current

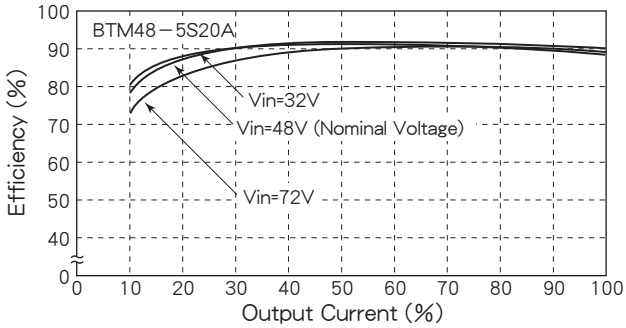
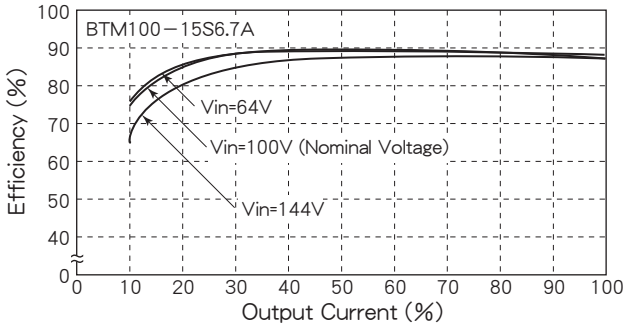


Fig. 8 Efficiency vs. Output Current



FD SERIES

80～100W DC/DC CONVERTERS Single Output

FDU type

H20×W60×L120 (mm)

FDS type

H20×W60×L120 (mm)

■ Features

- ●Built-in Input Filter
- ●Input-Output Isolation
- ●High Efficiency 85～92%
- ●Wide Input Voltage Range
- ●High Reliability
- ●Long Life by Mounting on Chassis or Using Heat Sink
- ●Adjustable Output Voltage ±5%
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection
- ●Thermal Protection ＋110℃～＋120℃
- ●Operating Ambient Temperature －40℃～＋85℃
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

- ●入力フィルタ内蔵
- ●入出力間絶縁
- ●高効率 85～92%
- ●広範囲な入力電圧
- ●高信頼性
- ●シャーシや放熱板への取り付けにより長寿命化
- ●可変出力電圧 ±5%
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵
- ●過熱保護回路内蔵 ＋110℃～＋120℃
- ●動作周囲温度 －40℃～＋85℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

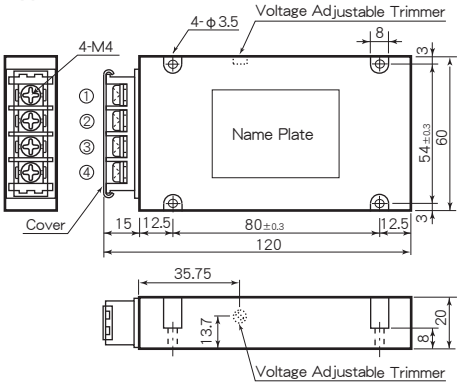
■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100, 140V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±5% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	±0.5% max. ±1% max. (3.3, 5V Vout only) (0～100% Load)
●Reflected Input Ripple, Noise	(5% Vin) Vp-p max.
●Output Ripple	40mVp-p max.
●Output Noise	(0.5% Vout+100mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	－40℃～＋85℃ (See Fig. 1)
●Max. Case Temperature	＋105℃
●Storage Temperature	－55℃～＋125℃
●Isolation Voltage	AC2000V one minute (Input－Output－Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
●Weight	350g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●MTBF	400,000H (Ta：25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

FDU type

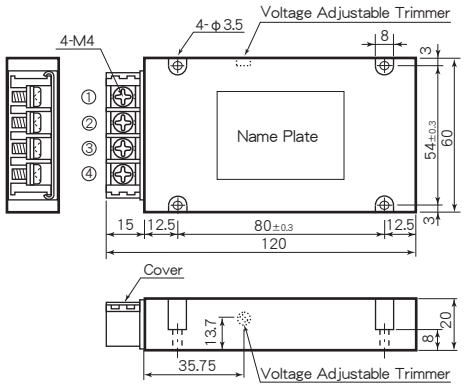


Terminal Outs

①	＋Vdc in
②	0 Vdc in
③	＋Vdc out
④	0 Vdc out

⊘ Voltage Adjustable Trimmer

FDS type



Terminal Outs

①	＋Vdc in
②	0 Vdc in
③	＋Vdc out
④	0 Vdc out

⊘ Voltage Adjustable Trimmer

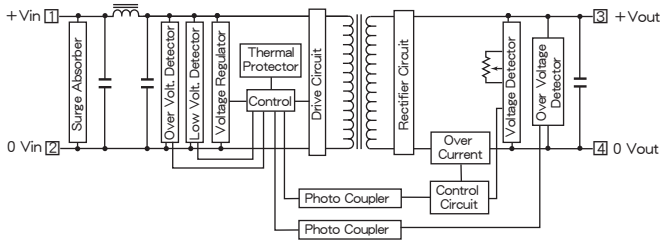
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	80% Load
FDU(FDS) 12－ 3.3S 24A	12 (8～18)	3.3	24	85	85
FDU(FDS) 12－ 5S 20A		5	20	87	89
FDU(FDS) 12－ 6S 16.7A		6	16.7	87	89
FDU(FDS) 12－ 12S 8.4A		12	8.4	88	90
FDU(FDS) 12－13.8S 7.2A		13.8	7.2	88	89
FDU(FDS) 12－ 15S 6.7A		15	6.7	88	89
FDU(FDS) 12－ 24S 4.2A		24	4.2	88	89
FDU(FDS) 24－ 3.3S 24A	24 (16～36)	3.3	24	88	90
FDU(FDS) 24－ 5S 20A		5	20	88	91
FDU(FDS) 24－ 6S 16.7A		6	16.7	88	91
FDU(FDS) 24－ 12S 8.4A		12	8.4	88	91
FDU(FDS) 24－13.8S 7.2A		13.8	7.2	88	91
FDU(FDS) 24－ 15S 6.7A		15	6.7	88	91
FDU(FDS) 24－ 24S 4.2A		24	4.2	88	91
FDU(FDS) 48－ 3.3S 24A	48 (32～72)	3.3	24	87	88
FDU(FDS) 48－ 5S 20A		5	20	89	92
FDU(FDS) 48－ 6S 16.7A		6	16.7	88	92
FDU(FDS) 48－ 12S 8.4A		12	8.4	88	91
FDU(FDS) 48－13.8S 7.2A		13.8	7.2	88	91
FDU(FDS) 48－ 15S 6.7A		15	6.7	88	91
FDU(FDS) 48－ 24S 4.2A		24	4.2	88	91
FDU(FDS)100－ 3.3S 24A	100 (64～144)	3.3	24	87	88
FDU(FDS)100－ 5S 20A		5	20	88	90
FDU(FDS)100－ 6S 16.7A		6	16.7	88	90
FDU(FDS)100－ 12S 8.4A		12	8.4	88	91
FDU(FDS)100－13.8S 7.2A		13.8	7.2	88	91
FDU(FDS)100－ 15S 6.7A		15	6.7	88	91
FDU(FDS)100－ 24S 4.2A		24	4.2	88	91
FDU(FDS)140－ 3.3S 24A	140 (90～200)	3.3	24	87	88
FDU(FDS)140－ 5S 20A		5	20	88	90
FDU(FDS)140－ 6S 16.7A		6	16.7	88	90
FDU(FDS)140－ 12S 8.4A		12	8.4	88	91
FDU(FDS)140－13.8S 7.2A		13.8	7.2	88	91
FDU(FDS)140－ 15S 6.7A		15	6.7	88	91
FDU(FDS)140－ 24S 4.2A		24	4.2	88	91

＊上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

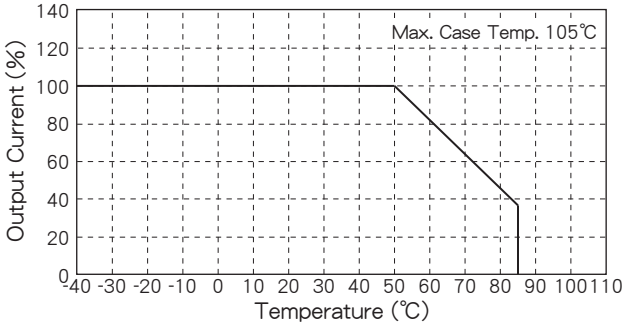


Fig. 2 Short Circuit Operating Area

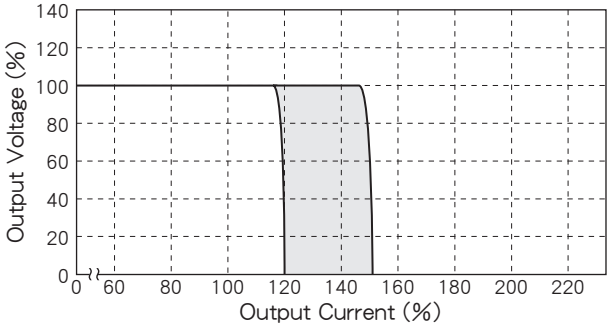


Fig. 3 Efficiency vs. Output Current

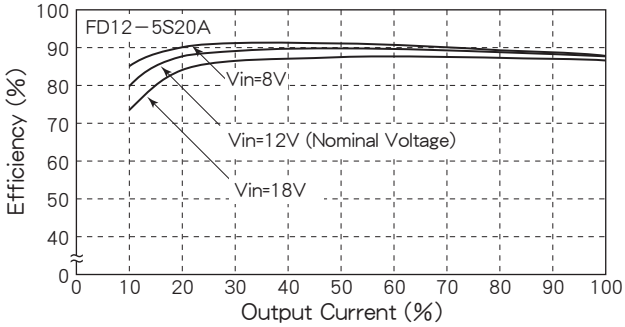


Fig. 4 Efficiency vs. Output Current

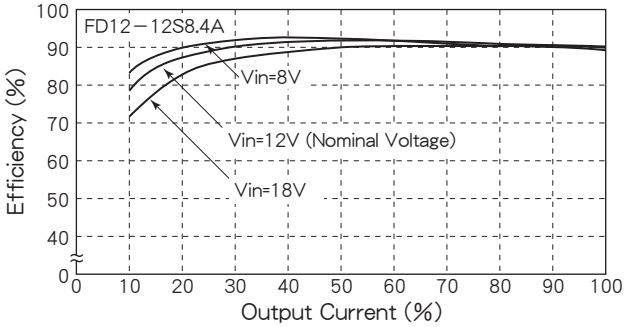


Fig. 5 Efficiency vs. Output Current

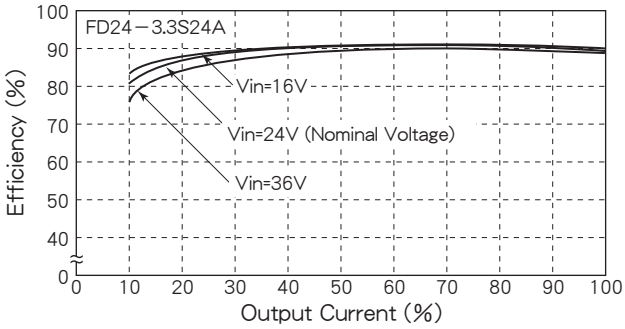


Fig. 6 Efficiency vs. Output Current

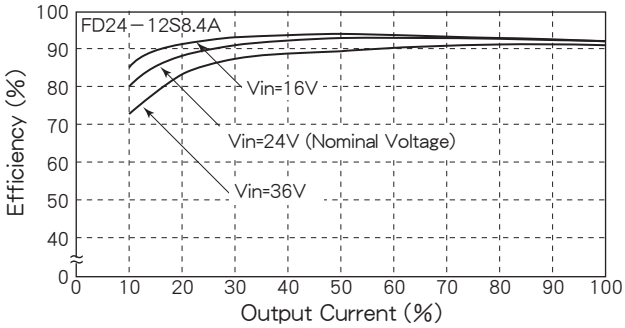


Fig. 7 Efficiency vs. Output Current

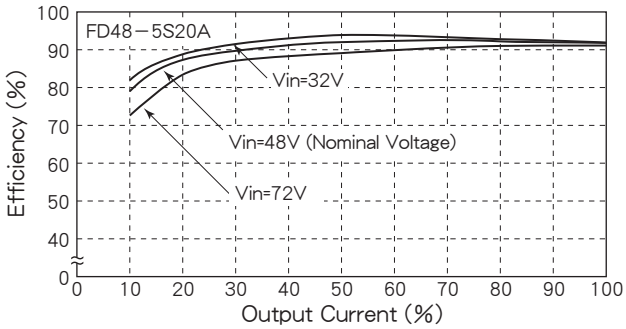


Fig. 8 Efficiency vs. Output Current

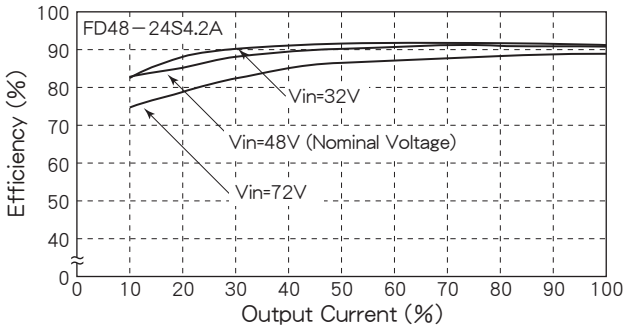
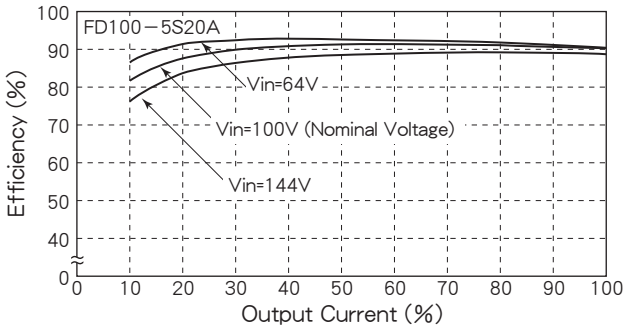


Fig. 9 Efficiency vs. Output Current



PD SERIES

85～110W DC/DC CONVERTERS
Single Output

H35×W70×L158 (mm)

■ Features

- ●Wide Input Voltage Range
- ●High Efficiency 83%～90%
- ●Input-Output Isolation (AC2000V)
- ●Low Output Ripple and Noise
- ●Long Life by mounting on Chassis or Using Heat Sink
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection 120%～140% Operation
- ●Operating Ambient Temp. −25℃～+71℃
- ●Max. Case Temperature+85℃
- ●Conformity to RoHS2 Directive

- ●広範囲な入力電圧範囲
- ●高効率 83%～90%
- ●入出力間絶縁 (AC2000V)
- ●出力ﾘｯﾌﾟﾙ,ﾉｲｽﾞが小さい
- ●シャーシや放熱板への取付により長寿命化
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵 120%～140%動作
- ●動作周囲温度 −25℃～+71℃
- ●最大ケース温度+85℃
- ●RoHS2指令対応

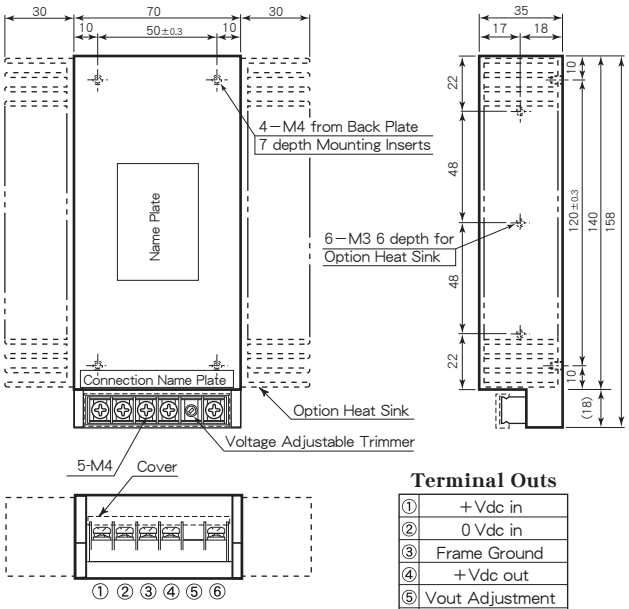
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 96V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Adjustment	±5%
●Efficiency	See Table 1
●Line Regulation	0.1% max. (at Vin Range)
●Load Regulation	1% max. (0～100% Load)
●Output Ripple	(0.1% Vout+50mV) p-p max.
●Output Noise	(0.5% Vout+50mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Output Over Voltage Protection	Built-in, Shut-down (120%～140% Vout)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−25℃～+71℃ (See Fig. 1)
●Max. Case Temp.	+85℃
●Storage Temp.	−40℃～+85℃
●Isolation Voltage	AC2000V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 800g max. Pair Heat Sinks : 250g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●MTBF	120,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

〈Top View〉



＊Option Heat Sink Model : A3-3664

Terminal Outs

①	+Vdc in
②	0 Vdc in
③	Frame Ground
④	+Vdc out
⑤	Vout Adjustment
⑥	0 Vdc out

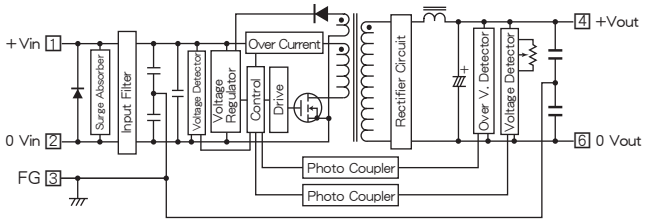
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%)
PD12 - 3.3S 26A	12 (6～18) at 50% Load (8～18) at 100% Load	3.3	26	83
PD12 - 5S 20A		5	20	85
PD12 - 12S 8.3A		12	8.3	85
PD12 -13.8S 7.3A		13.8	7.3	85
PD12 - 15S 7A		15	7	85
PD12 - 24S 4.5A		24	4.5	86
PD12 - 48S 2.3A		48	2.3	88
PD12 - 100S 1.1A		100	1.1	90
PD12 - 140S 0.8A		140	0.8	90
PD12 - 200S 0.55A		200	0.55	90
PD12 - 300S 0.36A		300	0.36	90
PD24 - 3.3S 26A	24 (14～40) at 50% Load (17～40) at 100% Load	3.3	26	83
PD24 - 5S 20A		5	20	85
PD24 - 12S 8.3A		12	8.3	86
PD24 -13.8S 7.3A		13.8	7.3	86
PD24 - 15S 7A		15	7	86
PD24 - 24S 4.5A		24	4.5	88
PD24 - 48S 2.3A		48	2.3	89
PD24 - 100S 1.1A		100	1.1	90
PD24 - 140S 0.8A		140	0.8	90
PD24 - 200S 0.55A		200	0.55	90
PD24 - 300S 0.36A		300	0.36	90
PD48 - 3.3S 26A	48 (28～80) at 50% Load (34～80) at 100% Load	3.3	26	83
PD48 - 5S 20A		5	20	85
PD48 - 12S 8.3A		12	8.3	85
PD48 -13.8S 7.3A		13.8	7.3	86
PD48 - 15S 7A		15	7	86
PD48 - 24S 4.5A		24	4.5	88
PD48 - 48S 2.3A		48	2.3	89
PD48 - 100S 1.1A		100	1.1	90
PD48 - 140S 0.8A		140	0.8	90
PD48 - 200S 0.55A		200	0.55	90
PD48 - 300S 0.36A		300	0.36	90
PD96 - 3.3S 26A	96 (56～160) at 50% Load (68～160) at 100% Load	3.3	26	83
PD96 - 5S 20A		5	20	87
PD96 - 12S 8.3A		12	8.3	85
PD96 -13.8S 7.3A		13.8	7.3	86
PD96 - 15S 7A		15	7	86
PD96 - 24S 4.5A		24	4.5	88
PD96 - 48S 2.3A		48	2.3	89
PD96 - 100S 1.1A		100	1.1	90
PD96 - 140S 0.8A		140	0.8	90
PD96 - 200S 0.55A		200	0.55	90
PD96 - 300S 0.36A		300	0.36	90

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

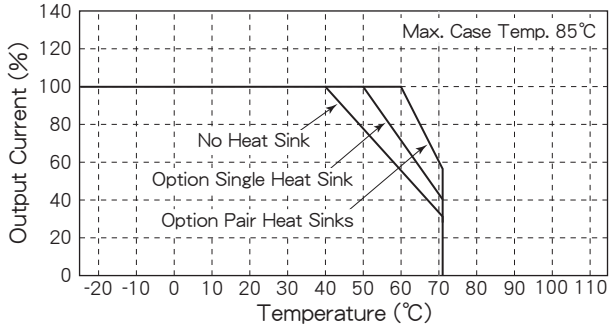


Fig. 2 Short Circuit Operating Area

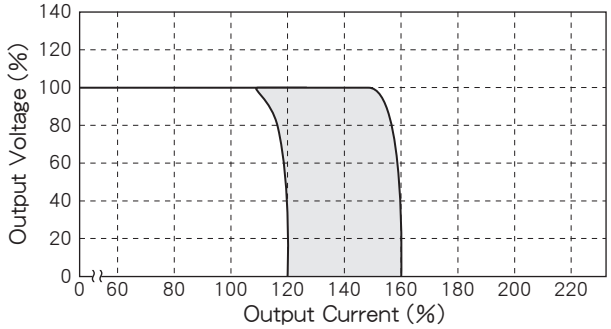


Fig. 3 Temperature Characteristic on Case Surface

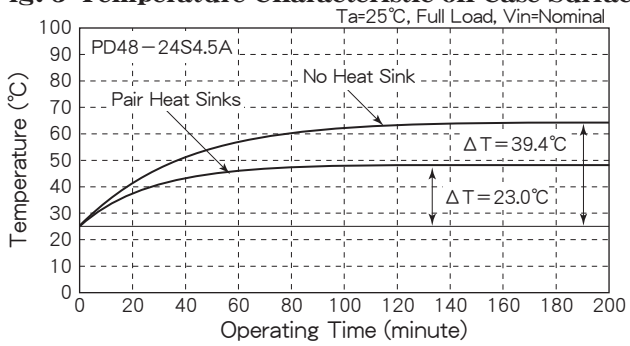


Fig. 4 Efficiency vs. Output Current

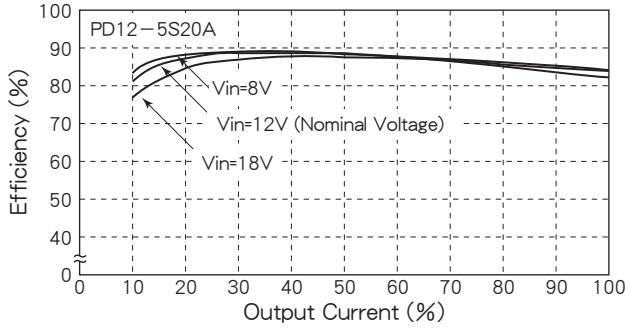


Fig. 5 Efficiency vs. Output Current

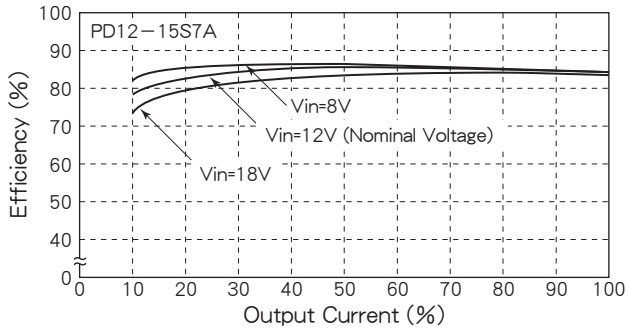


Fig. 6 Efficiency vs. Output Current

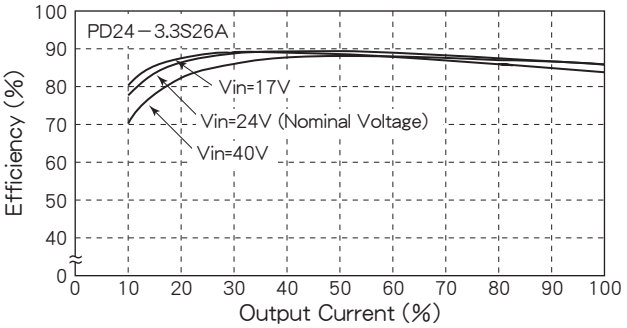


Fig. 7 Efficiency vs. Output Current

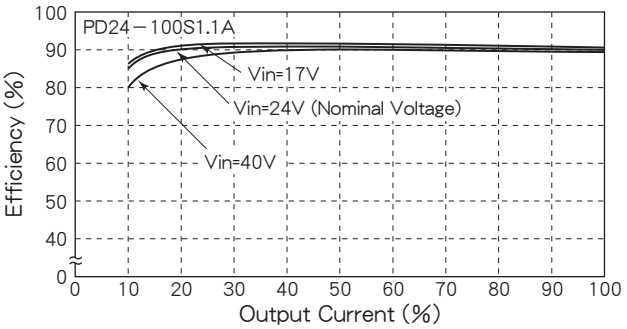


Fig. 8 Efficiency vs. Output Current

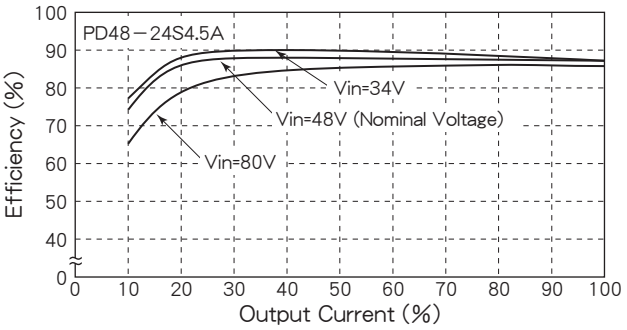
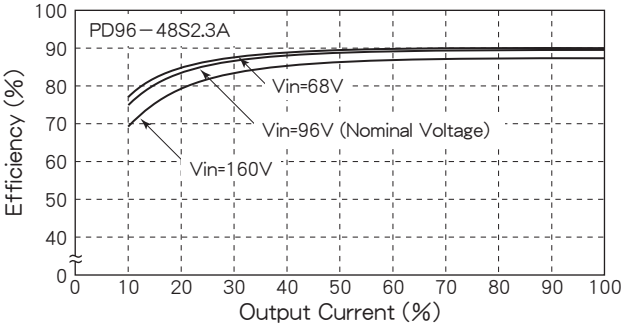


Fig. 9 Efficiency vs. Output Current



FM SERIES

105～200W DC/DC CONVERTERS
並列運転可能 Parallel Operation

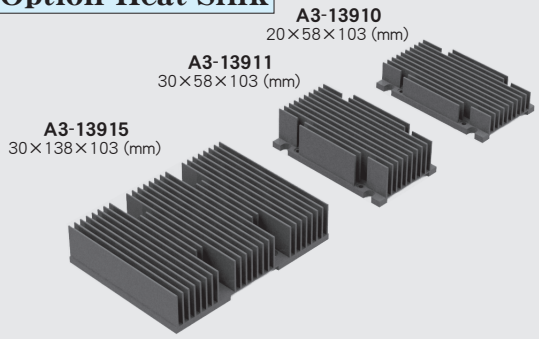
FMU type

H20×W60×L120 (mm)

FMS type

H20×W60×L120 (mm)

■ Option Heat Sink



■ Features

- ●Built-in Input Filter
- ●Input-Output Isolation
- ●High Efficiency 87～91%
- ●Wide Input Voltage Range
- ●High Reliability
- ●Adjustable Output Volt. ±10%
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection
- ●Thermal Protection +110℃～+120℃
- ●Possible Parallel Operation up to 3 converters
- ●Operating Ambient Temperature −40℃～+85℃
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

- ●入力フィルタ内蔵
- ●入出力間絶縁
- ●高効率 87～91%
- ●広範囲な入力電圧
- ●高信頼性
- ●可変出力電圧 ±10%
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵
- ●過熱保護回路内蔵 +110℃～+120℃
- ●3台まで並列運転可能
- ●動作周囲温度 −40℃～+85℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100, 140V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±10% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	3% max. (0～100% Load) (See Fig. 6)
●Reflected Input Ripple, Noise	(5% Vin)Vp-p max.
●Output Ripple	80mVp-p max.
●Output Noise	(0.5% Vout+100mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 5)
●Over Voltage Protection	115～140% Output Voltage
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
●Max. Case Temperature	+105℃
●Storage Temperature	−55℃～+125℃
●Isolation Voltage	AC2000V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body：350g max. Heat Sink A3-13910：135g max. A3-13911：175g max. A3-13915：425g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●MTBF	400,000H (Ta：25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Selection Guide

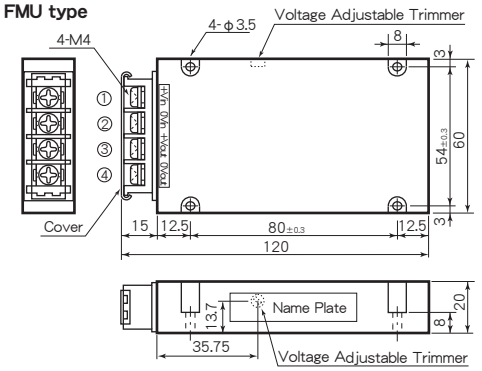
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	50% Load	80% Load
FMU(FMS) 12− 3.3S 32A	12 (8～18) at 50% Load (9～18) at 100% Load	3.3	32	85	88	87
FMU(FMS) 12− 5S 28A		5	28	86	90	88
FMU(FMS) 12− 6S 23.3A		6	23.3	86	90	88
FMU(FMS) 12− 12S 13.4A		12	13.4	87	90	89
FMU(FMS) 12−13.8S 11.6A		13.8	11.6	87	90	89
FMU(FMS) 12− 15S 10.7A		15	10.7	87	90	89
FMU(FMS) 12− 24S 6.7A		24	6.7	87	90	89
FMU(FMS) 12− 28S 5.8A		28	5.8	87	90	89
FMU(FMS) 12− 48S 3.4A		48	3.4	87	90	89
FMU(FMS) 24− 3.3S 40A	24 (16～36)	3.3	40	88	91	90
FMU(FMS) 24 5S 32A		5	32	90	92	91
FMU(FMS) 24− 6S 26.6A		6	26.6	90	92	91
FMU(FMS) 24− 12S 16.7A		12	16.7	90	92	91
FMU(FMS) 24−13.8S 14.5A		13.8	14.5	90	92	91
FMU(FMS) 24− 15S 13.4A		15	13.4	90	92	91
FMU(FMS) 24− 24S 8.4A		24	8.4	90	92	91
FMU(FMS) 24− 28S 7.2A		28	7.2	90	92	91
FMU(FMS) 24− 48S 4.2A		48	4.2	90	92	91
FMU(FMS) 48− 3.3S 40A	48 (36～76)	3.3	40	88	91	90
FMU(FMS) 48− 5S 32A		5	32	91	92	91
FMU(FMS) 48− 6S 26.6A		6	26.6	91	92	91
FMU(FMS) 48− 12S 16.7A		12	16.7	91	92	91
FMU(FMS) 48−13.8S 14.5A		13.8	14.5	91	92	91
FMU(FMS) 48− 15S 13.4A		15	13.4	91	92	91
FMU(FMS) 48− 24S 8.4A		24	8.4	91	92	91
FMU(FMS) 48− 28S 7.2A		28	7.2	91	92	91
FMU(FMS) 48− 48S 4.2A		48	4.2	91	92	91
FMU(FMS)100− 3.3S 40A	100 (64～144)	3.3	40	85	91	90
FMU(FMS)100− 5S 32A		5	32	87	92	91
FMU(FMS)100− 6S 26.6A		6	26.6	87	92	91
FMU(FMS)100− 12S 16.7A		12	16.7	87	92	91
FMU(FMS)100−13.8S 14.5A		13.8	14.5	87	92	91
FMU(FMS)100− 15S 13.4A		15	13.4	87	92	91
FMU(FMS)100− 24S 8.4A		24	8.4	87	92	91
FMU(FMS)100− 28S 7.2A		28	7.2	87	92	91
FMU(FMS)100− 48S 4.2A		48	4.2	87	92	91
FMU(FMS)140 − 3.3S 40A	140 (90～200)	3.3	40	85	91	90
FMU(FMS)140− 5S 32A		5	32	87	92	91
FMU(FMS)140− 6S 26.6A		6	26.6	87	92	91
FMU(FMS)140− 12S 16.7A		12	16.7	87	92	91
FMU(FMS)140−13.8S 14.5A		13.8	14.5	87	92	91
FMU(FMS)140− 15S 13.4A		15	13.4	87	92	91
FMU(FMS)140− 24S 8.4A		24	8.4	87	92	91
FMU(FMS)140− 28S 7.2A		28	7.2	87	92	91
FMU(FMS)140− 48S 4.2A		48	4.2	87	92	91

＊上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

■ Terminal Outs & Dimensions (±0.5mm)

FMU type

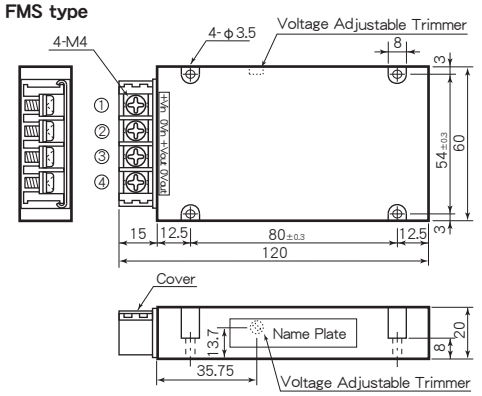


Terminal Outs

①	+Vdc in
②	0 Vdc in
③	+Vdc out
④	0 Vdc out

⊘ Voltage Adjustable Trimmer

FMS type

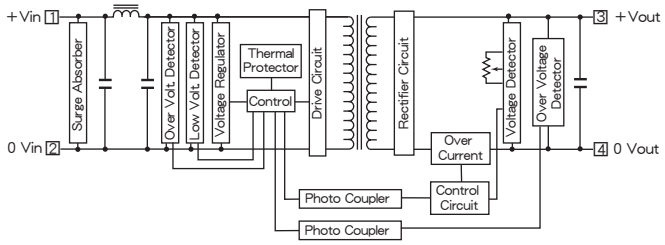


Terminal Outs

①	+Vdc in
②	0 Vdc in
③	+Vdc out
④	0 Vdc out

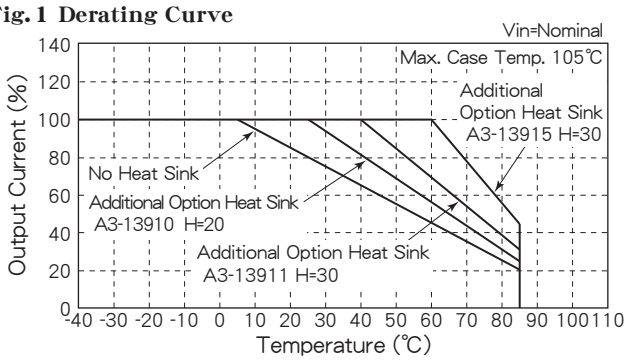
⊘ Voltage Adjustable Trimmer

■ Block Diagram



■ Characteristic Curves

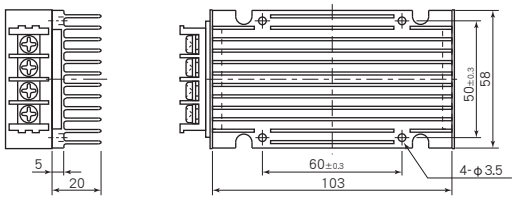
Fig. 1 Derating Curve



■ Option Heat Sink

Fig. 2 Temperature Characteristic on Case Surface

＊Option Heat Sink Model : A3-13910



FMU24-12S16.7A Additonal Heat Sink A3-13910
Ta=25℃, 100% Load, Vin=Nominal

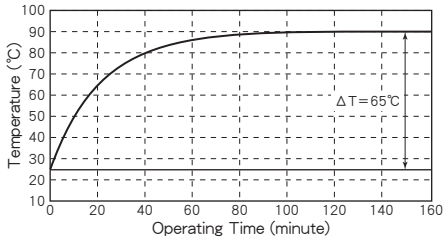
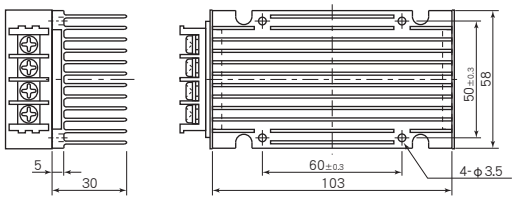


Fig. 3 Temperature Characteristic on Case Surface

＊Option Heat Sink Model : A3-13911



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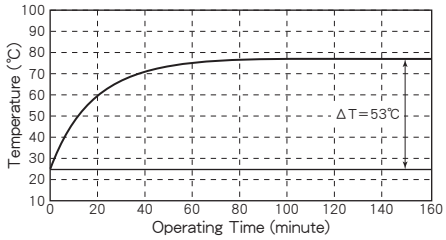
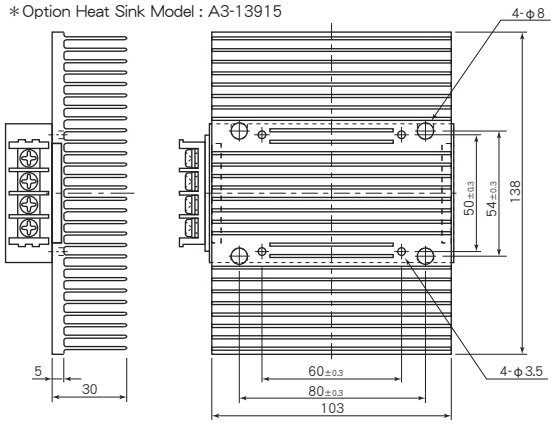
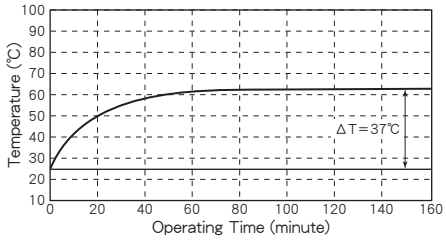


Fig. 4 Temperature Characteristic on Case Surface

＊Option Heat Sink Model : A3-13915



FMU24-12S16.7A Additonal Heat Sink A3-13915
Ta=25℃, 100% Load, Vin=Nominal



■ Characteristic Curves

Fig. 5 Short Circuit Operating Area

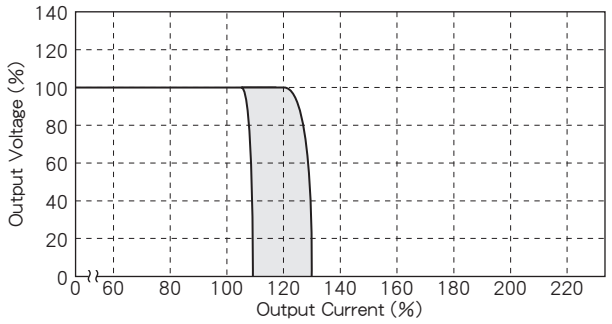
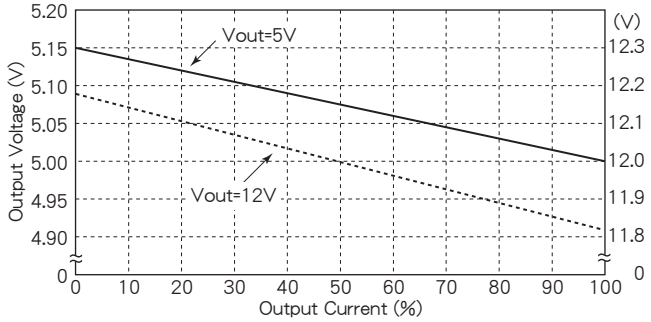


Fig. 6 Output Voltage vs. Output Current



＊並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。
Load Regulation is regulated large on purpose to equate the each unit's output current at parallel operation.

Fig. 7 Efficiency vs. Output Current

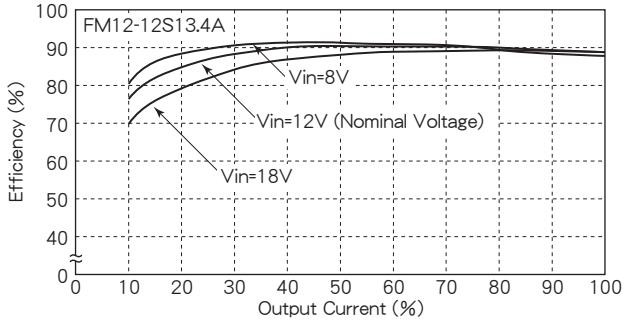


Fig. 8 Efficiency vs. Output Current

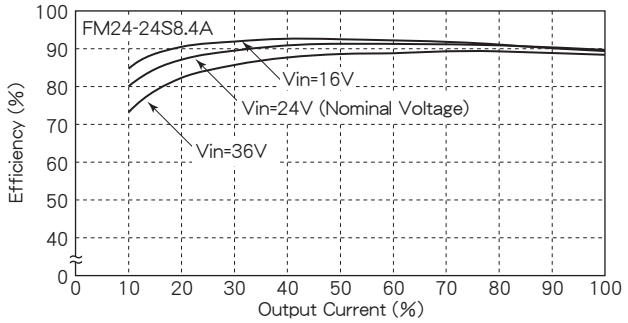


Fig. 9 Efficiency vs. Output Current

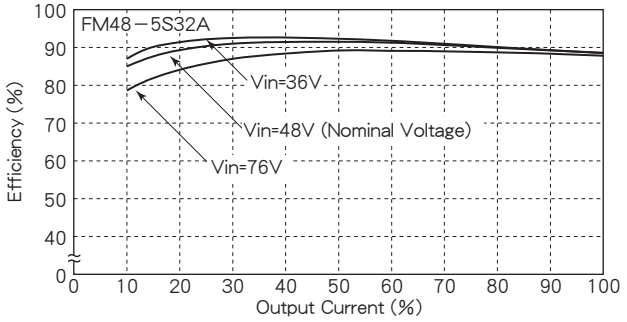


Fig. 10 Efficiency vs. Output Current

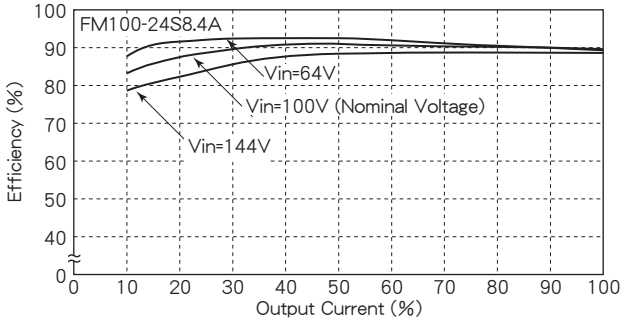
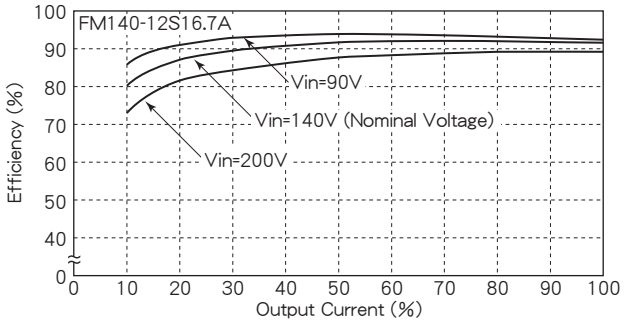


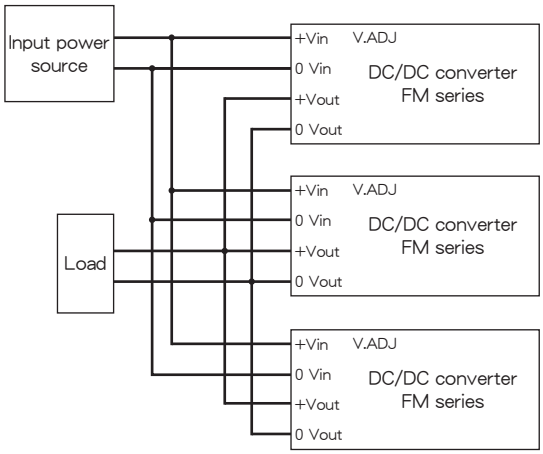
Fig. 11 Efficiency vs. Output Current



■ Parallel Operation

同機種を並列に動作させることにより、出力電流容量を増やすことができます。下図のように結線し、各コンバータ間の出力電圧を同じ電圧に調整することで、並列運転ができます。(Fig. 12を御参照ください)
It is possible to increase output current capacity by parallel operation of the same model. Please see the below figure for wiring instruction. Parallel operation is possible by each outputs to be same voltage.

Fig. 12 Parallel Operation Connection



KM SERIES

105～200W DC/DC CONVERTERS
並列運転可能 Parallel Operation

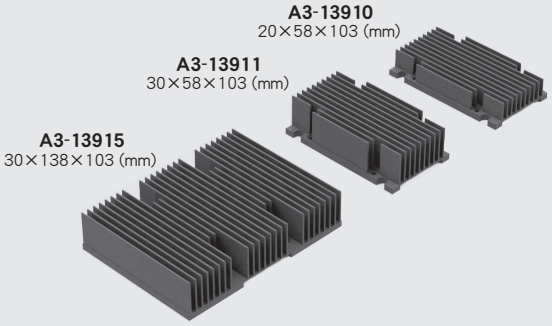
KMU type

H20×W60×L135 (mm)

KMS type

H20×W60×L135 (mm)

■ Option Heat Sink



■ Features

- ●Built-in Input Filter
- ●Input-Output Isolation
- ●High Efficiency 87～91%
- ●Wide Input Voltage Range
- ●High Reliability
- ●Adjustable Output Volt. ±10%
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Output Over Voltage Protection
- ●Thermal Protection +110℃～+120℃
- ●Remote ON/OFF Control
- ●Possible Parallel Operation up to 3 converters
- ●Operating Ambient Temperature −40℃～+85℃
- ●Conformity to RoHS2 Directive
- ●Not built-in aluminum and tantalum electrolytic capacitor

- ●入力フィルタ内蔵
- ●入出力間絶縁
- ●高効率 87～91%
- ●広範囲な入力電圧
- ●高信頼性
- ●可変出力電圧 ±10%
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵
- ●過熱保護回路内蔵 +110℃～+120℃
- ●リモートON/OFFコントロール
- ●3台まで並列運転可能
- ●動作周囲温度 −40℃～+85℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC12, 24, 48, 100, 140V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Range	±10% Adjustable
●Efficiency	See Table 1
●Line Regulation	±0.3% max. (at Vin Range)
●Load Regulation	3% max. (0～100% Load) (See Fig. 6)
●Reflected Input Ripple, Noise	(5% Vin) Vp-p max.
●Output Ripple	80mVp-p max.
●Output Noise	(0.5% Vout+100mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 5)
●Over Voltage Protection	115～140% Output Voltage
●Remote ON/OFF Control	ON：Short or 0～0.8V OFF：Open or 2～10V (Between terminal ② ～ ③)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−40℃～+85℃ (See Fig. 1)
●Max. Case Temperature	+105℃
●Storage Temperature	−55℃～+125℃
●Isolation Voltage	AC2000V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body：350g max. Heat Sink A3-13910：135g max. A3-13911：175g max. A3-13915：425g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●MTBF	400,000H (Ta：25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Selection Guide

Table 1

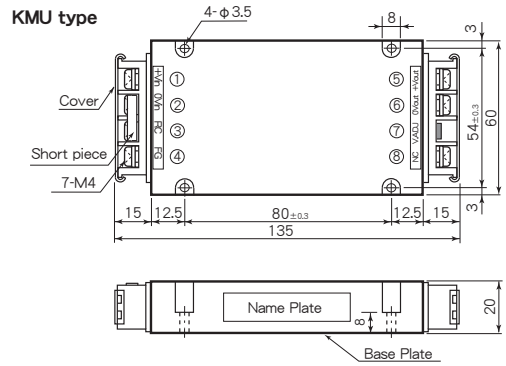
Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%) 20% Load	50% Load	80% Load
KMU(KMS) 12− 3.3S 32A	12 (8～18) at 50% Load (9～18) at 100% Load	3.3	32	85	88	87
KMU(KMS) 12− 5S 28A		5	28	86	90	88
KMU(KMS) 12− 6S 23.3A		6	23.3	86	90	88
KMU(KMS) 12− 12S 13.4A		12	13.4	87	90	89
KMU(KMS) 12−13.8S 11.6A		13.8	11.6	87	90	89
KMU(KMS) 12− 15S 10.7A		15	10.7	87	90	89
KMU(KMS) 12− 24S 6.7A		24	6.7	87	90	89
KMU(KMS) 12− 28S 5.8A		28	5.8	87	90	89
KMU(KMS) 12− 48S 3.4A		48	3.4	87	90	89
KMU(KMS) 24− 3.3S 40A	24 (16～36)	3.3	40	88	91	90
KMU(KMS) 24− 5S 32A		5	32	90	92	91
KMU(KMS) 24− 6S 26.6A		6	26.6	90	92	91
KMU(KMS) 24− 12S 16.7A		12	16.7	90	92	91
KMU(KMS) 24−13.8S 14.5A		13.8	14.5	90	92	91
KMU(KMS) 24− 15S 13.4A		15	13.4	90	92	91
KMU(KMS) 24− 24S 8.4A		24	8.4	90	92	91
KMU(KMS) 24− 28S 7.2A		28	7.2	90	92	91
KMU(KMS) 24− 48S 4.2A		48	4.2	90	92	91
KMU(KMS) 48− 3.3S 40A	48 (36～76)	3.3	40	88	91	90
KMU(KMS) 48− 5S 32A		5	32	91	92	91
KMU(KMS) 48− 6S 26.6A		6	26.6	91	92	91
KMU(KMS) 48− 12S 16.7A		12	16.7	91	92	91
KMU(KMS) 48−13.8S 14.5A		13.8	14.5	91	92	91
KMU(KMS) 48− 15S 13.4A		15	13.4	91	92	91
KMU(KMS) 48− 24S 8.4A		24	8.4	91	92	91
KMU(KMS) 48− 28S 7.2A		28	7.2	91	92	91
KMU(KMS) 48− 48S 4.2A		48	4.2	91	92	91
KMU(KMS)100− 3.3S 40A	100 (64～144)	3.3	40	85	91	90
KMU(KMS)100− 5S 32A		5	32	87	92	91
KMU(KMS)100− 6S 26.6A		6	26.6	87	92	91
KMU(KMS)100− 12S 16.7A		12	16.7	87	92	91
KMU(KMS)100−13.8S 14.5A		13.8	14.5	87	92	91
KMU(KMS)100− 15S 13.4A		15	13.4	87	92	91
KMU(KMS)100− 24S 8.4A		24	8.4	87	92	91
KMU(KMS)100− 28S 7.2A		28	7.2	87	92	91
KMU(KMS)100− 48S 4.2A		48	4.2	87	92	91
KMU(KMS)140 − 3.3S 40A	140 (90～200)	3.3	40	85	91	90
KMU(KMS)140− 5S 32A		5	32	87	92	91
KMU(KMS)140− 6S 26.6A		6	26.6	87	92	91
KMU(KMS)140− 12S 16.7A		12	16.7	87	92	91
KMU(KMS)140−13.8S 14.5A		13.8	14.5	87	92	91
KMU(KMS)140− 15S 13.4A		15	13.4	87	92	91
KMU(KMS)140− 24S 8.4A		24	8.4	87	92	91
KMU(KMS)140− 28S 7.2A		28	7.2	87	92	91
KMU(KMS)140− 48S 4.2A		48	4.2	87	92	91

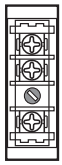
＊上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

KM SERIES DATA SHEET

■ Terminal Outs & Dimensions (±0.5mm)

KMU type



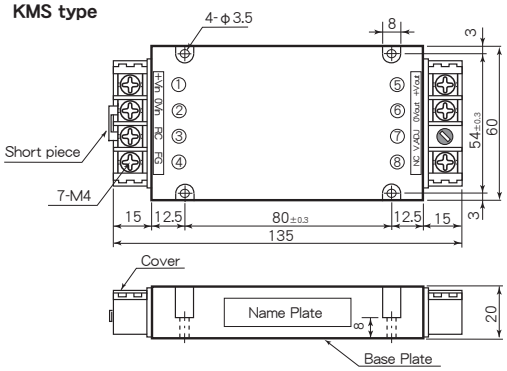


Terminal Outs

①	+Vdc in
②	0 Vdc in
③	RC
④	FG
⑤	+Vdc out
⑥	0 Vdc out
⑦	V. ADJ
⑧	NC

Voltage Adjustable Trimmer

KMS type

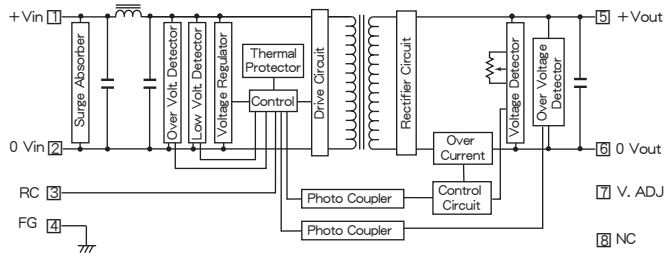


Terminal Outs

①	+Vdc in
②	0 Vdc in
③	RC
④	FG
⑤	+Vdc out
⑥	0 Vdc out
⑦	V. ADJ
⑧	NC

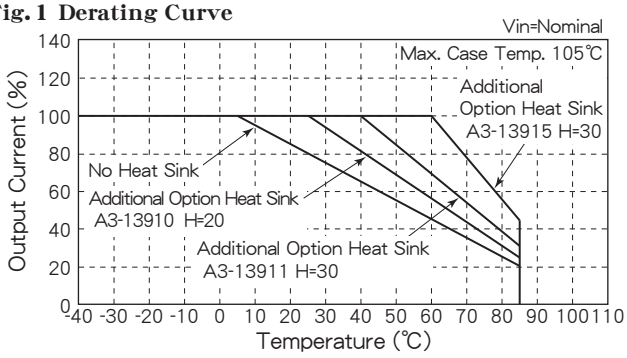
Voltage Adjustable Trimmer

■ Block Diagram



■ Characteristic Curves

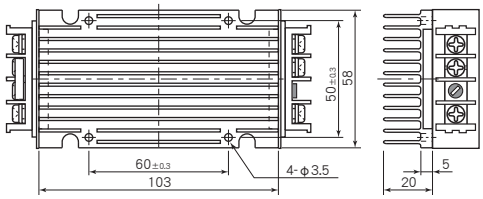
Fig. 1 Derating Curve



■ Option Heat Sink

Fig. 2 Temperature Characteristic on Case Surface

＊Option Heat Sink Model : A3-13910



KMU24-12S16.7A Additonal Heat Sink A3-13910
Ta=25℃, 100% Load, Vin=Nominal

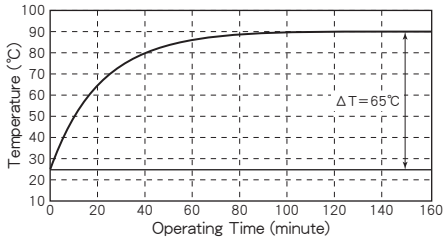
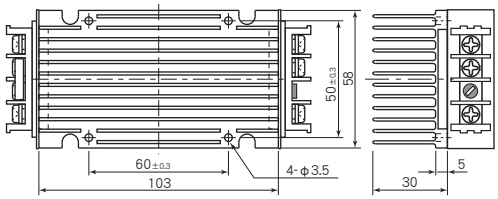


Fig. 3 Temperature Characteristic on Case Surface

＊Option Heat Sink Model : A3-13911



KMU24-12S16.7A Additonal Heat Sink A3-13911
Ta=25℃, 100% Load, Vin=Nominal

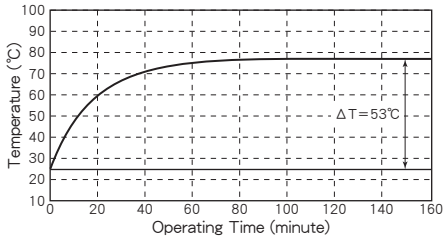
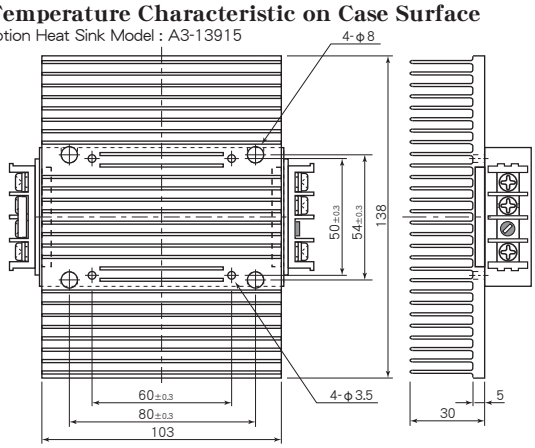
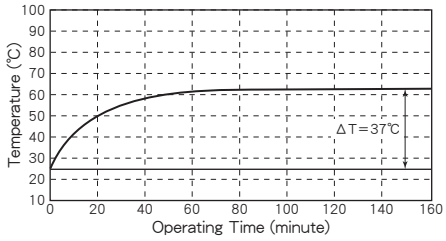


Fig. 4 Temperature Characteristic on Case Surface

＊Option Heat Sink Model : A3-13915



KMU24-12S16.7A Additonal Heat Sink A3-13915
Ta=25℃, 100% Load, Vin=Nominal



■ Characteristic Curves

Fig. 5 Short Circuit Operating Area

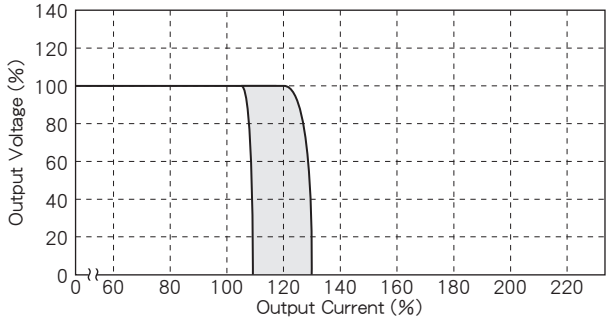


Fig. 6 Output Voltage vs. Output Current

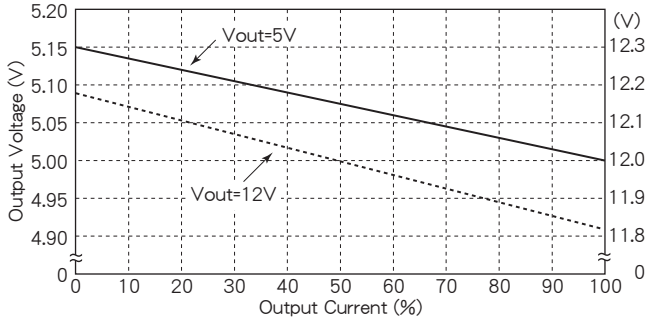


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Fig. 7 Efficiency vs. Output Current

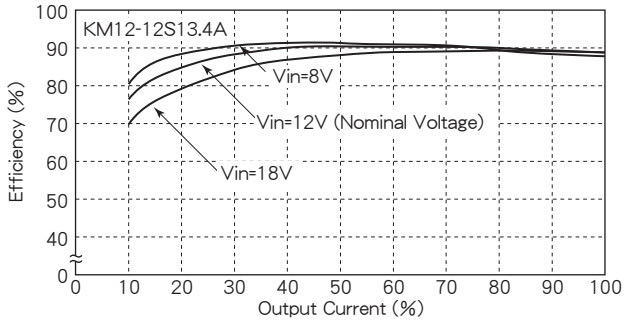


Fig. 8 Efficiency vs. Output Current

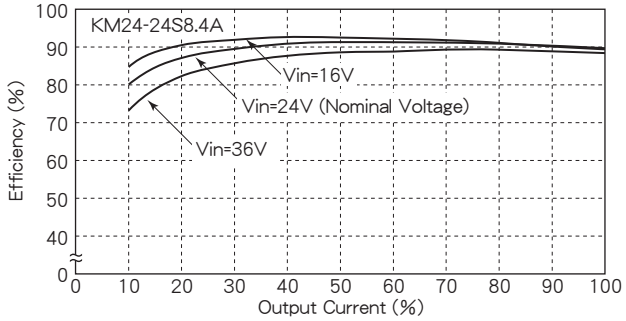


Fig. 9 Efficiency vs. Output Current

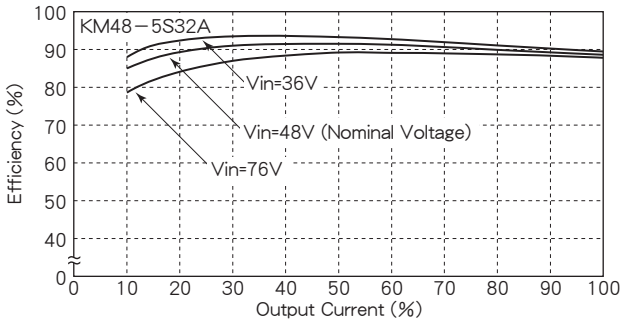


Fig. 10 Efficiency vs. Output Current

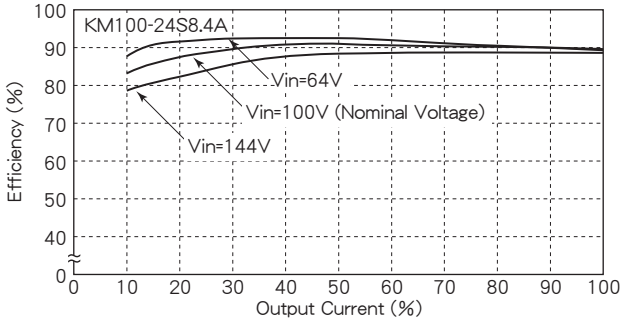
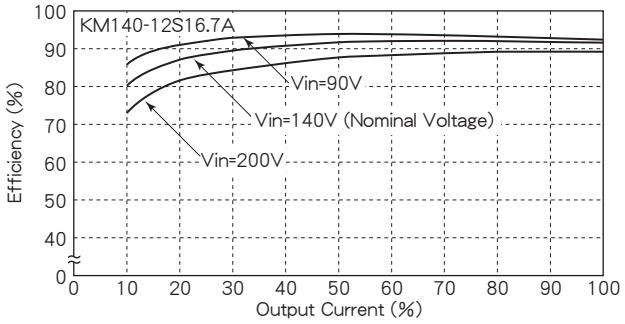


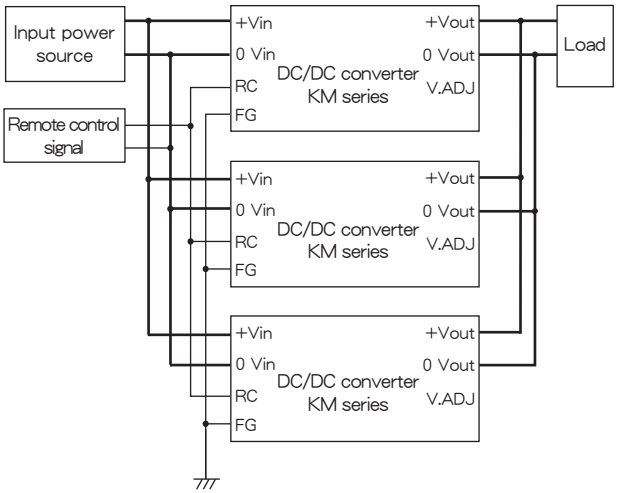
Fig. 11 Efficiency vs. Output Current



■ Parallel Operation

同機種を並列に動作させせることにより、出力電流容量を増やすことができます。下図のように結線し、各コンバータ間の出力電圧を同じ電圧に調整することで、並列運転ができます。(Fig. 12を御参照ください)
It is possible to increase output current capacity by parallel operation of the same model. Please see the below figure for wiring instruction. Parallel operation is possible by each outputs to be same voltage.

Fig. 12 Parallel Operation Connection



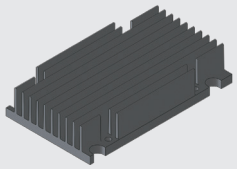
PM シリーズ

240～300W　DC/DCコンバータ
並列運転可能

PMS(端子横向きタイプ)

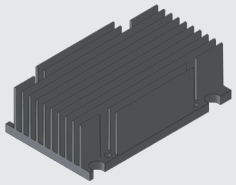
H20×W60×L120 (mm)

オプションヒートシンクA
A3-14777



H20×W58×L98(mm)

オプションヒートシンクB
A3-14778



H30×W58×L98(mm)

■特　長

- ●入力フィルタ内蔵
- ●入出力間絶縁(AC2000V)
- ●高効率　91～93%
- ●広範囲な入力電圧
- ●高信頼性
- ●可変出力電圧　±10%
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●出力過電圧保護回路内蔵
- ●過熱保護回路内蔵
  ＋110℃～＋120℃
- ●3台まで並列運転可能
- ●動作周囲温度
  －40℃～＋85℃
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び
  タンタルコンデンサ不使用

■仕　様

(周囲温度：25℃, 入力電圧：定格, 負荷：100%)

●入力電圧(範囲)	DC12, 24, 48, 100, 140V (表１参照)
●出力電圧, 電流	表１参照
●出力電圧調整範囲	±10%
●効率	表１参照
●対入力変動率	±0.3% max. (入力電圧範囲において)
●対負荷変動率	3% max. (0～100%負荷において) (図４参照)
●入力リップル・ノイズ	表２参照
●出力リップル・ノイズ	表３参照
●出力過電流保護	有り(図３参照), 自動復帰
●出力過電圧保護	出力電圧115～140%時, 手動復帰
●出力電圧温度係数	0.02%/℃ max.
●動作周囲温度範囲	－40℃～＋85℃ (図１参照)
●最大ケース温度	+105℃
●保存周囲温度範囲	－55℃～＋125℃
●絶縁耐圧	AC2000V　1分間 (入力－出力－ケース)
●絶縁抵抗	100MΩ min. (DC1000Vにて) (入力－出力－ケース)
●質量	本体：400g max. オプションヒートシンク A3-14777：135g max. A3-14778：175g max.
●湿度	20～95% RH
●衝撃	490m/s² (11ms X, Y, Z方向)
●振動	10～55Hz 98m/s² (30分間 X, Y, Z方向)
●構造	アルミケース
●MTBF	220,000H (周囲温度：25℃, 入力電圧：定格, 負荷：80%)
●無償保証期間	5年間

■型　式

表１

型式	入力電圧(電圧範囲)(V.DC)	出力電圧(V.DC)	出力電流(A)	効率(typ.)(%) 20%負荷	50%負荷	80%負荷
PMS　12－　12S　20A	12 (8～18) 50%負荷時 (9～18) 100%負荷時	12	20	87	91	91
PMS　12－13.8S 17.4A		13.8	17.4	88	91	91
PMS　12－　15S　16A		15	16	88	91	91
PMS　12－　24S　10A		24	10	88	91	91
PMS　12－　28S　8.6A		28	8.6	88	91	91
PMS　12－　48S　5A		48	5	88	91	91
PMS　24－　12S　25A	24 (16～36)	12	25	89	93	93
PMS　24－13.8S 21.7A		13.8	21.7	89	93	93
PMS　24－　15S　20A		15	20	89	93	93
PMS　24－　24S 12.5A		24	12.5	89	93	93
PMS　24－　28S 10.7A		28	10.7	89	93	93
PMS　24－　48S 6.25A		48	6.25	89	93	93
PMS　48－　12S　25A	48 (36～76)	12	25	89	93	93
PMS　48－13.8S 21.7A		13.8	21.7	89	93	93
PMS　48－　15S　20A		15	20	89	93	93
PMS　48－　24S 12.5A		24	12.5	89	93	93
PMS　48－　28S 10.7A		28	10.7	89	93	93
PMS　48－　48S 6.25A		48	6.25	89	93	93
PMS 100－　12S　25A	100 (64～144)	12	25	89	93	93
PMS 100－13.8S 21.7A		13.8	21.7	89	93	93
PMS 100－　15S　20A		15	20	89	93	93
PMS 100－　24S 12.5A		24	12.5	89	93	93
PMS 100－　28S 10.7A		28	10.7	89	93	93
PMS 100－　48S 6.25A		48	6.25	89	93	93
PMS 140－　12S　25A	140 (90～200)	12	25	89	93	93
PMS 140－13.8S 21.7A		13.8	21.7	89	93	93
PMS 140－　15S　20A		15	20	89	93	93
PMS 140－　24S 12.5A		24	12.5	89	93	93
PMS 140－　28S 10.7A		28	10.7	89	93	93
PMS 140－　48S 6.25A		48	6.25	89	93	93

＊上記仕様以外にも対応可能ですのでお問い合わせください。

表２ 入力電圧リップル・ノイズ

入力電圧(電圧範囲)(V.DC)	リップル(mVp-p max.)	ノイズ(mVp-p max.)
12 (9～18)	300	250
24 (16～36)	400	350
48 (36～76)	500	400
100 (64～144)	600	500
140 (90～200)	800	550

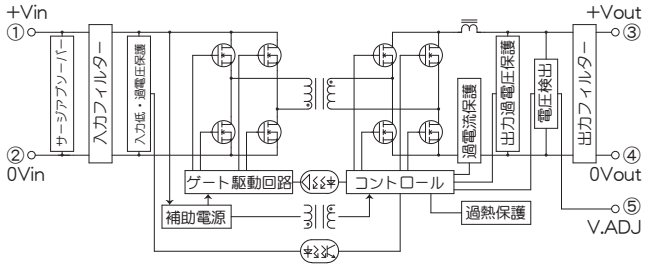
＊入力ラインは各1.5mツイスト線にて測定
＊使用環境によって異なります

表３ 出力電圧リップル・ノイズ

出力電圧(V.DC)	リップル(mVp-p max.)	ノイズ(mVp-p max.)
12	40	160
13.8	40	170
15	40	175
24	60	220
28	60	240
48	80	340

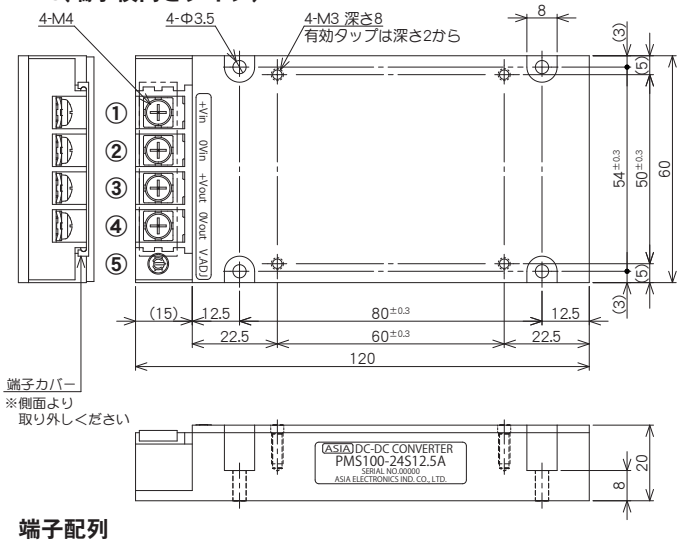
PM シリーズ　データシート

■ブロック図



■端子配列及び外形寸法 (±0.5mm)

PMS(端子横向きタイプ)

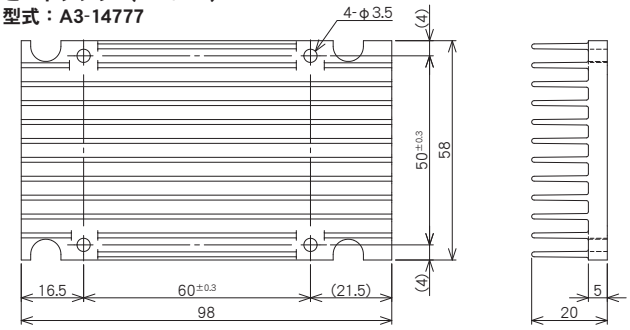


端子配列

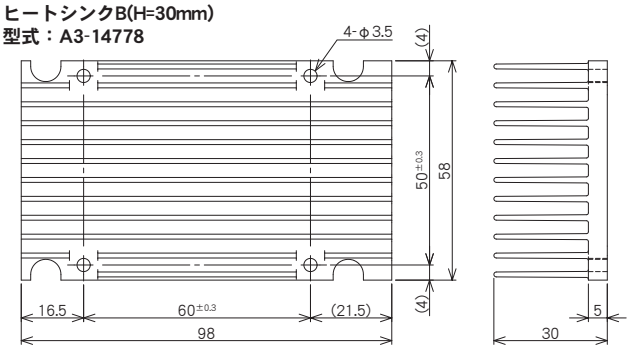
①	直流入力端子+Vin
②	直流入力端子 0 Vin
③	直流出力端子+Vout
④	直流出力端子 0 Vout
⑤	出力電圧調整ボリュームV.ADJ

■オプションヒートシンク (±0.5mm)

ヒートシンクA(H=20mm)
型式：A3-14777



ヒートシンクB(H=30mm)
型式：A3-14778



■特性データ

図1 ディレーティングカーブ

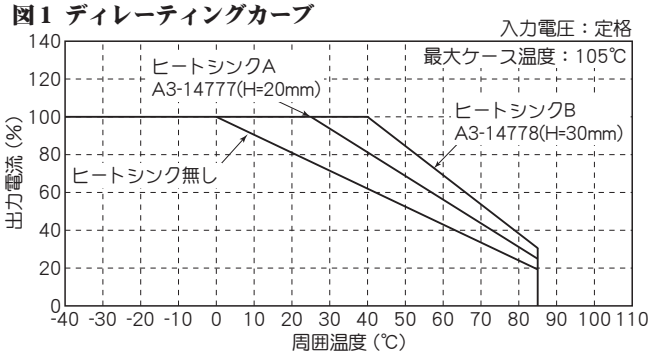


図2 温度上昇特性(ケース表面温度)【PMS100-24S12.5A】

図2.1 オプションヒートシンクを付けない場合

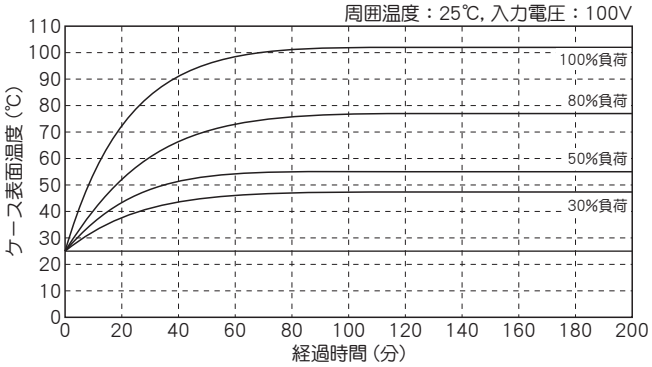


図2.2 オプションヒートシンクA(H=20mm) A3-14777 を付けた場合

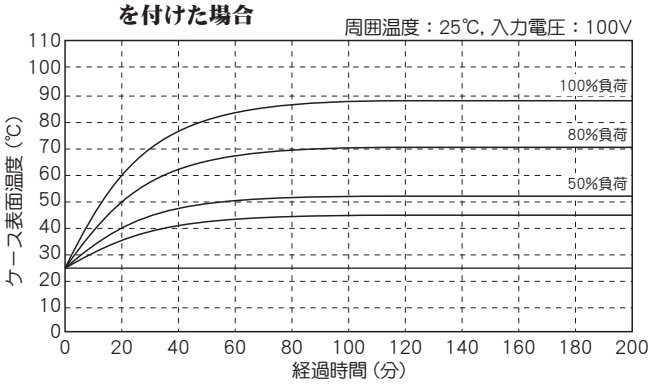
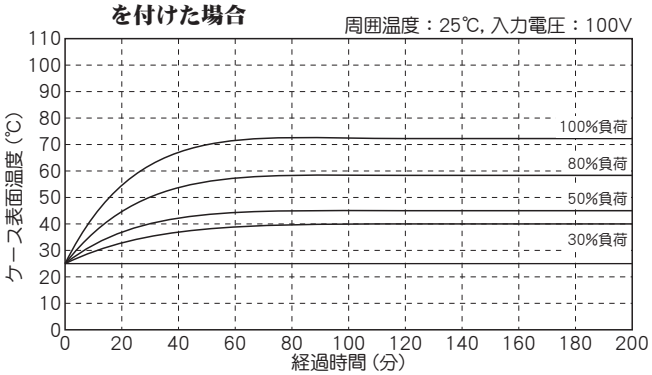


図2.3 オプションヒートシンクB(H=30mm) A3-14778 を付けた場合



■特性データ

図3 出力過電流保護範囲

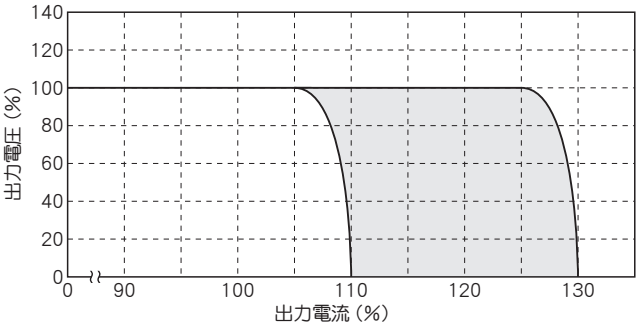
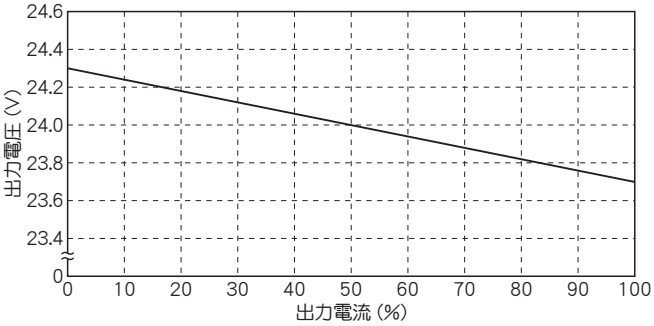


図4 出力電圧－出力電流特性【出力電圧：24V】



＊並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。

図5 効率－出力電流特性【PMS100-24S12.5A】

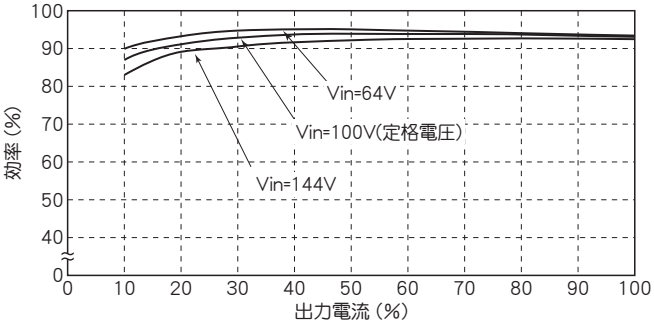


図6 入力電圧　リップル・ノイズ【PMS100-24S12.5A】

図6.1 入力電圧： 64V, 負荷：100%

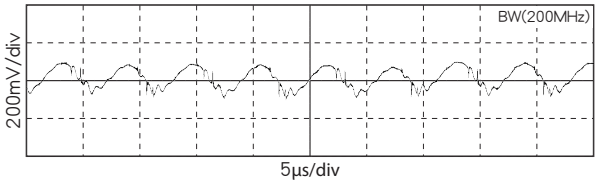


図6.2 入力電圧：100V, 負荷：100%

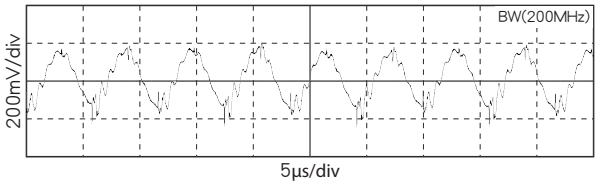


図6.3 入力電圧：144V, 負荷：100%

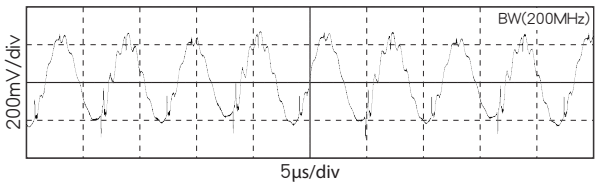


図7 出力電圧　リップル・ノイズ【PMS100-24S12.5A】

図7.1 入力電圧： 64V, 負荷：100%

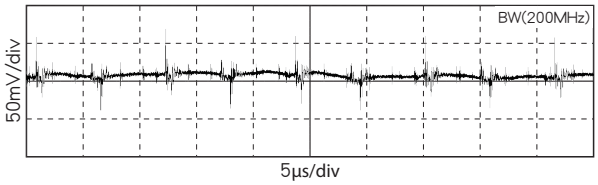


図7.2 入力電圧：100V, 負荷：100%

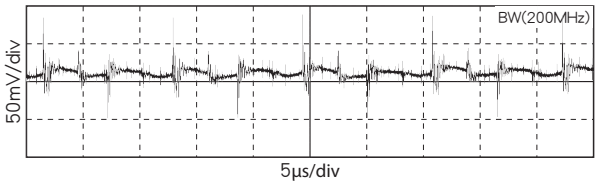
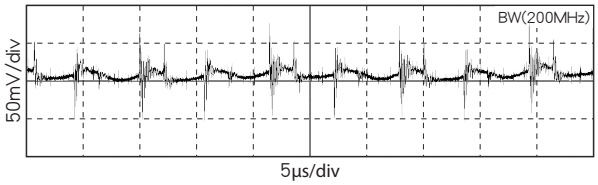


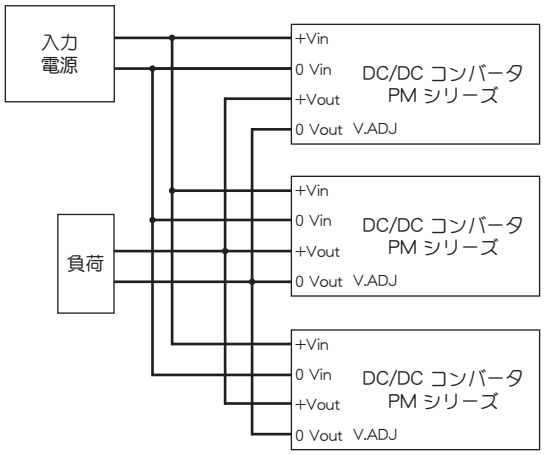
図7.3 入力電圧：144V, 負荷：100%



■ 並列運転

同機種を並列に動作させることにより、出力電流容量を増やすことができます。下図のように結線し、各コンバータ間の出力電圧を同じ電圧に調整することで、並列運転ができます。図８を参照ください。

図８ 並列運転時結線方法



RDP SERIES

130～250W DC/DC CONVERTERS
Single Output

並列運転可能
Parallel Operation

H36×W100×L220 (mm)

■ Features

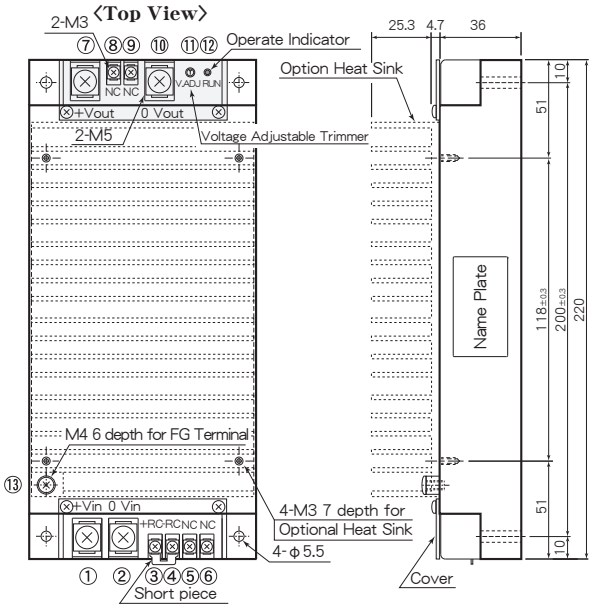
- ●Wide Input Voltage Range ●広範囲な入力電圧範囲
- ●High Efficiency 85%～92% ●高効率 85%～92%
- ●Input-Output Isolation (AC2000V) ●入出力間絶縁 (AC2000V)
- ●Low Output Ripple and Noise ●出力ﾘｯﾌﾟﾙ,ﾉｲｽﾞが小さい
- ●Possible Parallel Operation up to 4 converters ●4台まで並列運転可能
- ●Remote ON/OFF Control ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ機能
- ●Input Rush Current Protection ●入力突入電流保護回路内蔵
- ●Input Low Voltage Protection ●入力低電圧保護回路内蔵
- ●Input Over Voltage Protection ●入力過電圧保護回路内蔵
- ●Output Over Voltage Protection 120%～140% Operation ●出力過電圧保護回路内蔵 120%～140%動作
- ●Operating Ambient Temp −25℃～+71℃ ●動作周囲温度 −25℃～+71℃
- ●Max. Case Temperature +85℃ ●最大ケース温度+85℃
- ●Conformity to RoHS2 Directive ●RoHS2指令対応

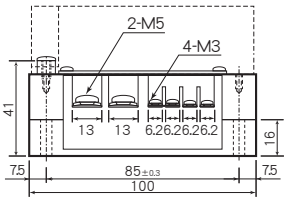
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC 12, 24, 48, 96V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Adjustment	-3～+10%
●Efficiency	See Table 1
●Line Regulation	0.2% max. (at Vin Range)
●Load Regulation	±1.5% typ. (0～100% Load) (See Fig. 8)
●Output Ripple	(0.1% Vout+50mV) p-p max.
●Output Noise	(0.5% Vout+50mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Output Over Voltage Protection	Built-in, Shut-down (120%～140% Vout)
●Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V (Between terminal ③ ～ ④)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−25℃～+71℃ (See Fig. 1)
●Max. Case Temp.	+85℃
●Storage Temp.	−40℃～+85℃
●Isolation Voltage	AC2000V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 1.8kg max. Heat Sink : 400g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	JIS E4031 Category 1 - Class B
●Surface Structure	Aluminum Case
●MTBF	100,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)





＊Option Heat Sink Model : A3-9023

Terminal Outs and Function

①	+Vdc in	⑦	+Vdc out
②	0 Vdc in	⑧	NC
③	+RC	⑨	NC
④	−RC	⑩	0 Vdc out
⑤	NC	⑪	V.ADJ
⑥	NC	⑫	Operate Indicator
		⑬	FG

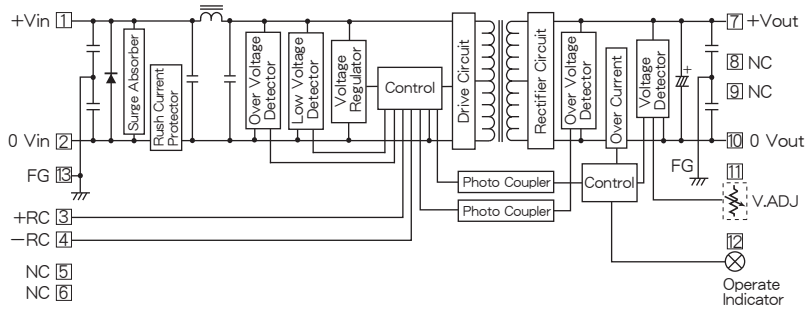
■ Selection Guide

Table 1

Model Number	Input Voltage (Range) (V. DC)	Input Rush Current (max.)(A)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%) 20% Load	Efficiency (typ.) (%) 80% Load
RDP12 - 3.3S 40A	12 (9～18)	62	3.3	40	85	85
RDP12 - 5S 40A			5	40	86	87
RDP12 - 12S 20.8A			12	20.8	88	89
RDP12 -13.8S 18.1A			13.8	18.1	88	89
RDP12 - 15S 16.7A			15	16.7	88	89
RDP12 - 24S 10.5A			24	10.5	89	89
RDP12 - 48S 5.3A			48	5.3	89	90
RDP12 - 100S 2.5A			100	2.5	89	90
RDP12 - 140S 1.8A			140	1.8	89	89
RDP12 - 200S 1.3A			200	1.3	89	90
RDP12 - 300S 0.85A			300	0.85	89	90
RDP24 - 3.3S 40A	24 (18～36)	31	3.3	40	86	87
RDP24 - 5S 40A			5	40	87	88
RDP24 - 12S 20.8A			12	20.8	88	91
RDP24 -13.8S 18.1A			13.8	18.1	88	91
RDP24 - 15S 16.7A			15	16.7	88	90
RDP24 - 24S 10.5A			24	10.5	88	91
RDP24 - 48S 5.3A			48	5.3	89	91
RDP24 - 100S 2.5A			100	2.5	89	92
RDP24 - 140S 1.8A			140	1.8	90	91
RDP24 - 200S 1.3A			200	1.3	90	91
RDP24 - 300S 0.85A			300	0.85	91	92
RDP48 - 3.3S 40A	48 (36～72)	16	3.3	40	86	87
RDP48 - 5S 40A			5	40	88	90
RDP48 - 12S 20.8A			12	20.8	88	91
RDP48 -13.8S 18.1A			13.8	18.1	88	91
RDP48 - 15S 16.7A			15	16.7	88	91
RDP48 - 24S 10.5A			24	10.5	88	91
RDP48 - 48S 5.3A			48	5.3	89	91
RDP48 - 100S 2.5A			100	2.5	89	91
RDP48 - 140S 1.8A			140	1.8	89	91
RDP48 - 200S 1.3A			200	1.3	89	91
RDP48 - 300S 0.85A			300	0.85	89	91
RDP96 - 3.3S 40A	96 (70～144)	8	3.3	40	86	87
RDP96 - 5S 40A			5	40	88	90
RDP96 - 12S 20.8A			12	20.8	88	91
RDP96 -13.8S 18.1A			13.8	18.1	88	91
RDP96 - 15S 16.7A			15	16.7	88	91
RDP96 - 24S 10.5A			24	10.5	88	92
RDP96 - 48S 5.3A			48	5.3	88	92
RDP96 - 100S 2.5A			100	2.5	88	92
RDP96 - 140S 1.8A			140	1.8	89	91
RDP96 - 200S 1.3A			200	1.3	89	91
RDP96 - 300S 0.85A			300	0.85	89	91

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

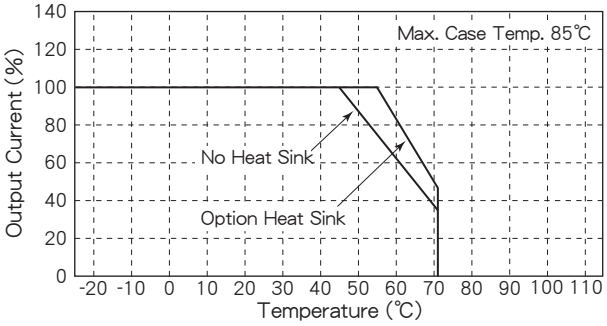


Fig. 2 Short Circuit Operating Area

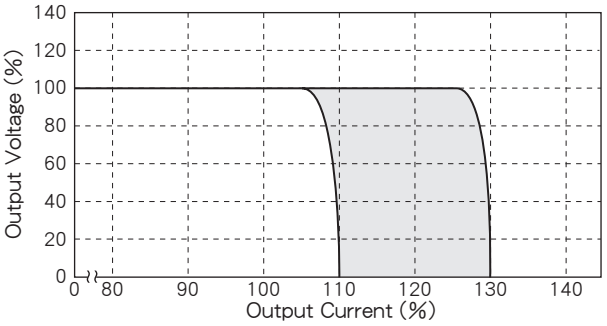


Fig. 3 Temperature Characteristic on Case Surface

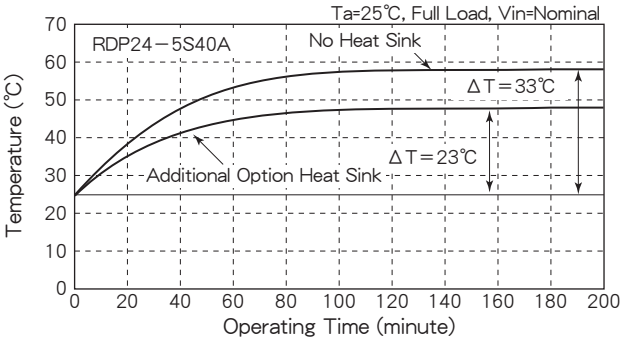


Fig. 4 Efficiency vs. Output Current

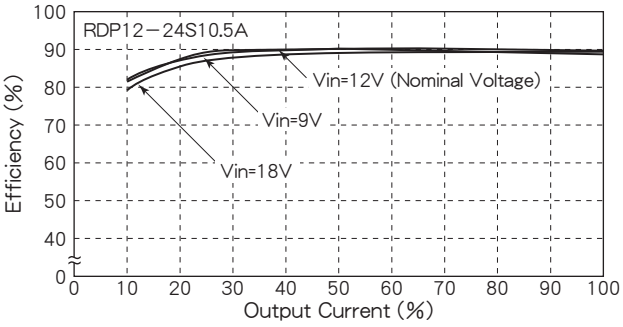


Fig. 5 Efficiency vs. Output Current

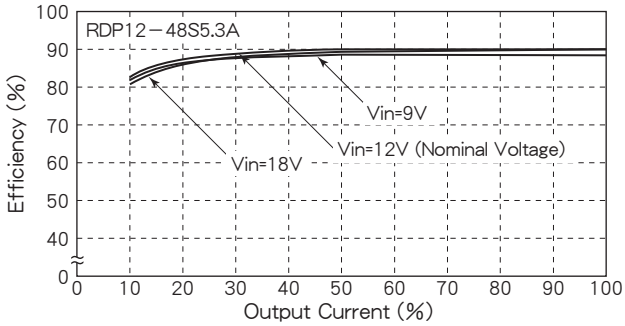


Fig. 6 Efficiency vs. Output Current

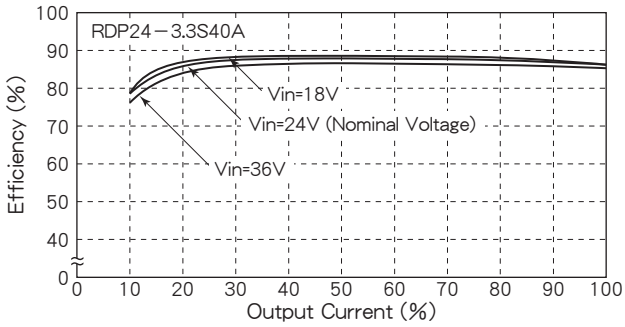


Fig. 7 Efficiency vs. Output Current

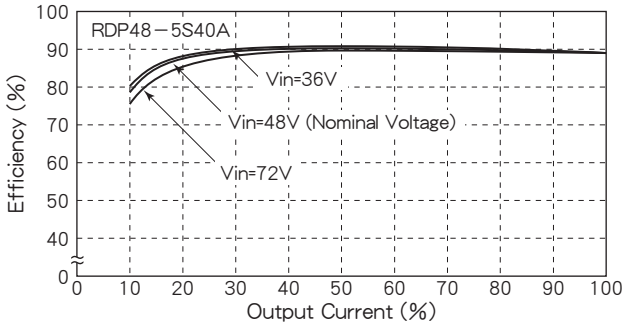
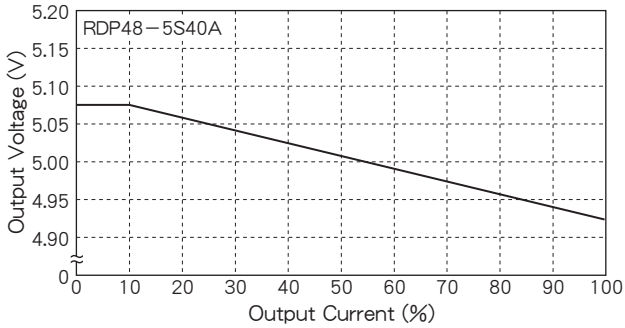


Fig. 8 Output Voltage vs. Output Current



＊並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。
Load Regulation is regulated large on purpose to equate the each unit's output current at parallel operation.

■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。
Output will be shut down in the input voltages on the following table. Output will automatically be reset when the input voltage comes to within the specified value.

定格入力電圧 Rated input voltage	低電圧保護 Low voltage protection	過電圧保護 Over voltage protection
12V (9～18V)	6～8V	20～22V
24V (18～36V)	12～16V	40～44V
48V (36～72V)	24～32V	75～82V
96V (70～144V)	48～64V	150～165V

2. 出力電圧値 Output voltage
出力電圧値はボリューム(V.ADJ)を回転させることにより、定格出力電圧の約－3%～+10%可変することができます。
Output voltage will be adjusted to -3% - +10% of rated voltage by means of volume (V.ADJ).

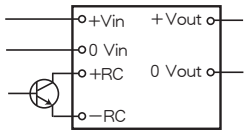
3. 出力過電流保護 Output over current protection
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約105%～130%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 105 - 130% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

4. 出力過電圧保護 Output over voltage protection
出力の過電圧から負荷側を保護する機能です。出力電圧値が定格値の約120～140%になると出力をOFFします。
This function is to protect a load from output over voltage. Output will be shut down when output voltage is 120 - 140% of rated voltage.

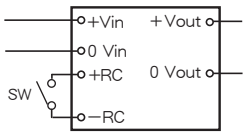
5. リモートON/OFFコントロール Remote ON/OFF control
リモートON/OFFコントロールを使用して、電源の出力をON/OFFする事ができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFする事ができます。RC端子は入力側にあり、入力電源回路とは絶縁されていません。ON/OFFコントロールを使用しないときは、＋RC端子と－RC端子を付属のショートピンで短絡させて下さい。
Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. RC terminals are located on the input side and the circuit is not isolated from input power source circuit. In case you don't use ON/OFF control, please short-circuit ＋RC and －RC terminals by means of attached short-bar.

＊回路構成例 Example of ON/OFF control circuit

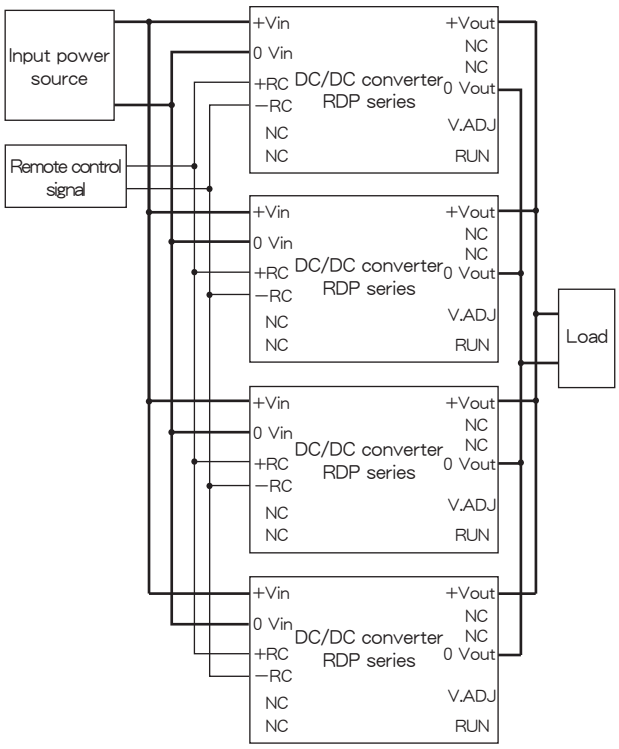
●TRによる例 Example by transistor



●SWによる例 Example by switch



6. 並列運転 Parallel operation
同機種を並列に動作させることにより出力電流容量を増やすことができます。
並列運転は 4 台まで接続可能です。
It is possible to increase output current capacity by means of parallel operation of the same medel. Please see the figure below for wiring instructions.
Parallel operation is possible up to 4 converters.



7. 入力側ヒューズ Input side fuse
電源の破損に備えて、必ず入力側にヒューズ又はブレーカーを使用してください。電流容量は表 1 の突入電流値を参考にしてください。
Please insert a fuse or a circuit breaker to prevent possible damage of converter. Please refer to Table 1 (rush current) to select proper current capacity of fuse or circuit breaker.

VD SERIES

500W DC/DC CONVERTERS
Single Output

並列運転可能
Parallel Operation

H40×W100×L220 (mm)

■ Features

- ●High Output 500W
- ●High Efficiency 89%～93%
- ●Input-Output Isolation (AC2000V)
- ●Possible Parallel Operation up to 4 converters
- ●Remote ON/OFF Control
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Thermal Protection ＋110℃～＋120℃
- ●Cooling by mounting on Chassis or using Heat Sink
- ●Conformity to RoHS2 Directive
- ●No built-in aluminum and tantalum electrolytic capacitor

- ●高出力 500W
- ●高効率 89%～93%
- ●入出力間絶縁 (AC2000V)
- ●4台まで並列運転可能
- ●リモートON/OFFコントロール
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●過熱保護回路内蔵 ＋110℃～＋120℃
- ●シャーシ上又はヒートシンクの取付により放熱
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

●Input Voltage, Range	DC 12, 24, 48, 96, 200, 300, 400V (See Table 1)
●Output Voltage, Current	See Table 1
●Output Voltage Adjustment	±5%
●Efficiency	See Table 1
●Line Regulation	0.3% max. (at Vin Range)
●Load Regulation	3.0% typ. (0～100% Load) (See Fig. 4)
●Output Ripple	(1.0% Vout) p-p max.
●Output Noise	(0.5% Vout+100mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Output Over Voltage Protection	Built-in, Shut-down (120%～140% Vout)
●Remote ON/OFF Control	ON ： Short or 0～0.8V OFF： Open or 2～10V (Between terminal ③ ～ ④)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	－40℃～＋85℃ (See Fig. 1)
●Max. Case Temp.	＋105℃
●Storage Temp.	－40℃～＋115℃
●Isolation Voltage	AC2000V one minute (Input－Output－Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
●Weight	Main Body : 2.1kg max. Heat Sink : 500g max.
●Humidity	20～95% RH
●Shock	490m/s^2 (11msec 3directions)
●Vibration	JIS E4031 Category 1 - Class B
●Surface Structure	Aluminum Case
●MTBF	160,000H (Ta：25℃, 80% Load, Nominal Vin)
●Warranty	5 years

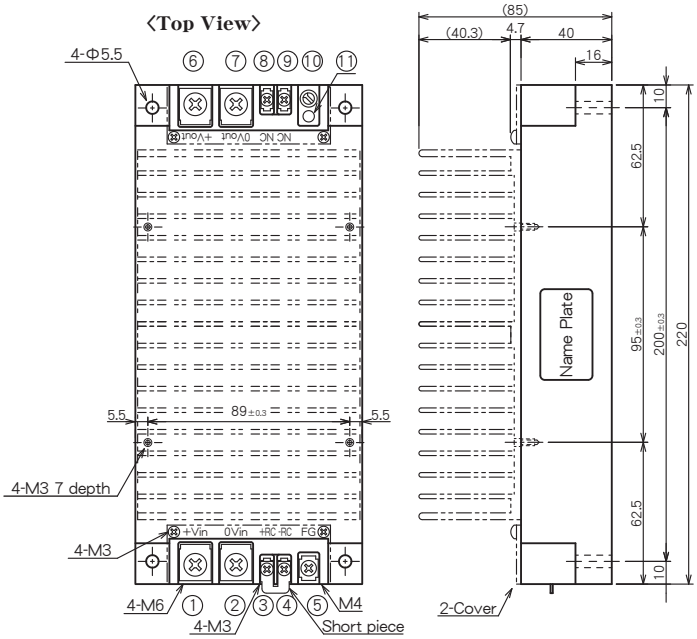
■ Selection Guide

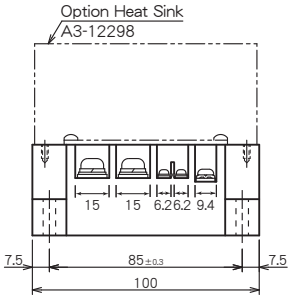
Table 1

Model Number	Input Voltage (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%) 20% Load	Efficiency (typ.) (%) 80% Load
VD12 - 12S 42A	12 (9～18)	12	42	91	90
VD12 - 13.8S 36A		13.8	36	91	90
VD12 - 15S 33A		15	33	91	89
VD12 - 24S 21A		24	21	91	89
VD12 - 28S 18A		28	18	91	89
VD12 - 48S 10.5A		48	10.5	91	91
VD12 - 100S 5A		100	5	90	91
VD12 - 140S 3.6A		140	3.6	90	90
VD12 - 200S 2.5A		200	2.5	90	90
VD12 - 300S 1.7A		300	1.7	89	89
VD12 - 400S 1.25A		400	1.25	89	89
VD24 - 12S 42A	24 (18～36)	12	42	91	91
VD24 - 13.8S 36A		13.8	36	91	91
VD24 - 15S 33A		15	33	91	90
VD24 - 24S 21A		24	21	91	90
VD24 - 28S 18A		28	18	91	90
VD24 - 48S 10.5A		48	10.5	91	92
VD24 - 100S 5A		100	5	91	92
VD24 - 140S 3.6A		140	3.6	90	91
VD24 - 200S 2.5A		200	2.5	90	91
VD24 - 300S 1.7A		300	1.7	89	90
VD24 - 400S 1.25A		400	1.25	89	90
VD48 - 12S 42A	48 (36～75)	12	42	89	91
VD48 - 13.8S 36A		13.8	36	89	91
VD48 - 15S 33A		15	33	89	90
VD48 - 24S 21A		24	21	89	91
VD48 - 28S 18A		28	18	89	91
VD48 - 48S 10.5A		48	10.5	89	93
VD48 - 100S 5A		100	5	88	93
VD48 - 140S 3.6A		140	3.6	88	92
VD48 - 200S 2.5A		200	2.5	88	92
VD48 - 300S 1.7A		300	1.7	88	91
VD48 - 400S 1.25A		400	1.25	88	91
VD96 - 12S 42A	96 (70～144)	12	42	89	91
VD96 - 13.8S 36A		13.8	36	89	91
VD96 - 15S 33A		15	33	89	90
VD96 - 24S 21A		24	21	89	91
VD96 - 28S 18A		28	18	89	91
VD96 - 48S 10.5A		48	10.5	89	93
VD96 - 100S 5A		100	5	88	93
VD96 - 140S 3.6A		140	3.6	88	92
VD96 - 200S 2.5A		200	2.5	88	92
VD96 - 300S 1.7A		300	1.7	88	91
VD96 - 400S 1.25A		400	1.25	88	91
VD200 - 12S 42A	200 (150～300)	12	42	89	91
VD200 - 13.8S 36A		13.8	36	89	91
VD200 - 15S 33A		15	33	89	90
VD200 - 24S 21A		24	21	89	91
VD200 - 28S 18A		28	18	89	91
VD200 - 48S 10.5A		48	10.5	89	93
VD200 - 100S 5A		100	5	88	93
VD200 - 140S 3.6A		140	3.6	88	92
VD200 - 200S 2.5A		200	2.5	88	92
VD200 - 300S 1.7A		300	1.7	88	91
VD200 - 400S 1.25A		400	1.25	88	91
VD300 - 12S 42A	300 (225～450)	12	42	88	91
VD300 - 13.8S 36A		13.8	36	88	91
VD300 - 15S 33A		15	33	88	90
VD300 - 24S 21A		24	21	88	91
VD300 - 28S 18A		28	18	88	91
VD300 - 48S 10.5A		48	10.5	88	93
VD300 - 100S 5A		100	5	87	93
VD300 - 140S 3.6A		140	3.6	87	92
VD300 - 200S 2.5A		200	2.5	87	92
VD300 - 300S 1.7A		300	1.7	87	91
VD300 - 400S 1.25A		400	1.25	87	91
VD400 - 12S 42A	400 (300～600)	12	42	87	91
VD400 - 13.8S 36A		13.8	36	87	91
VD400 - 15S 33A		15	33	87	90
VD400 - 24S 21A		24	21	87	91
VD400 - 28S 18A		28	18	87	91
VD400 - 48S 10.5A		48	10.5	87	93
VD400 - 100S 5A		100	5	86	93
VD400 - 140S 3.6A		140	3.6	86	92
VD400 - 200S 2.5A		200	2.5	86	92
VD400 - 300S 1.7A		300	1.7	86	91
VD400 - 400S 1.25A		400	1.25	86	91

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Terminal Outs & Dimensions (±0.5mm)





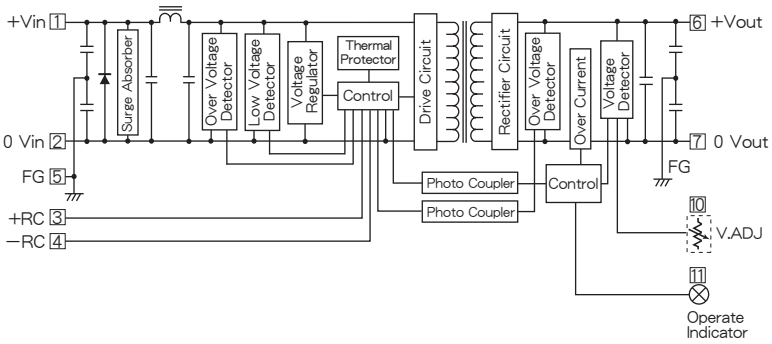
Terminal Outs and Function

①	+Vdc in	⑥	+Vdc out
②	0 Vdc in	⑦	0 Vdc out
③	+RC	⑧	NC
④	−RC	⑨	NC
⑤	FG	⑩	V.ADJ
		⑪	Operate Indicator

Voltage Adjustable Trimmer

＊Option Heat Sink Model : A3-12298

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

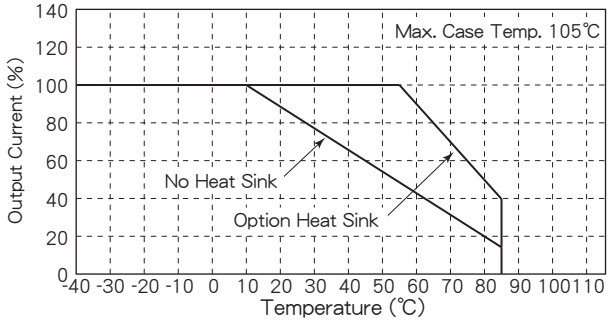


Fig. 2 Short Circuit Operating Area

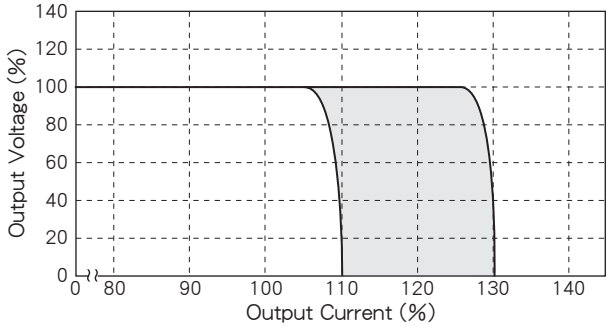


Fig. 3 Temperature Characteristic on Case Surface

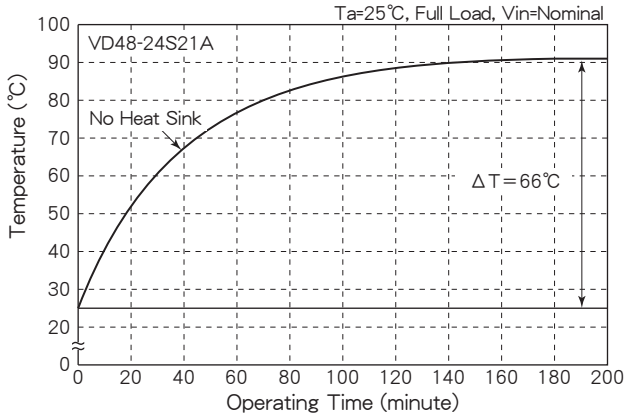
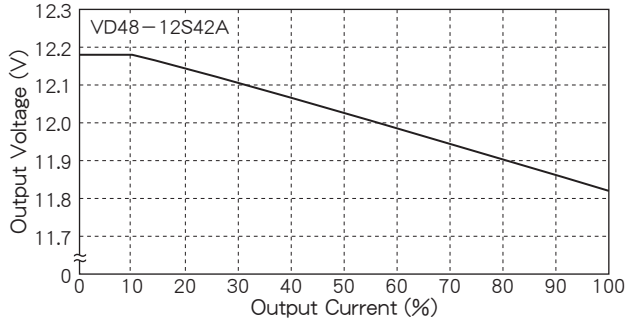


Fig. 4 Output Voltage vs. Output Current



＊並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。
Load Regulation is regulated large on purpose to equate
the each unit's output current at parallel operation.

Fig. 5 Efficiency vs. Output Current

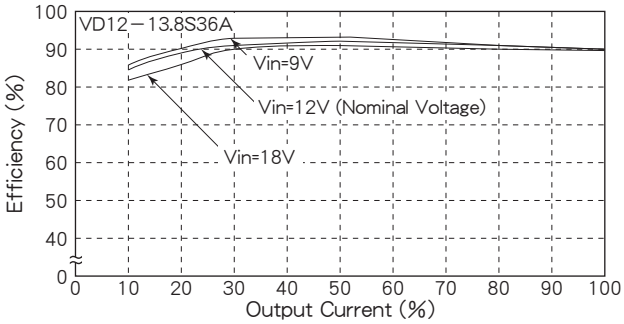


Fig. 6 Efficiency vs. Output Current

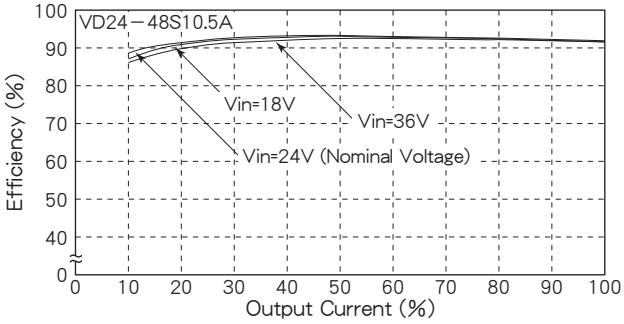


Fig. 7 Efficiency vs. Output Current

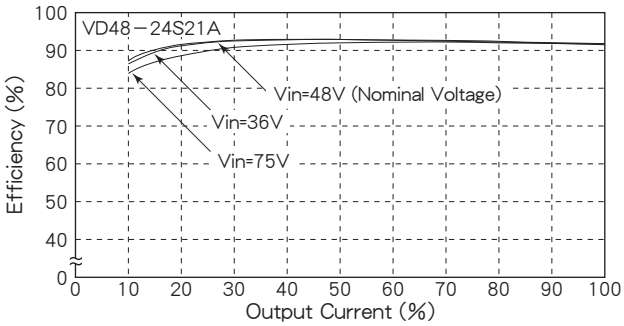
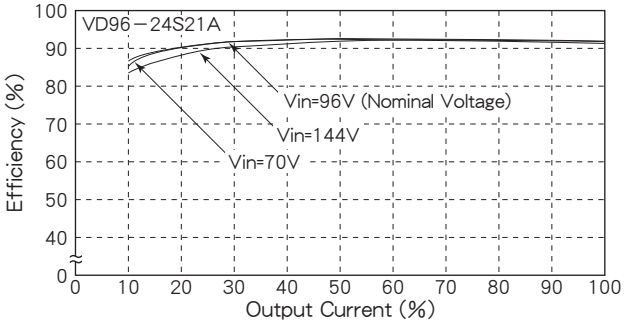


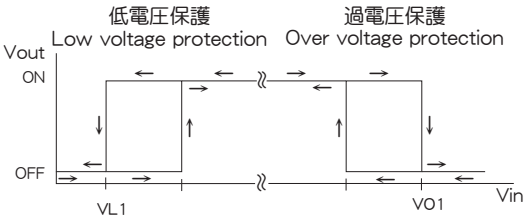
Fig. 8 Efficiency vs. Output Current



■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
入力が定格範囲外になると出力を停止します。範囲内に戻すと自動復帰します。またヒステリシス特性を有しています。
This function stops output if input is out of the rated voltage range and restarts output automatically in the rating votage range. It also has hysteresis characteristic.

ヒステリシス特性　Hysteresis Characteristic



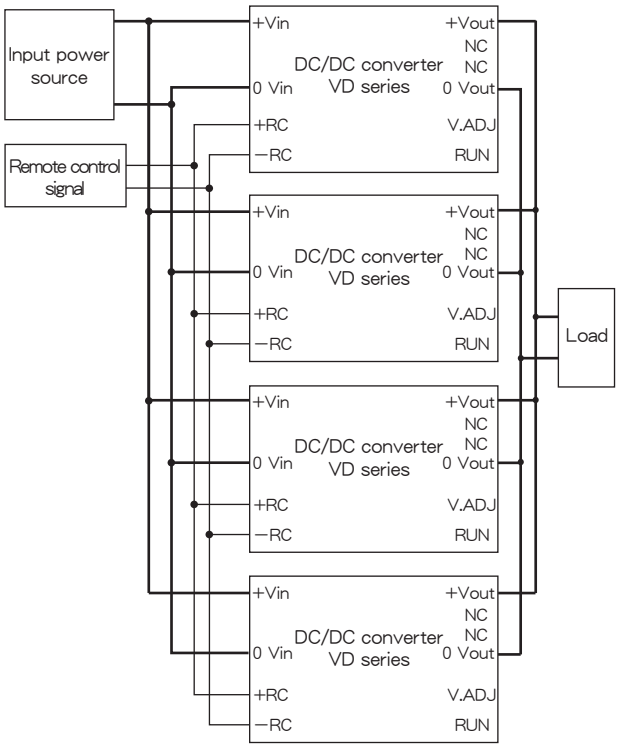
定格入力電圧 Rated input voltage	低電圧保護 Low voltage protection VL1	過電圧保護 Over voltage protection VO1
12V (9～ 18V)	6～8V	20～22V
24V (18～ 36V)	12～16V	40～44V
48V (36～ 75V)	24～32V	80～88V
96V (70～144V)	48～64V	152～160V
200V (150～300V)	100～133V	316～333V
300V (225～450V)	150～200V	474～500V
400V (300～600V)	200～266V	633～666V

2. 出力電圧値 Output voltage
出力電圧値はボリューム(V.ADJ)を回転させることにより、定格出力電圧の約±5%可変することができます。
Output voltage will be adjusted to ±5% of rated voltage by means of volume (V.ADJ).

3. 出力過電流保護 Output over current protection
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約105%～130%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 105 - 130% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

4. 出力過電圧保護 Output over voltage protection
出力の過電圧から負荷側を保護する機能です。出力電圧値が定格値の約120～140%になると出力をOFFします。
This function is to protect a load from output over voltage. Output will be shut down when output voltage is 120 - 140% of rated voltge.

5. 並列運転 Parallel operation
同機種を並列に動作させることにより出力電流容量を増やすことができます。
並列運転は 4 台まで接続可能です。
It is possible to increase output current capacity by means of parallel operation of the same medel. Please see the figure below for wiring instructions.
Parallel operation is possible up to 4 converters.



6. リモートON/OFFコントロール Remote ON/OFF control
リモートON/OFFコントロールを使用して、電源の出力をON/OFFする事ができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFする事ができます。RC端子は入力側にあり、入力電源回路とは絶縁されていません。ON/OFFコントロールを使用しないときは、＋RC端子と－RC端子を付属のショートピンで短絡させて下さい。
Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. RC terminals are located on the input side and the circuit is not isolated from input power source circuit. In case you don't use ON/OFF control, please short-circuit ＋RC and －RC terminals by means of attached short-bar.

＊回路構成例 Example of ON/OFF control circuit

●TRによる例 Example by transistor　●SWによる例 Example by switch

XD SERIES NEW

1000W DC/DC CONVERTERS Single Output

並列運転可能
Parallel Operation

H55×W120×L280 (mm)

■ Features

- High Output 1000W
- High Efficiency 89%～93%
- Input-Output Isolation (AC2000V)
- Possible Parallel Operation up to 4 converters
- Remote ON/OFF Control
- Input Low Voltage Protection
- Input Over Voltage Protection
- Thermal Protection ＋110℃～＋120℃
- Cooling by mounting on Chassis or using Heat Sink
- Conformity to RoHS2 Directive
- No aluminum electrolytic capacitor and no tantalum capacitor are used.
- Built-in Input Fuse

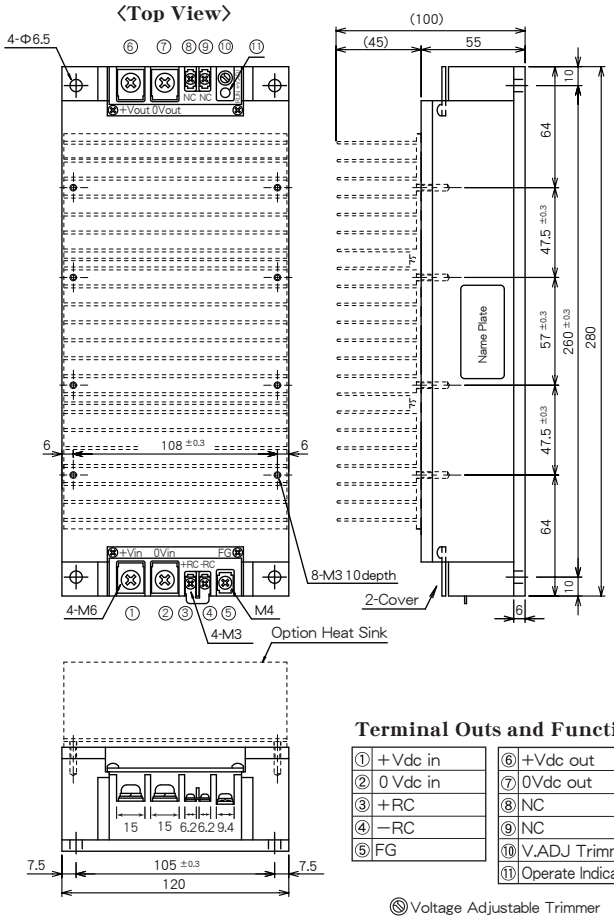
- 高出力 1000W
- 高効率 89%～93%
- 入出力間絶縁 (AC2000V)
- 4台まで並列運転可能
- リモートON/OFFコントロール
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 過熱保護回路内蔵 ＋110℃～＋120℃
- シャーシ上又はヒートシンクの取付により放熱
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用
- 入力ヒューズ内蔵

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

● Input Voltage, Range	DC 100, 200, 300, 400, 600V (See Table 1)
● Output Voltage, Current	See Table 1
● Output Voltage Adjustment	±5%
● Efficiency	See Table 1
● Line Regulation	0.3% max. (at Vin Range)
● Load Regulation	3.0% typ. (0～100% Load)
● Output Ripple	200mV p-p max.
● Output Noise	500mV p-p max.
● Short Circuit Protection	Built-in, Auto-restart
● Output Over Voltage Protection	Built-in, Shut-down (120%～140% Vout)
● Remote ON/OFF Control	ON : Short OFF : Open (Between pin ③ ～ ④)
● Temperature Coefficient	0.02%／℃ max.
● Operating Ambient Temp.	－40℃～＋85℃
● Max. Case Temp.	＋105℃
● Storage Temp.	－40℃～＋115℃
● Isolation Voltage	AC2000V one minute (Input－Output－Case)
● Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
● Weight	Main Body : 4.2kg max. Heat sink : 600g max.
● Humidity	20～95% RH
● Shock	490m/s² (11msec 3directions)
● Vibration	JIS E4031 Category 1 - Class B
● Surface Structure	Aluminium Case
● MTBF	120,000H (Ta : 25℃, 80%Load, Nominal Vin)
● Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)



Terminal Outs and Function

① ＋Vdc in	⑥ ＋Vdc out
② 0 Vdc in	⑦ 0Vdc out
③ ＋RC	⑧ NC
④ －RC	⑨ NC
⑤ FG	⑩ V.ADJ Trimmer
	⑪ Operate Indicator

Ⓢ Voltage Adjustable Trimmer

＊Option Heat Sink Model : A3-15568

■ Selection Guide

Table 1

Model Number	Input Voltage (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%) 20% Load	Efficiency (typ.) (%) 80% Load
XD100 - 24S42A	100(70～144)	24	42	89	93
XD200 - 24S42A	200(150～300)	24	42	89	93
XD300 - 24S42A	300(225～450)	24	42	89	93
XD400 - 24S42A	400(300～600)	24	42	89	93
XD600 - 24S42A	600(420～730)	24	42	89	93

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

LC SERIES

12～15W　AC-DC スイッチング電源

H20×W40×L60 (mm)

■ Features

- ● Input-Output Isolation　● 入出力間絶縁
- ● Completely Molding Device　● 完全モールド製品
- ● High Efficiency 75～85%　● 高効率　75～85%
- ● High Reliability　● 高信頼性
- ● 6 Sided Metal Shielding　● 6面メタルシールド
- ● Operating Ambient Temperature −30℃～+71℃　● 動作周囲温度 −30℃～+71℃
- ● VCCI Class B　● VCCI クラスB 準拠
- ● Conformity to RoHS2 Directive　● RoHS2指令対応

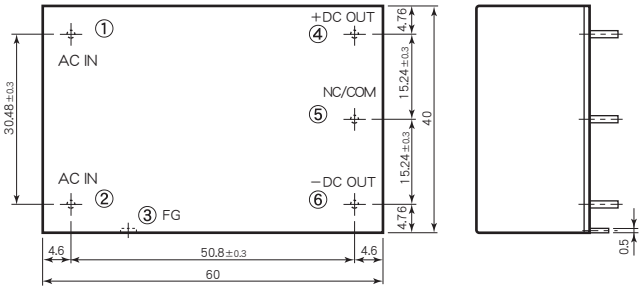
■ General Characteristics

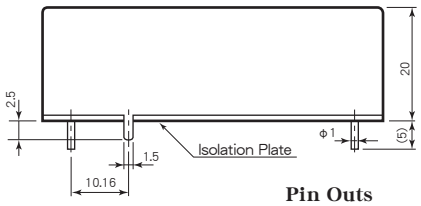
(at Ta : 25℃, Full Load, Nominal Vin)

● Input Voltage, Range	AC100, 200V (See Table 1)
● Input Frequency	47～440Hz
● Output Voltage, Current	See Table 1
● Output Voltage Accuracy	±2% ±3% (3.3, 5V Vout only)
● Efficiency	See Table 1
● Line Regulation	0.5% max. (at Vin Range)
● Load Regulation	Single : ±0.5% max. (0～100% Load) Dual : ±2% max. ±3% max. (±5V Vout only) (10～100% Load)
● Output Ripple	(0.2% Vout+40mV) p-p max.
● Output Noise	(0.5% Vout+50mV) p-p max.
● Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
● Input Rush Current	20A max.
● Temperature Coefficient	0.02%/℃ max.
● Operating Ambient Temp.	−30℃～+71℃ (See Fig. 1)
● Max. Case Temperature	+85℃
● Storage Temperature	−40℃～+85℃
● Isolation Voltage	AC1500V one minute (Input−Output−Case)
● Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
● Weight	120g max.
● Humidity	20～95% RH
● Shock	490m/s² (11msec 3directions)
● Vibration	10～55Hz 98m/s² (30minutes 3directions)
● Surface Structure	6 Sided Metal Case
● Soldering Conditions	
Soldering DIP	260℃, for 15 seconds max.
Soldering iron	360℃, for 5 seconds max.
● MTBF	Single : 140,000H Dual : 120,000H (Ta : 25℃, 80% Load, Nominal Vin)
● Warranty	5 years

■ Pin Outs & Dimensions (±0.5mm)

〈Top View〉

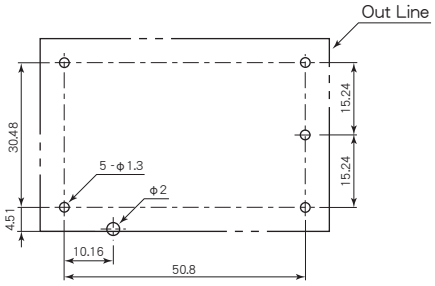




Pin Outs

Single Output		Dual Outputs	
①	AC in	①	AC in
②	AC in	②	AC in
③	Frame Ground	③	Frame Ground
④	+Vdc out	④	+Vdc out
⑤	No Connection	⑤	Common
⑥	−Vdc out	⑥	−Vdc out

■ Hole Configurations on PCB (Top View)



■ Selection Guide

Table 1

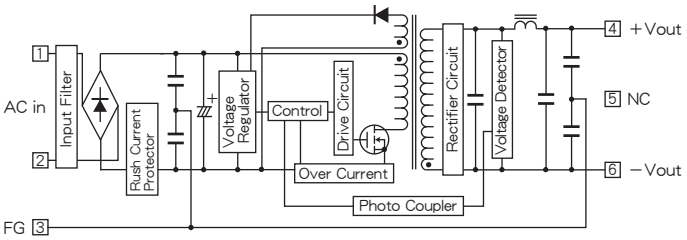
Model Number	Input Volt. (Range) (V. AC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
LC100− 3.3S 3.5A	100 (85～132)	3.3	3.5	81
LC100− 5S 3A		5	3	83
LC100− 12S 1.3A		12	1.3	85
LC100− 15S 1A		15	1	85
LC100− 24S 0.65A		24	0.65	85
LC100− 5D 1.5A		± 5	±1.5	75
LC100− 12D 0.65A		±12	±0.65	80
LC100− 15D 0.52A		±15	±0.52	81
LC200− 3.3S 3.5A	200 (175～264)	3.3	3.5	81
LC200− 5S 3A		5	3	83
LC200− 12S 1.3A		12	1.3	85
LC200− 15S 1A		15	1	85
LC200− 24S 0.65A		24	0.65	85
LC200− 5D 1.5A		± 5	±1.5	75
LC200− 12D 0.65A		±12	±0.65	80
LC200− 15D 0.52A		±15	±0.52	81

Note : Fuse is not included in this AC/DC converter, so fuse should be used outside.

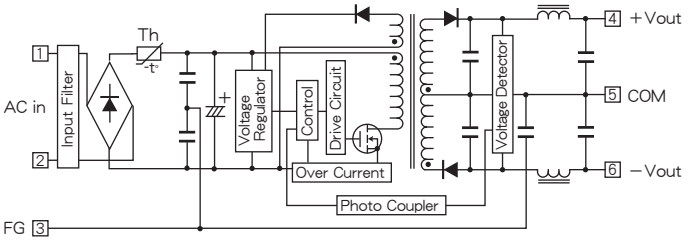
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

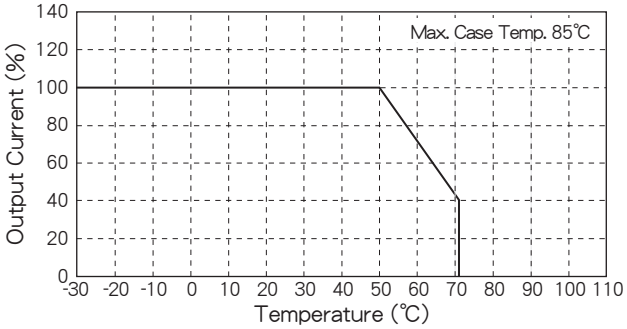


Fig. 2 Short Circuit Operating Area

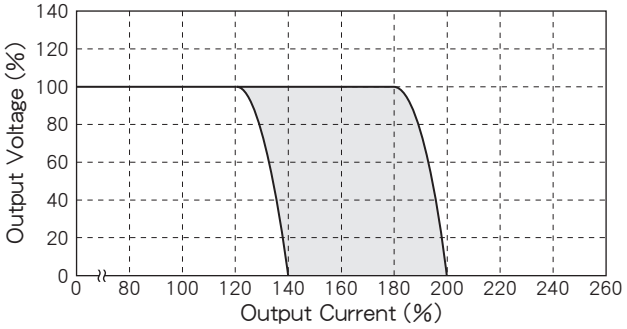


Fig. 3 Temperature Characteristic on Case Surface

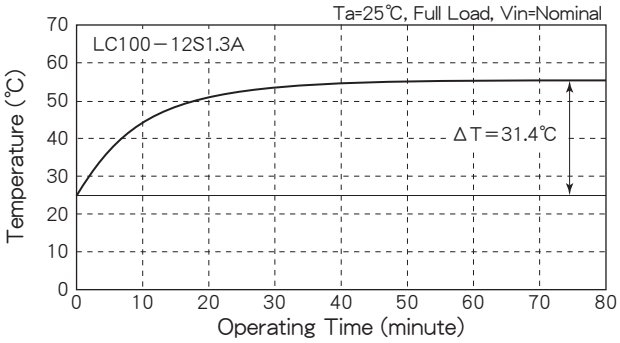


Fig. 4 Efficiency vs. Output Current

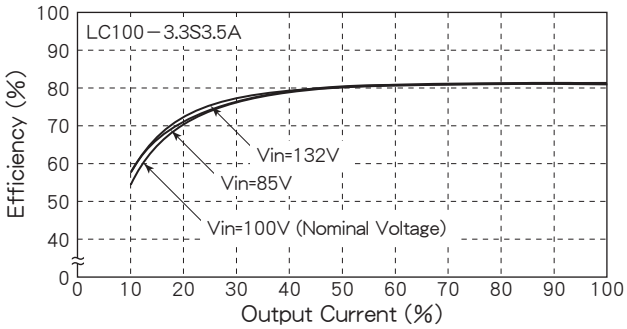


Fig. 5 Efficiency vs. Output Current

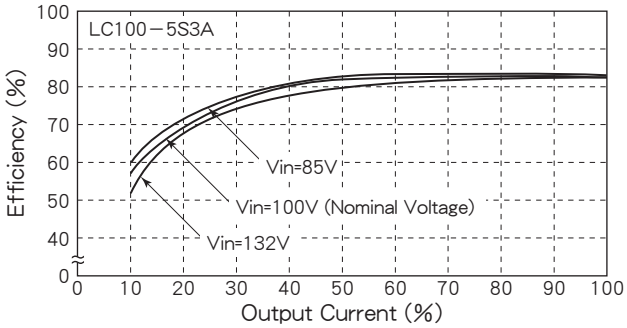


Fig. 6 Efficiency vs. Output Current

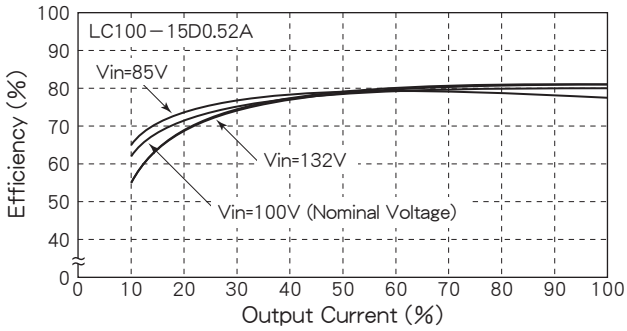


Fig. 7 Efficiency vs. Output Current

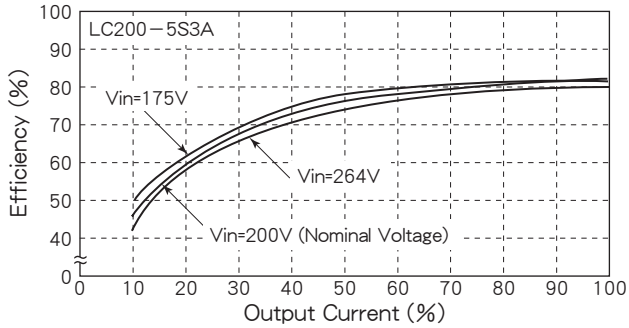
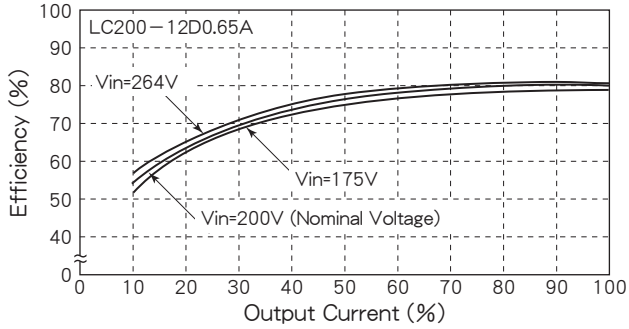


Fig. 8 Efficiency vs. Output Current



MC SERIES

24～30W　AC-DC スイッチング電源

H20×W50×L90 (mm)

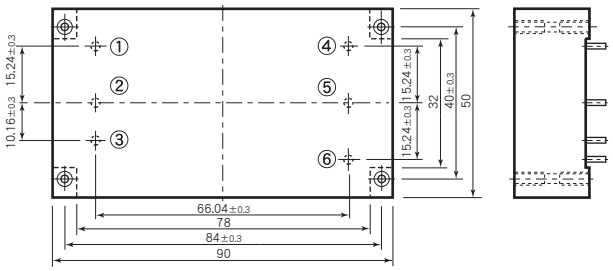
■ Features

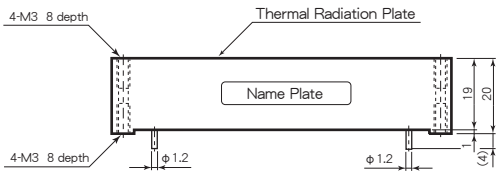
- ● Low Profile 20mm
- ● Input-Output Isolation (AC2000V)
- ● High Efficiency 84～85%
- ● Completely Molding Device
- ● 6 Sided Metal Shielding
- ● Output Over Voltage Protection
- ● Thermal Protection
  ＋90℃～＋100℃
- ● Operating Ambient Temperature
  －30℃～＋71℃
- ● VCCI Class B
- ● Conformity to RoHS2 Directive

- ● 薄型 20mm
- ● 入出力間絶縁 (AC2000V)
- ● 高効率　84～85%
- ● 完全モールド製品
- ● 6 面メタルシールド
- ● 出力過電圧保護回路内臓
- ● 過熱保護回路内蔵
  ＋90℃～＋100℃
- ● 動作周囲温度
  －30℃～＋71℃
- ● VCCI クラスB 準拠
- ● RoHS2指令対応

■ Pin Outs & Dimensions (±0.5mm)

〈Top View〉

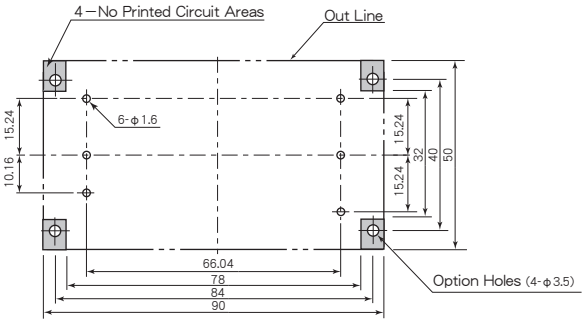




Pin Outs

①	AC in
②	AC in
③	Frame Ground
④	＋Vdc out
⑤	0 Vdc out
⑥	No Connection

■ Hole Configurations on PCB (Top View)



■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

● Input Voltage, Range	AC100V (See Table 1)
● Input Frequency	47～440Hz
● Output Voltage, Current	See Table 1
● Output Voltage Accuracy	±2% ±3% (3.3, 5V Vout only)
● Efficiency	See Table 1
● Line Regulation	±0.5% max. (at Vin Range)
● Load Regulation	±0.5% max. (0~100% Load)
● Output Ripple	(0.2% Vout+40mV) p-p max.
● Output Noise	(0.5% Vout+50mV) p-p max.
● Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
● Over Voltage Protection	115～140% Output Voltage
● Temperature Coefficient	0.02%/℃ max.
● Operating Ambient Temp.	－30℃～＋71℃ (See Fig. 1)
● Max. Case Temperature	＋85℃
● Storage Temperature	－40℃～＋85℃
● Isolation Voltage	AC2000V one minute (Input－Output－Case)
● Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
● Weight	200g max.
● Humidity	20～95% RH
● Shock	490m/s² (11msec 3directions)
● Vibration	10～55Hz 98m/s² (30minutes 3directions)
● Surface Structure	6 Sided Aluminum Case
● Soldering Conditions Soldering iron	360℃, for 5 seconds max.
● MTBF	130,000H (Ta：25℃, 80% Load, Nominal Vin)
● Warranty	5 years

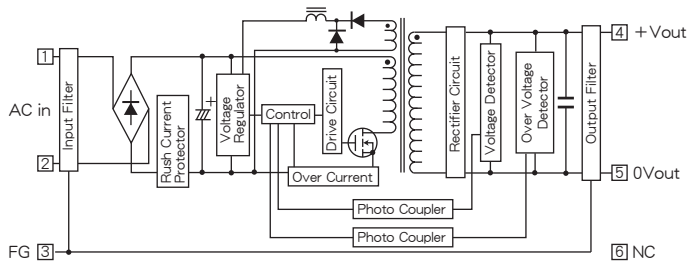
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. AC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)	
				20% Load	80% Load
MC100 － 3.3 S 7.2 A	100 (85～132)	3.3	7.2	75	84
MC100 － 5 S 6 A		5	6	75	85
MC100 － 12 S 2.6 A		12	2.6	75	85
MC100 － 15 S 2 A		15	2	75	85
MC100 － 24 S 1.3 A		24	1.3	75	85

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

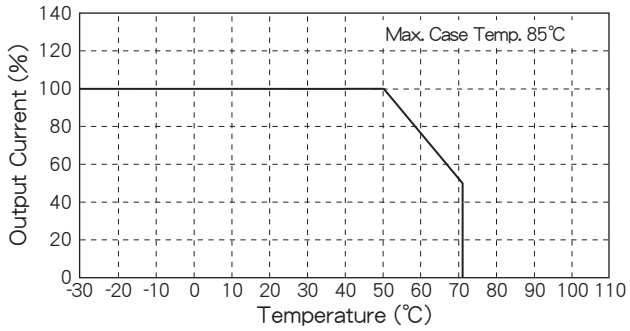


Fig. 2 Short Circuit Operating Area

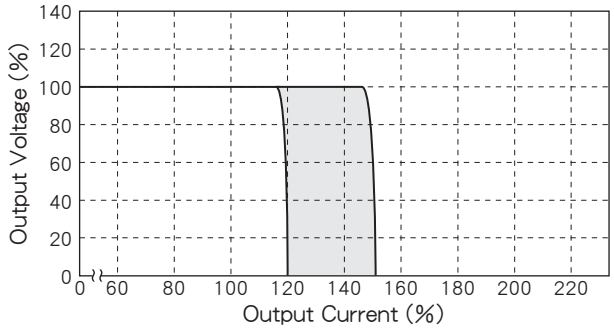


Fig. 3 Temperature Characteristic on Case Surface

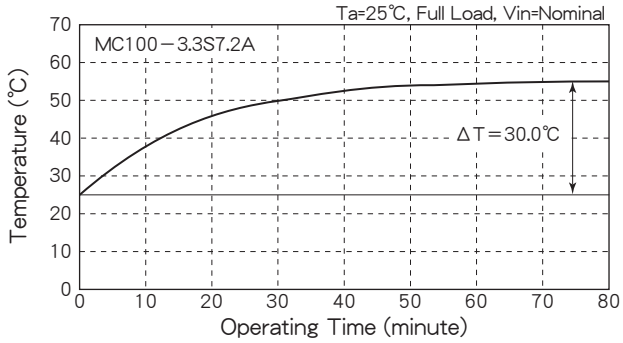


Fig. 4 Efficiency vs. Output Current

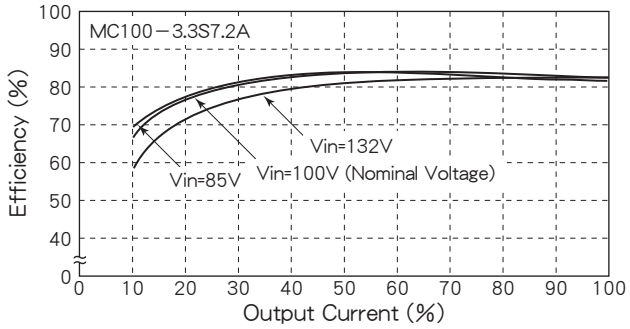


Fig. 5 Efficiency vs. Output Current

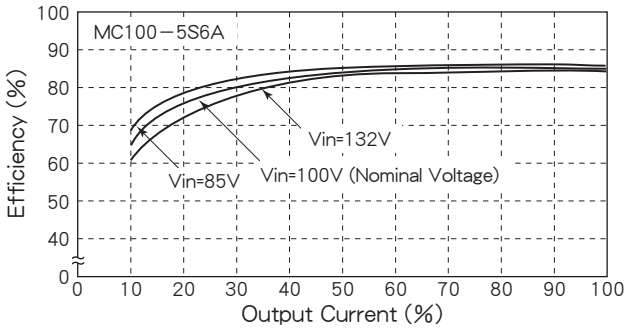


Fig. 6 Efficiency vs. Output Current

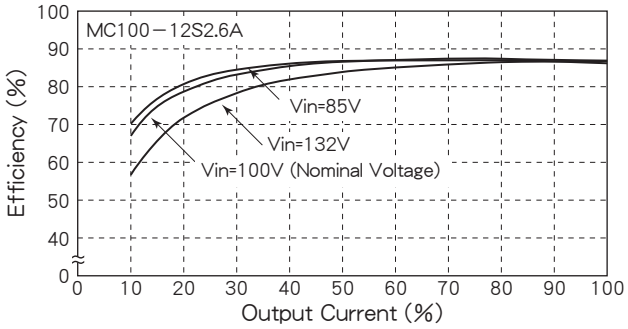


Fig. 7 Efficiency vs. Output Current

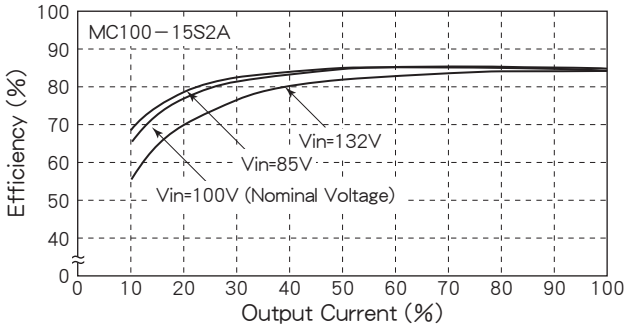
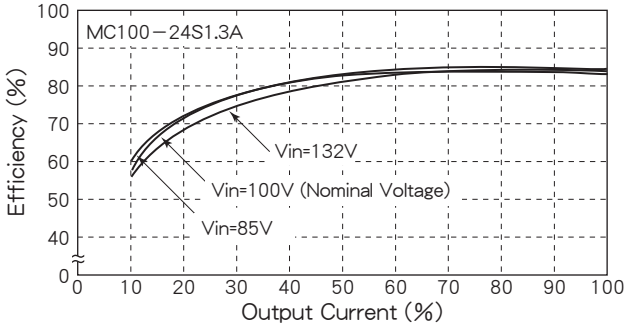


Fig. 8 Efficiency vs. Output Current



QC SERIES

15～24W AC-DC スイッチング電源
Single Output & Dual Outputs

H25×W50×L82 (mm)

■ Features

- ●Input-Output Isolation
- ●Completely Molding Device
- ●High Efficiency 75～80%
- ●Long Life by Mounting on Chassis or Using Heat Sink
- ●Operating Ambient Temperature −30℃～+71℃
- ●Conformity to VCCI Class B
- ●Conformity to RoHS2 Directive

- ●入出力間絶縁
- ●完全モールド製品
- ●高効率 75～80%
- ●シャーシや放熱板への取付けにより長寿命化
- ●動作周囲温度 −30℃～+71℃
- ●VCCI クラスB 準拠
- ●RoHS2指令対応

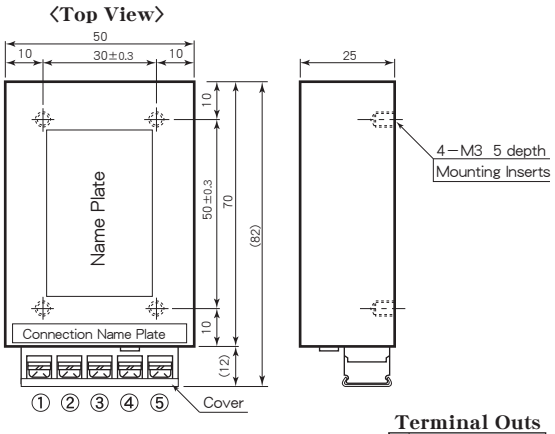
■ General Characteristics

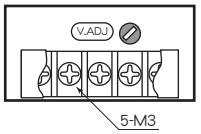
(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	AC100, 200V (See Table 1)
●Input Frequency	47～440Hz
●Output Voltage, Current	See Table 1
●Output Voltage Adjustment	Single : ±5%
●Output Voltage Accuracy	Dual : ±2% ±3% (5V Vout only)
●Efficiency	See Table 1
●Line Regulation	±0.5% max. (at Vin Range)
●Load Regulation	Single : ±0.5% max. (0～100% Load) Dual : ±2% max. ±3% max. (±5V Vout only) (10～100% Load)
●Output Ripple	(0.1% Vout+40mV) p-p max.
●Output Noise	(0.5% Vout+50mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Input Rush Current	40A max.
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−30℃～+71℃ (See Fig. 1)
●Max. Case Temperature	+85℃
●Storage Temperature	−40℃～+85℃
●Isolation Voltage	AC2000V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	210g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●MTBF	Single : 130,000H Dual : 110,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

Single Output



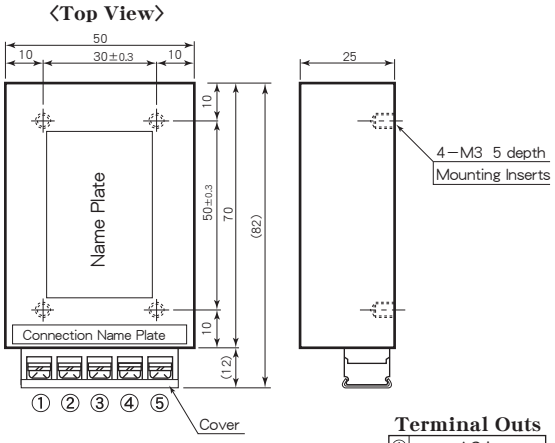


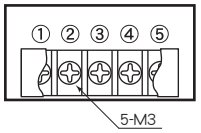
Voltage Adjustable Trimmer

Terminal Outs

①	AC in
②	AC in
③	+Vdc out
④	No Connection
⑤	0 Vdc out

Dual Outputs





Terminal Outs

①	AC in
②	AC in
③	+Vdc out
④	Common
⑤	−Vdc out

■ Selection Guide

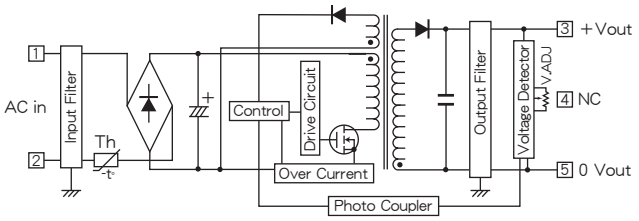
Table 1

Model Number	Input Volt. (Range) (V. AC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
QC100− 5S 3A	100 (85～132)	5	3	75
QC100− 12S 1.8A		12	1.8	79
QC100− 15S 1.6A		15	1.6	80
QC100− 24S 1A		24	1	80
QC100− 5W 1.5A		± 5	±1.5	75
QC100−12W 0.9A		±12	±0.9	78
QC100−15W 0.8A		±15	±0.8	79
QC200− 5S 3A	200 (175～264)	5	3	75
QC200− 12S 1.8A		12	1.8	79
QC200− 15S 1.6A		15	1.6	80
QC200− 24S 1A		24	1	80
QC200− 5W 1.5A		± 5	±1.5	75
QC200−12W 0.9A		±12	±0.9	78
QC200−15W 0.8A		±15	±0.8	79

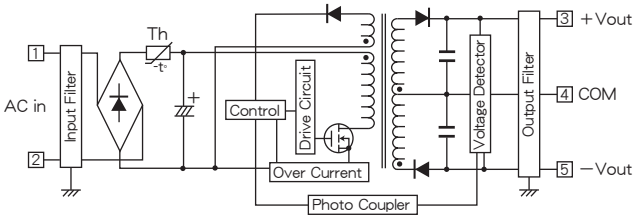
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

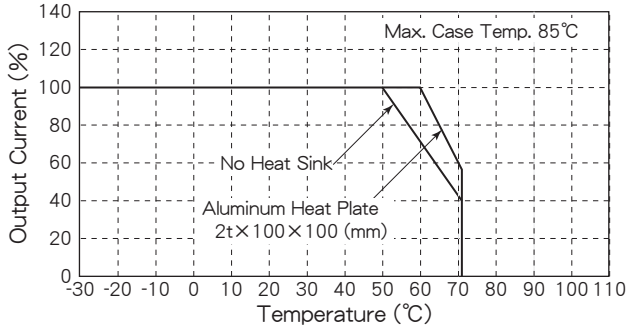


Fig. 2 Short Circuit Operating Area

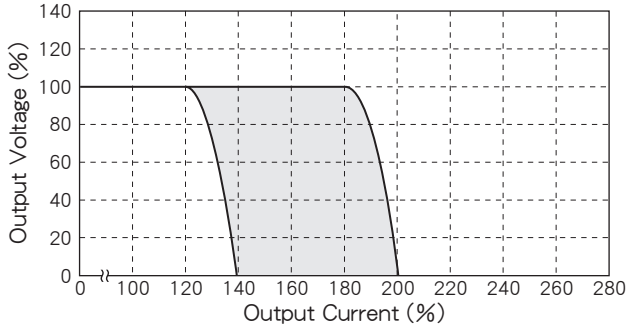


Fig. 3 Temperature Characteristic on Case Surface

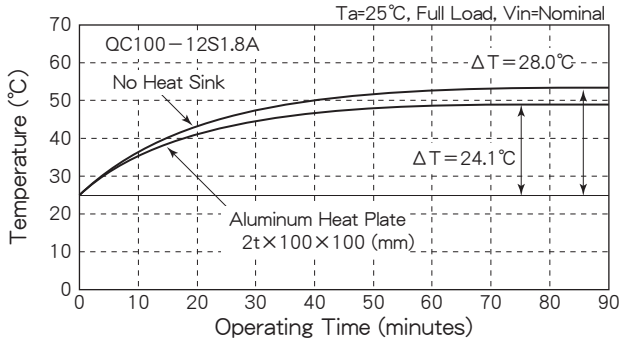


Fig. 4 Efficiency vs. Output Current

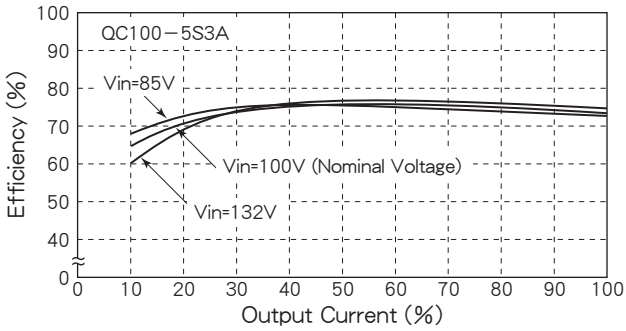


Fig. 5 Efficiency vs. Output Current

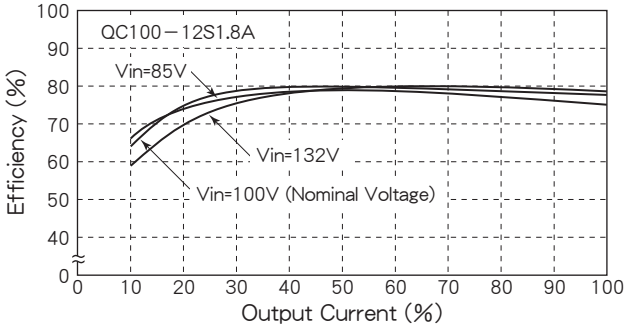


Fig. 6 Efficiency vs. Output Current

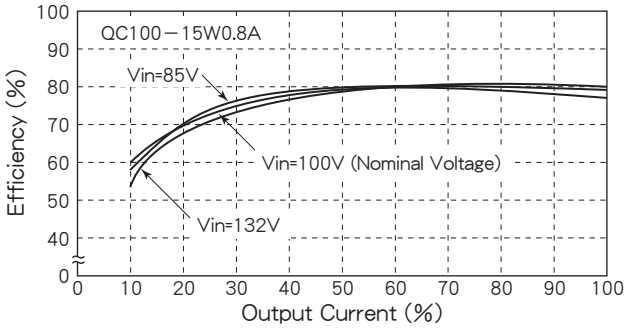
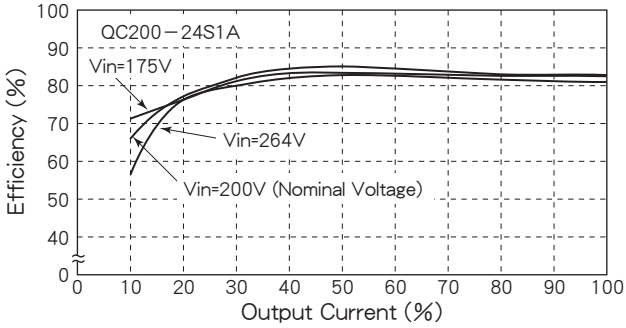


Fig. 7 Efficiency vs. Output Current



AFC SERIES

20～25W AC-DC スイッチング電源
Single, Dual & Triple Outputs

H30×W60×L112 (mm)

■ Features

- ●Input-Output Isolation ●入出力間絶縁
- ●Completely Molding Device ●完全モールド製品
- ●High Efficiency 75～80% ●高効率 75～80%
- ●Long Life by Mounting on ●シャーシや放熱板への
- ●Chassis or Using Heat Sink 取付けにより長寿命化
- ●Output Over Voltage Protection ●出力過電圧保護回路内蔵
  (Single and Dual Output only) (単出力、2出力のみ)
- ●Operating Ambient Temperature ●動作周囲温度
  －25℃～＋71℃ －25℃～＋71℃
- ●Conformity to RoHS2 Directive ●RoHS2指令対応

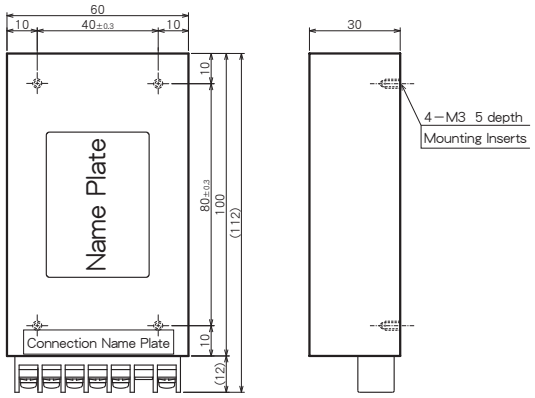
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

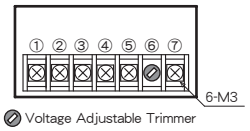
●Input Voltage, Range	AC100, 200V (See Table 1)
●Input Frequency	47～440Hz
●Output Voltage, Current	See Table 1
●Output Voltage Adjustment	Single, Dual : ±5%
●Output Voltage Accuracy	Triple : ±2% ±3% (5V Vout only)
●Efficiency	See Table 1
●Line Regulation	0.1% max. (at Vin Range)
●Load Regulation	Single, Dual : 0.5% max. 1% max. (5V Vout only) (0～100% Load) Triple : 1% max. (5V Vout) (0～100% Load) ±3% max. (±12, ±15V Vout) (10～100% Load)
●Output Ripple	(0.1% Vout＋40mV) p-p max.
●Output Noise	(0.5% Vout＋50mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage (Single and Dual Output only)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	－25℃～＋71℃ (See Fig. 1)
●Max. Case Temperature	＋85℃
●Storage Temperature	－40℃～＋85℃
●Isolation Voltage	AC1500V one minute (Input－Output－Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
●Weight	430g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●MTBF	Single : 110,000H, Dual : 90,000H Triple : 80,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

〈Top View〉



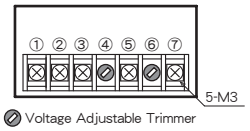
Single Output



Terminal Outs

①	AC in
②	AC in
③	No Connection
④	No Connection
⑤	＋Vdc out
⑥	Vout Adjustment
⑦	0Vdc out

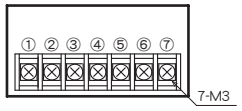
Dual Outputs



Terminal Outs

①	AC in
②	AC in
③	＋Vdc out
④	＋Vout Adjustment
⑤	Common
⑥	－Vout Adjustment
⑦	－Vdc out

Triple Outputs



Terminal Outs

①	AC in
②	AC in
③	＋ 5 V out
④	0 Vdc out
⑤	＋Vdc out
⑥	Common
⑦	－Vdc out

■ Selection Guide

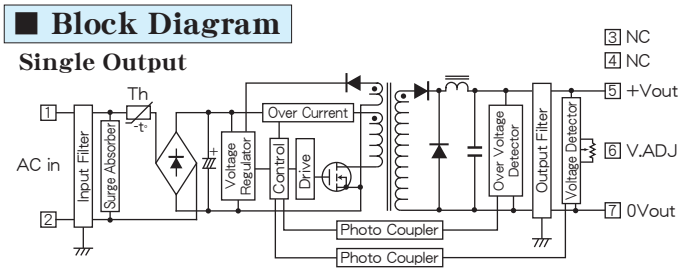
Table 1

Model Number	Input Volt. (Range) (V. AC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
AFC100－ 5S 4A	100 (85～132)	5	4	75
AFC100－ 12S 2A		12	2	79
AFC100－ 15S 1.6A		15	1.6	80
AFC100－ 24S 1.1A		24	1.1	80
AFC100－12W 1A		±12	±1	78
AFC100－15W 0.8A		±15	±0.8	79
AFC100－ 5S 12W		5, ±12	2, ±0.35	75
AFC100－ 5S 15W		5, ±15	2, ±0.3	75
AFC200－ 5S 4A	200 (175～264)	5	4	75
AFC200－ 12S 2A		12	2	79
AFC200－ 15S 1.6A		15	1.6	80
AFC200－ 24S 1.1A		24	1.1	80
AFC200－12W 1A		±12	±1	78
AFC200－15W 0.8A		±15	±0.8	79
AFC200－ 5S 12W		5, ±12	2, ±0.35	75
AFC200－ 5S 15W		5, ±15	2, ±0.3	75

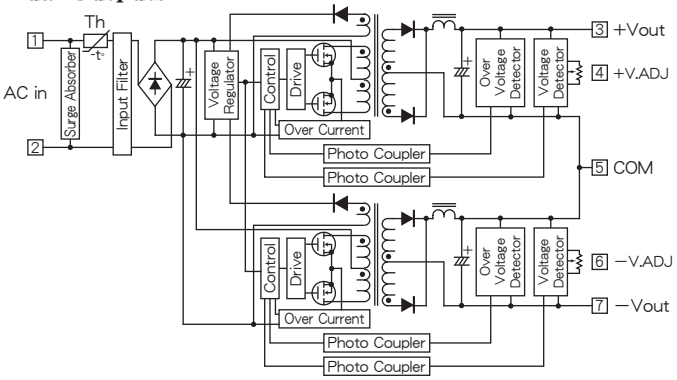
(注) ワイド入力電圧範囲 (AC85V~264V) の仕様製品も製作いたします。
Note : We can offer wide Vin range (AC85V~264V) device.

■ Block Diagram

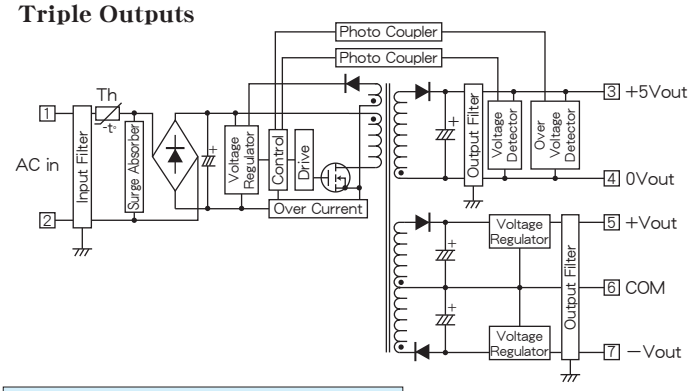
Single Output



Dual Outputs



Triple Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

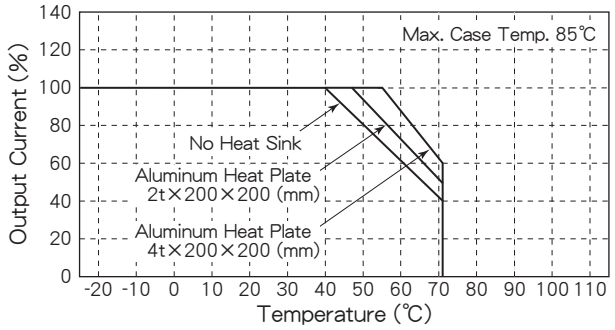


Fig. 2 Short Circuit Operating Area

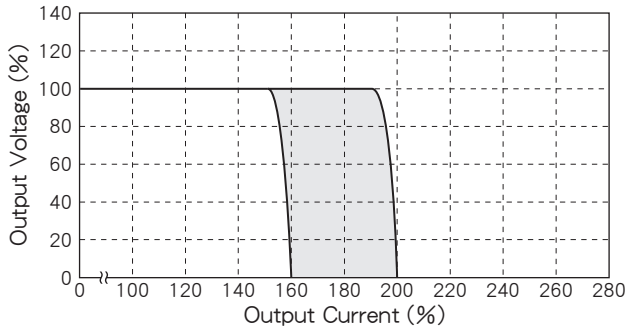


Fig. 3 Temperature Characteristic on Case Surface

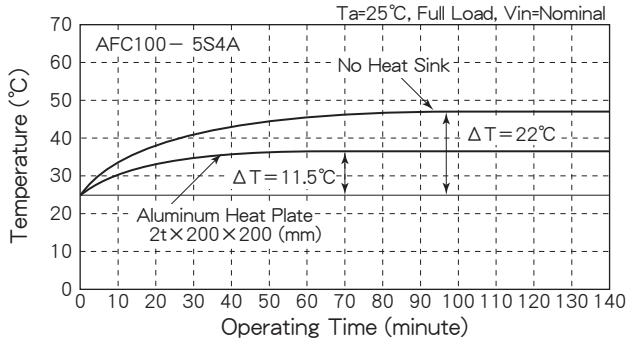


Fig. 4 Efficiency vs. Output Current

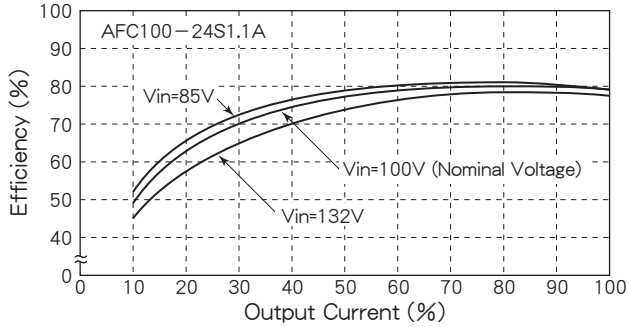
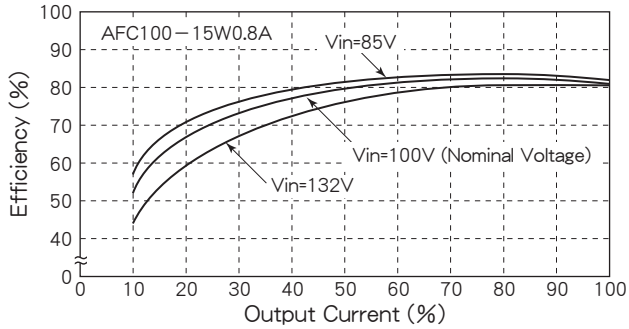


Fig. 5 Efficiency vs. Output Current



AKC SERIES

25～35W AC-DC スイッチング電源
Single, Dual & Triple Outputs

H30×W60×L132 (mm)

■ Features

- ●Input-Output Isolation ●入出力間絶縁
- ●Completely Molding Device ●完全モールド製品
- ●High Efficiency 75～80% ●高効率 75～80%
- ●Long Life by Mounting on Chassis or Using Heat Sink ●シャーシや放熱板への取付けにより長寿命化
- ●Output Over Voltage Protection (Single and Dual Output only) ●出力過電圧保護回路内蔵（単出力、2出力のみ）
- ●Operating Ambient Temperature －25℃～＋71℃ ●動作周囲温度 －25℃～＋71℃
- ●Conformity to RoHS2 Directive ●RoHS2指令対応

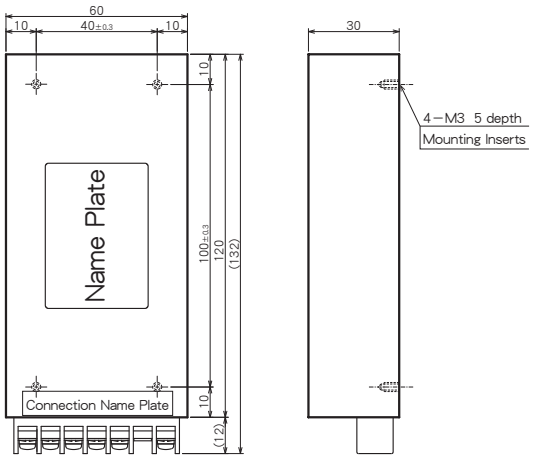
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

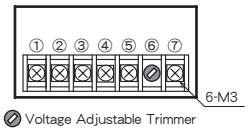
●Input Voltage, Range	AC100, 200V (See Table 1)
●Input Frequency	47～440Hz
●Output Voltage, Current	See Table 1
●Output Voltage Adjustment	Single, Dual : ±5%
●Output Voltage Accuracy	Triple : ±2% ±3% (5V Vout only)
●Efficiency	See Table 1
●Line Regulation	0.1% max. (at Vin Range)
●Load Regulation	Single, Dual : 0.5% max. 1% max. (5V Vout only) (0～100% Load) Triple : 1% max. (5V Vout) (0～100% Load) ±3% max. (±12, ±15V Vout) (10～100% Load)
●Output Ripple	(0.1% Vout＋40mV) p-p max.
●Output Noise	(0.5% Vout＋50mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage (Single and Dual Output only)
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	－25℃～＋71℃ (See Fig. 1)
●Max. Case Temperature	＋85℃
●Storage Temperature	－40℃～＋85℃
●Isolation Voltage	AC1500V one minute (Input－Output－Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
●Weight	550g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●MTBF	Single : 110,000H, Dual : 90,000H Triple : 80,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

〈Top View〉



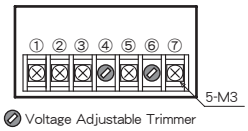
Single Output



Terminal Outs

①	AC in
②	AC in
③	No Connection
④	No Connection
⑤	＋Vdc out
⑥	Vout Adjustment
⑦	0Vdc out

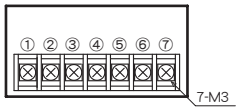
Dual Outputs



Terminal Outs

①	AC in
②	AC in
③	＋Vdc out
④	＋Vout Adjustment
⑤	Common
⑥	－Vout Adjustment
⑦	－Vdc out

Triple Outputs



Terminal Outs

①	AC in
②	AC in
③	＋ 5 V out
④	0 Vdc out
⑤	＋Vdc out
⑥	Common
⑦	－Vdc out

■ Selection Guide

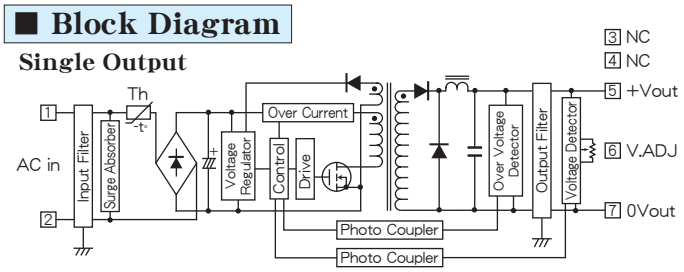
Table 1

Model Number	Input Volt. (Range) (V. AC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
AKC100－ 5S 5A	100 (85～132)	5	5	75
AKC100－12S 3A		12	3	79
AKC100－15S 2.4A		15	2.4	80
AKC100－24S 1.5A		24	1.5	80
AKC100－12W 1.5A		±12	±1.5	78
AKC100－15W 1.2A		±15	±1.2	79
AKC100－ 5S 12W		5, ±12	3, ±0.35	75
AKC100－ 5S 15W		5, ±15	3, ±0.3	75
AKC200－ 5S 5A	200 (175～264)	5	5	75
AKC200－12S 3A		12	3	79
AKC200－15S 2.4A		15	2.4	80
AKC200－24S 1.5A		24	1.5	80
AKC200－12W 1.5A		±12	±1.5	78
AKC200－15W 1.2A		±15	±1.2	79
AKC200－ 5S 12W		5, ±12	3, ±0.35	75
AKC200－ 5S 15W		5, ±15	3, ±0.3	75

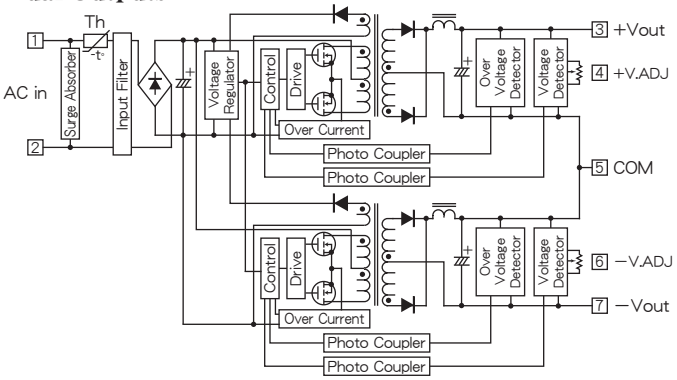
(注) ワイド入力電圧範囲 (AC85V~264V) の仕様製品も製作いたします。
Note : We can offer wide Vin range (AC85V~264V) device.

■ Block Diagram

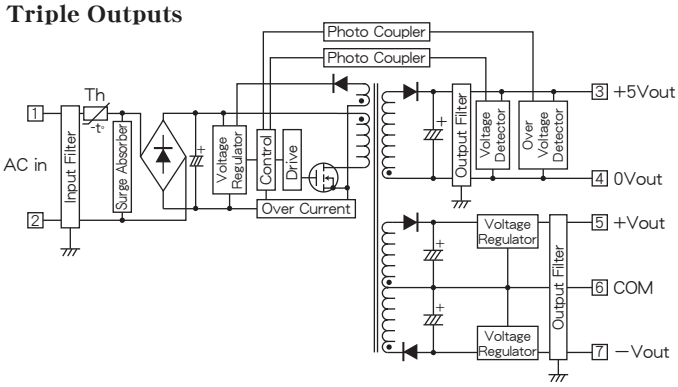
Single Output



Dual Outputs



Triple Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

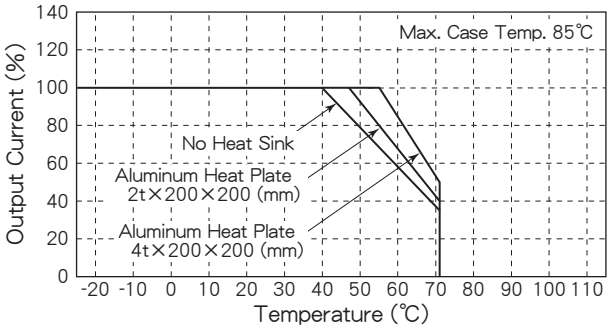


Fig. 2 Short Circuit Operating Area

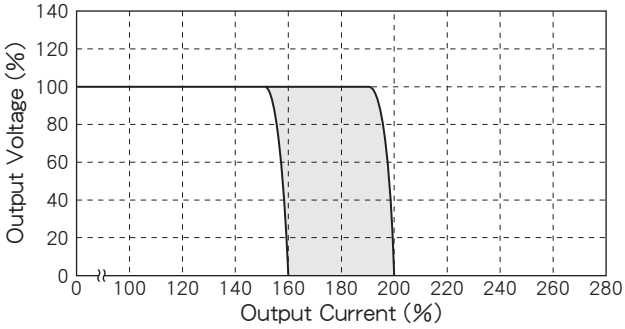


Fig. 3 Temperature Characteristic on Case Surface

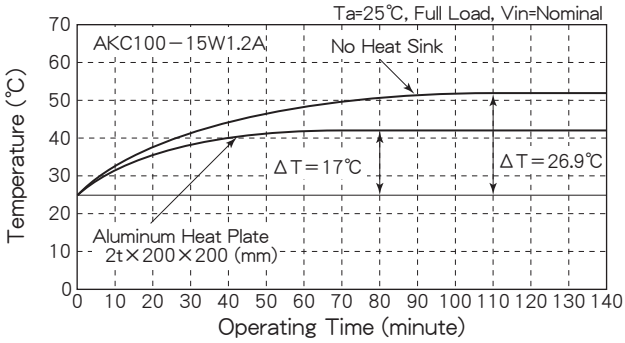


Fig. 4 Efficiency vs. Output Current

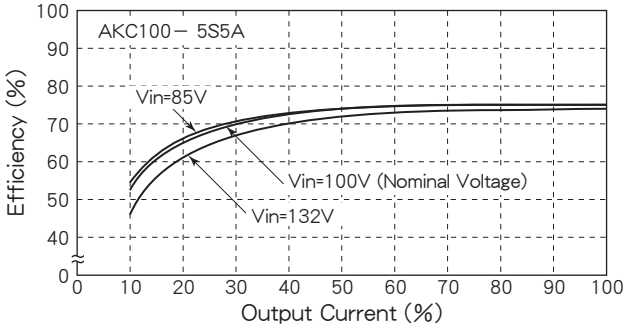
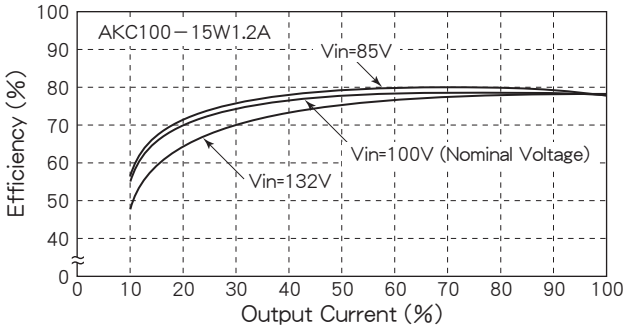


Fig. 5 Efficiency vs. Output Current



KC SERIES / KCW SERIES

50W / 36W (Wide Input Voltage Range)

AC-DC スイッチング電源

H30×W60×L132 (mm)

■ Features

- ●Wide Input Voltage Range (KCW) AC85～264V
- ●Improved Power Factor
- ●Output Over Voltage Protection
- ●High Efficinecy 83～88%
- ●Input-Output Isolation (AC1500V)
- ●Operating Ambient Temperature −25℃～+71℃
- ●Adjustable Output Volt. ±5%
- ●Conformity to VCCI Class B
- ●Conformity to RoHS2 Directive

- ●ワイド入力電圧 (KCW) AC85～264V
- ●力率改善回路内蔵
- ●出力過電圧保護回路内蔵
- ●高効率 83～88%
- ●入出力間絶縁 (AC1500V)
- ●動作周囲温度 −25℃～+71℃
- ●可変出力電圧 ±5%
- ●VCCI クラスB 準拠
- ●RoHS2指令対応

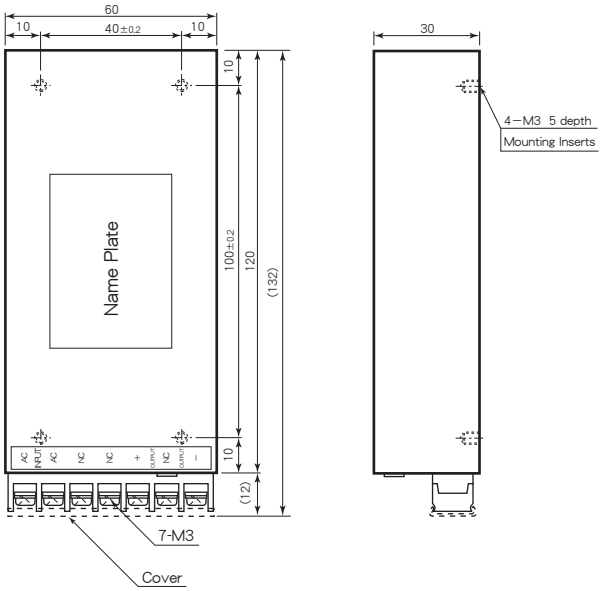
■ General Characteristics

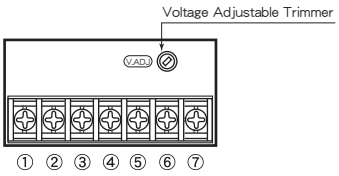
(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage, Range	KC : AC100V (85～132V) AC200V (175～264V) KCW : AC160V (85～264V)
●Input Frequency	47～440Hz
●Power Factor	0.80 typ. (Vin : 50, 60Hz) 0.65 typ. (Vin : 400Hz)
●Output Voltage, Current	See Table 1
●Output Voltage Adjustment	±5%
●Efficiency	See Table 1
●Line Regulation	0.1% max. (at Vin Range)
●Load Regulation	0.5% max. 1.5% max. (5V Vout only) (0～100% Load)
●Output Ripple	(0.1% Vout+40mV) p-p max. (Vin : 50, 60Hz) (1% Vout+40mV) p-p max. (Vin : 400Hz)
●Output Noise	(0.5% Vout+50mV) p-p max. (Vin : 50, 60Hz) (1.5% Vout+50mV) p-p max. (Vin : 400Hz)
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−25℃～+71℃ (See Fig. 1)
●Max. Case Temperature	+85℃
●Storage Temperature	−40℃～+85℃
●Isolation Voltage	AC1500V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	550g max.
●Humidity	20～95% RH
●Shock	490m/s² (11msec 3directions)
●Vibration	10～55Hz 98m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●MTBF	110,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

〈Top View〉





Terminal Outs

①	AC in
②	AC in
③	No Connection
④	No Connection
⑤	+Vdc out
⑥	No Connection
⑦	−Vdc out

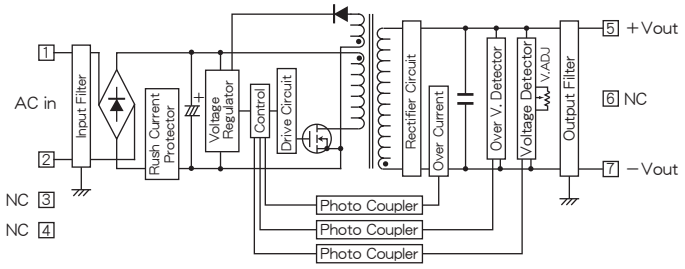
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. AC)	Output Voltage (V. DC)	Output Current (A)	Efficiency 80% Load (%)(typ.)
KC100− 5S 10A	100 (85～132)	5	10	85
KC100− 12S 4.2A		12	4.2	87
KC100− 15S 3.3A		15	3.3	88
KC100− 24S 2.1A		24	2.1	88
KC200− 5S 10A	200 (175～264)	5	10	85
KC200− 12S 4.2A		12	4.2	87
KC200− 15S 3.3A		15	3.3	88
KC200− 24S 2.1A		24	2.1	88
KCW160− 5S 7A	160 (85～264)	5	7	83
KCW160−12S 3A		12	3	85
KCW160−15S 2.4A		15	2.4	86
KCW160−24S 1.5A		24	1.5	86

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

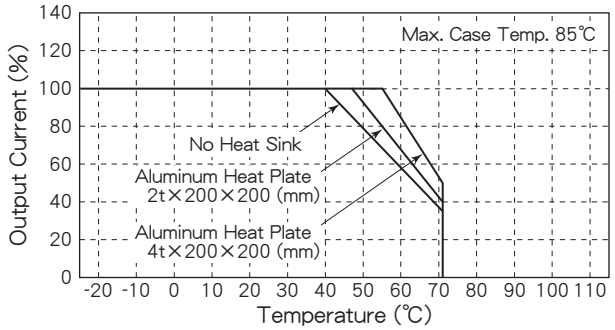


Fig. 2 Short Circuit Operating Area

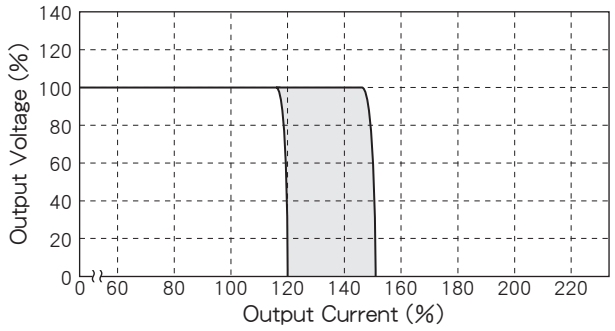


Fig. 3 Efficiency vs. Output Current

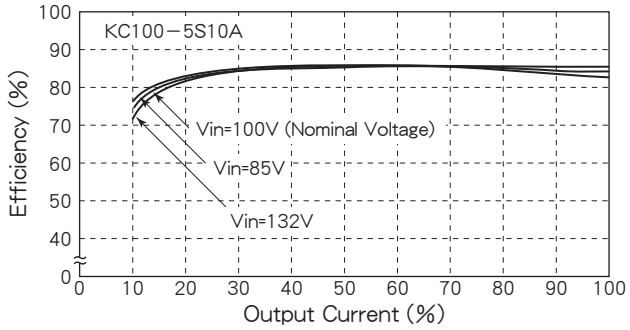


Fig. 4 Efficiency vs. Output Current

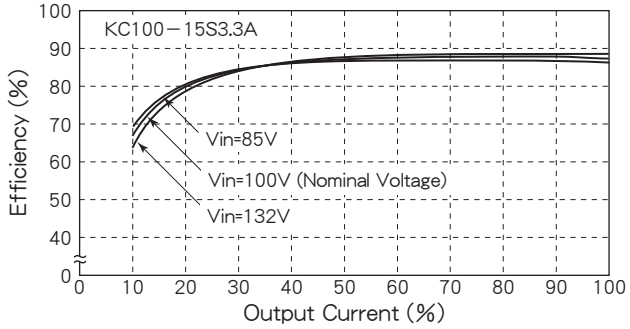


Fig. 5 Efficiency vs. Output Current

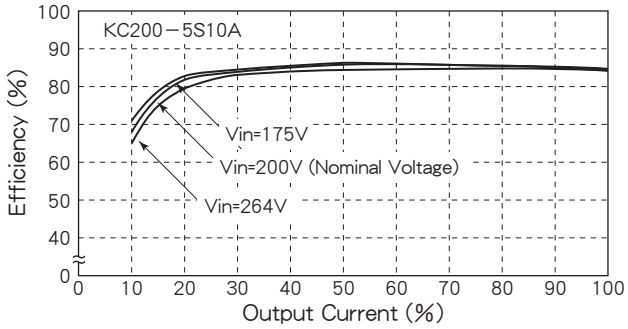


Fig. 6 Efficiency vs. Output Current

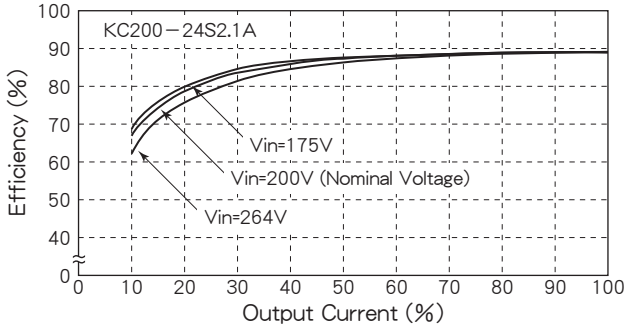


Fig. 7 Efficiency vs. Output Current

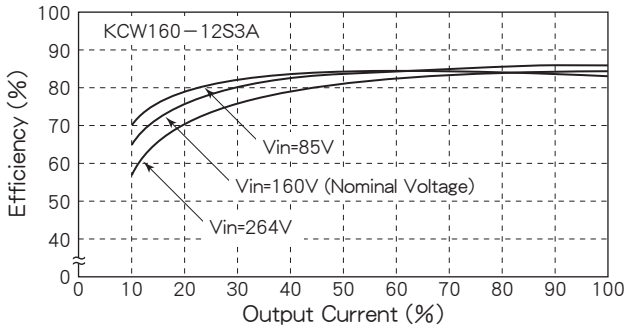
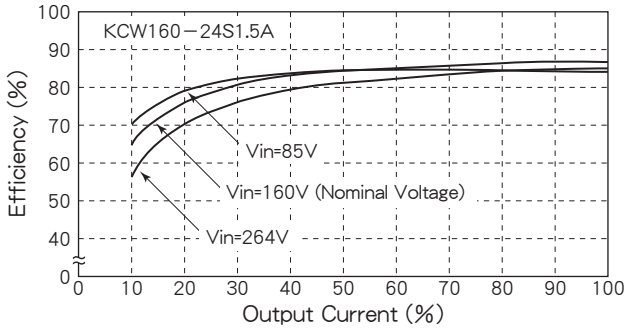


Fig. 8 Efficiency vs. Output Current



PC SERIES

70～100W AC-DC スイッチング電源
Single Output & Dual Outputs

H35×W70×L158 (mm)

■ Features

- ●Input-Output Isolation ●入出力間絶縁
- ●Completely Molding Device ●完全モールド製品
- ●High Efficiency 80～87% ●高効率 80～87%
- ●Long Life by Mounting on Chassis or Using Heat Sink ●シャーシや放熱板への取付けにより長寿命化
- ●Input Rush Current Protection ●入力突入電流保護回路内蔵
- ●Output Over Voltage Protection ●出力過電圧保護回路内蔵
- ●Operating Ambient Temperature −25℃～+71℃ ●動作周囲温度 −25℃～+71℃
- ●Conformity to VCCI Class B, FCC Class B ●VCCI クラスB FCC クラスB 準拠
- ●Conformity to RoHS2 Directive ●RoHS2指令対応

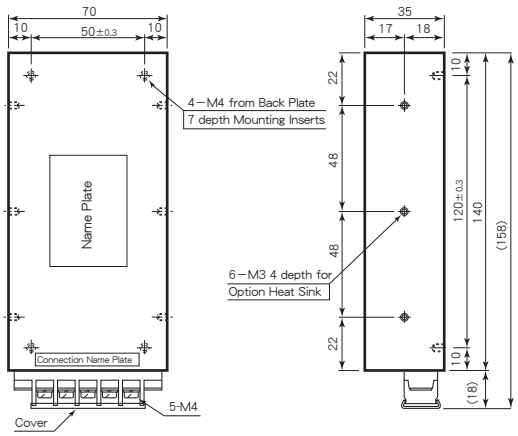
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

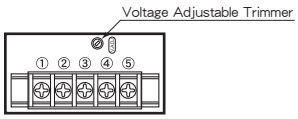
●Input Voltage, Range	AC100, 200V (See Table 1)
●Input Frequency	47～440Hz
●Output Voltage, Current	See Table 1
●Output Voltage Adjustment	Single : ±5% Dual : ±5%
●Efficiency	See Table 1
●Line Regulation	0.1%max. (at Vin Range)
●Load Regulation	0.5% max. 1% max. (5V Vout only) (0～100% Load)
●Output Ripple	(0.1% Vout+40mV) p-p max.
●Output Noise	(0.5% Vout+50mV) p-p max.
●Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
●Over Voltage Protection	115～140% Output Voltage
●Temperature Coefficient	0.02%/℃ max.
●Operating Ambient Temp.	−25℃～+71℃ (See Fig. 1)
●Max. Case Temperature	+85℃
●Storage Temperature	−40℃～+85℃
●Isolation Voltage	AC2000V one minute (Input−Output−Case)
●Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	Main Body : 800g max. Pair Heat Sinks : 250g max.
●Humidity	20～95% RH
●Shock	196m/s² (11msec 3directions)
●Vibration	10～55Hz 49m/s² (30minutes 3directions)
●Surface Structure	Aluminum Case
●MTBF	Single : 110,000H Dual : 90,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±0.5mm)

〈Top View〉



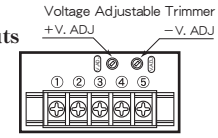
Single Output



Terminal Outs

①	AC in
②	AC in
③	No Connection
④	+Vdc out
⑤	0 Vdc out

Dual Outputs

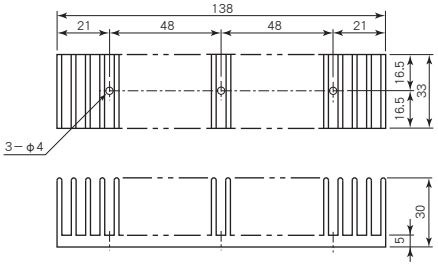


Terminal Outs

①	AC in
②	AC in
③	+Vdc out
④	Common
⑤	−Vdc out

注：フレームグランド端子は取付ネジを使用してください。
Note : Frame ground terminal be used with mounting screw.

■ Option Heat Sink



Option Heat Sink Model : A3-3664

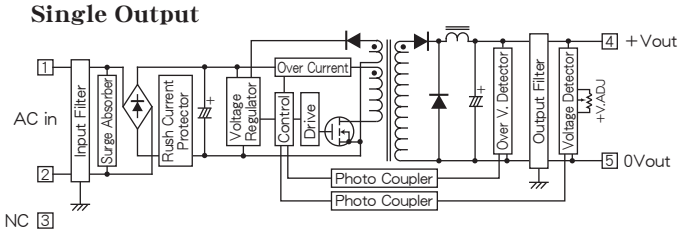
■ Selection Guide

Table 1

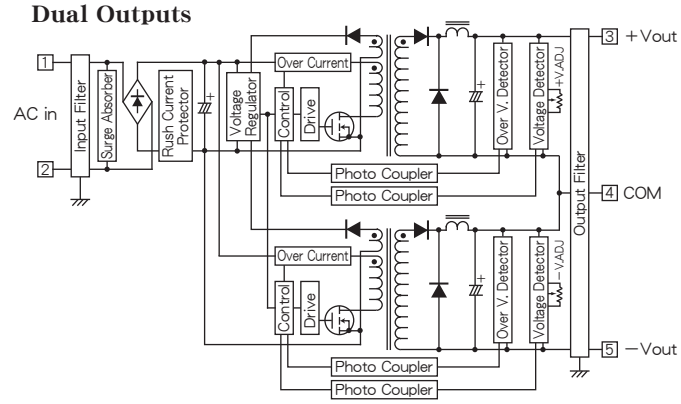
Model Number	Input Volt. (Range) (V. AC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
PC 100 − 5 S 14A	100 (85～132)	5	14	80
PC 100 − 12 S 8.3A		12	8.3	84
PC 100 − 15 S 6.6A		15	6.6	85
PC 100 − 24 S 4.2A		24	4.2	87
PC 100 − 12 D 4A		±12	± 4	84
PC 100 − 15 D 3.3A		±15	± 3.3	84
PC 200 − 5 S 14A	200 (175～264)	5	14	80
PC 200 − 12 S 8.3A		12	8.3	84
PC 200 − 15 S 6.6A		15	6.6	85
PC 200 − 24 S 4.2A		24	4.2	87
PC 200 − 12 D 4A		±12	± 4	84
PC 200 − 15 D 3.3A		±15	± 3.3	84

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

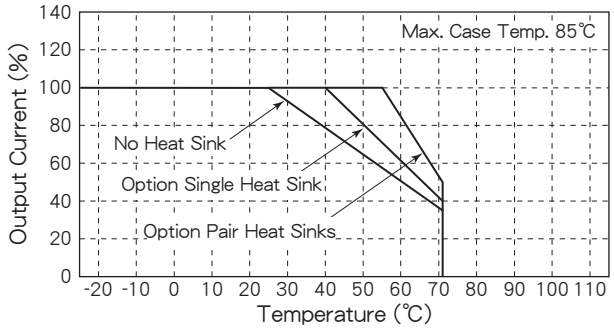


Fig. 2 Short Circuit Operating Area

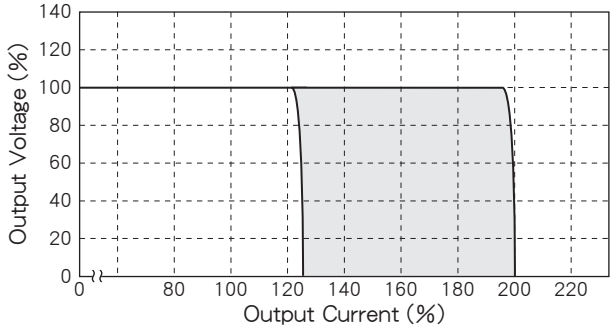


Fig. 3 Temperature Characteristic on Case Surface

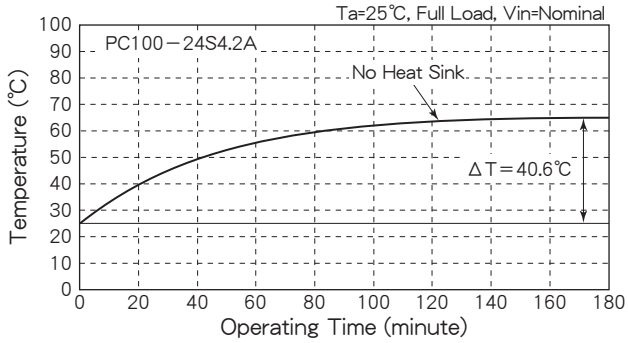


Fig. 4 Efficiency vs. Output Current

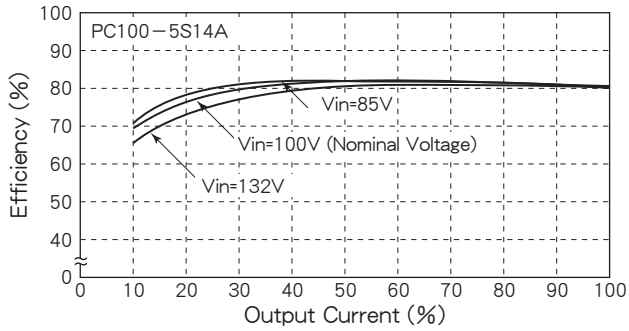


Fig. 5 Efficiency vs. Output Current

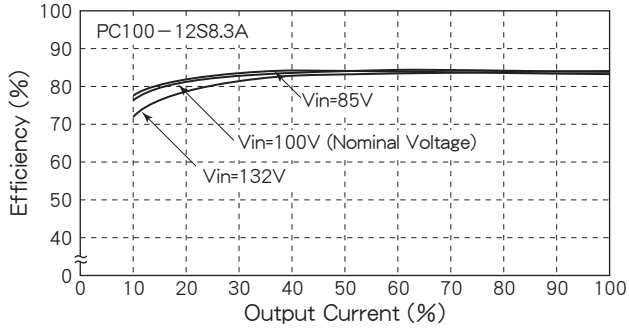


Fig. 6 Efficiency vs. Output Current

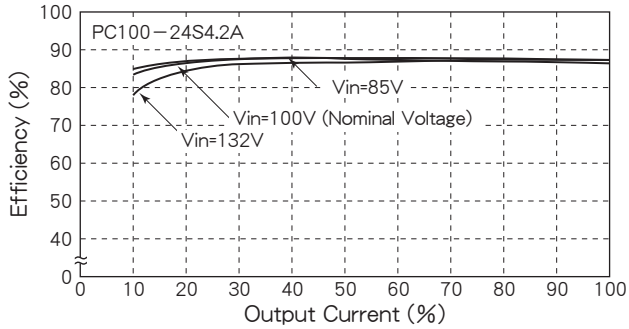


Fig. 7 Efficiency vs. Output Current

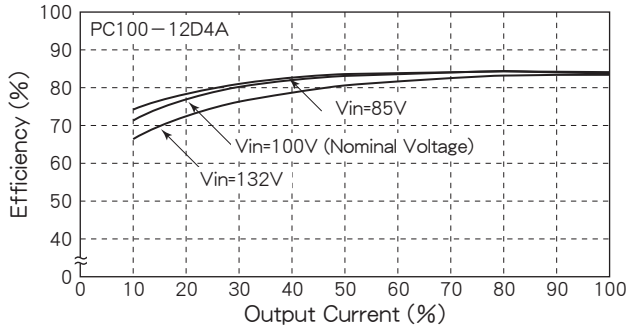
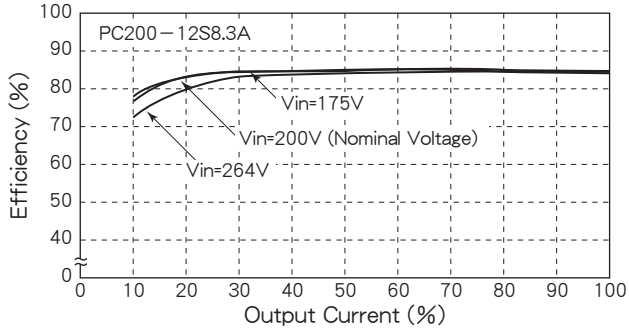


Fig. 8 Efficiency vs. Output Current



KA60 SERIES

60VA DC/AC INVERTERS
Sine Wave Output

H30×W60×L140 (mm)

■ Features

- High Efficiency 81～85% typical
- Input Low Voltage Protection
- Input Over Voltage Protection
- Thermal Protection
  ＋90℃～＋110℃
- Output Frequency Temp. Coefficient
  0.01%/℃ max.
- Input-Output Isolation (AC2000V)
- Operating Ambient Temperature
  －25℃～＋71℃
- Adjustable Output Volt. ±5%
- Built-in Input and Output Noise Filter
- Conformity to RoHS2 Directive

- 高効率 81～85% typical
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 過熱保護回路内蔵
  ＋90℃～＋110℃
- 出力周波数温度係数
  0.01%/℃ 以下
- 入出力間絶縁 (AC2000V)
- 動作周囲温度
  －25℃～＋71℃
- 可変出力電圧 ±5%
- 入出力ノイズフィルタ内蔵
- RoHS2指令対応

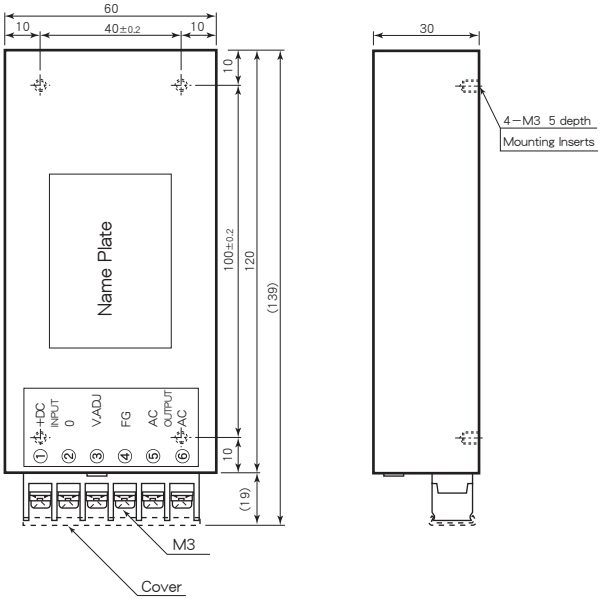
■ General Characteristics

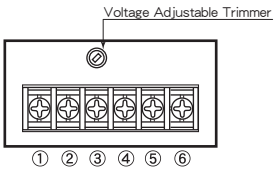
(at Ta : 25℃, Full Load, Nominal Vin)

- Input Voltage: DC12, 24, 48, 96V (See Table 1)
- Output Voltage: AC100Vrms, ±5% Adjustable
  AC200Vrms, ±5% Adjustable
  AC220Vrms, ±5% Adjustable
- Output Current: See Table 1
- Output Frequency: 50Hz, 60Hz, 400Hz, ±0.1%
- Output Wave: Sine Wave
- Output Wave Distortion: 1.5% max.
  3% max. (Vout : 400Hz only)
- Output Voltage Temperature Coefficient: 0.02%/℃ max.
- Output Frequency Temperature Coefficient: 0.01%/℃ max.
- Efficiency: See Table 1
- Line Regulation: ±0.2% max. (at Vin Range)
- Load Regulation: ±0.5% max. (0～100% Load)
- Short Circuit Protection: Built-in, Auto-restart (See Fig. 2)
- Operating Ambient Temp.: －25℃～＋71℃ (See Fig. 1)
- Storage Temperature: －40℃～＋85℃
- Isolation Voltage: AC2000V 1 min. (Input－Output)
  AC2000V 1 min. (Input－Case)
  AC1000V 1 min. (Output－Case)
- Isolation Impedance: 100MΩ min. (at DC1000V)
  (Input－Output－Case)
- Weight: 550g max.
- Humidity: 20～90% RH
- Shock: 490m/s² (11msec 3directions)
- Vibration: 10～55Hz 98m/s²
  (30minutes 3directions)
- Surface Structure: Aluminum Case
- MTBF: 120,000H
  (Ta : 25℃, 80% Load, Nominal Vin)
- Warranty: 5 years

■ Terminal Outs & Dimensions (±0.5mm)

〈Top View〉





Terminal Outs

①	＋Vdc in
②	0 Vdc in
③	No Connection
④	Frame Ground
⑤	AC out
⑥	AC out

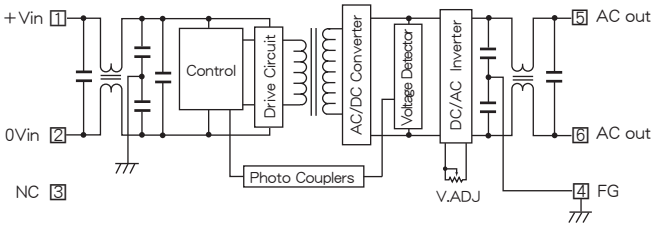
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	Output Frequency (Hz)	Efficiency (typ.)(%) 20% Load	Efficiency (typ.)(%) 80% Load
KA60-12-100S 0.6A 50	12 (9～18)	100	0.6	50	72	83
KA60-12-100S 0.6A 60		100	0.6	60	72	83
KA60-12-100S 0.6A400		100	0.6	400	70	82
KA60-12-200S 0.3A 50		200	0.3	50	66	81
KA60-12-200S 0.3A 60		200	0.3	60	66	81
KA60-12-220S 0.27A50		220	0.27	50	66	81
KA60-12-220S 0.27A60		220	0.27	60	66	81
KA60-24-100S 0.6A 50	24 (18～36)	100	0.6	50	72	85
KA60-24-100S 0.6A 60		100	0.6	60	72	85
KA60-24-100S 0.6A400		100	0.6	400	71	84
KA60-24-200S 0.3A 50		200	0.3	50	66	83
KA60-24-200S 0.3A 60		200	0.3	60	66	83
KA60-24-220S 0.27A50		220	0.27	50	66	83
KA60-24-220S 0.27A60		220	0.27	60	66	83
KA60-48-100S 0.6A 50	48 (36～76)	100	0.6	50	71	85
KA60-48-100S 0.6A 60		100	0.6	60	71	85
KA60-48-100S 0.6A400		100	0.6	400	69	84
KA60-48-200S 0.3A 50		200	0.3	50	65	83
KA60-48-200S 0.3A 60		200	0.3	60	65	83
KA60-48-220S 0.27A50		220	0.27	50	65	83
KA60-48-220S 0.27A60		220	0.27	60	65	83
KA60-96-100S 0.6A 50	96 (72～144)	100	0.6	50	71	83
KA60-96-100S 0.6A 60		100	0.6	60	71	83
KA60-96-100S 0.6A400		100	0.6	400	70	82
KA60-96-200S 0.3A 50		200	0.3	50	65	81
KA60-96-200S 0.3A 60		200	0.3	60	65	81
KA60-96-220S 0.27A50		220	0.27	50	65	81
KA60-96-220S 0.27A60		220	0.27	60	65	81

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

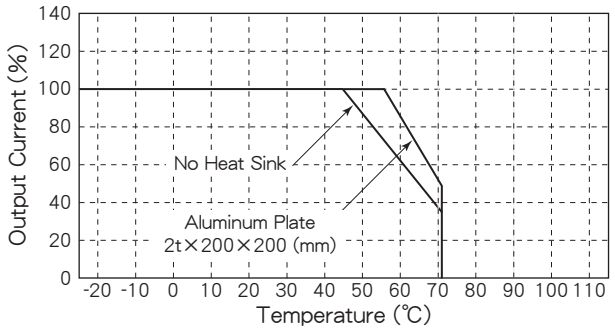


Fig. 2 Short Circuit Operating Area

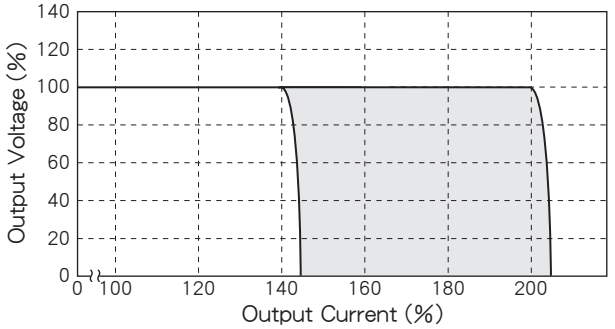


Fig. 3 Temperature Characteristic on Case Surface

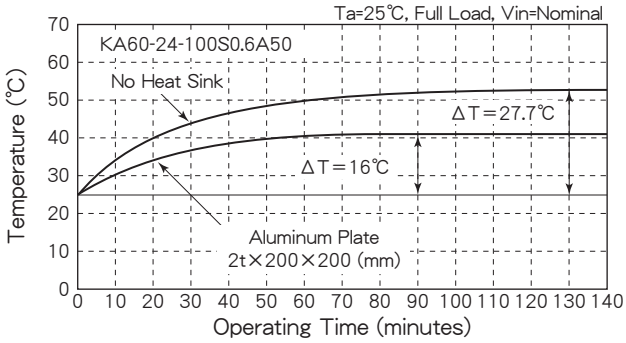
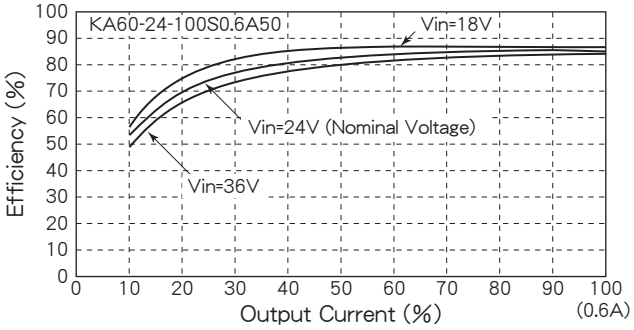


Fig. 4 Efficiency vs. Output Current



■ 主な機能及び注意事項 Function and direction in application

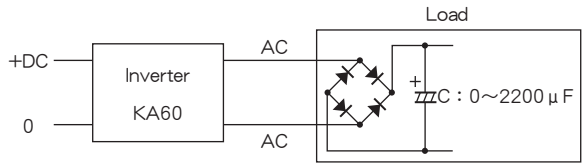
1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。
Output will be shut down in the input voltages on the following table. Output will automatically be reset when the input voltage comes to within the specified value.

定格入力電圧 Rated input voltage	低電圧保護動作点 Low voltage protection	過電圧保護動作点 Over voltage protection
12V (9～18V)	6～8V	20～22V
24V (18～36V)	12～16V	40～44V
48V (36～76V)	24～32V	80～88V
96V (72～144V)	48～64V	150～165V

2. 出力過電流保護 Output over current protection
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約140%～200%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 140 - 200% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

3. 過熱保護 Thermal protection
本体内部に過熱保護回路が内蔵されています。内部温度が＋90℃～＋110℃にて出力が停止します。＋90℃以下で自動復帰します。
Thermal protection is built-in. Output will be shut down in +90 -110℃ at the plate inside and will automatically be reset below +90℃.

4. 出力側突入電流保護 Output rush current protection
出力側の負荷としてダイオードで整流されたC負荷の突入電流に対して、問題なくインバータは動作します。
Inverter operates unconditionally against rush current of capacitor load rectified by diodes.



KA100 シリーズ

100VA DC/AC インバータ 正弦波出力

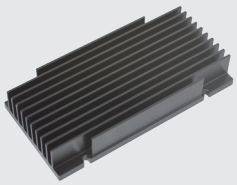
端子横向きタイプ(D)

H30×W60×L139 (mm)

端子縦向きタイプ(E)

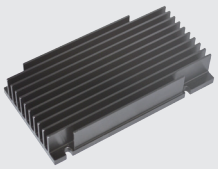
H30×W60×L139 (mm)

オプションヒートシンク Dタイプ用 A4-4691



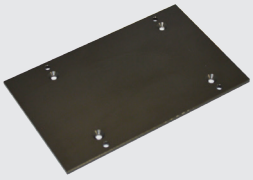
H20×W58×L117 (mm)

オプションヒートシンク Eタイプ用 A4-4616



H20×W58×L109 (mm)

オプションベースプレート A4-4622



H3×W80×L128 (mm)

■ 特　長

- 高効率　84～88% typical
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 過熱保護回路内蔵　＋110℃～＋130℃
- 出力周波数温度係数　0.01%/℃ 以下
- 入出力間絶縁 (AC2000V)
- 動作周囲温度　－40℃～＋85℃
- 可変出力電圧 ±5%
- 入出力ノイズフィルタ内蔵
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ 仕　様

(周囲温度：25℃, 入力電圧：定格, 負荷：100%)

- 入力電圧　DC12, 24, 48, 100V (表－1参照)
- 出力電圧　AC100Vrms, ±5% 調整可能
  AC200Vrms, ±5% 調整可能
  AC220Vrms, ±5% 調整可能
- 出力電流　表－1参照
- 出力周波数　50Hz, 60Hz, ±0.1%
- 出力波形歪み率　正弦波, 1.5% max.
- 出力電圧温度係数　0.02%/℃ max.
- 出力周波数温度係数　0.01%/℃ max.
- 効率　表－1参照
- 対入力変動率　0.5% max. (入力電圧範囲において)
- 対負荷変動率　1.0% max. (0～100%負荷において)
- 出力過電流保護　図－2参照
- 動作周囲温度範囲　－40℃～＋85℃ (図－1参照)
- 最大ケース温度　＋105℃
- 保存周囲温度範囲　－40℃～＋115℃
- 絶縁耐圧　AC2000V 1分間
  (入力－出力－ケース間)
- 絶縁抵抗　100MΩ min. (DC1000Vにて)
  (入力－出力－ケース間)
- 質量　本体：680g max.
  オプションヒートシンク：180g max.
  オプションベースプレート：100g max.
- 湿度　20～90% RH
- 衝撃　490m/s² (11msec. X, Y, Z方向)
- 振動　10～55Hz 98m/s²
  (30分間 X, Y, Z方向)
- 構造　アルミケース
- MTBF　120,000時間
  (周囲温度：25℃, 入力電圧：定格, 負荷：80%)
- 無償保証期間　5年間

■ 型　式

表 - 1

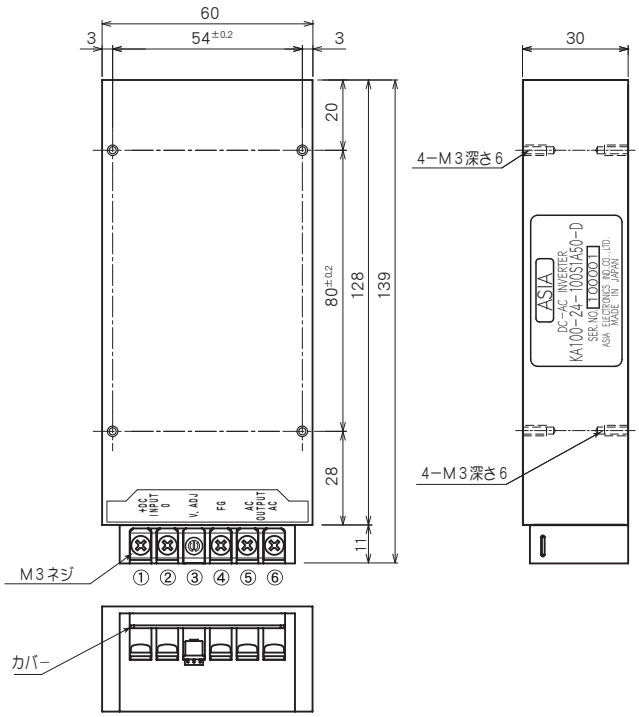
型　式	端子方向 横	端子方向 縦	入力電圧 (電圧範囲) (V. DC)	出力電圧 (V. AC)	出力電流 (A rms)	出力周波数 (Hz)	効率 (typ.) (%) 20% 負荷時	効率 (typ.) (%) 80% 負荷時
KA100 - 12 - 100S 1A 50 - D	○		12 (9～18)	100	1	50	80	86
KA100 - 12 - 100S 1A 50 - E		○						
KA100 - 12 - 100S 1A 60 - D	○					60		
KA100 - 12 - 100S 1A 60 - E		○						
KA100 - 12 - 200S 0.5A 50 - D	○			200	0.5	50	75	84
KA100 - 12 - 200S 0.5A 50 - E		○						
KA100 - 12 - 200S 0.5A 60 - D	○					60		
KA100 - 12 - 200S 0.5A 60 - E		○						
KA100 - 12 - 220S 0.45A 50 - D	○			220	0.45	50	75	84
KA100 - 12 - 220S 0.45A 50 - E		○						
KA100 - 12 - 220S 0.45A 60 - D	○					60		
KA100 - 12 - 220S 0.45A 60 - E		○						
KA100 - 24 - 100S 1A 50 - D	○		24 (18～36)	100	1	50	82	88
KA100 - 24 - 100S 1A 50 - E		○						
KA100 - 24 - 100S 1A 60 - D	○					60		
KA100 - 24 - 100S 1A 60 - E		○						
KA100 - 24 - 200S 0.5A 50 - D	○			200	0.5	50	77	86
KA100 - 24 - 200S 0.5A 50 - E		○						
KA100 - 24 - 200S 0.5A 60 - D	○					60		
KA100 - 24 - 200S 0.5A 60 - E		○						
KA100 - 24 - 220S 0.45A 50 - D	○			220	0.45	50	77	86
KA100 - 24 - 220S 0.45A 50 - E		○						
KA100 - 24 - 220S 0.45A 60 - D	○					60		
KA100 - 24 - 220S 0.45A 60 - E		○						
KA100 - 48 - 100S 1A 50 - D	○		48 (36～76)	100	1	50	82	88
KA100 - 48 - 100S 1A 50 - E		○						
KA100 - 48 - 100S 1A 60 - D	○					60		
KA100 - 48 - 100S 1A 60 - E		○						
KA100 - 48 - 200S 0.5A 50 - D	○			200	0.5	50	77	86
KA100 - 48 - 200S 0.5A 50 - E		○						
KA100 - 48 - 200S 0.5A 60 - D	○					60		
KA100 - 48 - 200S 0.5A 60 - E		○						
KA100 - 48 - 220S 0.45A 50 - D	○			220	0.45	50	77	86
KA100 - 48 - 220S 0.45A 50 - E		○						
KA100 - 48 - 220S 0.45A 60 - D	○					60		
KA100 - 48 - 220S 0.45A 60 - E		○						
KA100 - 100 - 100S 1A 50 - D	○		100 (70～144)	100	1	50	82	88
KA100 - 100 - 100S 1A 50 - E		○						
KA100 - 100 - 100S 1A 60 - D	○					60		
KA100 - 100 - 100S 1A 60 - E		○						
KA100 - 100 - 200S 0.5A 50 - D	○			200	0.5	50	77	86
KA100 - 100 - 200S 0.5A 50 - E		○						
KA100 - 100 - 200S 0.5A 60 - D	○					60		
KA100 - 100 - 200S 0.5A 60 - E		○						
KA100 - 100 - 220S 0.45A 50 - D	○			220	0.45	50	77	86
KA100 - 100 - 220S 0.45A 50 - E		○						
KA100 - 100 - 220S 0.45A 60 - D	○					60		
KA100 - 100 - 220S 0.45A 60 - E		○						

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。

■ 外形及び寸法（±0.5mm）

端子横向きタイプ(D)

〈Top View〉

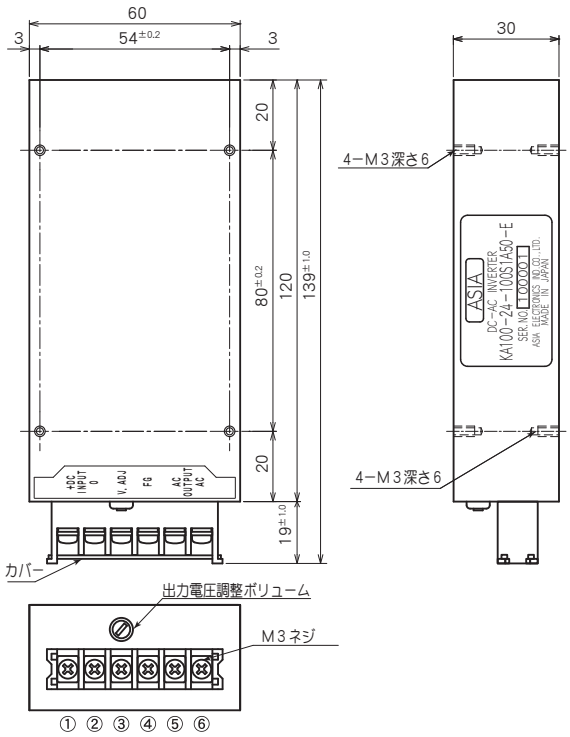


端子配列

①	直流入力端子 +V
②	直流入力端子 0V
③	出力電圧調整ボリューム
④	フレームグランド
⑤	交流出力端子
⑥	交流出力端子

端子縦向きタイプ(E)

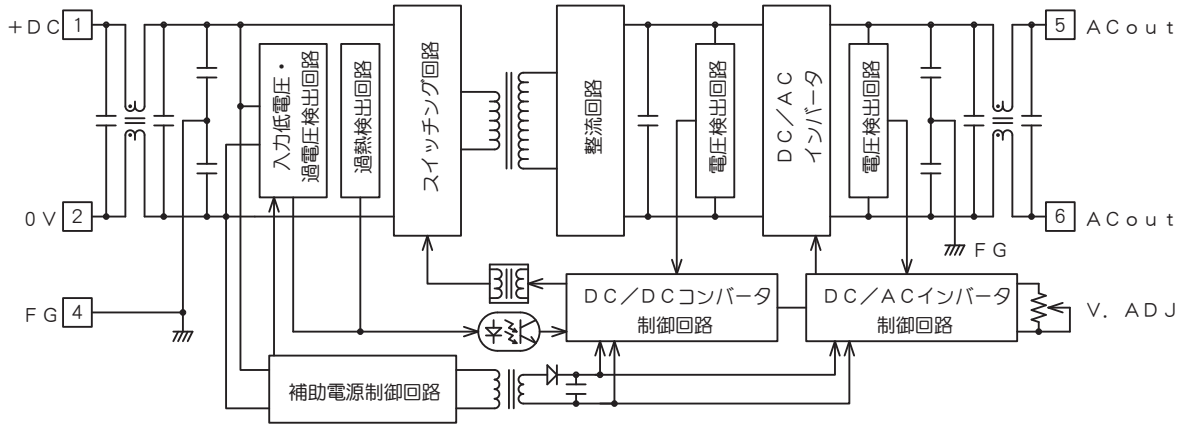
〈Top View〉



端子配列

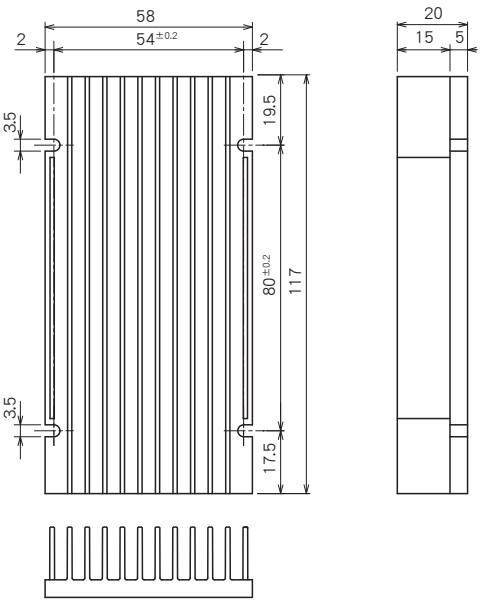
①	直流入力端子 +V
②	直流入力端子 0V
③	ＮＣ
④	フレームグランド
⑤	交流出力端子
⑥	交流出力端子

■ ブロック図



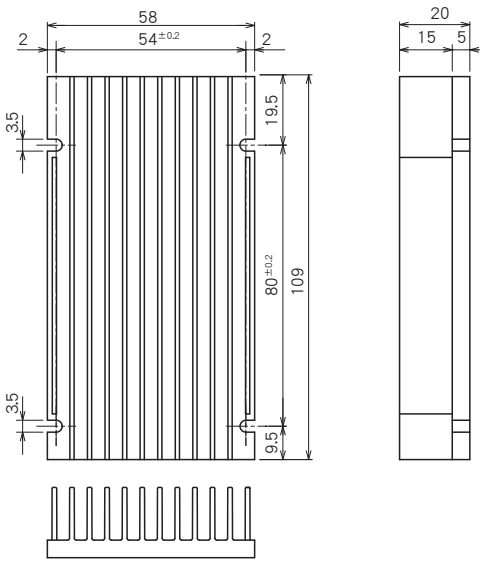
■ オプションヒートシンク

端子横向きタイプ(D用)



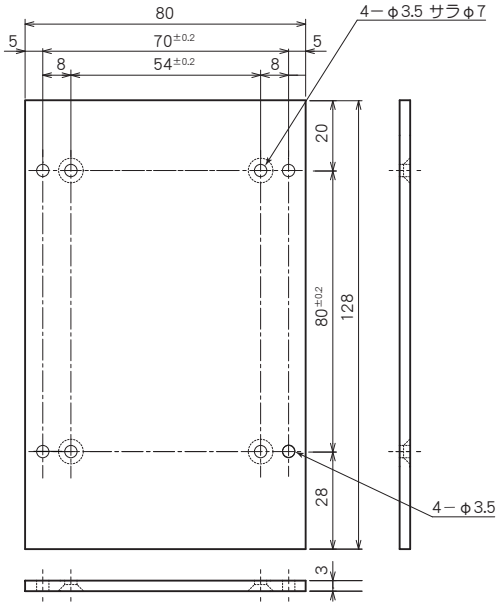
＊ヒートシンク型式 : A4-4691

端子縦向きタイプ(E用)



＊ヒートシンク型式 : A4-4616

■ オプションベースプレート



＊ベースプレート型式 : A4-4622

■ 特性データ

図 - 1　ディレーティングカーブ

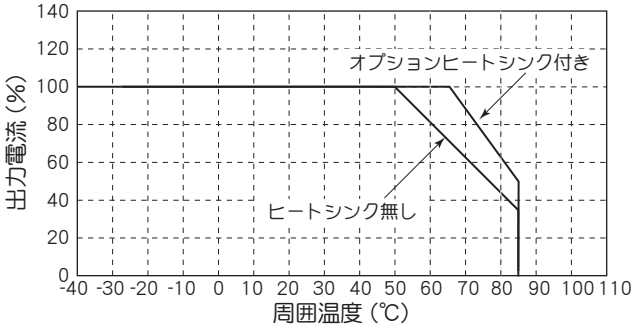


図 - 2　過電流保護範囲

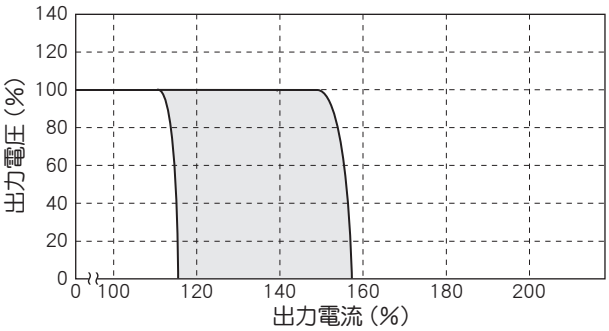


図 - 3　温度上昇特性（ケース表面温度）

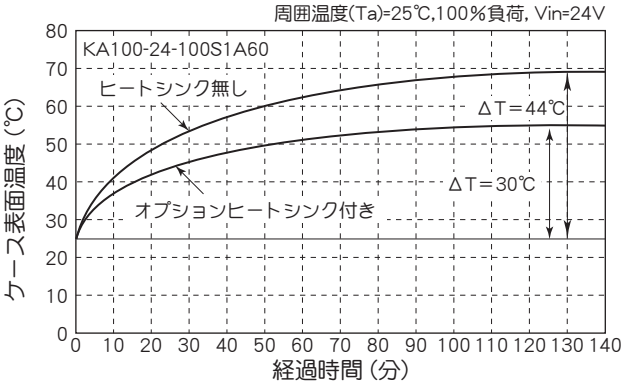
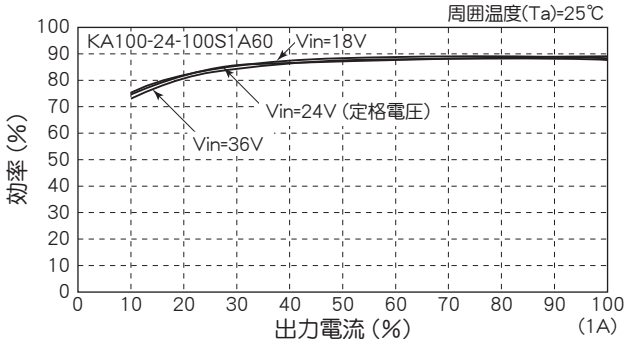


図 - 4　効率 - 出力電流特性

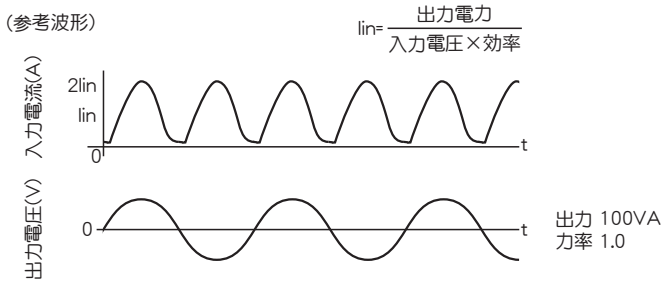


■ 主な機能及び注意事項

1. 入力低電圧保護、入力過電圧保護
下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。

定格入力電圧	低電圧保護動作点	過電圧保護動作点
12V (9～18V)	6～8V	19～21V
24V (18～36V)	12～16V	38～42V
48V (36～76V)	24～32V	80～88V
100V (70～144V)	48～64V	150～165V

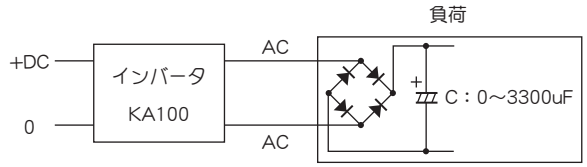
2. 入力電流
電解コンデンサレスのため、大きな脈流があります。300W以上の供給源をご用意ください。



3. 出力過電流保護
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の110%以上にて検出し出力電圧を制限します。また自動復帰特性を有しています。

4. 過熱保護
本体内部に過熱保護回路が内蔵されています。内部温度が+110～130℃にて出力が停止します。＋110℃以下で自動復帰します。

5. 出力側突入電流保護
出力側の負荷としてダイオードで整流されたコンデンサの突入電流に対して、問題なくインバータは動作します。



PA100 SERIES

100VA DC/AC INVERTERS
Sine Wave Output

H35×W70×L160 (mm)

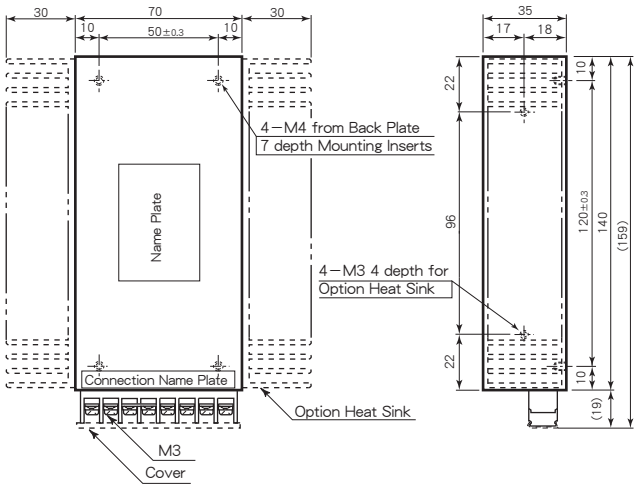
■ Features

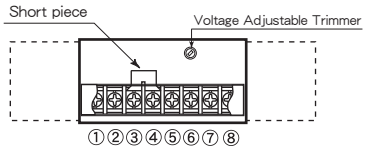
- ● High Efficiency 83～86% typical
- ● Remote ON/OFF Control
- ● Input Low Voltage Protection
- ● Input Over Voltage Protection
- ● Input Rush Current Protection
- ● Thermal Protection ＋90℃～＋110℃
- ● Output Frequency Temp. Coefficient 0.01%/℃ max.
- ● Input-Output Isolation (AC2000V)
- ● Operating Ambient Temperature －25℃～＋71℃
- ● Adjustable Output Volt. ±5%
- ● Built-in Input and Output Noise Filter
- ● Conformity to RoHS2 Directive

- ●高効率 83～86% typical
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●入力突入電流保護回路内蔵
- ●過熱保護回路内蔵 ＋90℃～＋110℃
- ●出力周波数温度係数 0.01%/℃ 以下
- ●入出力間絶縁 (AC2000V)
- ●動作周囲温度 －25℃～＋71℃
- ●可変出力電圧 ±5%
- ●入出力ノイズフィルタ内蔵
- ●RoHS2指令対応

■ Terminal Outs & Dimentions (±0.5mm)

〈Top View〉





Terminal Outs

①	＋Vdc in
②	0 Vdc in
③	＋Remote Control (＋RC)
④	－Remote Control (－RC)
⑤	Frame Ground
⑥	No Connection
⑦	AC out
⑧	AC out

＊Option Heat Sink Model : A3-3664

＊When not using Remote Control, you short-circuit in the ③ - ④ terminal.

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

● Input Voltage	DC12, 24, 48, 96V (See Table 1)
● Output Voltage	AC100Vrms, ±5% Adjustable AC200Vrms, ±5% Adjustable AC220Vrms, ±5% Adjustable
● Output Current	See Table 1
● Output Frequency	50Hz, 60Hz, 400Hz, ±0.1%
● Output Wave	Sine Wave
● Output Wave Distortion	1.5% max. 3% max. (Vout : 400Hz only)
● Output Voltage Temperature Coefficient	0.02%/℃ max.
● Output Frequency Temperature Coefficient	0.01%/℃ max.
● Efficiency	See Table 1
● Line Regulation	0.5% max. (at Vin Range)
● Load Regulation	1% max. (0～100% Load)
● Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
● Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V
● Operating Ambient Temperature	－25℃～＋71℃ (See Fig. 1)
● Storage Temperature	－40℃～＋85℃
● Isolation Voltage	AC2000V 1 min. (Input－Output) AC2000V 1 min. (Input－Case) AC1000V 1 min. (Output－Case)
● Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
● Weight	Main Body : 850g max. Pair Heat Sinks : 250g max.
● Humidity	20～90% RH
● Shock	490m/s² (11msec 3directions)
● Vibration	10～55Hz 98m/s² (30minutes 3directions)
● Surface Structure	Aluminum Case
● MTBF	120,000H (Ta : 25℃, 80% Load, Nominal Vin)
● Warranty	5 years

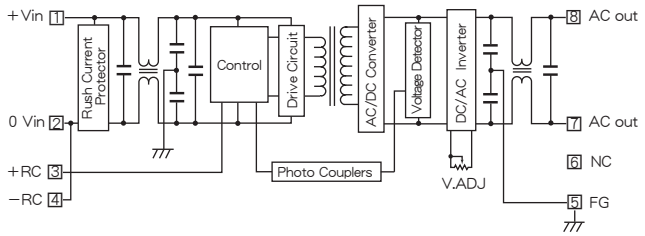
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	Output Frequency (Hz)	Efficiency (typ.) (%) 20% Load	Efficiency (typ.) (%) 80% Load
PA100-12-100S 1A 50	12 (9～18)	100	1	50	81	85
PA100-12-100S 1A 60		100	1	60	81	85
PA100-12-100S 1A400		100	1	400	79	83
PA100-12-200S 0.5A 50		200	0.5	50	80	85
PA100-12-200S 0.5A 60		200	0.5	60	80	85
PA100-12-220S0.45A 50		220	0.45	50	80	85
PA100-12-220S0.45A 60		220	0.45	60	80	85
PA100-24-100S 1A 50	24 (18～36)	100	1	50	82	86
PA100-24-100S 1A 60		100	1	60	82	86
PA100-24-100S 1A400		100	1	400	80	84
PA100-24-200S 0.5A 50		200	0.5	50	81	86
PA100-24-200S 0.5A 60		200	0.5	60	81	86
PA100-24-220S0.45A 50		220	0.45	50	81	86
PA100-24-220S0.45A 60		220	0.45	60	81	86
PA100-48-100S 1A 50	48 (36～76)	100	1	50	82	86
PA100-48-100S 1A 60		100	1	60	82	86
PA100-48-100S 1A400		100	1	400	80	84
PA100-48-200S 0.5A 50		200	0.5	50	81	86
PA100-48-200S 0.5A 60		200	0.5	60	81	86
PA100-48-220S0.45A 50		220	0.45	50	81	86
PA100-48-220S0.45A 60		220	0.45	60	81	86
PA100-96-100S 1A 50	96 (72～144)	100	1	50	82	86
PA100-96-100S 1A 60		100	1	60	82	86
PA100-96-100S 1A400		100	1	400	80	84
PA100-96-200S 0.5A 50		200	0.5	50	81	86
PA100-96-200S 0.5A 60		200	0.5	60	81	86
PA100-96-220S0.45A 50		220	0.45	50	81	86
PA100-96-220S0.45A 60		220	0.45	60	81	86

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

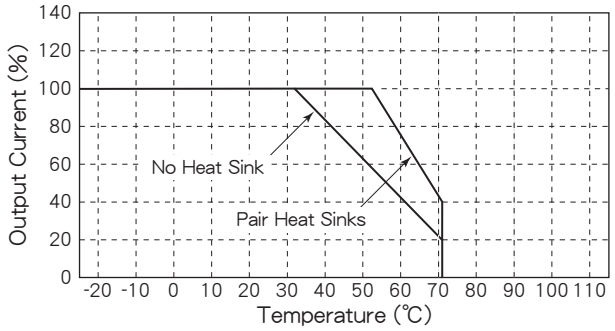


Fig. 2 Short Circuit Operating Area

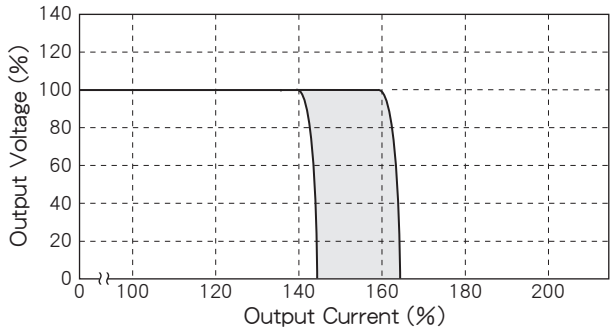


Fig. 3 Temperature Characteristic on Case Surface

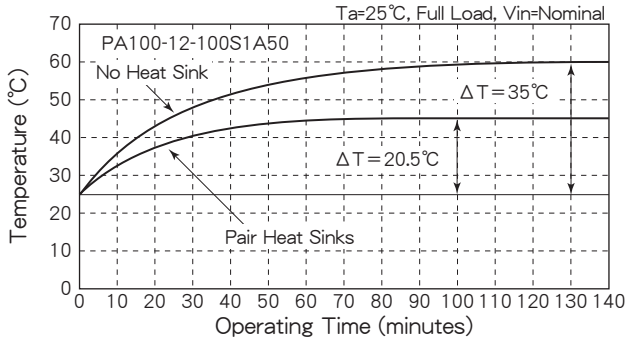
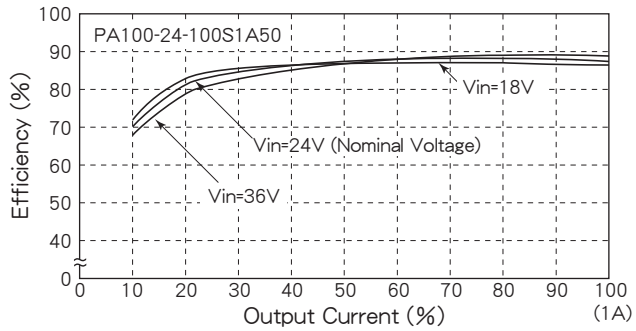


Fig. 4 Efficiency vs. Output Current



■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。
Output will be shut down in the input voltages on the following table. Output will automatically be reset when the input voltage comes to within the specified value.

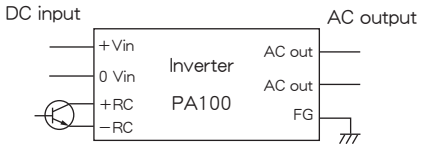
定格入力電圧 Rated input voltage	低電圧保護動作点 Low voltage protection	過電圧保護動作点 Over voltage protection
12V (9～18V)	6～8V	20～22V
24V (18～36V)	12～16V	40～44V
48V (36～76V)	24～32V	80～88V
96V (72～144V)	48～64V	150～165V

2. 出力過電流保護 Output over current protection
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約140%～160%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 140 - 160% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

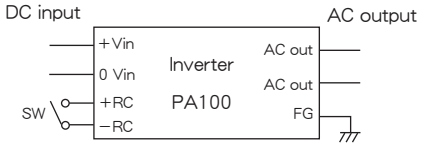
3. 過熱保護 Thermal protection
本体内部に過熱保護回路が内蔵されています。内部温度が＋90℃～＋110℃にて出力が停止します。＋90℃以下で自動復帰します。
Thermal protection is built-in. Output will be shut down in +90 - 110℃ at the plate inside and will automatically be reset below +90℃.

4. リモートON/OFFコントロール Remote ON/OFF control
リモートON/OFFコントロールを使用して、電源の出力をON/OFFする事ができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFする事ができます。RC端子は入力側にあり、入力電源回路とは絶縁されていません。
Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. RC terminals are located on the input side and the circuit is not isolated from input power source circuit.

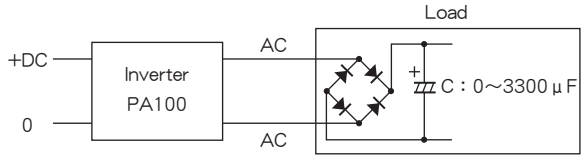
●TRによる例 Example by transistor



●SWによる例 Example by switch



5. 出力側突入電流保護 Output rush current protection
出力側の負荷としてダイオードで整流されたC負荷の突入電流に対して、問題なくインバータは動作します。
Inverter operates unconditionally against rush current of capacitor load rectified by diodes.

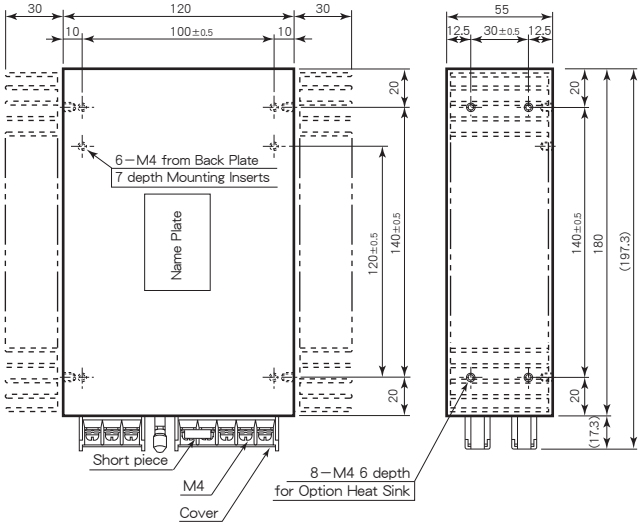


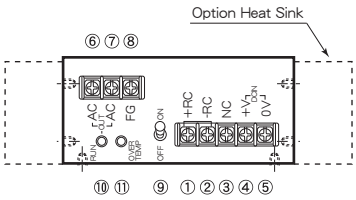
MA250 SERIES

250VA DC/AC INVERTERS
Sine Wave Output

H55×W120×L198 (mm)

■ Terminal Outs & Dimensions (±1.0mm)





＊Option Heat Sink Model : A3-8860

Terminal Outs

①	＋Remote Control (+RC)
②	−Remote Control (−RC)
③	No Connection (NC)
④	＋Vdc in
⑤	0 Vdc in
⑥	AC out
⑦	AC out
⑧	Frame Ground (FG)
⑨	ON/OFF Switch
⑩	Operation Indicator
⑪	Over Thermal Indicator

■ Features

- ● High Efficiency 85～87% typical
- ● Vertical, Horizontal Mount
- ● Remote ON/OFF Control
- ● Input Low Voltage Protection
- ● Input Over Voltage Protection
- ● Input Rush Current Protection (Input DC12V type is not built-in.)
- ● Thermal Protection ＋90℃～＋110℃
- ● Output Frequency Temp. Coefficient 0.01%/℃ max.
- ● Input-Output Isolation (AC2000V)
- ● Operating Ambient Temperature −25℃～＋71℃
- ● Built-in Input and Output Noise Filter
- ● Conformity to RoHS2 Directive

- ●高効率 85～87% typical
- ●縦置き、横置き共用
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●入力突入電流保護回路内蔵 (DC12V入力は除く)
- ●過熱保護回路内蔵 ＋90℃～＋110℃
- ●出力周波数温度係数 0.01%/℃ 以下
- ●入出力間絶縁 (AC2000V)
- ●動作周囲温度 −25℃～＋71℃
- ●入出力ノイズフィルタ内蔵
- ●RoHS2指令対応

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

● Input Voltage	DC12, 24, 48, 96V (See Table 1)
● Output Voltage	AC100Vrms, ±1% AC200Vrms, ±1% AC220Vrms, ±1%
● Output Current	See Table 1
● Output Frequency	50Hz, 60Hz, 400Hz, ±0.1%
● Output Wave	Sine Wave
● Output Wave Distortion	1.5% max. 3% max. (Vout : 400Hz only)
● Output Voltage Temperature Coefficient	0.02%/℃ max.
● Output Frequency Temperature Coefficient	0.01%/℃ max.
● Efficiency	See Table 1
● Line Regulation	0.5% max. (at Vin Range)
● Load Regulation	1% max. (0～100% Load)
● Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
● Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V
● Operating Ambient Temperature	−25℃～＋71℃ (See Fig. 1)
● Storage Temperature	−40℃～＋85℃
● Isolation Voltage	AC2000V one minute (Input−Output−Case)
● Isolation Impedance	100MΩ min. (at DC1000V) (Input−Output−Case)
● Weight	Main Body : 3kg max. Pair Heat Sinks : 700g max.
● Humidity	20～90% RH
● Shock	490m/s² (11msec 3directions)
● Vibration	10～55Hz 98m/s² (30minutes 3directions)
● Surface Structure	Aluminum Case
● MTBF	90,000H (Ta : 25℃, 80% Load, Nominal Vin)
● Warranty	5 years

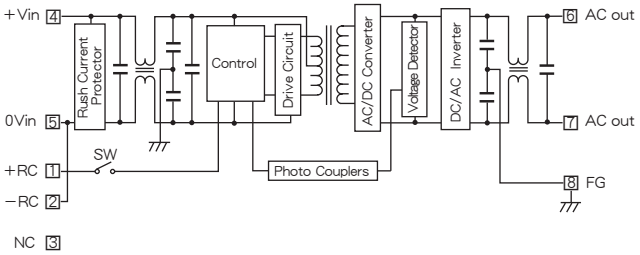
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	Output Frequency (Hz)	Efficiency (typ.) (%) 20% Load	80% Load
MA250-12-100S 2.5A50	12 (9～18)	100	2.5	50	84	85
MA250-12-100S 2.5A60		100	2.5	60	84	85
MA250-12-100S2.5A400		100	2.5	400	84	85
MA250-12-200S1.25A50		200	1.25	50	84	85
MA250-12-200S1.25A60		200	1.25	60	84	85
MA250-12-220S 1.1A50		220	1.1	50	84	85
MA250-12-220S 1.1A60		220	1.1	60	84	85
MA250-24-100S 2.5A50	24 (18～36)	100	2.5	50	84	87
MA250-24-100S 2.5A60		100	2.5	60	84	87
MA250-24-100S2.5A400		100	2.5	400	84	87
MA250-24-200S1.25A50		200	1.25	50	84	87
MA250-24-200S1.25A60		200	1.25	60	84	87
MA250-24-220S 1.1A50		220	1.1	50	84	87
MA250-24-220S 1.1A60		220	1.1	60	84	87
MA250-48-100S 2.5A50	48 (36～76)	100	2.5	50	84	87
MA250-48-100S 2.5A60		100	2.5	60	84	87
MA250-48-100S2.5A400		100	2.5	400	84	87
MA250-48-200S1.25A50		200	1.25	50	84	87
MA250-48-200S1.25A60		200	1.25	60	84	87
MA250-48-220S 1.1A50		220	1.1	50	84	87
MA250-48-220S 1.1A60		220	1.1	60	84	87
MA250-96-100S 2.5A50	96 (72～144)	100	2.5	50	84	87
MA250-96-100S 2.5A60		100	2.5	60	84	87
MA250-96-100S2.5A400		100	2.5	400	84	87
MA250-96-200S1.25A50		200	1.25	50	84	87
MA250-96-200S1.25A60		200	1.25	60	84	87
MA250-96-220S 1.1A50		220	1.1	50	84	87
MA250-96-220S 1.1A60		220	1.1	60	84	87

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

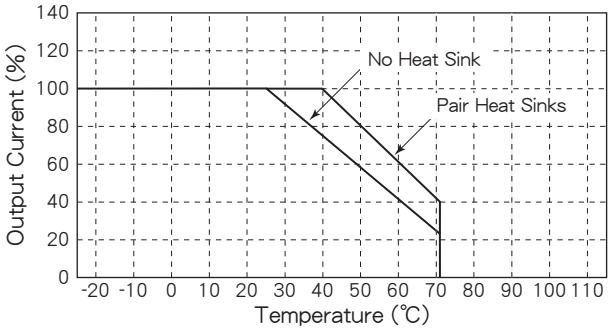


Fig. 2 Short Circuit Operating Area

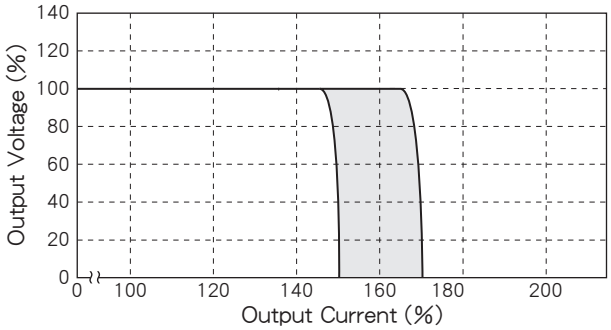


Fig. 3 Temperature Characteristic on Case Surface

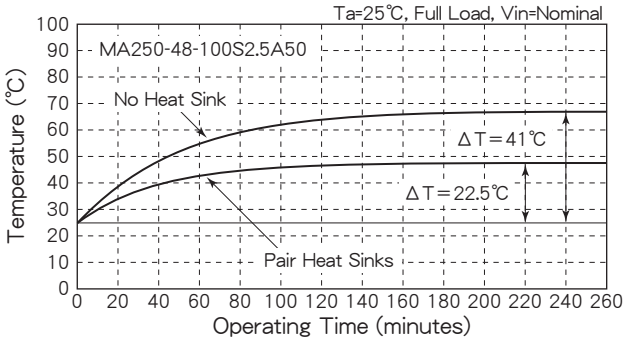
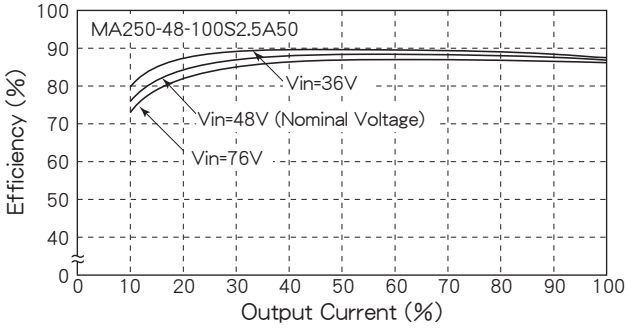


Fig. 4 Efficiency vs. Output Current



■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。
Output will be shut down in the input voltages on the following table. Output will automatically be reset when the input voltage comes to within the specified value.

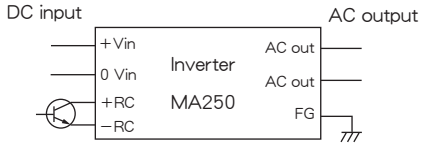
定格入力電圧 Rated input voltage	低電圧保護動作点 Low voltage protection	過電圧保護動作点 Over voltage protection
12V (9～18V)	6～8V	20～22V
24V (18～36V)	12～16V	40～44V
48V (36～76V)	24～32V	80～88V
96V (72～144V)	48～64V	150～165V

2. 出力過電流保護 Output over current protection
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約150%～170%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 150 - 170% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

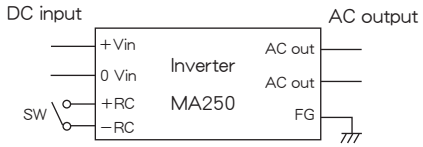
3. 過熱保護 Thermal protection
本体内部に過熱保護回路が内蔵されています。内部温度が＋90℃～＋110℃にて出力が停止します。＋90℃以下で自動復帰します。
Thermal protection is built-in. Output will be shut down in +90 - 110℃ at the plate inside and will automatically be reset below +90℃.

4. リモートON/OFFコントロール Remote ON/OFF control
リモートON/OFFコントロールを使用して、電源の出力をON/OFFする事ができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFする事ができます。またRC端子間をショートしたままスイッチを手動でON/OFFする事により、出力電圧をON/OFFできます。RC端子は入力側にあり、入力電源回路とは絶縁されていません。
Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. In addition, ON/OFF of the output voltage is possible by performing ON/OFF of the switch on front panel by manual operation with short between RC terminals. RC terminals are located on the input side and the circuit is not isolated from input power source circuit.

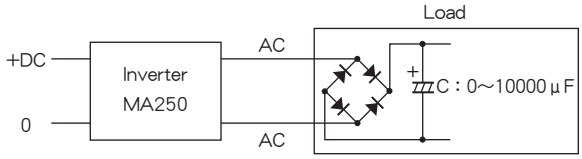
●TRによる例 Example by transistor



●SWによる例 Example by switch



5. 出力側突入電流保護 Output rush current protection
出力側の負荷としてダイオードで整流されたC負荷の突入電流に対して、問題なくインバータは動作します。
Inverter operates unconditionally against rush current of capacitor load rectified by diodes.



VA500 SERIES

400～500VA DC/AC INVERTERS
Sine Wave Output

H60×W120×L220 (mm)

■ Features

- ● High Efficiency 86～88% typical
- ● Vertical, Horizontal Mount
- ● Remote ON/OFF Control
- ● Input Low Voltage Protection
- ● Input Over Voltage Protection
- ● Thermal Protection ＋110℃～＋120℃
- ● Output Frequency Temp. Coefficient 0.01%/℃ max.
- ● Input-Output Isolation (AC2000V)
- ● Operating Ambient Temperature －40℃～＋85℃
- ● Built-in Output Noise Filter
- ● Built-in Input Fuse
- ● Built-in Frequency Changing Switch (50Hz or 60Hz)
- ● Conformity to RoHS2 Directive
- ● Not built-in aluminum and tantalum electrolytic capacitor

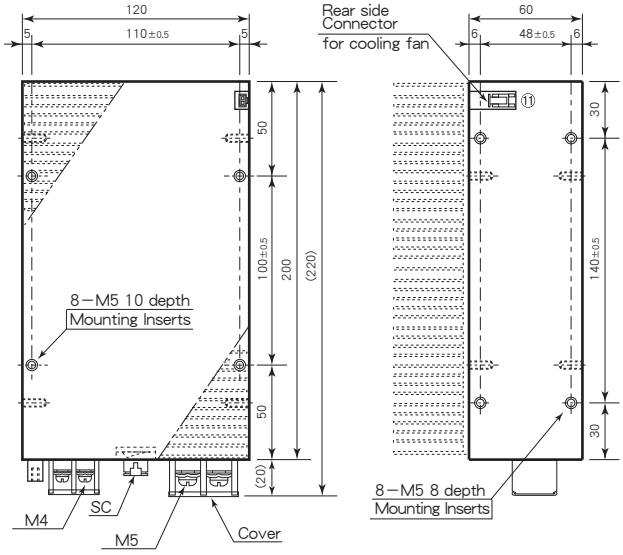
- ●高効率 86～88% typical
- ●縦置き、横置き共用
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●過熱保護回路内蔵 ＋110℃～＋120℃
- ●出力周波数温度係数 0.01%/℃ 以下
- ●入出力間絶縁 (AC2000V)
- ●動作周囲温度 －40℃～＋85℃
- ●出力ノイズフィルタ内蔵
- ●入力ヒューズ内蔵
- ●周波数切替スイッチ有り (50Hz又は60Hz)
- ●RoHS2指令対応
- ●アルミ電解コンデンサ及び タンタルコンデンサ不使用

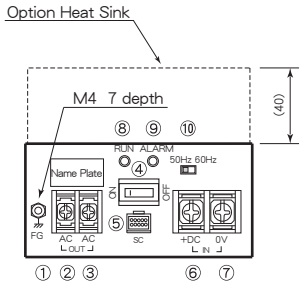
■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

● Input Voltage	DC12, 24, 48, 96, 200, 300, 400V (See Table 1)
● Output Voltage	AC100Vrms, ±1% AC200Vrms, ±1% AC220Vrms, ±1%
● Output Current	See Table 1
● Output Frequency	50Hz/60Hz, ±0.1%
● Output Wave, Distortion	Sine Wave, 1.5% max.
● Output Voltage Temperature Coefficient	0.02%/℃ max.
● Output Frequency Temperature Coefficient	0.01%/℃ max.
● Efficiency	See Table 1
● Line Regulation	0.5% max. (at Vin Range)
● Load Regulation	1% max. (0～100% Load)
● Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
● Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V
● Operating Ambient Temperature	－40℃～＋85℃ (See Fig. 1)
● Max. Case Temp.	＋105℃
● Storage Temperature	－40℃～＋115℃
● Isolation Voltage	AC2000V one minute (Input－Output－Case)
● Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
● Weight	Main Body : 3.9kg max. Heat Sink : 900g max.
● Humidity	20～90% RH
● Shock	490m/s² (11msec 3directions)
● Vibration	10～55Hz 98m/s² (30minutes 3directions)
● Surface Structure	Aluminum Case
● MTBF	90,000H (Ta : 25℃, 80% Load, Nominal Vin)
● Warranty	5 years

■ Terminal Outs & Dimensions (±1.0mm)





＊Option Heat Sink Model : A3-13270

Terminal Outs

①	Frame Ground (FG)
②	AC out
③	AC out
④	ON/OFF Switch
⑤	Signal Connector
⑥	＋Vdc in
⑦	0 Vdc in
⑧	Operation Indicator
⑨	Alarm Indicator
⑩	Frequency Changing Switch
⑪	Rear side Connector

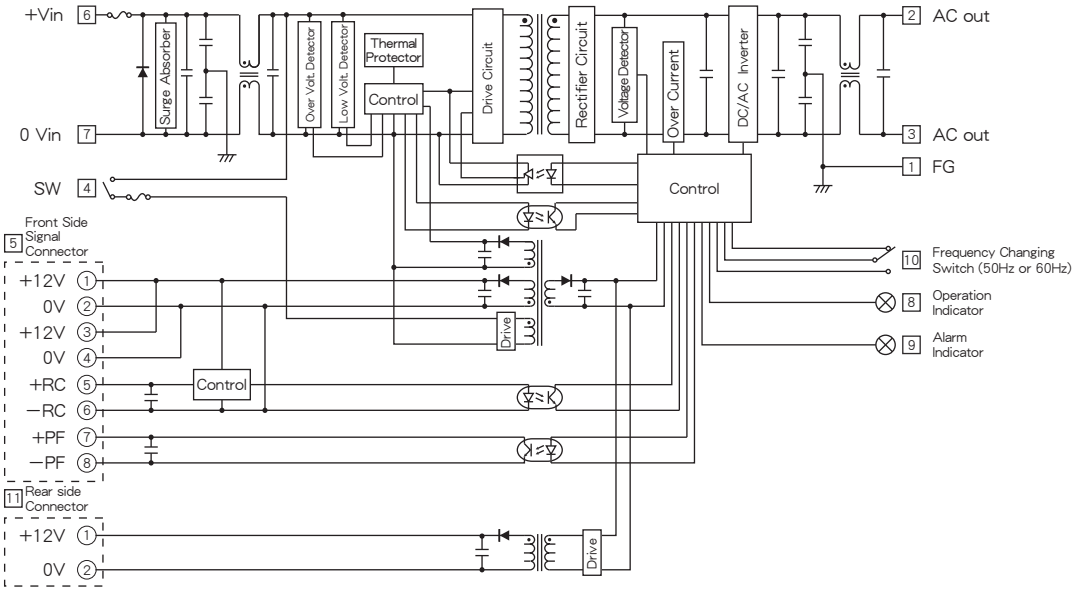
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	Output Frequency (Hz)	Efficiency (typ.) (%) 20% Load	Efficiency (typ.) (%) 80% Load
VA500-12 - 100S 4A	12 (9～18)	100	4	50/60	85	86
VA500-12 - 200S 2A		200	2	50/60	83	86
VA500-12 - 220S1.8A		220	1.8	50/60	83	86
VA500-24 - 100S 5A	24 (18～36)	100	5	50/60	86	88
VA500-24 - 200S2.5A		200	2.5	50/60	83	88
VA500-24 - 220S2.2A		220	2.2	50/60	83	88
VA500-48 - 100S 5A	48 (36～76)	100	5	50/60	86	88
VA500-48 - 200S2.5A		200	2.5	50/60	83	88
VA500-48 - 220S2.2A		220	2.2	50/60	83	88
VA500-96 - 100S 5A	96 (72～144)	100	5	50/60	86	88
VA500-96 - 200S2.5A		200	2.5	50/60	83	88
VA500-96 - 220S2.2A		220	2.2	50/60	83	88
VA500-200-100S 5A	200 (150～300)	100	5	50/60	86	88
VA500-200-200S2.5A		200	2.5	50/60	83	88
VA500-200-220S2.2A		220	2.2	50/60	83	88
VA500-300-100S 5A	300 (225～450)	100	5	50/60	86	88
VA500-300-200S2.5A		200	2.5	50/60	83	88
VA500-300-220S2.2A		220	2.2	50/60	83	88
VA500-400-100S 5A	400 (300～600)	100	5	50/60	86	88
VA500-400-200S2.5A		200	2.5	50/60	83	88
VA500-400-220S2.2A		220	2.2	50/60	83	88

※1 出力周波数(50Hz又は60Hz)は周波数切替スイッチによって選択可能です。
Output frequency(50Hz or 60Hz) is selectable by a Frequency Changing Switch.
※2 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Connector Pin Out

Front side Signal Connector Pin Outs

Mating connector : PADP-10V-1-S (J.S.T)
Terminal : SPH-001T-P0.5L (J.S.T)
SPH-002T-P0.5L (J.S.T)
SPND-001T-C0.5 (J.S.T)
SPND-002T-C0.5 (J.S.T)

① Stand-by source (+12V, 0.05A)
② Stand-by source (0V)
③ Stand-by source (+12V, 0.05A)
④ Stand-by source (0V)
⑤ Remote Control (+)
⑥ Remote Control (−)
⑦ Power Fail (+)
⑧ Power Fail (−)
⑨ No Connection
⑩ No Connection

Rear side Connector Pin Outs

Mating connector : PAP-02V-S (J.S.T)
Terminal : SPHD-001T-P0.5 (J.S.T)
SPHD-002T-P0.5 (J.S.T)

① Stand-by source (+12V, 0.2A)
② Stand-by source (0V)

■ Characteristic Curves

Fig. 1 Derating Curve

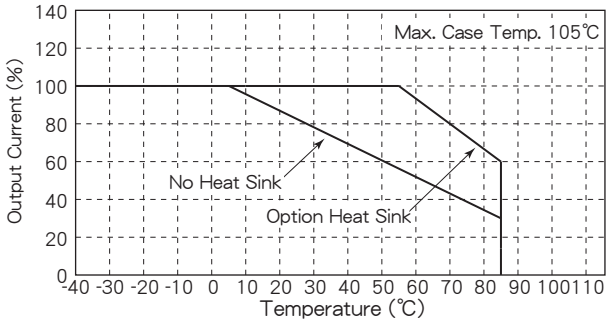


Fig. 2 Short Circuit Operating Area

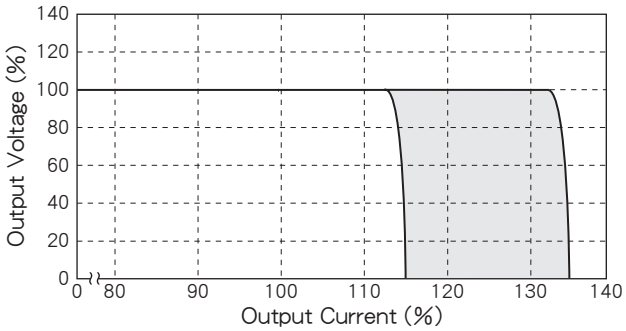


Fig. 3 Temperature Characteristic on Case Surface

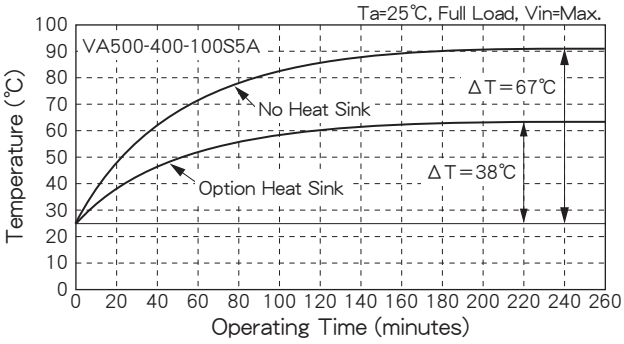


Fig. 4 Efficiency vs. Output Current

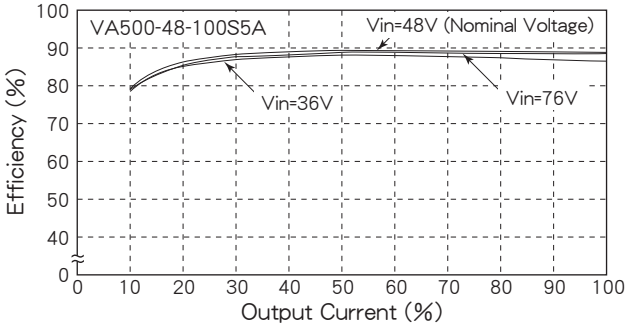
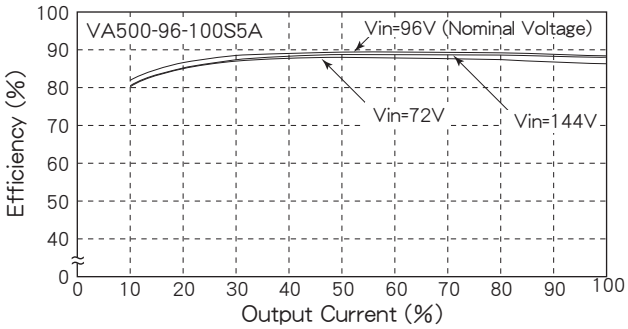


Fig. 5 Efficiency vs. Output Current



■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。
Output will be shut down in the input voltages on the following table. Output will automatically be reset when the input voltage comes to within the specified value.

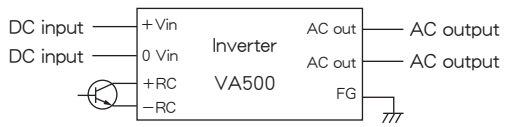
定格入力電圧 Rated input voltage	低電圧保護動作点 Low voltage protection	過電圧保護動作点 Over voltage protection
12V (9～18V)	6～8V	20～22V
24V (18～36V)	12～16V	40～44V
48V (36～76V)	24～32V	80～88V
96V (72～144V)	48～64V	152～168V
200V (150～300V)	102～133V	316～330V
300V (225～450V)	153～200V	474～495V
400V (300～600V)	204～265V	633～660V

2. 出力過電流保護 Output over current protection
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約115%～135%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 115%～135% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

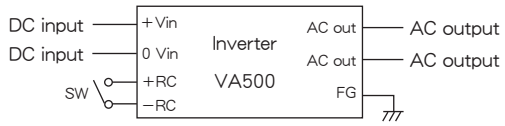
3. 過熱保護 Thermal protection
本体内部に過熱保護回路が内蔵されています。内部温度が＋110℃～＋120℃にて出力が停止します。＋110℃以下で自動復帰します。
Thermal protection is built-in. Output will be shut down in +110 - 120℃ at the plate inside and will automatically be reset below +110℃.

4. リモートON/OFFコントロール Remote ON/OFF control
リモートON/OFFコントロールを使用して、電源の出力をON/OFFする事ができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFする事ができます。またRC端子間をショートしたままスイッチを手動でON/OFFする事により、出力電圧をON/OFFできます。RC端子は、入力、出力、FG端子、PF端子、リアサイドコネクタ端子と絶縁されています。
Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. In addition, ON/OFF of the output voltage is possible by performing ON/OFF of the switch on front panel by manual operation with short between RC terminals. RC terminals are isolated from input, output, FG terminal, PF terminal and rear side connector terminal.

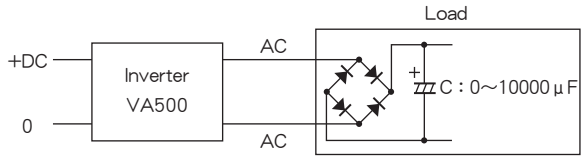
●TRによる例 Example by transistor



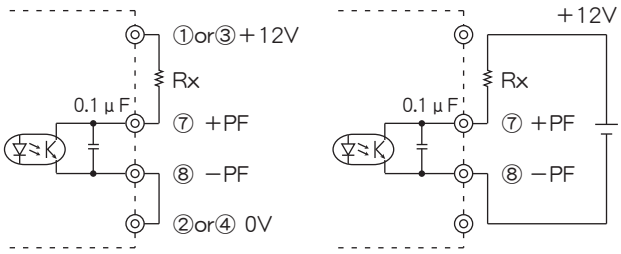
●SWによる例 Example by switch



5. 出力側突入電流保護 Output rush current protection
出力側の負荷としてダイオードで整流されたC負荷の突入電流に対して、問題なくインバータは動作します。
Inverter operates unconditionally against rush current of capacitor load rectified by diodes.



6. PF端子（オープンコレクタ方式） PF terminals (Open collector method)
PF端子は、以下の保護が動作した場合に"Open"になります。
・入力低電圧保護
・入力過電圧保護
・出力過電流保護
・過熱保護
電源正常時はPF端子が "Short" になります。
PF端子は、入力、出力、FG端子、RC端子、リアサイドコネクタ端子と絶縁されています。
When the following protection operates, the PF terminal outputs "Open".
・Input low voltage protection
・Input over voltage protection
・Output over current protection
・Thermal protection
The PF terminal outputs "Short" in the power supply normalcy.
PF terminal is isolated from input, output, FG terminal, RC terminal and rear side connector terminal.

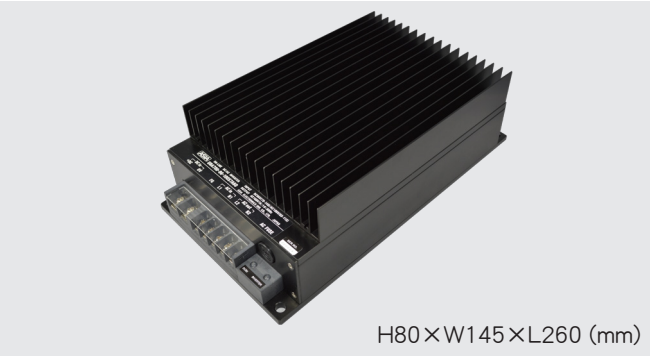


internal power supply　　outside power supply

7. リアサイドDC12V 0.2A電源コネクタ端子
Rear side DC12V 0.2A power supply connector terminal
リアサイドコネクタ端子のDC12V出力は、放熱効果を高める為の外付け冷却ファン用の電源に使う事ができます。リアサイドコネクタ端子は、入力、出力、FG端子、RC端子、PF端子と絶縁されています。
Possible to use the DC12V output of the rear side connector terminal as a power supply fot external cooling fans to add a heat radiation effect. Rear side connector terminal is isolated from input, output, FG terminal, RC terminal and PF terminal.

UBA700 SERIES

700VA DC/AC インバータ
正弦波出力　常時給電インバータ



H80×W145×L260 (mm)

■ 特　長

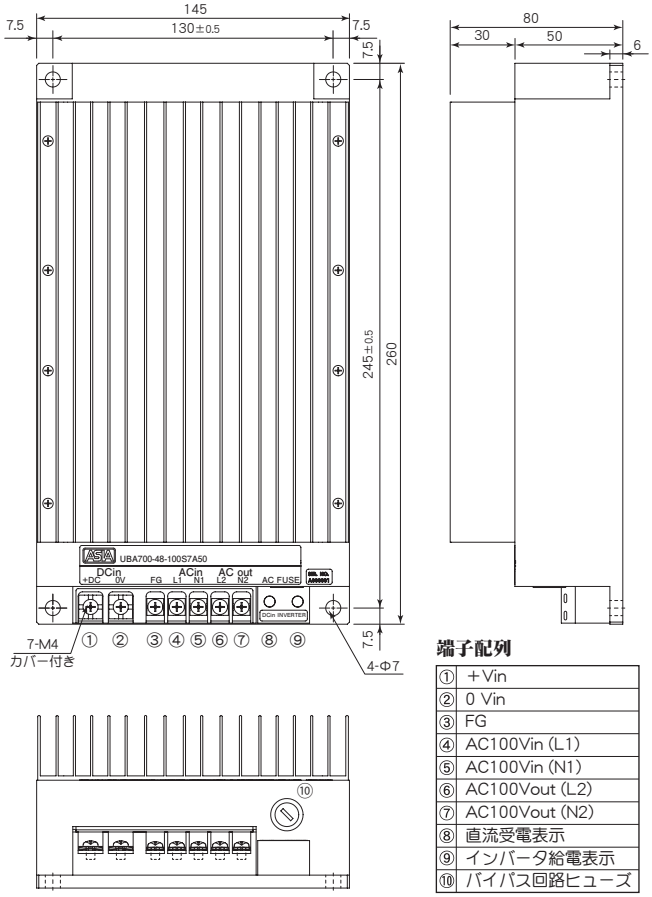
- ●正弦波出力
- ●常時給電インバータ
- ●DC入力異常時、バイパス (AC100V)出力に自動切替 (表－2参照)
- ●高効率 89～90% typical
- ●入出力間絶縁 (AC2000V)
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●入力突入電流保護回路内蔵
- ●過熱保護回路内蔵
- ●内部発熱部+110℃～+130℃においてバイパス給電に切替
- ●インバータからバイパスへの切替時の瞬断時間約20ms
- ●入力ヒューズ内蔵
- ●入出力ノイズフィルタ内蔵
- ●RoHS2指令対応
- ●長寿命電解コンデンサ使用 (105℃ 10000H品)

■ 仕　様

(周囲温度：25℃, 100%負荷, 定格入力電圧)

●直流入力電圧	DC48, 96V (表－1参照)
●バイパス入力電圧	AC100Vrms ±15% 50Hz±5% or 60Hz±5%
●出力電圧	AC100Vrms, ±2%
●出力電流	表－1参照
●出力周波数	50/60Hz ±0.1%
●出力波形	正弦波
●出力波形歪み率	1.0% max. (線形負荷) 12% max. (整流器負荷)
●出力電圧温度係数	0.02%/℃ max.
●出力周波数温度係数	0.01%/℃ max.
●効率	86～90% (表－1参照)
●対入力変動	0.5% max. (入力電圧範囲において)
●対負荷変動	1.5% max. (インバータ給電時) 1.0% max. (バイパス給電時)
●短絡保護	10～15S 継続にてインバータ給電停止、 バイパス切り替え
●動作周囲温度	－25℃～＋85℃ (図－1参照)
●保存周囲温度	－40℃～＋105℃
●絶縁耐圧	AC2000V 1分間 (入力－出力－ケース間)
●絶縁抵抗	100MΩ min. (DC1000Vにて) (入力－出力－ケース間)
●質量	4.9kg max.
●湿度	20～95% RH
●衝撃	490m/s^2 (11msec. X, Y, Z方向)
●振動	JIS E4031 区分1 等級B
●構造	6面アルミケース
●期待寿命	100,000時間 (周囲温度：25℃, 80%負荷, 定格入力電圧)
●無償保証期間	5年間

■ 外形及び寸法 (±1.0mm)



端子配列

①	＋Vin
②	0 Vin
③	FG
④	AC100Vin (L1)
⑤	AC100Vin (N1)
⑥	AC100Vout (L2)
⑦	AC100Vout (N2)
⑧	直流受電表示
⑨	インバータ給電表示
⑩	バイパス回路ヒューズ

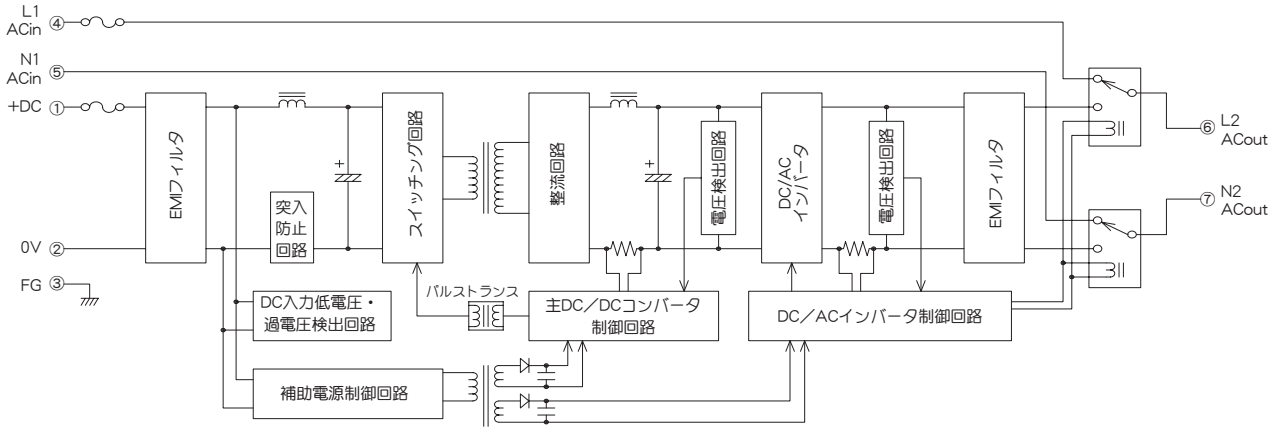
■ 型　式

表 - 1

型　式	入力電圧 (電圧範囲) (V. DC)	出力電圧 (V. AC)	出力電流 (A rms)	出力周波数 (Hz)	効率 (typ.) (%) 20% 負荷時	効率 (typ.) (%) 80% 負荷時
UBA700-48-100S7A50	48V (36～76)	100	7	50	86	89
UBA700-48-100S7A60		100	7	60	86	89
UBA700-96-100S7A50	96V (70～140)	100	7	50	86	90
UBA700-96-100S7A60		100	7	60	86	90

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。

■ ブロック図



■ 特性データ

図 - 1　ディレーティングカーブ

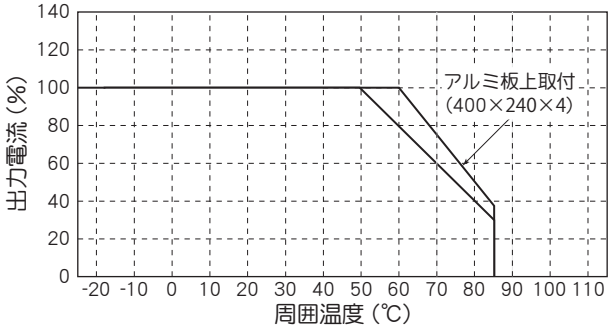


図 - 2　過電流保護範囲

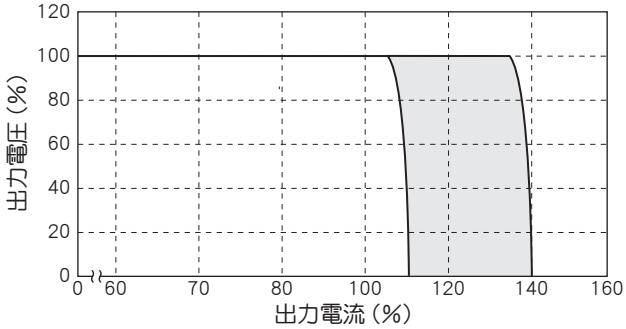


図 - 3　効率 - 出力電流特性

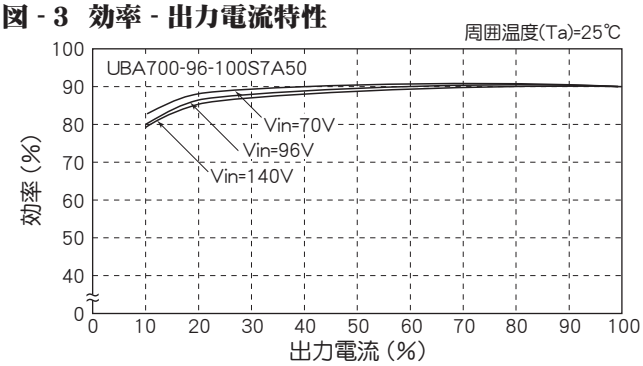
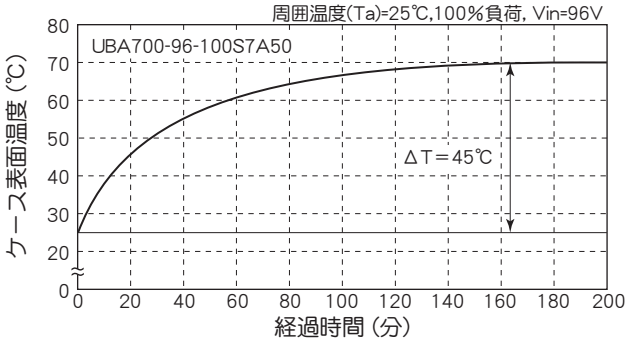


図 - 4　温度上昇特性（ケース表面温度）



■ 主な機能及び注意事項

1. 入力低電圧保護、入力過電圧保護
   下記DC入力電圧にてインバータ給電が停止し、バイパス給電に切り替わります。入力電圧範囲に戻れば自動復帰します。

表－2

定格入力電圧	低電圧保護動作点	過電圧保護動作点
DC48V (36~76V)	DC24~32V	DC80~88V
DC96V (70~140V)	DC48~64V	DC150~165V

UCA700 SERIES

700VA DC/AC インバータ
正弦波出力　非常時給電インバータ

■ 特　長

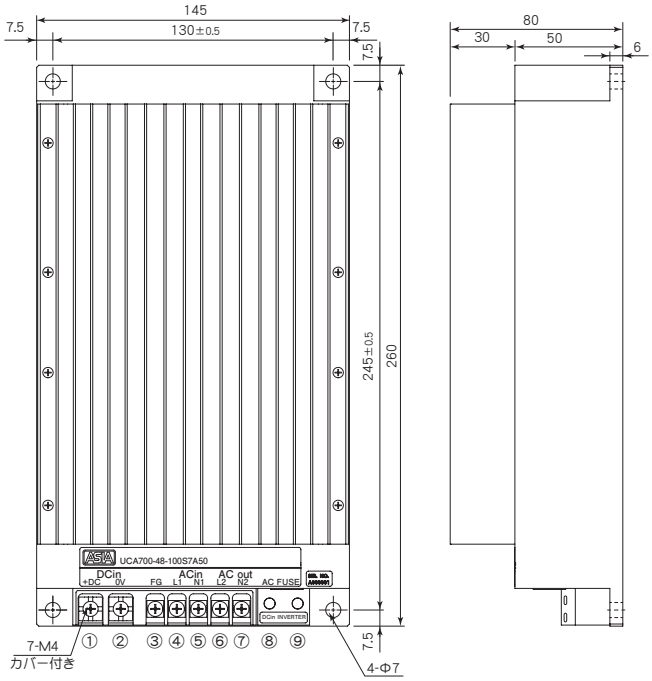
- ●正弦波出力
- ●非常時給電インバータ
- ●商用入力停電時、インバータ給電に自動切替（表－2参照）
- ●高効率 89～90% typical
- ●入出力間絶縁（AC2000V）
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●入力突入電流保護回路内蔵
- ●過熱保護回路内蔵
- ●内部発熱部+110℃～+130℃においてバイパス給電に切替
- ●バイパスからインバータへの切替時の瞬断時間約20ms
- ●入力ヒューズ内蔵
- ●入出力ノイズフィルタ内蔵
- ●RoHS2指令対応
- ●長寿命電解コンデンサ使用（105℃ 10000H品）

■ 仕　様

（周囲温度：25℃, 100%負荷, 定格入力電圧）

●直流入力電圧	DC48, 96V（表－1参照）
●バイパス入力電圧	AC100Vrms ±15% 50Hz±5% or 60Hz±5%
●出力電圧	AC100Vrms, ±2%
●出力電流	表－1参照
●出力周波数	50/60Hz ±0.1%
●出力波形	正弦波
●出力波形歪み率	1.0% max.（線形負荷） 12% max.（整流器負荷）
●出力電圧温度係数	0.02%/℃ max.
●出力周波数温度係数	0.01%/℃ max.
●効率	86～90%（表－1参照）
●対入力変動	0.5% max.（入力電圧範囲において）
●対負荷変動	1.5% max.（インバータ給電時） 1.0% max.（バイパス給電時）
●短絡保護	10～15S 継続にてインバータ給電停止、 バイパス切り替え
●動作周囲温度	－25℃～＋85℃（図－1参照）
●保存周囲温度	－40℃～＋105℃
●絶縁耐圧	AC2000V 1分間 （入力－出力－ケース間）
●絶縁抵抗	100MΩ min.（DC1000Vにて） （入力－出力－ケース間）
●質量	4.9kg max.
●湿度	20～95% RH
●衝撃	490m/s^2（11msec. X, Y, Z方向）
●振動	JIS E4031 区分1 等級B
●構造	6面アルミケース
●期待寿命	100,000時間 （周囲温度：25℃, 80%負荷, 定格入力電圧）
●無償保証期間	5年間

■ 外形及び寸法（±1.0mm）



端子配列

①	＋Vin
②	0 Vin
③	FG
④	AC100Vin (L1)
⑤	AC100Vin (N1)
⑥	AC100Vout (L2)
⑦	AC100Vout (N2)
⑧	直流受電表示
⑨	インバータ給電表示
⑩	バイパス回路ヒューズ

■ 型　式

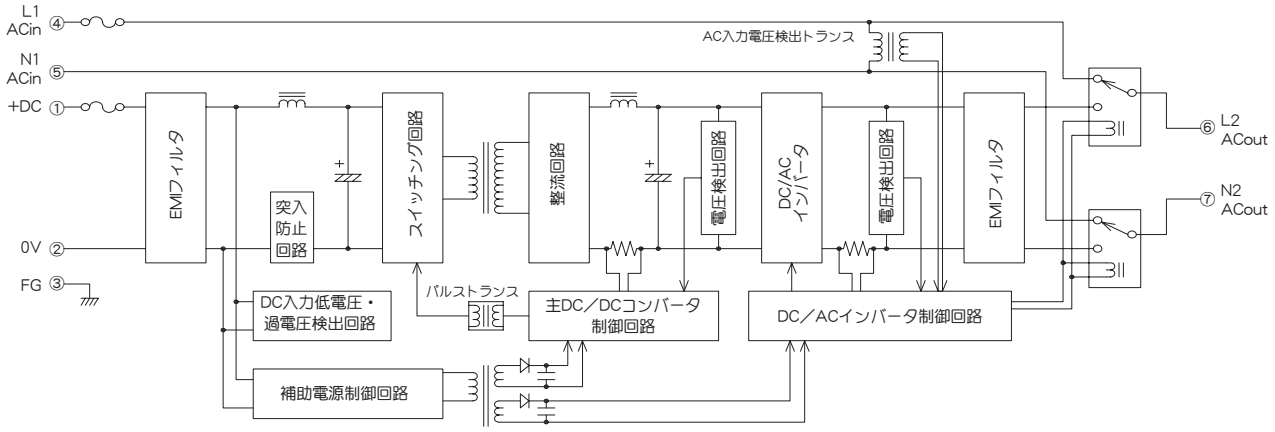
表 - 1

型　式	入力電圧（電圧範囲）(V. DC)	出力電圧 (V. AC)	出力電流 (A rms)	出力周波数 (Hz)	効率 (typ.) (%) 20% 負荷時	効率 (typ.) (%) 80% 負荷時
UCA700-48-100S7A50	48V (36～76)	100	7	50	86	89
UCA700-48-100S7A60		100	7	60	86	89
UCA700-96-100S7A50	96V (70～140)	100	7	50	86	90
UCA700-96-100S7A60		100	7	60	86	90

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。

UCA700 シリーズ　データシート

■ ブロック図



■ 特性データ

図 - 1　ディレーティングカーブ

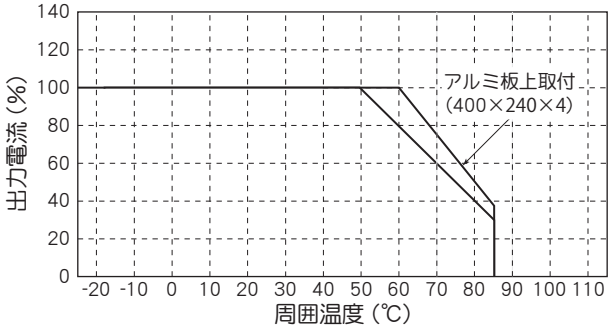


図 - 2　過電流保護範囲

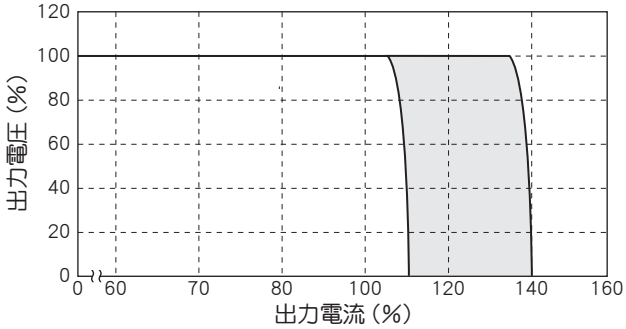


図 - 3　効率 - 出力電流特性

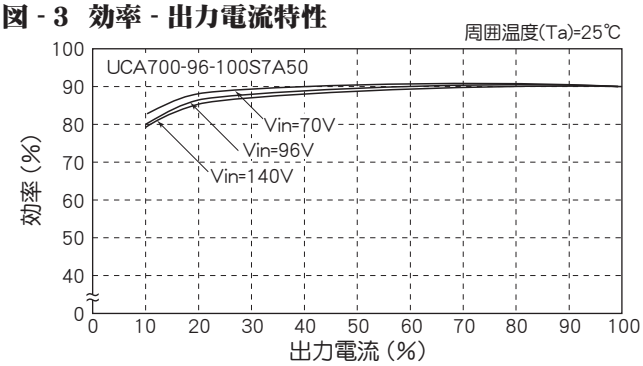
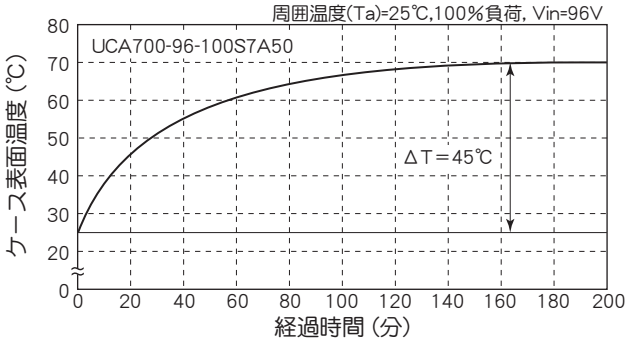


図 - 4　温度上昇特性（ケース表面温度）



■ 主な機能及び注意事項

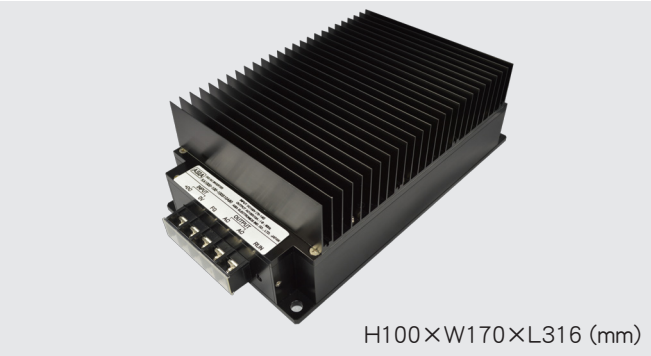
1. 入力低電圧保護、入力過電圧保護
   ①下記DC入力電圧にてインバータ給電が停止し、バイパス給電に切り替わります。入力電圧範囲に戻れば自動復帰します。
   ②下記AC入力電圧にてバイパス給電が停止し、インバータ給電に切り替わります。入力電圧範囲に戻れば自動復帰します。

表－2

定格入力電圧	低電圧保護動作点	過電圧保護動作点
DC48V (36~76V)	DC24~32V	DC80~88V
DC96V (70~140V)	DC48~64V	DC150~165V
AC100V (85~115V)	AC60~84V	AC116~128V

XA1000 SERIES NEW

1000VA DC/AC インバータ 正弦波出力



■ 特　長

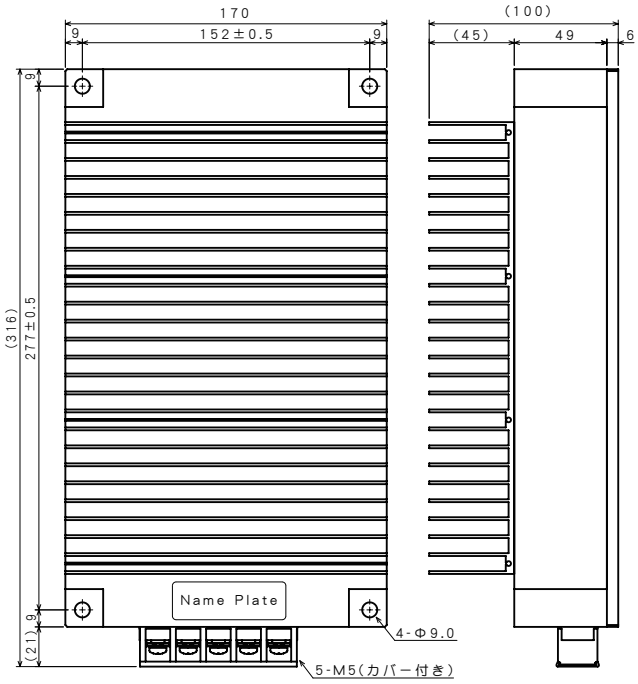
- ●正弦波出力
- ●高効率 88～92% typical
- ●入出力間絶縁 (AC2000V)
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●入力突入電流保護回路内蔵
- ●過熱保護回路内蔵
  内部発熱部が+110℃～+130℃にて出力停止
- ●入力ヒューズ内蔵
- ●入出力ノイズフィルタ内蔵
- ●RoHS2指令対応
- ●長寿命電解コンデンサ使用

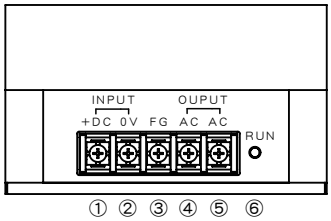
■ 仕　様

(周囲温度：25℃, 100%負荷, 定格入力電圧)

●入力電圧	DC48, 100V (表－1参照)
●出力電圧	AC100Vrms, ±2%(負荷0%)
●出力電流	表－1参照
●出力周波数	50/60Hz ±0.1%
●出力波形	正弦波
●出力波形歪み率	1.0% max. (線形負荷) 12% max. (整流器負荷)
●出力電圧温度係数	0.02%/℃ max.
●出力周波数温度係数	0.01%/℃ max.
●効率	88～92% (表－1参照)
●対入力変動	0.5% max. (入力電圧範囲において)
●対負荷変動	1.5% max.
●出力過電流保護	110%以上にて動作 10～15S 継続にて出力停止
●動作周囲温度	－25℃～＋85℃ (図－1参照)
●保存周囲温度	－40℃～＋105℃
●絶縁耐圧	AC2000V 1分間 (入力－出力－ケース間)
●絶縁抵抗	100MΩ min. (DC1000Vにて) (入力－出力－ケース間)
●質量	7.1kg max.
●湿度	20～95% RH
●衝撃	294m/s² (11ms. X, Y, Z方向)
●振動	JIS E4031 区分1 等級B
●構造	6面アルミケース
●期待寿命	100,000時間 (周囲温度：25℃, 80%負荷, 定格入力電圧)
●無償保証期間	5年間

■ 外形及び寸法 (±1.0mm)





①	＋Vin
②	0 Vin
③	FG
④	ACout
⑤	ACout
⑥	運転表示灯

■ 型　式

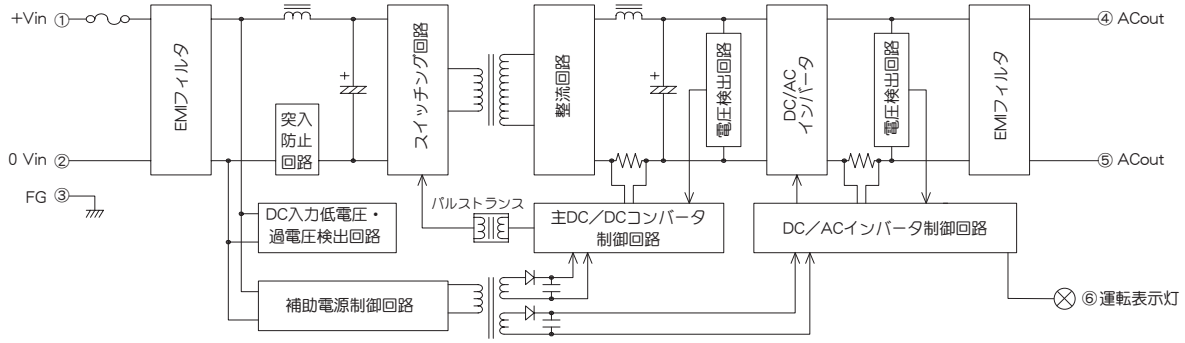
表 - 1

型　式	入力電圧 (電圧範囲) (V. DC)	出力電圧 (V. AC)	出力電流 (A rms)	出力 周波数 (Hz)	効率 (typ.) (%) 20% 負荷時	効率 (typ.) (%) 80% 負荷時
XA1000- 48 -100S10A50	48V (36～76)	100	10	50	88	91
XA1000- 48 -100S10A60		100	10	60	88	91
XA1000-100-100S10A50	100V (70～140)	100	10	50	88	92
XA1000-100-100S10A60		100	10	60	88	92

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。

XA1000 シリーズ　データシート

■ ブロック図



■ 特性データ

図 - 1　ディレーティングカーブ

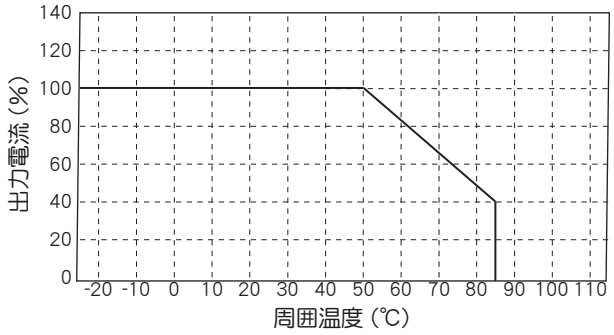


図 - 2　過電流保護範囲

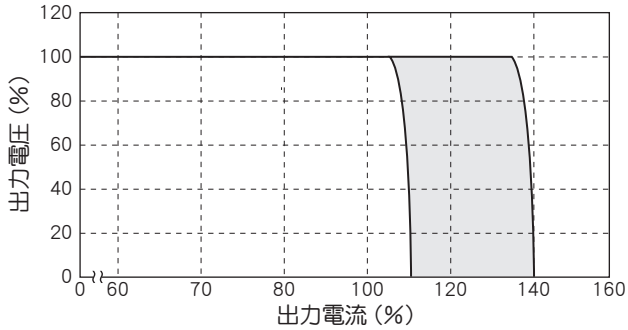


図 - 3　効率 - 出力電流特性

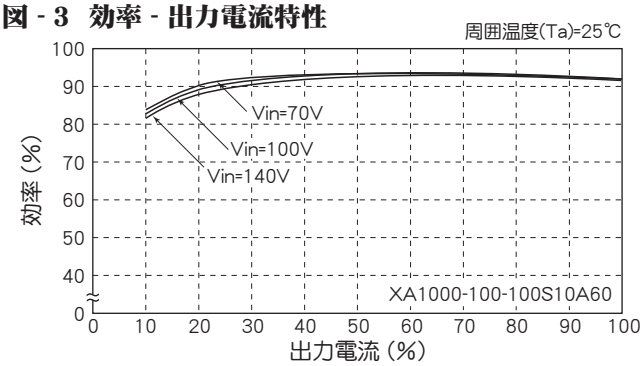
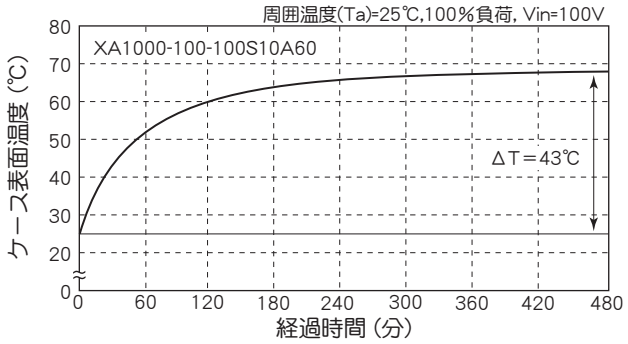


図 - 4　温度上昇特性（ケース表面温度）



■ 主な機能及び注意事項

1. 入力低電圧保護、入力過電圧保護
   下記DC入力電圧にて出力電圧がOFFとなります。入力電圧範囲に戻れば自動復帰します。

表－2

定格入力電圧	低電圧保護動作点	過電圧保護動作点
DC48V (36~76V)	DC24~32V	DC80~88V
DC100V (70~140V)	DC48~64V	DC150~165V

RA520 SERIES

400～500VA DC/AC INVERTERS
Sine Wave Output

H114×W110×L310 (mm)

■ Features

- ● High Efficiency 86～88% typ.
- ● Wide Input Voltage Range
- ● Input-Output Isolation (AC2000V)
- ● High Reliability
- ● Output Frequency Temp. Coefficient 0.01%/℃ max.
- ● Remote ON/OFF Control
- ● Input Low Voltage Protection
- ● Input Over Voltage Protection
- ● Input Rush Current Protection (Input DC12V type is not built-in.)
- ● Thermal Protection ＋90℃～＋110℃
- ● Operating Ambient Temperature －25℃～＋70℃
- ● Built-in Input Fuse
- ● Built-in Input and Output Noise Filter
- ● Built-in Frequency Changing Switch (50Hz or 60Hz)
- ● Conformity to RoHS2 Directive

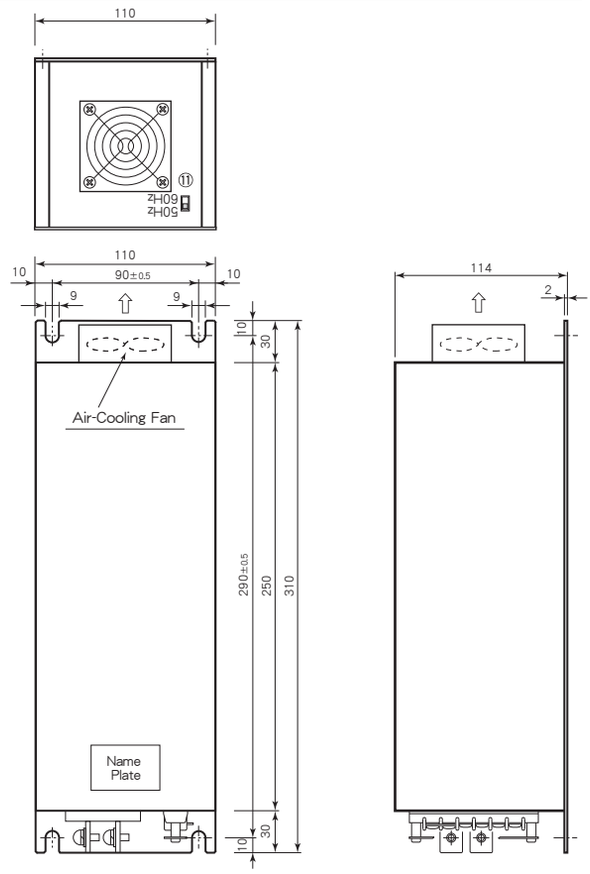
- ●高効率 86～88% typical
- ●広範囲な入力電圧
- ●入出力間絶縁 (AC2000V)
- ●高信頼性
- ●出力周波数温度係数 0.01%/℃ 以下
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●入力突入電流保護回路内蔵 (DC12V入力は除く)
- ●過熱保護回路内蔵 ＋90℃～＋110℃
- ●動作周囲温度 －25℃～＋70℃
- ●入力ヒューズ内蔵
- ●入出力ノイズフィルタ内蔵
- ●周波数切替スイッチ有り (50Hz又は60Hz)
- ●RoHS2指令対応

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

● Input Voltage	DC12, 24, 48, 96V (See Table 1)
● Output Voltage	AC100Vrms, ±1% AC200Vrms, ±1% AC220Vrms, ±1%
● Output Current	See Table 1
● Output Frequency	50Hz/60Hz, ±0.1%
● Output Wave, Distortion	Sine Wave, 1.5% max.
● Output Voltage Temperature Coefficient	0.02%/℃ max.
● Output Frequency Temperature Coefficient	0.01%/℃ max.
● Efficiency	See Table 1
● Line Regulation	0.5% max. (at Vin Range)
● Load Regulation	1% max. (0～100% Load)
● Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
● Remote ON/OFF Control	ON : Short or 0～0.8V OFF : Open or 2～10V
● Operating Ambient Temperature	－25℃～＋70℃ (See Fig. 1)
● Storage Temperature	－40℃～＋70℃
● Isolation Voltage	AC2000V one minute (Input－Output－Case)
● Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
● Weight	4.7kg max.
● Humidity	20～90% RH
● Shock	196m/s² (11msec 3directions)
● Vibration	10～55Hz 29.4m/s² (30minutes 3directions)
● Surface Structure	Metal Case
● MTBF	90,000H (Ta : 25℃, 80% Load, Nominal Vin)
● Warranty	5 years

■ Terminal Outs & Dimensions (±1.0mm)



Terminal Outs and Function

①	＋Vdc in
②	0 Vdc in
③	＋Remote Control (＋RC)
④	－Remote Control (－RC)
⑤	No Connection (NC)
⑥	AC out
⑦	AC out
⑧	Frame Ground (FG)
⑨	Operation Indicator
⑩	ON/OFF Control Switch
⑪	Frequency Changing Switch

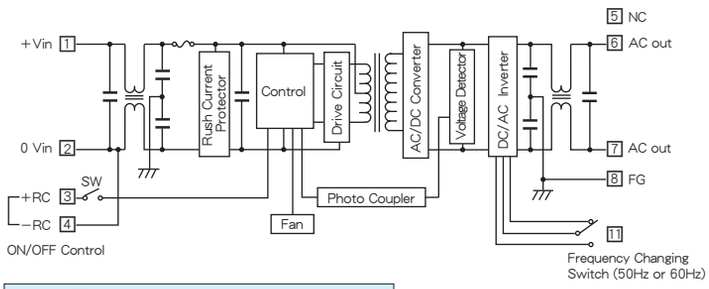
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	※1Output Frequency (Hz)	Efficiency (Typical)(%) 20% Load	Efficiency (Typical)(%) 80% Load
RA520-12-100S 4A	12 (9～18)	100	4	50/60	83	86
RA520-12-200S 2A		200	2	50/60	82	86
RA520-12-220S1.8A		220	1.8	50/60	82	86
RA520-24-100S 5A	24 (18～36)	100	5	50/60	83	88
RA520-24-200S2.5A		200	2.5	50/60	82	88
RA520-24-220S2.2A		220	2.2	50/60	82	88
RA520-48-100S 5A	48 (36～76)	100	5	50/60	83	88
RA520-48-200S2.5A		200	2.5	50/60	82	88
RA520-48-220S2.2A		220	2.2	50/60	82	88
RA520-96-100S 5A	96 (72～144)	100	5	50/60	83	88
RA520-96-200S2.5A		200	2.5	50/60	82	88
RA520-96-220S2.2A		220	2.2	50/60	82	88

※1 出力周波数(50Hz又は60Hz)は周波数切替スイッチによって選択可能です。
Output frequency(50Hz or 60Hz) is selectable by a Frequency Changing Switch.
※2 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

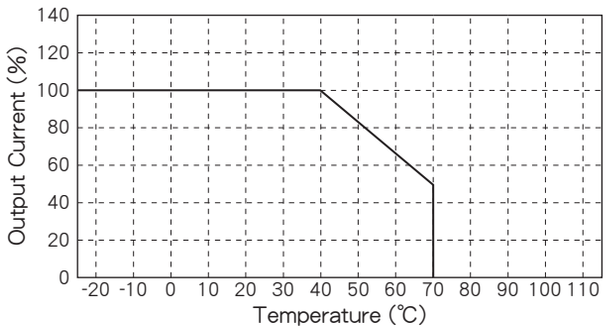


Fig. 2 Short Circuit Operating Area

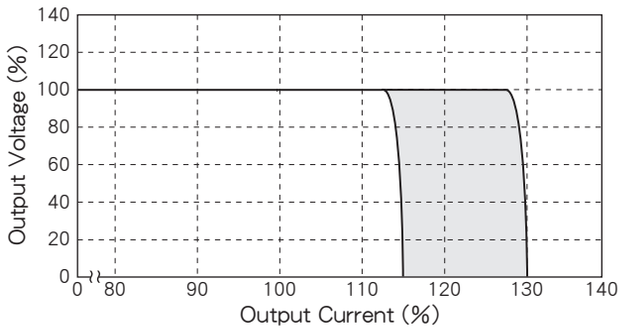


Fig. 3 Temperature Characteristic on Case Surface

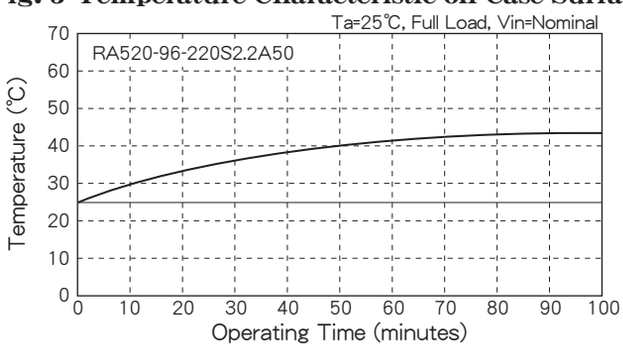


Fig. 4 Efficiency vs. Output Current

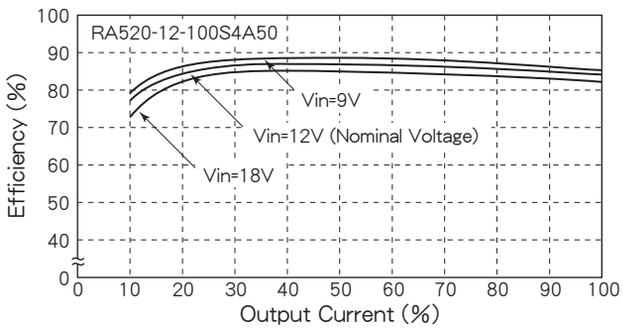


Fig. 5 Efficiency vs. Output Current

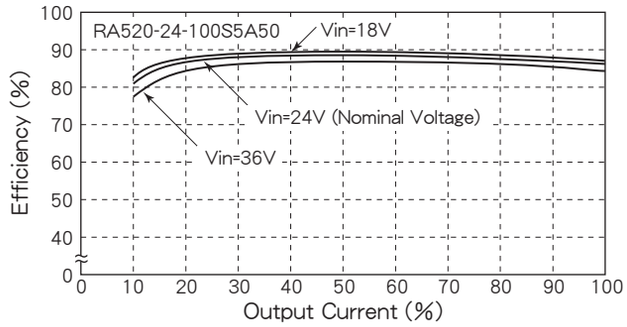


Fig. 6 Efficiency vs. Output Current

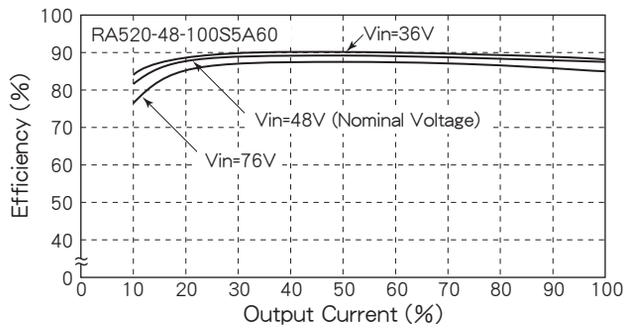
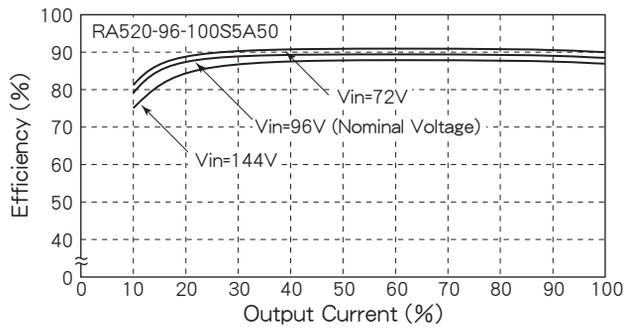


Fig. 7 Efficiency vs. Output Current



■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。
Output will be shut down in the input voltages on the following table. Output will automatically be reset when the input voltage comes to within the specified value.

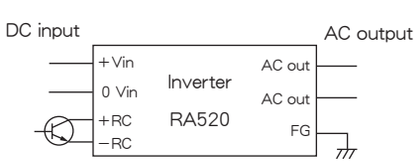
定格入力電圧 Rated input voltage	低電圧保護動作点 Low voltage protection	過電圧保護動作点 Over voltage protection
12V (9～18V)	6～8V	20～22V
24V (18～36V)	12～16V	40～44V
48V (36～76V)	24～32V	80～88V
96V (72～144V)	48～64V	150～165V

2. 出力過電流保護 Output over current protection
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約115%～130%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 115%～130% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

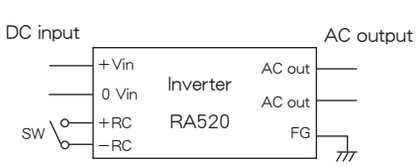
3. 過熱保護 Thermal protection
本体内部に過熱保護回路が内蔵されています。内部温度が＋90℃～＋110℃にて出力が停止します。＋90℃以下で自動復帰します。
Thermal protection is built-in. Output will be shut down in +90 -110℃ at the plate inside and will automatically be reset below +90℃.

4. リモートON/OFFコントロール Remote ON/OFF control
リモートON/OFFコントロールを使用して、電源の出力をON/OFFする事ができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFする事ができます。またRC端子間をショートしたままスイッチを手動でON/OFFする事により、出力電圧をON/OFFできます。RC端子は入力側にあり、入力電源回路とは絶縁されていません。
Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. In addition, ON/OFF of the output voltage is possible by performing ON/OFF of the switch on front panel by manual operation with short between RC terminals. RC terminals are located on the input side and the circuit is not isolated from input power source circuit.

●TRによる例 Example by transistor

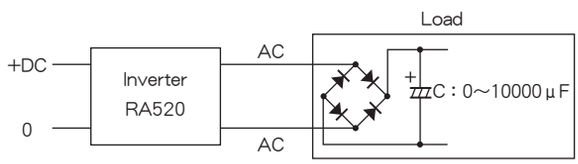


●SWによる例 Example by switch



5. ファンの作動 Cooling fan operation
冷却ファンは入力電圧が印加され、さらに内部温度が＋45℃以上にて作動します。従って、入力を印加した直後ではファンは作動しません。作動までの時間は負荷の条件により異なります。全負荷の場合は約10分後に作動します。
It will operate when input voltage is applied and inner temperature is getting more than +45℃. Therefore it does not operate right after input voltage is applied. Time to operate depends on load conditions. In case of 100% load, it would be approximately 10 minutes.

6. 出力側突入電流保護 Output rush current protection
出力側の負荷としてダイオードで整流されたC負荷の突入電流に対して、問題なくインバータは動作します。
Inverter operates unconditionally against rush current of capacitor load rectified by diodes.



HA1010 SERIES

800～1000VA DC/AC INVERTERS
Sine Wave Output

H165×W130×L320 (mm)

■ Features

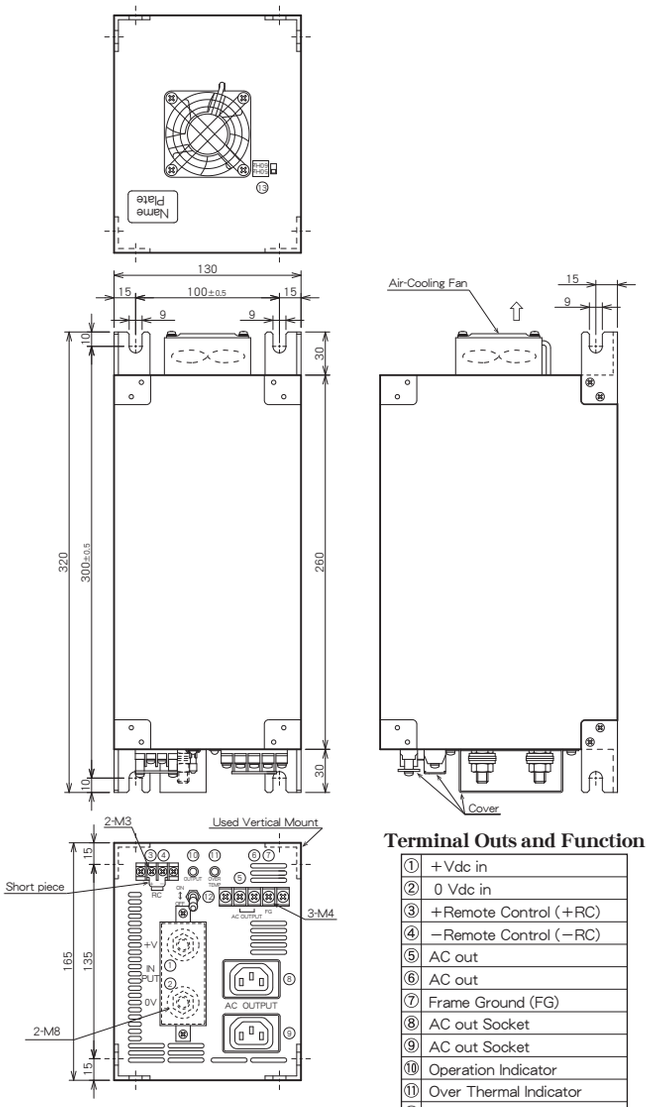
- ● Compact and High Power ●小型、大容量
- ● Vertical, Horizontal Mount ●縦置き、横置き 共用
- ● High Efficiency 84～88% typ. ●高効率 84～88% typical
- ● Output Frequency Temp. Coefficient 0.01%/℃ max. ●出力周波数温度係数 0.01%/℃ 以下
- ● Input-Output Isolation (AC2000V) ●入出力間絶縁 (AC2000V)
- ● Remote ON/OFF Control ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ● Input Low Voltage Protection ●入力低電圧保護回路内蔵
- ● Input Over Voltage Protection ●入力過電圧保護回路内蔵
- ● Input Rush Current Protection (Input DC12V type is not built-in.) ●入力突入電流保護回路内蔵 (DC12V入力は除く)
- ● Thermal Protection ＋90℃～＋110℃ ●過熱保護回路内蔵 ＋90℃～＋110℃
- ● High Reliability ●高信頼性
- ● Built-in Input Fuse ●入力ヒューズ内蔵
- ● Built-in Input and Output Noise Filter (Input DC12V type is not built-in.) ●入出力ノイズフィルタ内蔵 (DC12V入力は除く)
- ● Built-in Frequency Changing Switch (50Hz or 60Hz) ●周波数切替スイッチ有り (50Hz又は60Hz)
- ● Conformity to RoHS2 Directive ●RoHS2指令対応

■ General Characteristics

(at Ta : 25℃, Full Load, Nominal Vin)

● Input Voltage	DC12, 24, 30, 48, 96V (See Table 1)
● Output Voltage	AC100Vrms, ±1% AC200Vrms, ±1% AC220Vrms, ±1%
● Output Current	See Table 1
● Output Frequency	50Hz/60Hz, ±0.1%
● Output Wave, Distortion	Sine Wave, 1.5% max.
● Output Voltage Temperature Coefficient	0.02%/℃ max.
● Output Frequency Temperature Coefficient	0.01%/℃ max.
● Efficiency	See Table 1
● Line Regulation	0.5% max. (at Vin Range)
● Load Regulation	1% max. (0～100% Load)
● Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
● Remote ON/OFF Control	ON : Short or 0~0.8V OFF : Open or 2~10V
● Operating Ambient Temperature	－25℃～＋70 ℃ (See Fig. 1)
● Storage Temperature	－40℃～＋70℃
● Isolation Voltage	AC2000V one minute (Input－Output－Case)
● Isolation Impedance	100MΩ min. (at DC1000V) (Input－Output－Case)
● Weight	6.8kg max.
● Humidity	20～90% RH
● Shock	196m/s^2 (11msec 3directions)
● Vibration	10～55Hz 29.4m/s^2 (30minutes 3directions)
● Surface Structure	6 Sided Aluminum Case
● LIFE	100,000H (Ta : 25℃, 80% Load, Nominal Vin)
● Warranty	5 years

■ Terminal Outs & Dimensions (±1.0mm)



Terminal Outs and Function

①	＋Vdc in
②	0 Vdc in
③	＋Remote Control (＋RC)
④	－Remote Control (－RC)
⑤	AC out
⑥	AC out
⑦	Frame Ground (FG)
⑧	AC out Socket
⑨	AC out Socket
⑩	Operation Indicator
⑪	Over Thermal Indicator
⑫	On/Off Switch
⑬	Frequency Changing Switch

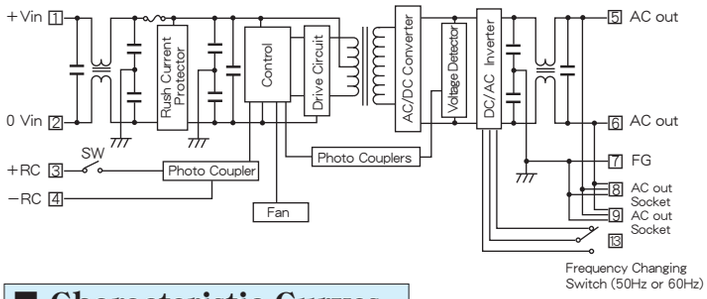
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	※1Output Frequency (Hz)	Efficiency (Typical)(%) 20% Load	80% Load
HA1010-12-100S 8A	12 (9～18)	100	8	50/60	84	84
HA1010-12-200S 4A		200	4	50/60	84	84
HA1010-12-220S 4A		220	4	50/60	84	84
HA1010-24-100S 10A	24 (18～36)	100	10	50/60	85	86
HA1010-24-200S 5A		200	5	50/60	85	86
HA1010-24-220S4.5A		220	4.5	50/60	85	86
HA1010-30-100S 10A	30 (22～44)	100	10	50/60	85	86
HA1010-30-200S 5A		200	5	50/60	85	86
HA1010-30-220S4.5A		220	4.5	50/60	85	86
HA1010-48-100S 10A	48 (36～76)	100	10	50/60	86	87
HA1010-48-200S 5A		200	5	50/60	86	87
HA1010-48-220S4.5A		220	4.5	50/60	86	87
HA1010-96-100S 10A	96 (72～144)	100	10	50/60	87	88
HA1010-96-200S 5A		200	5	50/60	87	88
HA1010-96-220S4.5A		220	4.5	50/60	87	88

※1 出力周波数(50Hz又は60Hz)は周波数切替スイッチによって選択可能です。
Output frequency(50Hz or 60Hz) is selectable by a Frequency Changing Switch.
※2 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

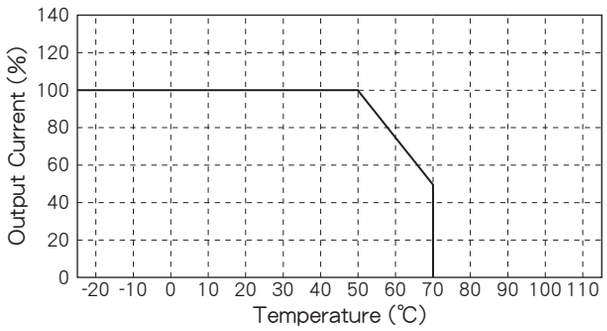


Fig. 2 Short Circuit Operating Area

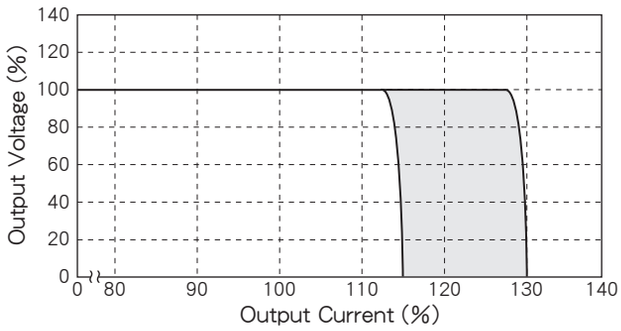


Fig. 3 Temperature Characteristic on Case Surface

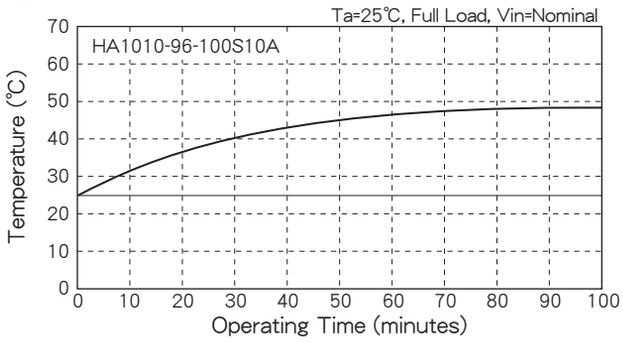


Fig. 4 Efficiency vs. Output Current

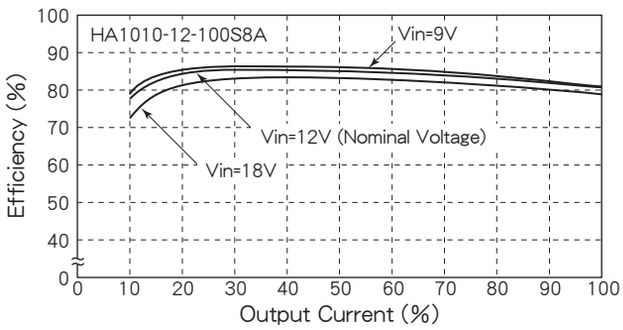


Fig. 5 Efficiency vs. Output Current

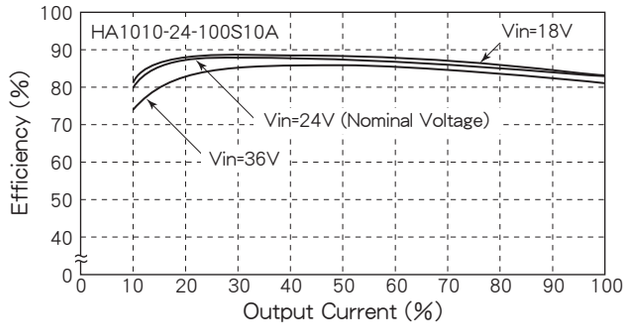


Fig. 6 Efficiency vs. Output Current

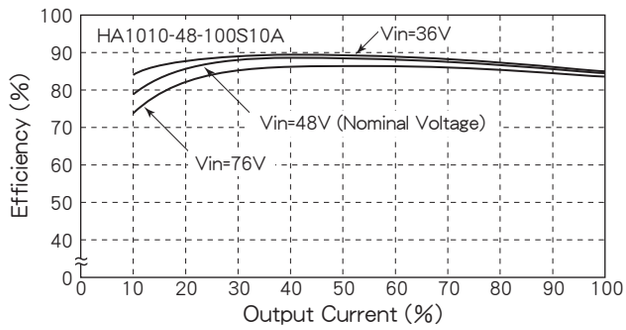
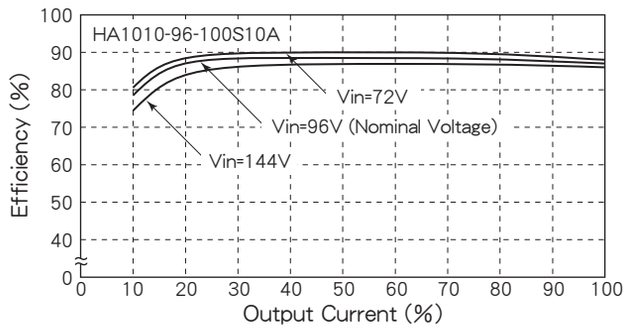


Fig. 7 Efficiency vs. Output Current



■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。
Output will be shut down in the input voltages on the following table. Output will automatically be reset when the input voltage comes to within the specified value.

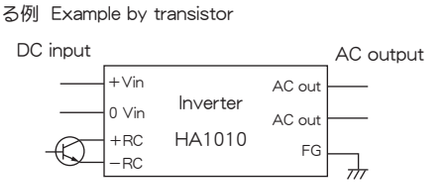
定格入力電圧 Rated input voltage	低電圧保護動作点 Low voltage protection	過電圧保護動作点 Over voltage protection
12V (9～18V)	6～8V	20～22V
24V (18～36V)	12～16V	40～44V
30V (22～44V)	15～20V	46～50V
48V (36～76V)	24～32V	80～88V
96V (72～144V)	48～64V	150～165V

2. 出力過電流保護 Output over current protection
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約115%～130%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 115%～130% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

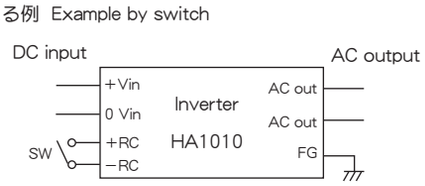
3. 過熱保護 Thermal protection
本体内部に過熱保護回路が内蔵されています。内部温度が＋90℃～＋110℃にて出力が停止します。＋90℃以下で自動復帰します。
Thermal protection is built-in. Output will be shut down in +90 - 110℃ at the plate inside and will automatically be reset below +90℃.

4. リモートON/OFFコントロール Remote ON/OFF control
リモートON/OFFコントロールを使用して、電源の出力をON/OFFする事ができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFする事ができます。またRC端子間をショートしたままスイッチを手動でON/OFFする事により、出力電圧をON/OFFできます。RC端子は、入力、出力、FG端子と絶縁されています。
Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. In addition, ON/OFF of the output voltage is possible by performing ON/OFF of the switch on front panel by manual operation with short between RC terminals. RC terminals are isolated from input, output, FG terminal.

●TRによる例 Example by transistor

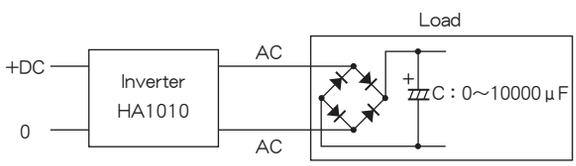


●SWによる例 Example by switch



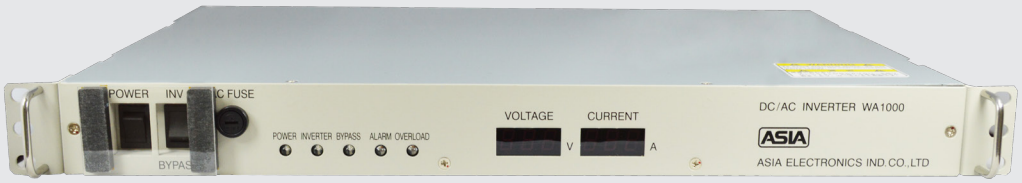
5. ファンの作動 Cooling fan operation
冷却ファンは入力電圧が印加され、さらに内部温度が＋60℃以上にて作動します。従って、入力を印加した直後ではファンは作動しません。作動までの時間は負荷の条件により異なります。全負荷の場合は約10分後に作動します。
It will operate when input voltage is applied and inner temperature is getting more than +60℃. Therefore it does not operate right after input voltage is applied. Time to operate depends on load conditions. In case of 100% load, it would be approximately 10 minutes.

6. 出力側突入電流保護 Output rush current protection
出力側の負荷としてダイオードで整流されたC負荷の突入電流に対して、問題なくインバータは動作します。
Inverter operates unconditionally against rush current of capacitor load rectified by diodes.



WA1000 シリーズ
1000VA DC/AC インバータ

常時/非常時給電インバータ
同期並列運転可能



H44×W482×L345 (mm)

■ 特　長

- ●正弦波出力
- ●スイッチにより、インバータ給電/バイパス給電の優先給電切替可能
- ●６台までの同期並列運転可能
- ●DC入力停電時、バイパス（AC100V）給電に自動切替（インバータ給電時）
- ●商用入力停電時、インバータ給電に自動切替（バイパス給電時）
- ●19インチラックサイズ（1U：高さ44）
- ●入力低電圧保護回路内蔵（DC入力, AC入力）
- ●入力過電圧保護回路内蔵（DC入力）
- ●入力突入電流保護回路内蔵（DC入力）
- ●負荷モニタ機能搭載
- ●入力ヒューズ内蔵（DC入力, AC入力）
- ●入出力ノイズフィルタ内蔵（DC入力, AC入力）
- ●VCCI クラスA準拠
- ●RoHS2指令対応

■ 仕　様

（周囲温度：25℃, 100%負荷, 定格入力電圧）

●直流入力電圧	DC24, 36, 48, 96V （表－1 参照）
●バイパス用交流入力	AC100Vrms ±15% 50Hz±5%又は60Hz±5%
●入力低電圧保護	DC入力：表－8 参照 AC入力：AC60V～84V（表－8 参照）
●入力過電圧保護	DC入力：表－8 参照
●出力電圧	AC100Vrms：インバータ給電時 交流入力電圧－3.0%以内：バイパス給電時
●定格出力容量	1kVA
●定格負荷力率	1.0
●負荷力率変動範囲	1.0～0.7 遅れ
●出力周波数	50Hz/60Hz, ±0.1% 切替スイッチにより選択
●出力波形	正弦波
●出力波形歪み率	1.5% max.（線形負荷） 10% max.（整流器負荷）
●出力電圧温度係数	0.02%/℃ max.
●出力周波数温度係数	0.01%/℃ max.
●インバータ給電効率	86～90%（表－1 参照）
●対入力変動率	0.5% max.（入力電圧範囲において）
●対負荷変動率	6.0% typ. （インバータ給電時） 3.0% typ. （バイパス給電時）
●出力過電流保護（※注1）	尖頭値電流18A以上にてインバータ給電電流制限 実効値電流13A以上にてインバータ給電停止 バイパス給電切替（手動復帰）
●過熱保護（※注1）	インバータ回路発熱部が+110℃～+130℃にて インバータ給電停止（手動復帰）
●ファン動作監視	ファンの回転数が規定の70%以下にてALARM 表示が点灯（規定範囲に戻れば消灯）
●アラーム出力	正常時：ALARM端子間　オープン 異常時：ALARM端子間　ショート
●リモートON/OFF コントロール	端子間オープン：出力ON 端子間ショート：出力OFF
●運転表示	表－２～５ 参照
●負荷モニタ	出力負荷率に比例したDC信号を出力
●給電切替時瞬断時間	20msec. max.
●動作周囲温度範囲	－25℃～＋60℃（図－6 参照）
●保存周囲温度範囲	－40℃～＋70℃
●湿度	20～90% RH（結露なき事）
●絶縁耐圧（※注2）	AC2000V 1分間 （DC入力－出力－ケース間） AC1000V 1分間 （SIGNAL端子－入力, 出力, ケース間）
●絶縁抵抗（※注2）	100MΩ min.（DC1000Vにて） （DC入力－出力－SIGNAL端子－ケース間）
●質量	7.5kg
●衝撃	196m/s^2 （11msec. X, Y, Z方向）
●振動	10～55Hz 19.6m/s^2 （X, Y, Z方向各30分間）
●構造	6面メタルケース
●期待寿命	100,000H （周囲温度：25℃, 80%負荷, 定格入力電圧時）
●無償補償期間	5年間

注1：手動復帰は起動スイッチ再投入、リモートコントロール再投入又は電源再投入による。
注2：AC出力－ケース間に雷サージ対策用バリスタが入っている為絶縁試験時には同部品を取外す必要があります。
（工場出荷時に同部品を取外して絶縁試験を全数実施済み）

■ セレクションガイド

表－1

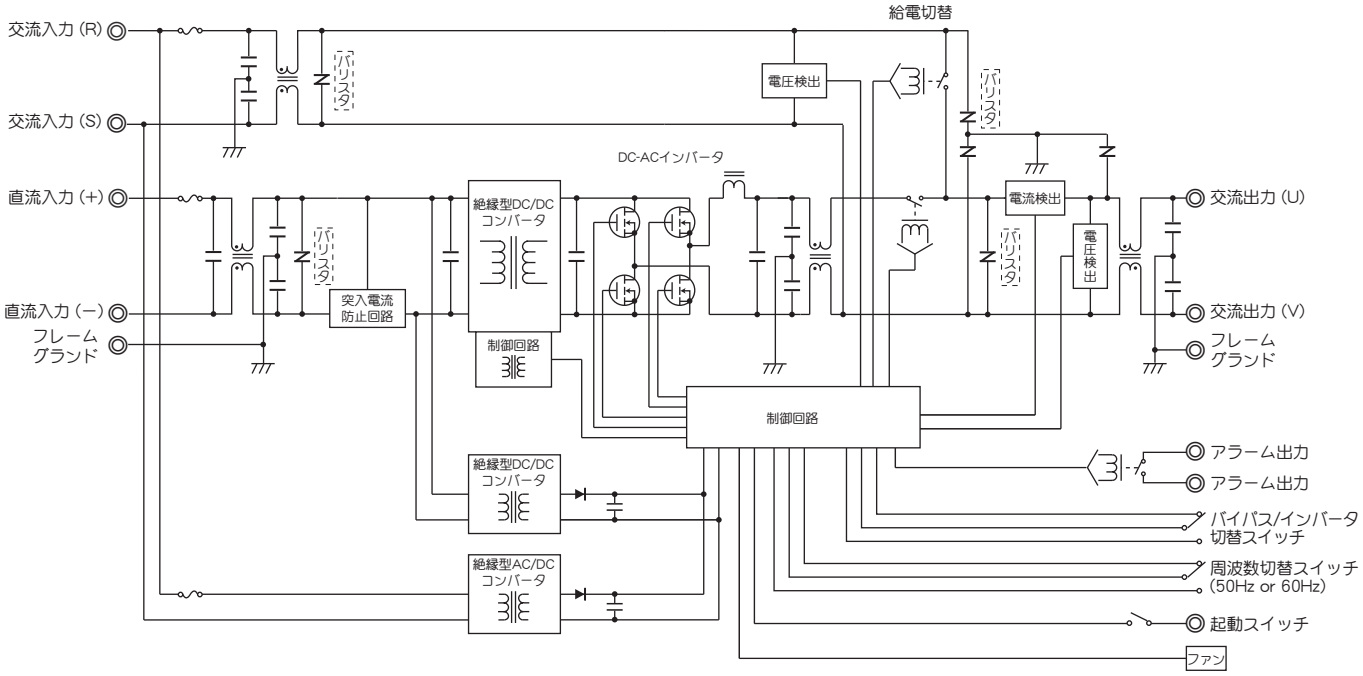
型　名	入力電圧（電圧範囲）(V. DC)	出力電圧 (V. AC)	出力電流 (A rms)	※1 出力周波数 (Hz)	効率 (Typical)(%)	
					20% 負荷時	80% 負荷時
WA1000-24-100S10A	24 (18～36)	100	10	50/60	83	86
WA1000-36-100S10A	36 (27～54)	100	10	50/60	86	89
WA1000-48-100S10A	48 (36～76)	100	10	50/60	86	90
WA1000-96-100S10A	96 (72～144)	100	10	50/60	86	90

※1 出力周波数(50Hz又は60Hz)は周波数設定スイッチによって選択可能です。
※2 上記仕様以外にも対応可能ですので お問い合わせ下さい。

WA1000 シリーズ　ブロック図

■ ブロック図

図－1



WA1000 シリーズ　運転表示

■ 運転表示　単機運転インバータ給電時

● 点灯　● 点灯　点滅　○ 消灯を示します　給電設定SW：インバータ（INV側）

表－2

No.	前面パネルLED表示					給電出力	アラーム出力 正常時：オープン 異常時：ショート	現象と対処方法
	POWER	INVERTER	BYPASS	ALARM	OVER LOAD			
1	○ 入力OFF	○ 給電無し	○ 給電無し	○ 異常無し	○ 異常無し	停止	オープン	ON / OFFスイッチがOFFになっている又はRC端子がショートになっている ⇒ ON / OFFスイッチをONにする又はRC端子をオープンにする
2	● 入力ON	● 給電有り	○ 給電無し	○ 異常無し	○ 異常無し	インバータ	オープン	正常動作
3	● 入力ON	● 給電有り	○ 給電無し	点滅 給電異常	○ 異常無し	インバータ	オープン	AC入力が未接続又はAC入力電圧が低い為、バイパス給電が停止した （バイパス給電のみ停止 インバータ給電出力は動作） ⇒ AC入力を接続する、AC入力電圧を入力電圧範囲内にする
4	● 入力ON	○ 給電無し	● 給電有り	点滅 給電異常	○ 異常無し	バイパス	オープン	DC入力が未接続、DC入力電圧が低い又は高い為、 インバータ給電が停止しバイパス給電へ切り替った ⇒ DC入力を接続する、DC入力電圧を入力電圧範囲内にする
5	● 入力ON	● 給電有り	○ 給電無し	○ 異常無し	● 過負荷検出	インバータ	オープン	定格電流の105%以上の実効値電流又は、 定格電流の150%以上の尖頭値電流により出力過負荷を検出した ⇒ 出力負荷を軽減する 定格容量以下になれば自動復帰
6	● 入力ON	○ 給電無し	● 給電有り	点滅 給電異常	点滅 過電流動作	バイパス	ショート	定格電流の130%以上の実効値電流により過電流保護が働き インバータ給電が停止しバイパス給電へ切り替った ⇒ 出力負荷を軽減する 電源再投入にて復帰させる
7	● 入力ON	○ 給電無し	○ 給電無し	● 給電異常	点滅 過電流動作	停止	ショート	負荷側のショート等による過大な電流により過電流保護及び AC入力ヒューズが溶断し全出力が停止した ⇒出力負荷を確認しAC入力ヒューズ交換後、電源再投入にて復帰させる
8	● 入力ON	● 給電有り	○ 給電無し	● 異常検出	○ 異常無し	インバータ	ショート	冷却ファン作動時、ファンの回転数が定格の70%以下に低下した ⇒ ファンの回転数が定格範囲に戻ればALARMが消灯します。ALARMが消灯しない場合はファン故障の可能性が有ります 弊社までお問い合わせ下さい
9	● 入力ON	○ 給電無し	● 給電有り	● 異常検出	○ 異常無し	バイパス	ショート	インバータ回路過熱検出部が110℃以上となり 過熱保護によりインバータ給電が停止しバイパス給電へ切り替った ⇒ 本体を冷却後、電源再投入にて復帰させる
10	● 入力ON	○ 給電無し	○ 給電無し	● 異常検出	○ 異常無し	停止	ショート	①AC入力ヒューズ断線により全出力が停止した ⇒ AC入力ヒューズ交換後、電源再投入にて復帰させる ②内部DC入力ヒューズ断線により全出力が停止した ⇒ 外部からのヒューズ交換不可の為、弊社までお問い合わせ下さい

■ 運転表示　同期並列運転インバータ給電時

● 点灯　● 点灯　点滅　○ 消灯を示します　給電設定SW：インバータ（INV側）

表－3

No.	前面パネルLED表示					給電出力	アラーム出力 正常時：オープン 異常時：ショート	現象と対処方法
	POWER	INVERTER	BYPASS	ALARM	OVER LOAD			
1	○ 入力OFF	○ 給電無し	○ 給電無し	○ 異常無し	○ 異常無し	停止	オープン	ON / OFFスイッチがOFFになっている又はRC端子がショートになっている ⇒ ON / OFFスイッチをONにする又はRC端子をオープンにする
2	● 入力ON	● 給電有り	○ 給電無し	○ 異常無し	○ 異常無し	インバータ	オープン	正常動作
3	● 入力ON	○ 給電無し	● 給電有り	○ 異常無し	○ 異常無し	バイパス	オープン	給電設定SWの設定がインバータ給電とバイパス給電と混在している為、 全装置がバイパス給電となっている ⇒ 同期並列運転時は給電設定SWを全て同じ設定にする
4	● 入力ON	● 給電有り	○ 給電無し	点滅 給電異常	○ 異常無し	インバータ	オープン	AC入力が未接続又はAC入力電圧が低い為、バイパス給電が停止した （バイパス給電のみ停止 インバータ給電出力は動作） ⇒ AC入力を接続する、AC入力電圧を入力電圧範囲内にする
5	● 入力ON	○ 給電無し	● 給電有り	点滅 給電異常	○ 異常無し	バイパス	オープン	DC入力が未接続、DC入力電圧が低い又は高い為、 インバータ給電が停止しバイパス給電へ切り替った ⇒ DC入力を接続する、DC入力電圧を入力電圧範囲内にする
6	● 入力ON	● 給電有り	○ 給電無し	○ 異常無し	● 過負荷検出	インバータ	オープン	定格電流の105%以上の実効値電流又は、 定格電流の150%以上の尖頭値電流により出力過負荷を検出した ⇒ 出力負荷を軽減する 定格容量以下になれば自動復帰
7	● 入力ON	○ 給電無し	● 給電有り	点滅 給電異常	点滅 過電流動作	バイパス	ショート	定格電流の130%以上の実効値電流により過電流保護が働き インバータ給電が停止しバイパス給電切り替った ⇒ 出力負荷を軽減する 電源再投入にて復帰させる
8	● 入力ON	○ 給電無し	○ 給電無し	● 給電異常	点滅 過電流動作	停止	ショート	負荷側のショート等による過大な電流により過電流保護及び AC入力ヒューズが溶断し全出力が停止した ⇒出力負荷を確認しAC入力ヒューズ交換後、電源再投入にて復帰させる
9	● 入力ON	● 給電有り	○ 給電無し	● 異常検出	○ 異常無し	インバータ	ショート	冷却ファン作動時、ファンの回転数が定格の70%以下に低下した ⇒ ファンの回転数が定格範囲に戻ればALARMが消灯します。ALARMが消灯しない場合はファン故障の可能性が有ります 弊社までお問い合わせ下さい
10	● 入力ON	○ 給電無し	● 給電有り	● 異常検出	○ 異常無し	バイパス	ショート	インバータ回路過熱検出部が110℃以上となり 過熱保護によりインバータ給電が停止しバイパス給電へ切り替った ⇒ 本体を冷却後、電源再投入にて復帰させる
11	● 入力ON	○ 給電無し	○ 給電無し	● 異常検出	○ 異常無し	停止	ショート	①AC入力ヒューズ断線により全出力が停止した ⇒ AC入力ヒューズ交換後、電源再投入にて復帰させる ②内部DC入力ヒューズ断線により全出力が停止した ⇒ 外部からのヒューズ交換不可の為、弊社までお問い合わせ下さい

WA1000 シリーズ　運転表示

■ 運転表示　単機運転バイパス給電時

● 点灯　● 点灯　● 点滅　○ 消灯を示します　給電設定SW：バイパス（BYPASS側）

表－4

No.	前面パネルLED表示					給電出力	アラーム出力 正常時：オープン 異常時：ショート	現象と対処方法
	POWER	INVERTER	BYPASS	ALARM	OVER LOAD			
1	○ 入力OFF	○ 給電無し	○ 給電無し	○ 異常無し	○ 異常無し	停止	オープン	ON / OFFスイッチがOFFになっている又はRC端子がショートになっている ⇒ ON / OFFスイッチをONにする又はRC端子をオープンにする
2	● 入力ON	○ 給電無し	● 給電有り	○ 異常無し	○ 異常無し	バイパス	オープン	正常動作
3	● 入力ON	● 給電有り	○ 給電無し	● 給電異常	○ 異常無し	インバータ	オープン	AC入力が未接続又はAC入力電圧が低い為、 バイパス給電が停止しインバータ給電に切り替った ⇒ AC入力を接続する、AC入力電圧を入力電圧範囲内にする
4	● 入力ON	○ 給電無し	● 給電有り	● 給電異常	○ 異常無し	バイパス	オープン	DC入力が未接続、DC入力電圧が低い又は高い為、インバータ給電が停止した （インバータ給電のみ停止 バイパス給電出力は動作） ⇒ DC入力を接続する、DC入力電圧を入力電圧範囲内にする
5	● 入力ON	○ 給電無し	● 給電有り	○ 異常無し	● 過負荷検出	バイパス	オープン	定格電流の105%以上の実効値電流又は、 定格電流の150%以上の尖頭値電流により出力過負荷を検出した ⇒ 出力負荷を軽減する 定格容量以下になれば自動復帰
6	● 入力ON	○ 給電無し	● 給電有り	● 給電異常	● 過電流動作	バイパス	ショート	定格電流の130%以上の実効値電流により過電流保護が働きスタンバイ中の インバータが停止した（インバータ給電のみ停止 バイパス給電出力は動作） ⇒ 出力負荷を軽減する 電源再投入にて復帰させる
7	● 入力ON	○ 給電無し	○ 給電無し	● 給電異常	● 過電流動作	停止	ショート	負荷側のショート等による過大な電流により AC入力ヒューズが溶断し、全出力が停止した ⇒ 出力負荷を確認しAC入力ヒューズ交換後、電源再投入にて復帰させる
8	● 入力ON	○ 給電無し	● 給電有り	● 異常検出	○ 異常無し	バイパス	ショート	冷却ファン作動時、ファンの回転数が定格の70%以下に低下した ⇒ ファンの回転数が定格範囲に戻ればALARMが消灯します。ALARMが消灯しない場合はファン故障の可能性が有ります 弊社までお問い合わせ下さい
9	● 入力ON	○ 給電無し	○ 給電無し	● 異常検出	○ 異常無し	停止	ショート	①AC入力ヒューズ断線により全出力が停止した ⇒ AC入力ヒューズ交換後、電源再投入にて復帰させる ②内部DC入力ヒューズ断線により全出力が停止した ⇒ 外部からのヒューズ交換不可の為、弊社までお問い合わせ下さい

■ 運転表示　同期並列運転バイパス給電時

● 点灯　● 点灯　● 点滅　○ 消灯を示します　給電設定SW：バイパス（BYPASS側）

表－5

No.	前面パネルLED表示					給電出力	アラーム出力 正常時：オープン 異常時：ショート	現象と対処方法
	POWER	INVERTER	BYPASS	ALARM	OVER LOAD			
1	○ 入力OFF	○ 給電無し	○ 給電無し	○ 異常無し	○ 異常無し	停止	オープン	ON / OFFスイッチがOFFになっている又はRC端子がショートになっている ⇒ ON / OFFスイッチをONにする又はRC端子をオープンにする
2	● 入力ON	○ 給電無し	● 給電有り	○ 異常無し	○ 異常無し	バイパス	オープン	正常動作
3	● 入力ON	● 給電有り	○ 給電無し	● 給電異常	○ 異常無し	インバータ	オープン	AC入力が未接続又はAC入力電圧が低い為、 バイパス給電が停止しインバータ給電に切り替った ⇒ AC入力を接続する、AC入力電圧を入力電圧範囲内にする
4	● 入力ON	○ 給電無し	● 給電有り	● 給電異常	○ 異常無し	バイパス	オープン	DC入力が未接続、DC入力電圧が低い又は高い為、インバータ給電が停止した （インバータ給電のみ停止 バイパス給電出力は動作） ⇒ DC入力を接続する、DC入力電圧を入力電圧範囲内にする
5	● 入力ON	○ 給電無し	● 給電有り	○ 異常無し	● 過負荷検出	バイパス	オープン	定格電流の105%以上の実効値電流又は、 定格電流の150%以上の尖頭値電流により出力過負荷を検出した ⇒ 出力負荷を軽減する 定格容量以下になれば自動復帰
6	● 入力ON	○ 給電無し	● 給電有り	● 給電異常	● 過電流動作	バイパス	ショート	定格電流の130%以上の実効値電流により過電流保護が働きスタンバイ中の インバータが停止した（インバータ給電のみ停止 バイパス給電出力は動作） ⇒ 出力負荷を軽減する 電源再投入にて復帰させる
7	● 入力ON	○ 給電無し	○ 給電無し	● 給電異常	● 過電流動作	停止	ショート	負荷側のショート等による過大な電流により AC入力ヒューズが溶断し、全出力が停止した ⇒ 出力負荷を確認しAC入力ヒューズ交換後、電源再投入にて復帰させる
8	● 入力ON	● 給電有り	○ 給電無し	● 異常検出	○ 異常無し	インバータ	ショート	冷却ファン作動時、ファンの回転数が定格の70%以下に低下した ⇒ ファンの回転数が定格範囲に戻ればALARMが消灯します。ALARMが消灯しない場合はファン故障の可能性が有ります 弊社までお問い合わせ下さい
9	● 入力ON	○ 給電無し	○ 給電無し	● 異常検出	○ 異常無し	停止	ショート	①AC入力ヒューズ断線により全出力が停止した ⇒ ACヒューズ交換後、電源再投入にて復帰させる ②内部DC入力ヒューズ断線により全出力が停止した ⇒ 外部からのヒューズ交換不可の為、弊社までお問い合わせ下さい

WA1000 シリーズ　外形図

■ 端子配置図及び外形図（±1.0mm）

図－2

制御信号入出力端子（SIGNAL 12P）

① SY1　同期信号入出力
② SY1　同期信号入出力
③ SY2　給電信号入出力
④ SY2　給電信号入出力
⑤ SYCOM 信号入出力０Ｖ
⑥ SYCOM 信号入出力０Ｖ
⑦ ＋RC　リモートコントロール（＋）
⑧ －RC　リモートコントロール（－）
⑨ ＋PO　負荷モニタ信号出力（＋）
⑩ －PO　負荷モニタ信号出力（－）
⑪ ALARM アラーム出力
⑫ ALARM アラーム出力

並列接続台数設定スイッチ

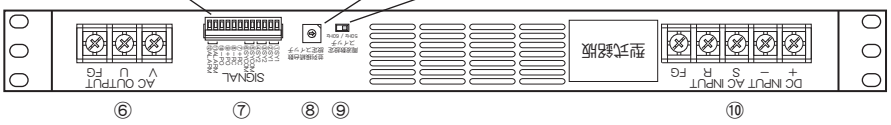
周波数設定スイッチ
50Hz/60Hz

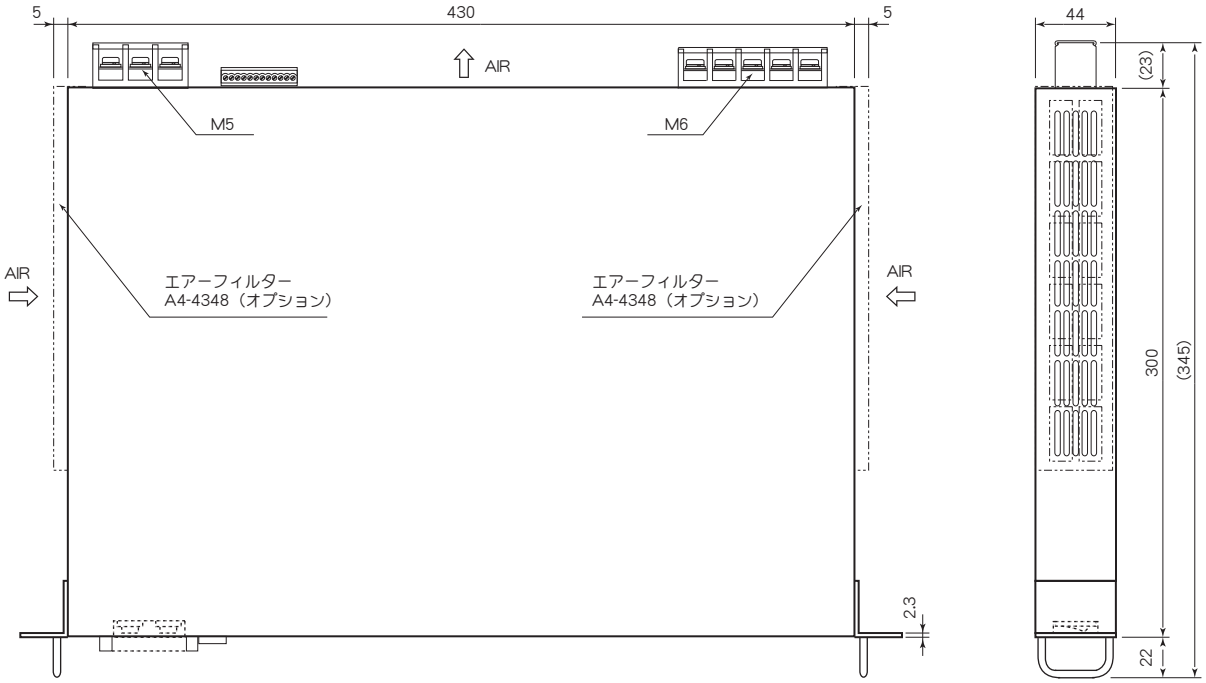
後面パネル

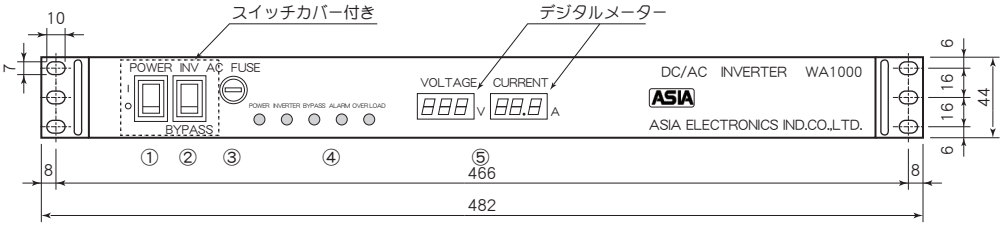
表－6

⑥	出力端子	AC OUTPUT (V, U) FG	交流出力端子 フレームグランド端子
⑦	制御信号 入出力端子 (SIGNAL 12P)	SY1 SY2 SYCOM RC（＋，－） PO（＋，－） ALARM	同期信号入出力 給電信号入出力 信号入出力0V リモートON/OFFコントロール 負荷モニタ信号出力 アラーム出力（警報）
⑧	並列接続台数 設定スイッチ	並列接続台数 設定スイッチ	並列接続台数設定
⑨	周波数設定 スイッチ	50Hz/60Hz	周波数設定スイッチ
⑩	入力端子	AC INPUT (R, S) DC INPUT（＋，－） FG	交流入力(バイパス入力)端子 直流入力端子 フレームグランド端子

後面図







前面パネル

表－7

①	ON / OFF スイッチ	POWER I,O	装置起動用スイッチ	④	LED表示	POWER INVERTER BYPASS ALARM OVER LOAD	装置起動時点灯（緑） インバータ動作時点灯（緑） バイパス運転時点灯（緑） 装置異常時点灯（赤） 装置過負荷時点灯（赤）
②	優先給電設定 スイッチ	INV / BYPASS	インバータ運転とバイパス 運転の優先給電切替				
③	AC入力ヒューズ	AC FUSE	バイパス回路過電流保護用	⑤	デジタルメーター	VOLTAGE CURRENT	出力電圧表示 出力電流表示

■ 主な機能及び注意事項

1. 入力低電圧保護、入力過電圧保護
①下記DC入力電圧にてインバータ給電が停止し、バイパス給電に切り替わります。入力電圧範囲に戻れば自動復帰します。
②下記AC入力電圧にてバイパス給電が停止し、インバータ給電に切り替わります。入力電圧範囲に戻れば自動復帰します。

表－8

定格入力電圧	低電圧保護動作点	過電圧保護動作点
DC24V (18~36V)	DC12~16V	DC40~44V
DC36V (27~54V)	DC18~24V	DC60~66V
DC48V (36~76V)	DC24~32V	DC80~88V
DC96V (72~144V)	DC48~64V	DC150~165V
AC100V (85~115V)	AC60~84V	機能無し

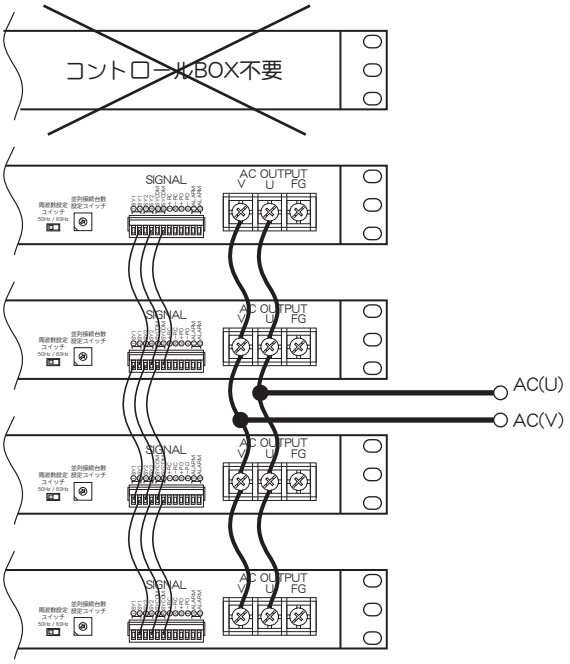
2. 出力過電流保護
負荷が短絡した場合など、過大な負荷電流が流れた時に負荷と本体を保護する機能です。インバータ給電時は尖頭値電流18A以上にてインバータ給電電流制限となります。（自動復帰）
また、実効値電流13A以上にてインバータ給電が停止しバイパス給電に切り替わります。起動スイッチ再投入又は電源再投入にて復帰します。
バイパス給電時はAC入力ヒューズにて保護をします。
AC入力ヒューズ溶断時は全動作が停止します。

3. 過熱保護
本体内部に過熱保護回路が内蔵されています。
インバータ回路発熱部が＋110℃～＋130℃にてインバータ給電が停止します。起動スイッチ再投入又は電源再投入にて復帰します。

4. リモートON/OFFコントロール
リモートON/OFFコントロールを使用して、電源の出力をON/OFFする事ができます。RC端子間をオープンにする事で出力電圧がON、RC端子間をショートにする事で出力電圧がOFFになります。RC端子間に5V-CMOSレベルの電気信号を加える事により出力をON/OFFする事ができます。RC端子は入力、出力、FG端子と絶縁されています。

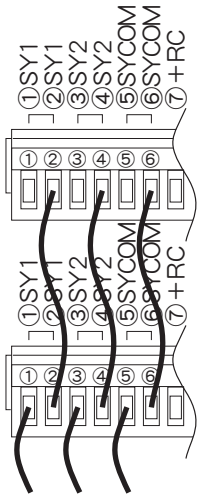
5. 同期並列運転方法
本製品はマスター・スレーブ方式では無い為、同機種を並列に接続させるだけで容易に出力電流容量を増やす事ができます。また、外部コントローラー等の必要もありません。最大6台まで並列接続が可能です。
全てのインバータの周波数を周波数設定スイッチにて同じにします。
各インバータの負荷出力線は交流出力端子（V，U）から、同一長さ、太さの電線を用いて一点結合し、負荷に配線して下さい。（図－３参照）
信号入出力端子のSY1，SY2，SYCOMをそれぞれ並列に接続して下さい。
装置間配線は50cm以内とし、シールド線又はツイスト線を使用して下さい。（図－４参照）

図－3

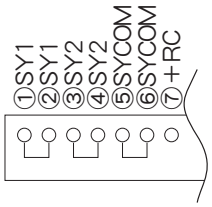


図－4

同期信号端子結線方法



装置内部結線図



SY1　：同期信号入出力
（インバータ周波数の同期をとる）
SY2　：給電信号入出力
（インバータ給電／バイパス給電の切替制御信号）
SYCOM ：各信号入出力の0V

電線の接続、解除はマイナスドライバーで行なって下さい。
結線ビス締付トルクは0.2～0.25N・m、
推奨電線径は0.3～1.0mm²です。

※同期並列運転に関する注意事項
・交流入力電源が一線接地されている場合は、交流入力端子のS端子側を接地相として下さい。出力側を一線接地し使用する場合は、交流出力端子のV端子側を接地相として下さい。
・事故防止の為、インバータユニットを取付、取外しする際は入力電源をOFFにして作業を行なって下さい。
・同期信号端子へ接続をする際、一つの穴に複数の電線をまとめて接続しないで下さい。結線ビスの緩み、電線の抜け等による接触不良の原因になります。

6. 周波数設定
出力周波数の設定は、後面パネルの周波数設定スイッチにて50Hz又は60Hzに設定します。
同期並列運転時は全てのインバータの周波数設定を同じにして下さい。
周波数設定が混在している場合は全数60Hzで出力されます。

7. 並列接続台数設定
同期並列運転を行なう場合は、並列接続する台数を台数設定スイッチにて設定して下さい。例えば4台並列設置の場合は、全てのインバータの台数設定スイッチを4に合わせます。
単機運転の場合は台数設定スイッチを1に設定して下さい。

図－5

（例）4台並列設置の場合

全インバータの台数設定スイッチを４に合わせる。

単機運転の場合

台数設定スイッチを1に合わせる。

8. 負荷モニタ機能
負荷モニタ信号出力端子（＋PO，－PO）より、インバータの出力負荷率に比例したDC信号が出力されます。
（例）　50％負荷時：DC2.5V
　　100％負荷時：DC5.0V
同期並列運転時に負荷モニタ機能を使用する場合は、負荷モニタ信号入出力端子の＋PO,－POをそれぞれ並列に接続して下さい。
並列接続時は、合計の出力負荷率がDC信号にて出力されます。

■ 主な機能及び注意事項

9. 給電切替
インバータ給電とバイパス給電の切替は、前面パネルの優先給電設定スイッチにて設定します。両給電とも異常検出が無い場合は、優先給電設定スイッチで設定された給電側から給電されます。
どちらかの給電から異常が検出された場合は、異常検出していない方を自動選択し出力が給電されます。（自動給電選択）
両給電とも異常が検出された場合は、出力が停止します。
同期並列運転時に優先給電設定スイッチの設定が混在している場合は、全装置バイパス給電にて出力されます。

10. 冗長動作（同期並列運転 インバータ給電時）
同期並列運転時に異常検出があった場合、異常検出1台目については異常が発生した装置のみ給電停止となり、他の装置はそのままインバータ給電を継続します。
異常検出2台目より、全装置がバイパス給電に切り替ります。

11. ファンの作動
冷却ファンは入力電圧が印加され、さらに内部温度検出部が＋60℃以上又は出力負荷率が50％以上にて作動します。
ファン作動時、ファンの回転数が定格の70％以下になるとALARM表示が点灯します。（回転数が定格範囲に戻れば消灯）

12. アラーム表示・アラーム出力
下記内容の異常を検出した場合、前面パネルLED表示のALARMが点灯し、後面パネルのアラーム出力端子間がショートになります。
①冷却ファン作動時、ファンの回転数が定格の70％以下に低下した場合
（表－２,４,５ No.8，表－３　No.9）
②インバータ回路過熱検出部が＋110℃～＋130℃となり過熱保護により　インバータ給電が停止した場合
（表－２ No.9，表－３ No.10）
③前面パネルのAC入力ヒューズが断線した場合
（表－２ No.10，表－３ No.11，表－４,５ No.9）
④製品内部のDCヒューズが断線した場合
（表－２ No.10，表－３ No.11，表－４,５ No.9）

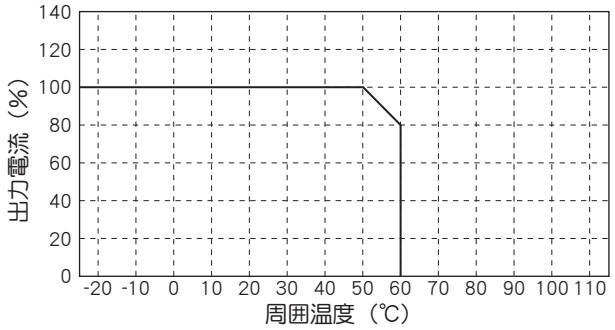
過電流保護によるインバータ給電又はバイパス給電停止時は、前面パネルLED表示のALARMとOVER LOADが点滅し、後面パネルのアラーム出力端子間がショートになります。
（表－２ No.6, 7，表－３ No.7, 8，表－４,５ No.6, 7）

交流入力、直流入力のどちらかが未接続又は入力電圧範囲外の場合、前面パネルLED表示のALARMが点滅します。この場合アラーム出力端子間はオープンとなります。
（表－２,４,５ No.3, 4，表－３ No.4, 5）

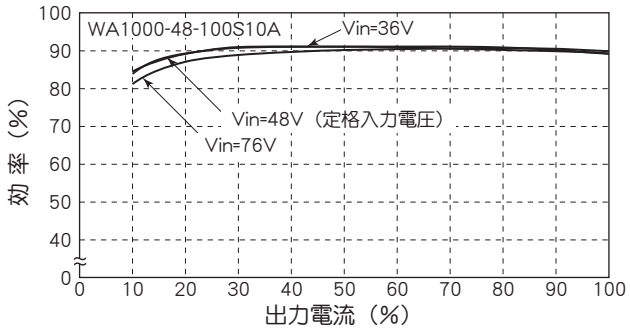
アラーム出力方式：リレー接点出力（DC30V-2A , AC125V-0.4A）
（参考：最低電圧, 電流　DC10mV, 10mA）
正常時　　：接点間オープン
異常検出時：接点間ショート

■ 特性曲線

図－6　ディレーティングカーブ



図－7　効率曲線（Vin=48V）



FA1010 SERIES

1000VA DC/AC INVERTERS
Sine Wave Output

H88×W482×L295.1 (mm)

■ Features

- ●Compact and High Power
- ●Fit to 19" (2U) Rack System
- ●High Efficiency 87% typ.
- ●Output Frequency Temp. Coefficient 0.01%/℃ max.
- ●Input-Output Isolation (AC2000V)
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Input Rush Current Protection
- ●Thermal Protection ＋90℃～＋110℃
- ●Built-in Input Fuse
- ●Built-in Input and Output Noise Filter
- ●Conformity to RoHS2 Directive

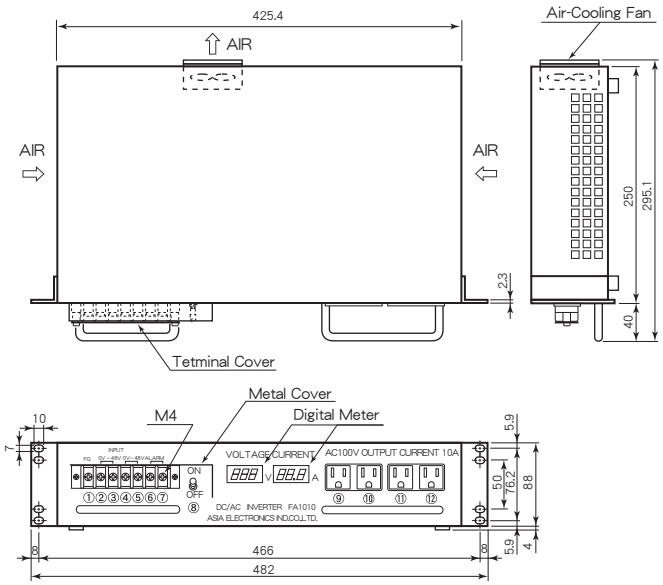
- ●小型、大容量
- ●19インチラックサイズ (2U)
- ●高効率 87% typical
- ●出力周波数温度係数 0.01%/℃ 以下
- ●入出力間絶縁 (AC2000V)
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●入力突入電流保護回路内蔵
- ●過熱保護回路内蔵 ＋90℃～＋110℃
- ●入力ヒューズ内蔵
- ●入出力ノイズフィルタ内蔵
- ●RoHS2指令対応

■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

● Input Voltage	DC24, 36, 48, 96V (See Table 1)
● Output Voltage	AC100Vrms, ±1%
● Output Current	See Table 1
● Output Frequency	50Hz, 60Hz, ±0.1%
● Output Wave, Distortion	Sine Wave, 1.0% max.
● Output Voltage Temperature Coefficient	0.02%/℃ max.
● Output Frequency Temperature Coefficient	0.01%/℃ max.
● Efficiency	86～87% (See Table 1)
● Line Regulation	0.5% max. (at Vin Range)
● Load Regulation	1% max. (0～100% Load)
● Short Circuit Protection	Built-in, Auto-restart (See Fig. 2)
● Output Alarm Signal	Normal : Open between terminals Abnormal : Short between terminals (Output is Shut-down)
● Operating Ambient Temperature	－25℃～＋60℃ (See Fig. 1)
● Storage Temperature	－40℃～＋70℃
● Isolation Voltage（※注1）	AC2000V one minute (Input－Output－Case)
● Isolation Impedance（※注1）	100MΩ min. (at DC1000V) (Input－Output－Case)
● Weight	9kg max.
● Humidity	20～90% RH
● Shock	196m/s² (11msec 3directions)
● Vibration	10～55Hz 29.4m/s² (30minutes 3directions)
● Surface Structure	6 Sided Metal Case
● LIFE	100,000H (Ta：25℃, 80% Load, Nominal Vin)
● Warranty	5 years

■ Terminal Outs & Dimensions (±1.0mm)



Terminal Outs and Function

	24V Input	36V Input	48V Input	96V Input
①	Frame Ground (FG)	Frame Ground (FG)	Frame Ground (FG)	Frame Ground (FG)
②	＋24Vdc in	＋36Vdc in	0Vdc in	＋96Vdc in
③	＋24Vdc in	＋36Vdc in	－48Vdc in	＋96Vdc in
④	0Vdc in	0Vdc in	0Vdc in	0Vdc in
⑤	0Vdc in	0Vdc in	－48Vdc in	0Vdc in
⑥	Alarm Signal	Alarm Signal	Alarm Signal	Alarm Signal
⑦	Alarm Signal	Alarm Signal	Alarm Signal	Alarm Signal
⑧	On/Off Switch	On/Off Switch	On/Off Switch	On/Off Switch
⑨	AC out Socket	AC out Socket	AC out Socket	AC out Socket
⑩	AC out Socket	AC out Socket	AC out Socket	AC out Socket
⑪	AC out Socket	AC out Socket	AC out Socket	AC out Socket
⑫	AC out Socket	AC out Socket	AC out Socket	AC out Socket

注1：AC出力ーケース間に雷サージ対策用バリスタが入っている為
絶縁試験時には同部品を取外す必要があります。
（工場出荷時に同部品を取外して絶縁試験を全数実施済み）

■ Selection Guide

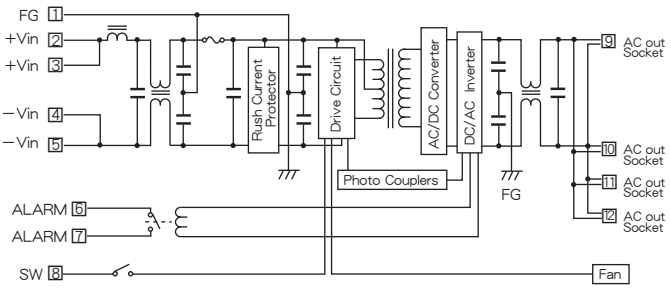
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	Output Frequency (Hz)	Efficiency (Typical)(%) 20% Load	80% Load
FA1010-24-100S 10A50	24 (18～36)	100	10	50	86	87
FA1010-24-100S 10A60		100	10	60	86	87
FA1010-36-100S 10A50	36 (27～54)	100	10	50	86	87
FA1010-36-100S 10A60		100	10	60	86	87
FA1010-48-100S 10A50	48 (36～76)	100	10	50	86	87
FA1010-48-100S 10A60		100	10	60	86	87
FA1010-96-100S 10A50	96 (72～144)	100	10	50	86	87
FA1010-96-100S 10A60		100	10	60	86	87

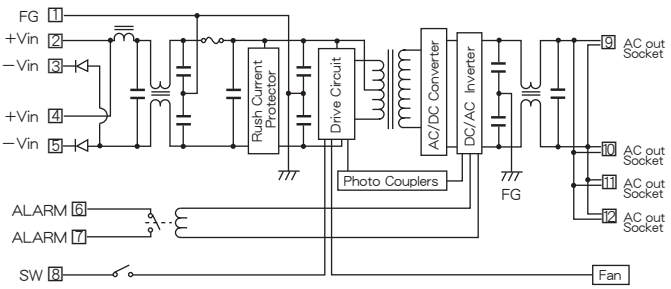
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram

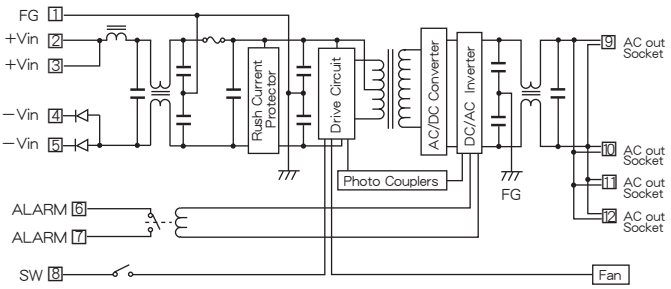
＊24V Input, 36V Input



＊48V Input



＊96V Input



■ Characteristic Curves

Fig. 1 Derating Curve

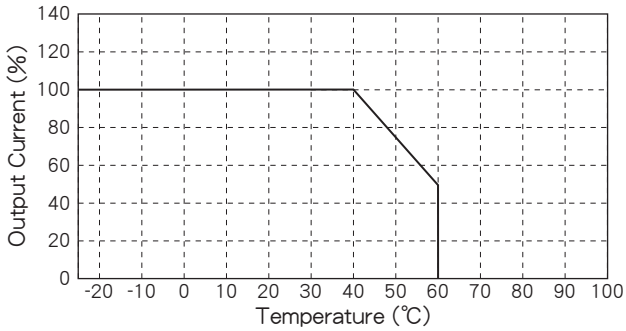


Fig. 2 Short Circuit Operating Area

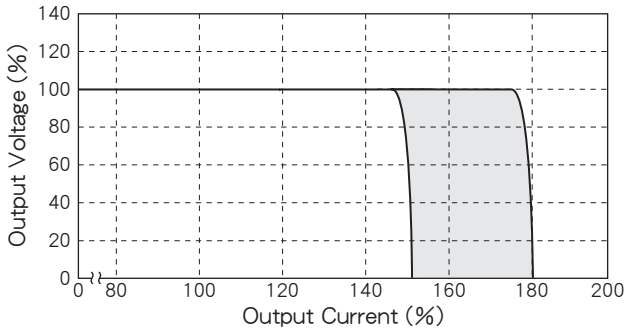


Fig. 3 Efficiency vs. Output Current

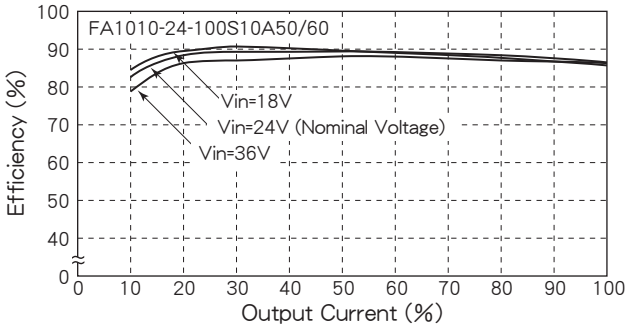


Fig. 4 Efficiency vs. Output Current

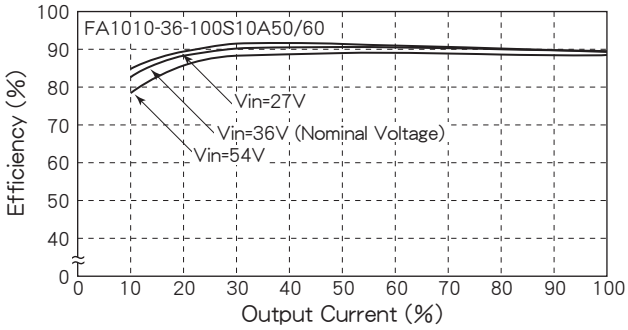


Fig. 5 Efficiency vs. Output Current

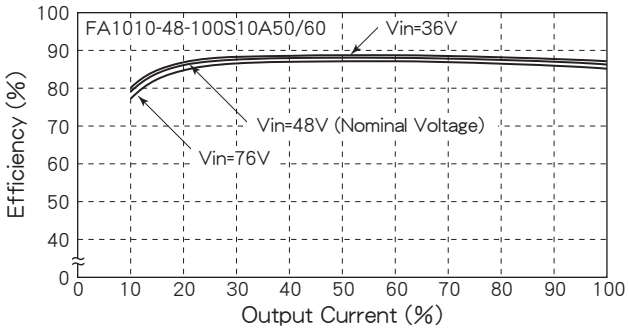
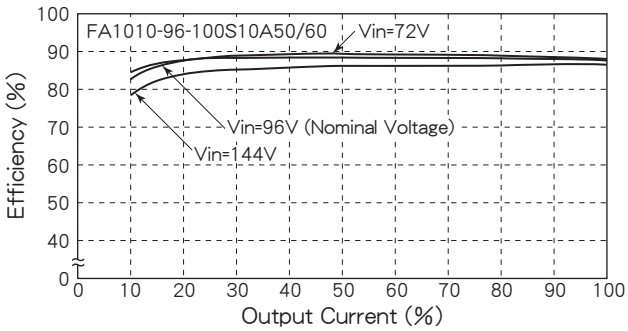


Fig. 6 Efficiency vs. Output Current



ZA1000 SERIES
1000VA DC/AC INVERTERS (Sine Wave Output)

同期並列運転可能
Synchronized Parallel Operation

H88×W482×L295 (mm)

■ Features

- ●Single Operation is Possible
- ●Plural Synchronized Parallel Operation is possible
- ●Fit to 19" (2U) rack system
- ●High Efficiency 87% typ.
- ●Input-Output Isolation (AC2000V)
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Input Rush Current Protection
- ●Thermal Protection ＋90℃～＋110℃
- ●Built-in Input Fuse
- ●Built-in Input and Output Noise Filter
- ●Built-in Frequency Changing Switch (50Hz or 60Hz)
- ●Conforming to RoHS2 Directive

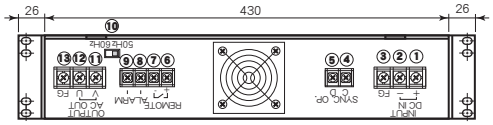
- ●単独運転可能
- ●複数の同期並列運転可能
- ●19インチラックサイズ (2U)
- ●高効率 87% typical
- ●入出力間絶縁 (AC2000V)
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●入力突入電流保護回路内蔵
- ●過熱保護回路内蔵 ＋90℃～＋110℃
- ●入力ヒューズ内蔵
- ●入出力ノイズフィルタ内蔵
- ●周波数切替スイッチ有り (50Hz又は60Hz)
- ●RoHS2指令対応

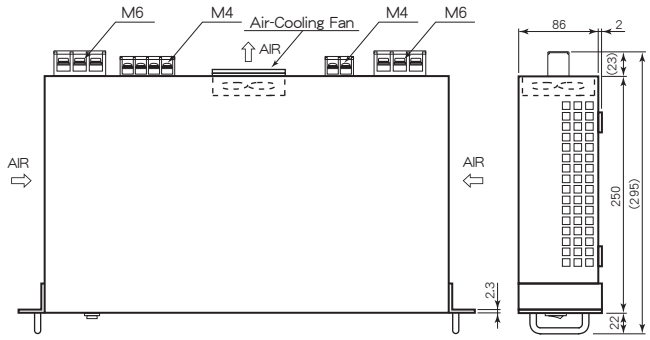
■ General Characteristics

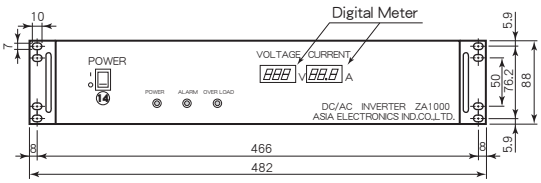
(at Ta : 25℃, Full Load, Nominal Vin)

●Input Voltage	DC24, 36, 48, 96V (See Table 1)
●Output Voltage	AC100Vrms
●Output Current	See Table 1
●Output Frequency	50Hz/60Hz, ±1Hz Built-in changing switch
●Output Wave, Distortion	Sine Wave, 3% max.
●Output Voltage Temperature Coefficient	0.05%/℃ max.
●Output Frequency Temperature Coefficient	0.05%/℃ max.
●Efficiency	86～87% (See Table 1)
●Line Regulation	0.5% max. (at Vin Range)
●Load Regulation	AC103Vrms (0A Load) AC100Vrms (5A Load) AC97Vrms (10A Load)
●Short Circuit Protection	Built-in, Shut-down (See Fig. 2)
●Output Alarm Signal	Normal : Open between terminals Abnormal : Short between terminals (Output is Shut-down)
●Remote ON/OFF Control	ON : Open, OFF : Short
●Operating Ambient Temperature	－25℃～＋50℃ (See Fig. 1)
●Storage Temperature	－40℃～＋70℃
●Isolation Voltage (※注1)	AC2000V one minute (Input－Output－Case)
●Isolation Impedance (※注1)	100MΩ min. (at DC1000V) (Input－Output－Case)
●Weight	9kg max.
●Humidity	20～90% RH
●Shock	196m/s^2 (11msec 3directions)
●Vibration	10～55Hz 19.6m/s^2 (30minutes 3directions)
●Surface Structure	6 Sided Metal Case
●LIFE	100,000H (Ta : 25℃, 80% Load, Nominal Vin)
●Warranty	5 years

■ Terminal Outs & Dimensions (±1.0mm)







Terminal Outs and Function

①	＋Vdc in
②	－Vdc in
③	Frame Ground (FG)
④	Sync. Op. (C)
⑤	Sync. Op. (D)
⑥	＋Remote (ON/OFF)
⑦	－Remote (ON/OFF)
⑧	Alarm Signal
⑨	Alarm Signal
⑩	Frequency Changing Switch
⑪	AC out (V)
⑫	AC out (U)
⑬	Frame Ground (FG)
⑭	ON/OFF Switch

注1：AC出力ーケース間に雷サージ対策用バリスタが入っている為
絶縁試験時には同部品を取外す必要があります。
（工場出荷時に同部品を取外して絶縁試験を全数実施済み）

■ Selection Guide

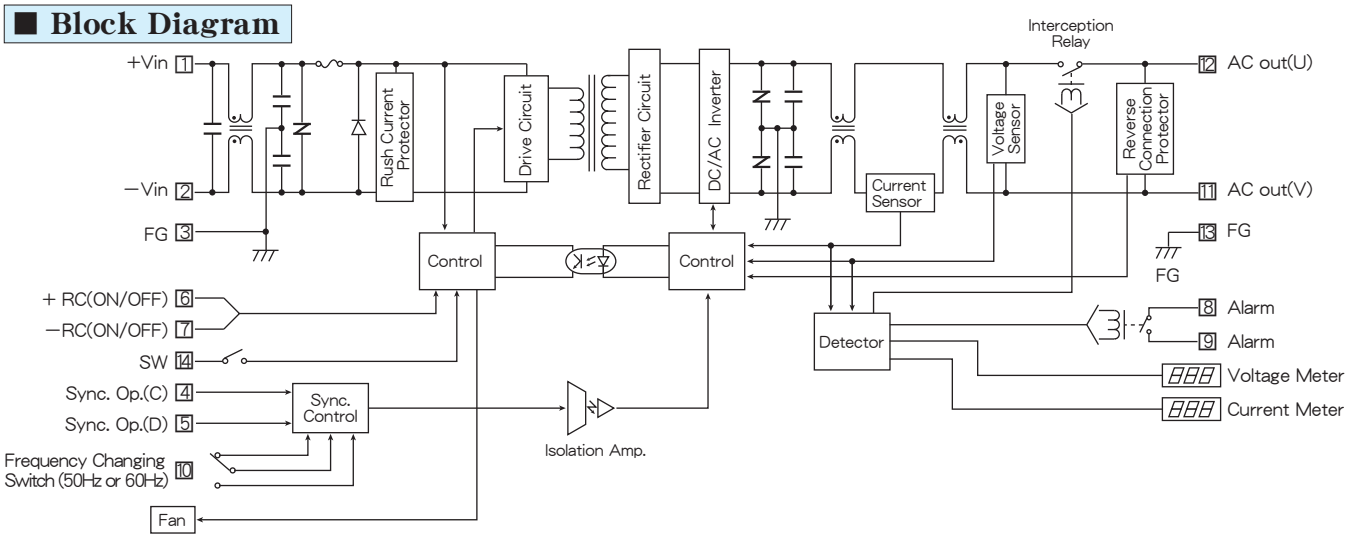
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	※1Output Frequency (Hz)	Efficiency (Typical)(%) 20% Load	Efficiency (Typical)(%) 80% Load
ZA1000-24-100S10A	24 (18～36)	100	10	50/60	86	87
ZA1000-36-100S10A	36 (27～54)	100	10	50/60	86	87
ZA1000-48-100S10A	48 (36～76)	100	10	50/60	86	87
ZA1000-96-100S10A	96 (72～144)	100	10	50/60	86	87

※1 出力周波数(50Hz又は60Hz)は周波数切替スイッチによって選択可能です。
Output frequency(50Hz or 60Hz) is selectable by a frequency Changing Switch.
※2 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

ZA1000 SERIES　DATA SHEET

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

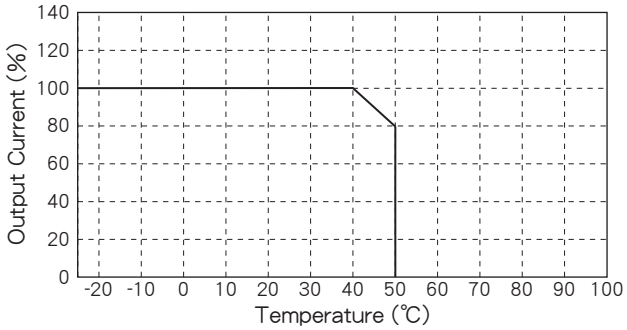
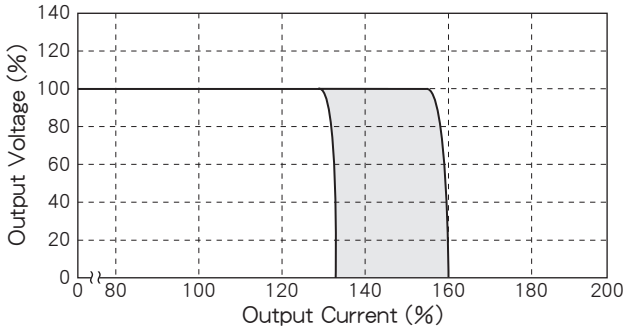


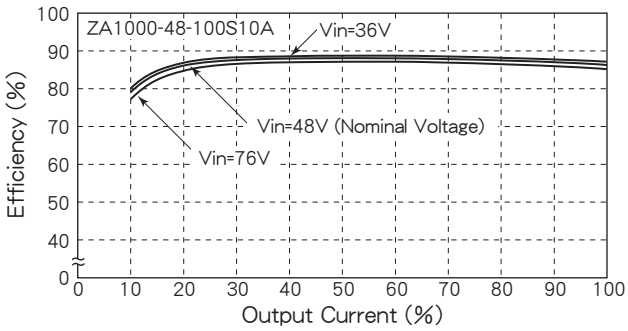
Fig. 2 Short Circuit Operating Area



※出力過負荷が10～15秒間続くと、出力が停止します。
入力再投入で、出力電圧が復帰します。

※When an output overload continues 10-15 seconds,
the output stops.
By an input reintroduction, the output voltage returns.

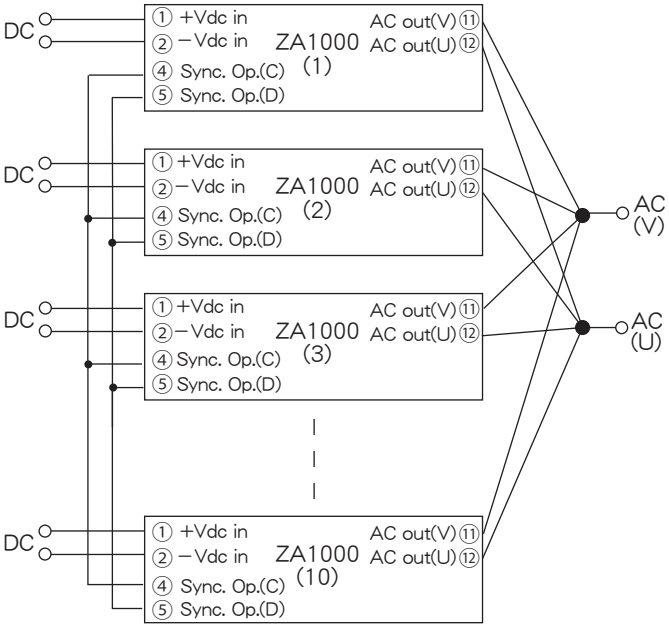
Fig. 3 Efficiency vs. Output Current



■ 主な機能及び注意事項
Function and direction in application

同期並列運転方法（10台まで可能）
（注：設定周波数は必ず同じにして下さい。）
（注：端子の接続を間違えると破損することがあります。）

Synchronized parallel operating method
(ZA1000 is able to synchronize to 10 sets.)
※Use all ZA1000 at the same frequency.
※ZA1000 may be damaged if you make a mistake
in connection of terminals.



アラーム出力
出力方式：リレー接点出力 (DC30V-2A max.) (AC125V-0.4A max.)
（参考：最低電圧, 電流　DC10mV, 10mA）
異常検出時：接点間ショート

アラーム出力条件

直流入力異常時	交流出力異常時	並列接続異常時	その他
入力低電圧 入力過電圧 起動スイッチOFF リモート コントロールOFF	出力過電流 出力低電圧	周波数混在 出力結線逆接 同期信号線逆接	過熱保護 内蔵ヒューズ断線 内部パワー 素子破損

BA1000 SERIES
1000VA DC/AC INVERTER

常時給電インバータ
ON-LINE INVERTER

H88×W482×L295 (mm)

■ Features

- ●Sine Wave Output ●正弦波出力
- ●On-line Inverter ●常時給電インバータ
- ●DC Input is unusual, automatically Change to Bypass Output (AC100V) ●DC入力異常時、バイパス(AC100V)出力に自動切替
- ●Fit to 19" (2U) rack system ●19インチラックサイズ (2U)
- ●High Efficiency 87% typ. ●高効率 87% typical
- ●Input-Output Isolation (AC2000V) ●入出力間絶縁 (AC2000V)
- ●Remote ON/OFF Control ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●Input Low Voltage Protection ●入力低電圧保護回路内蔵
- ●Input Over Voltage Protection ●入力過電圧保護回路内蔵
- ●Input Rush Current Protection ●入力突入電流保護回路内蔵
- ●Thermal Protection ●過熱保護回路内蔵
  Thermal Inside is +90℃～+110℃, Change to Bypass Power Supply
  内部発熱部+90℃～+110℃においてバイパス給電に切替
- ●At Change from Inverter to Bypass, Momentary Disconnection Time is about 20ms. ●ｲﾝﾊﾞｰﾀからﾊﾞｲﾊﾟｽへの切替時の瞬断時間約20ms
- ●Output Alarm Signal ●アラーム出力有り
  Normal：Open between terminals (Inverter Power Supply)
  通常時：ALARM端子間ｵｰﾌﾟﾝ(ｲﾝﾊﾞｰﾀ給電中)
  Abnormal：Short between terminals (Bypass Power Supply)
  異常時：ALARM端子間ｼｮｰﾄ(ﾊﾞｲﾊﾟｽ給電中)
- ●Built-in Input Fuse ●入力ヒューズ内蔵
- ●Built-in Input and Output Noise Filter ●入出力ノイズフィルタ内蔵
- ●Built-in Frequency Changing Switch (50Hz or 60Hz) ●周波数切替スイッチ有り(50Hz又は60Hz)
- ●Air Cooling Fan is going more than 60℃ Inside of Case (Below 45℃, Fan is Stop) Long Life Fan 100,000H at 60℃ ●強制空冷、内部温度60℃以上でファン動作(45℃以下でファン停止)内部ファンは、60℃、100,000Hの長寿命品を使用
- ●Conformity to RoHS2 Directive ●RoHS2指令対応

■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

●Input Voltage	DC24, 36, 48, 96V (See Table 1)
●Bypass Input Voltage	AC100Vrms ±15% 50Hz±5% or 60Hz±5%
●Output Voltage	AC100Vrms, ±1%
●Output Current	See Table 1
●Output Frequency	50Hz/60Hz, ±1% Built-in changing switch
●Output Wave	Sine Wave
●Output Wave Distortion	1.5% max. (Linear Load)
●Output Voltage Temperature Coefficient	0.02%/℃ max.
●Output Frequency Temperature Coefficient	0.01%/℃ max.
●Efficiency	86～87% (See Table 1)
●Line Regulation	0.5% max. (at Vin Range)
●Load Regulation	1.0% max. (0～100% Load)
●Short Circuit Protection	Built-in, Shut-down
●Output Alarm Signal	Normal：Open between terminals Abnormal：Short between terminals
●Remote ON/OFF Control	ON：Open, OFF：Short
●Operating Ambient Temperature	−25℃～+50℃ (50℃, 80% Load)
●Storage Temperature	−40℃～+70℃
●Isolation Voltage（※注1）	AC2000V one minute (Input−Output−Case)
●Isolation Impedance（※注1）	100MΩ min. (at DC1000V) (Input−Output−Case)
●Weight	9kg max.
●Humidity	20～90% RH
●Shock	196m/s² (11msec 3directions)
●Vibration	10～55Hz 19.6m/s² (30minutes 3directions)
●Surface Structure	6 Sided Metal Case
●LIFE	100,000H (Ta：25℃, 80% Load, Nominal Vin)
●Warranty	5 years

注1：AC出力ケース間に雷サージ対策用バリスタが入っている為絶縁試験時には同部品を取外す必要があります。
（工場出荷時に同部品を取外して絶縁試験を全数実施済み）

■ Selection Guide

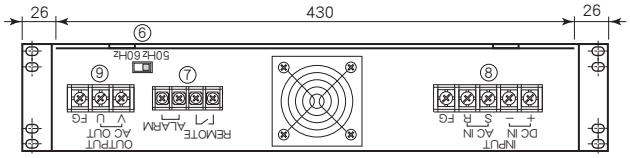
Table 1

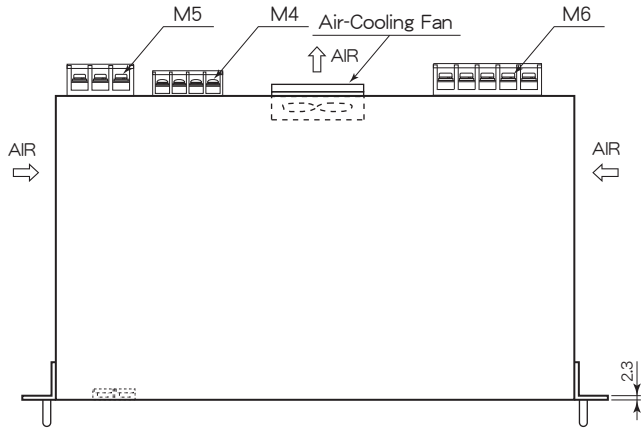
Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	※1Output Frequency (Hz)	Efficiency (Typical)(%) 20% Load	Efficiency (Typical)(%) 80% Load
BA1000-24-100S10A	24 (18～36)	100	10	50/60	86	87
BA1000-36-100S10A	36 (27～54)	100	10	50/60	86	87
BA1000-48-100S10A	48 (36～76)	100	10	50/60	86	87
BA1000-96-100S10A	96 (72～144)	100	10	50/60	86	87

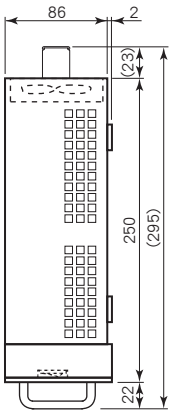
※1 出力周波数(50Hz又は60Hz)は周波数切替スイッチによって選択可能です。
Output frequency(50Hz or 60Hz) is selectable by a frequency Changing Switch.
※2 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

BA1000 SERIES DATA SHEET

■ Terminal Outs & Dimensions (±1.0mm)





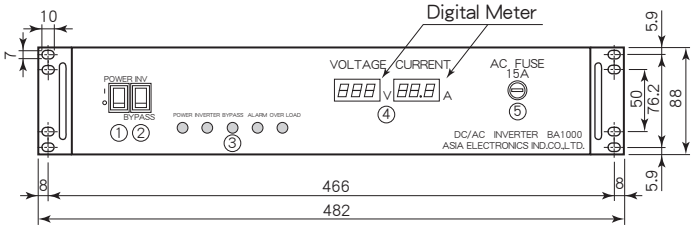


Front Panel

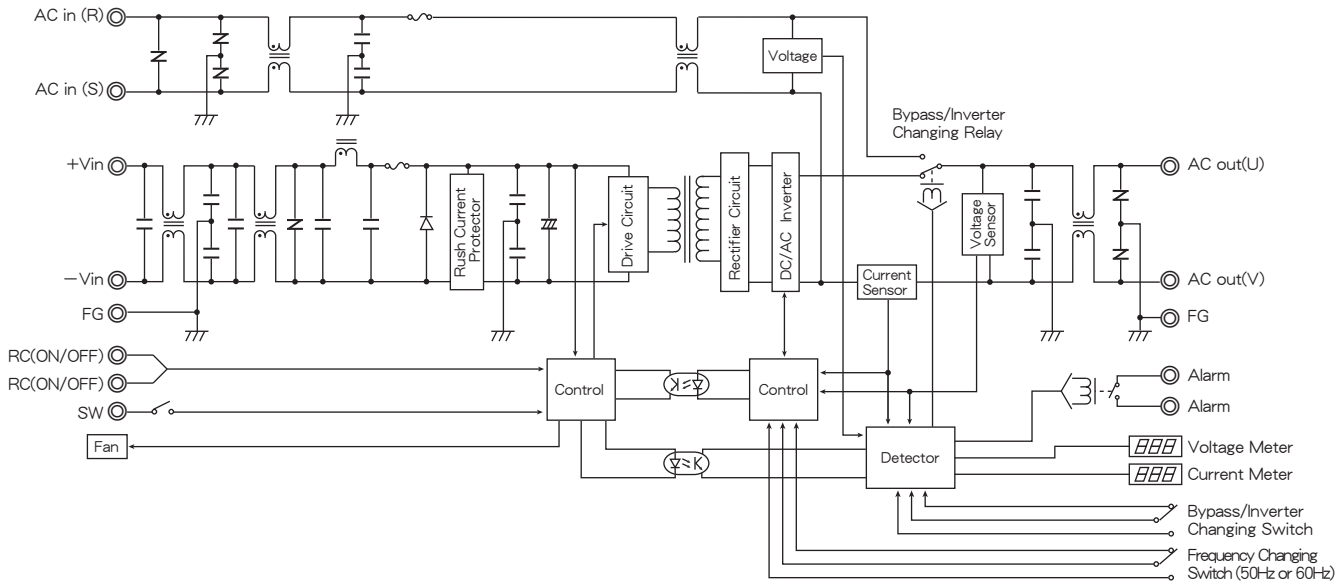
①	ON/OFF Switch	POWER I,O	装置起動用スイッチ
②	INV/BYPASS Changing Switch	INV/BYPASS	手動によるインバータ運転とバイパス運転の切替
③	LED Indicators	POWER INVERTER BYPASS ALARM OVER LOAD	出力給電時点灯 インバータ動作時点灯 バイパス運転時点灯 装置異常時点灯 装置が過負荷時点灯
④	Digital Indicators	VOLTAGE CURRENT	出力電圧表示 出力電流表示
⑤	AC Input Fuse	AC FUSE 15A	バイパス回路過電流保護用 15A

Back Panel

⑥	Frequency Changing Switch	50Hz/60Hz	周波数切替SW
⑦	Signal Input Output Terminal Outs	ALARM REMOTE	無電圧接点信号（警報） 遠方停止信号用端子
⑧	Input Terminal Outs	ACIN (S,R) DCIN (+, −)	交流入力(バイパス入力)端子 直流入力端子
⑨	Output Terminal Outs	AC OUT (V,U)	交流出力端子



■ Block Diagram



CA1000 SERIES
1000VA DC/AC INVERTER

非常時給電インバータ
OFF-LINE INVERTER

H88×W482×L295 (mm)

■ Features

- ●Sine Wave Output
- ●Off-line Inverter
- ●Public Power Supply is interrupted, Output Automatically Change to Inverter Power Supply
- ●Fit to 19" (2U) rack system
- ●High Efficiency 87% typ.
- ●Input-Output Isolation (AC2000V)
- ●Remote ON/OFF Control
- ●Input Low Voltage Protection
- ●Input Over Voltage Protection
- ●Input Rush Current Protection
- ●Thermal Protection
  Thermal Inside is +90℃～+110℃, Inverter Output is Shut-down
- ●Output change from Bypass to Inverter, Momentary Disconnection Time is about 20ms.
- ●Output Alarm Signal
  Normal：Open between terminals (Bypass Power Supply)
  Abnormal：Short between terminals (Inverter Power Supply)
- ●Built-in Input Fuse
- ●Built-in Input and Output Noise Filter
- ●Built-in Frequency Changing Switch (50Hz or 60Hz)
- ●Air Cooling Fan is going more than 60℃ inside of case
  (Below 45℃, Fan is stop)
  Long Life Fan 100,000H at 60℃
- ●Conformity to RoHS2 Directive

- ●正弦波出力
- ●非常時給電インバータ
- ●商用入力停電時、インバータ給電に自動切替
- ●19インチラックサイズ (2U)
- ●高効率 87% typical
- ●入出力間絶縁 (AC2000V)
- ●ﾘﾓｰﾄON/OFFｺﾝﾄﾛｰﾙ
- ●入力低電圧保護回路内蔵
- ●入力過電圧保護回路内蔵
- ●入力突入電流保護回路内蔵
- ●過熱保護回路内蔵
  内部発熱部+90℃～+110℃においてインバータ運転停止
- ●ﾊﾞｲﾊﾟｽからｲﾝﾊﾞｰﾀへの切替時の瞬断時間約20ms
- ●アラーム出力有り
  通常時：ALARM端子間オープン (ﾊﾞｲﾊﾟｽ給電中)
  異常時：ALARM端子間ショート (ｲﾝﾊﾞｰﾀ給電中)
- ●入力ヒューズ内蔵
- ●入出力ノイズフィルタ内蔵
- ●周波数切替スイッチ有り (50Hz又は60Hz)
- ●強制空冷、内部温度60℃以上でファン動作 (45℃以下でファン停止) 内部ファンは、60℃、100,000Hの長寿命品を使用
- ●RoHS2指令対応

■ General Characteristics

(at Ta：25℃, Full Load, Nominal Vin)

● Input Voltage, Range	DC24, 36, 48, 96V (See Table 1)
● Bypass Input Voltage	AC100Vrms, ±15% 50Hz±5% or 60Hz±5%
● Output Voltage	AC100Vrms, ±1%
● Output Current	See Table 1
● Output Frequency	50Hz/60Hz, ±1% Built-in changing switch
● Output Wave	Sine Wave
● Output Wave Distortion	1.5% max. (Linear Load)
● Output Voltage Temperature Coefficient	0.02%/℃ max.
● Output Frequency Temperature Coefficient	0.01%/℃ max.
● Efficiency	86～87% (See Table 1)
● Line Regulation	0.5% max. (at Vin Range)
● Load Regulation	1.0% max. (0～100% Load)
● Short Circuit Protection	Built-in, Shut-down
● Output Alarm Signal	Normal：Open between terminals Abnormal：Short between terminals
● Remote ON/OFF Control	ON：Open, OFF：Short
● Operating Ambient Temperature	−25℃～+50℃ (50℃ 80% Load)
● Storage Temperature	−40℃～+70℃
● Isolation Voltage（※注1）	AC2000V one minute (Input−Output−Case)
● Isolation Impedance（※注1）	100MΩ min. (at DC1000V) (Input−Output−Case)
● Weight	9kg max.
● Humidity	20～90% RH
● Shock	196m/s² (11msec 3directions)
● Vibration	10～55Hz 19.6m/s² (30minutes 3directions)
● Surface Structure	6 Sided Metal Case
● LIFE	100,000H (Ta：25℃, 80% Load, Nominal Vin)
● Warranty	5 years

注1：AC出力ーケース間に雷サージ対策用バリスタが入っている為絶縁試験時には同部品を取外す必要があります。
（工場出荷時に同部品を取外して絶縁試験を全数実施済み）

■ Selection Guide

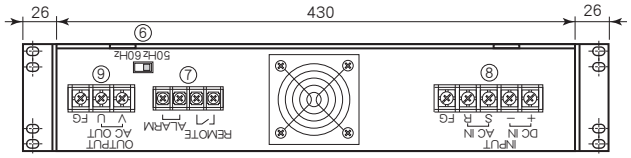
Table 1

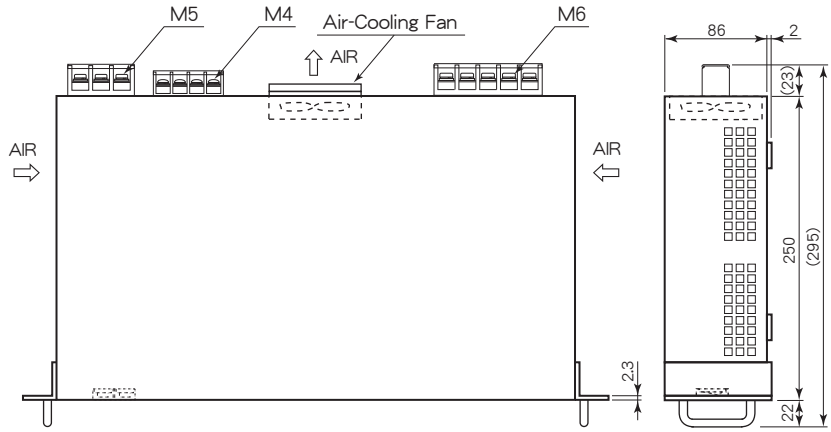
Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	※1Output Frequency (Hz)	Efficiency (Typical)(%)	
					20% Load	80% Load
CA1000-24-100S10A	24 (18～36)	100	10	50/60	86	87
CA1000-36-100S10A	36 (27～54)	100	10	50/60	86	87
CA1000-48-100S10A	48 (36～76)	100	10	50/60	86	87
CA1000-96-100S10A	96 (72～144)	100	10	50/60	86	87

※1 出力周波数(50Hz又は60Hz)は周波数切替スイッチによって選択可能です。
Output frequency(50Hz or 60Hz) is selectable by a frequency Changing Switch.
※2 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

CA1000 SERIES DATA SHEET

■ Terminal Outs & Dimensions (±1.0mm)



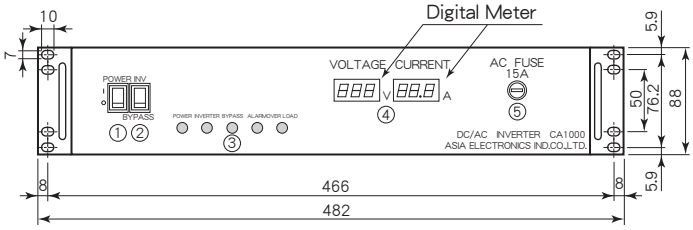


Front Panel

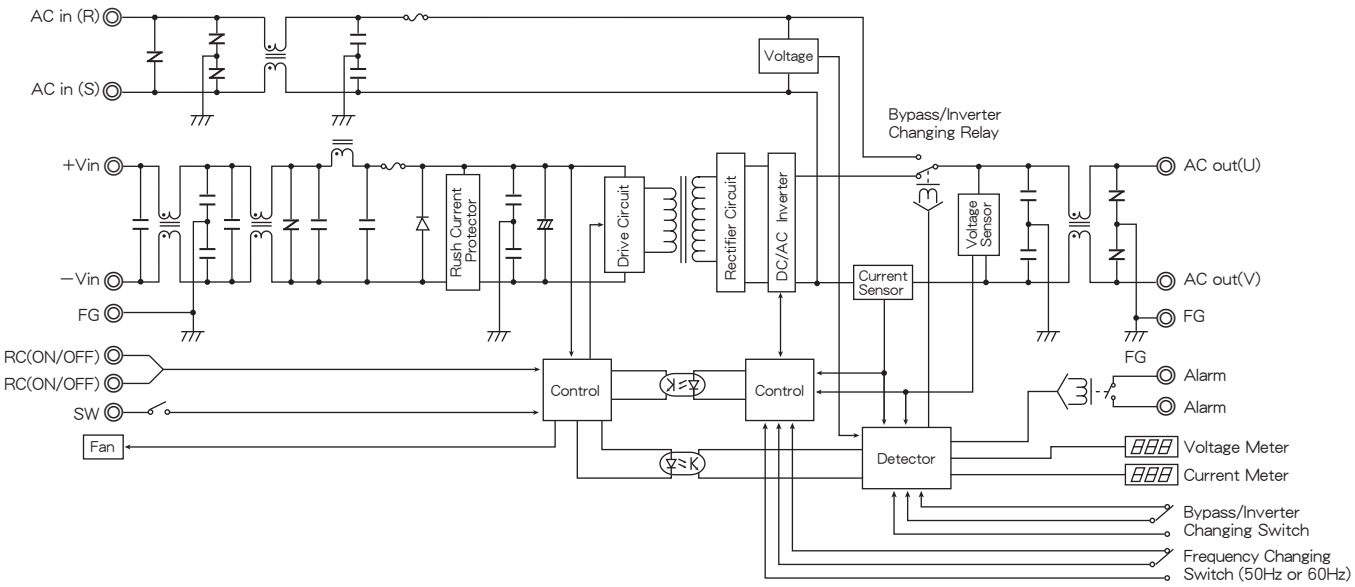
①	ON/OFF Switch	POWER I,O	装置起動用スイッチ
②	INV/BYPASS Changing Switch	INV/BYPASS	手動によるインバータ運転と バイパス運転の切替
③	LED Indicators	POWER INVERTER BYPASS ALARM OVER LOAD	出力給電時点灯 インバータ動作時点灯 バイパス運転時点灯 装置異常時点灯 装置が過負荷時点灯
④	Digital Indicators	VOLTAGE CURRENT	出力電圧表示 出力電流表示
⑤	AC Input Fuse	AC FUSE 15A	バイパス回路過電流保護用 15A

Back Panel

⑥	Frequency Changing Switch	50Hz/60Hz	周波数切替SW
⑦	Signal Input Output Terminal Outs	ALARM REMOTE	無電圧接点信号(警報) 遠方停止信号用端子
⑧	Input Terminal Outs	ACIN (S,R) DCIN (+, −)	交流入力(バイパス入力)端子 直流入力端子
⑨	Output Terminal Outs	AC OUT (V,U)	交流出力端子



■ Block Diagram



ZA2000 SERIES
2000VA DC/AC INVERTERS

同期並列運転可能
(Sine Wave Output) Synchronized Parallel Operation

H88×W482×L395 (mm)

■ Features

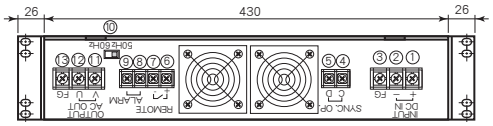
- ● Single Operation is possible ● 単独運転可能
- ● Plural Synchronized Parallel Operation is possible ● 複数の同期並列運転可能
- ● Fit to 19" (2U) rack system ● 19インチラックサイズ (2U)
- ● High Efficiency 87% typ. ● 高効率 87% typical
- ● Input-Output Isolation (AC2000V) ● 入出力間絶縁 (AC2000V)
- ● Input Low Voltage Protection ● 入力低電圧保護回路内蔵
- ● Input Over Voltage Protection ● 入力過電圧保護回路内蔵
- ● Input Rush Current Protection ● 入力突入電流保護回路内蔵
- ● Thermal Protection +90℃～+110℃ ● 過熱保護回路内蔵 +90℃～+110℃
- ● Built-in Input Fuse ● 入力ヒューズ内蔵
- ● Built-in Input and Output Noise Filter ● 入出力ノイズフィルタ内蔵
- ● Built-in Frequency Changing Switch (50Hz or 60Hz) ● 周波数切替スイッチ有り (50Hz又は60Hz)
- ● Conformity to RoHS2 Directive ● RoHS2指令対応

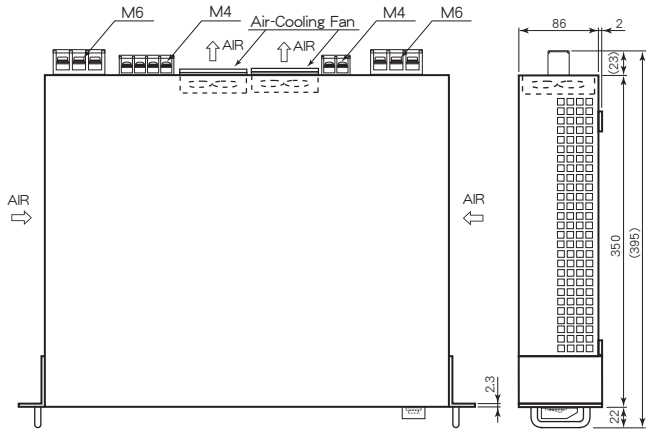
■ General Characteristics

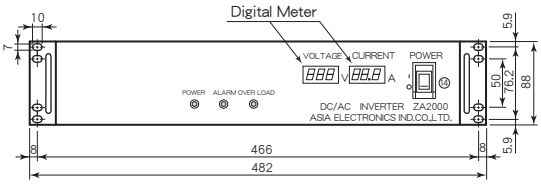
(at Ta : 25℃, Full Load, Nominal Vin)

● Input Voltage	DC48, 96, 144V (See Table 1)
● Output Voltage	AC100Vrms
● Output Current	See Table 1
● Output Frequency	50Hz/60Hz, ±1Hz Built-in changing switch
● Output Wave, Distortion	Sine Wave, 3% max.
● Output Voltage Temperature Coefficient	0.05%/℃ max.
● Output Frequency Temperature Coefficient	0.05%/℃ max.
● Efficiency	86～87% (See Table 1)
● Line Regulation	0.5% max. (at Vin Range)
● Load Regulation	AC103Vrms (0A Load) AC100Vrms (10A Load) AC97Vrms (20A Load)
● Short Circuit Protection	Built-in, Shut-down (See Fig. 2)
● Output Alarm Signal	Normal : Open between terminals Abnormal : Short between terminals (Output is Shut-down)
● Remote ON/OFF Control	ON : Open, OFF : Short (Between pin ⑥～⑦)
● Operating Ambient Temperature	−25℃～+50℃ (See Fig. 1)
● Storage Temperature	−40℃～+70℃
● Isolation Voltage (※注1)	AC2000V one minute (Input−Output−Case)
● Isolation Impedance (※注1)	100MΩ min. (at DC1000V) (Input−Output−Case)
● Weight	13.5kg max.
● Humidity	20～90% RH
● Shock	196m/s² (11msec 3directions)
● Vibration	10～55Hz 19.6m/s² (30minutes 3directions)
● Surface Structure	6 Sided Metal Case
● LIFE	100,000H (Ta : 25℃, 80% Load, Nominal Vin)
● Warranty	5 years

■ Terminal Outs & Dimensions (±1.0mm)







Terminal Outs and Function

①	+Vdc in
②	−Vdc in
③	Frame Ground (FG)
④	Sync. Op. (C)
⑤	Sync. Op. (D)
⑥	+ Remote (ON/OFF)
⑦	−Remote (ON/OFF)
⑧	Alarm Signal
⑨	Alarm Signal
⑩	Frequency Changing Switch
⑪	AC out (V)
⑫	AC out (U)
⑬	Frame Ground (FG)
⑭	ON/OFF Switch

注1：AC出力ーケース間に雷サージ対策用バリスタが入っている為
絶縁試験時には同部品を取外す必要があります。
（工場出荷時に同部品を取外して絶縁試験を全数実施済み）

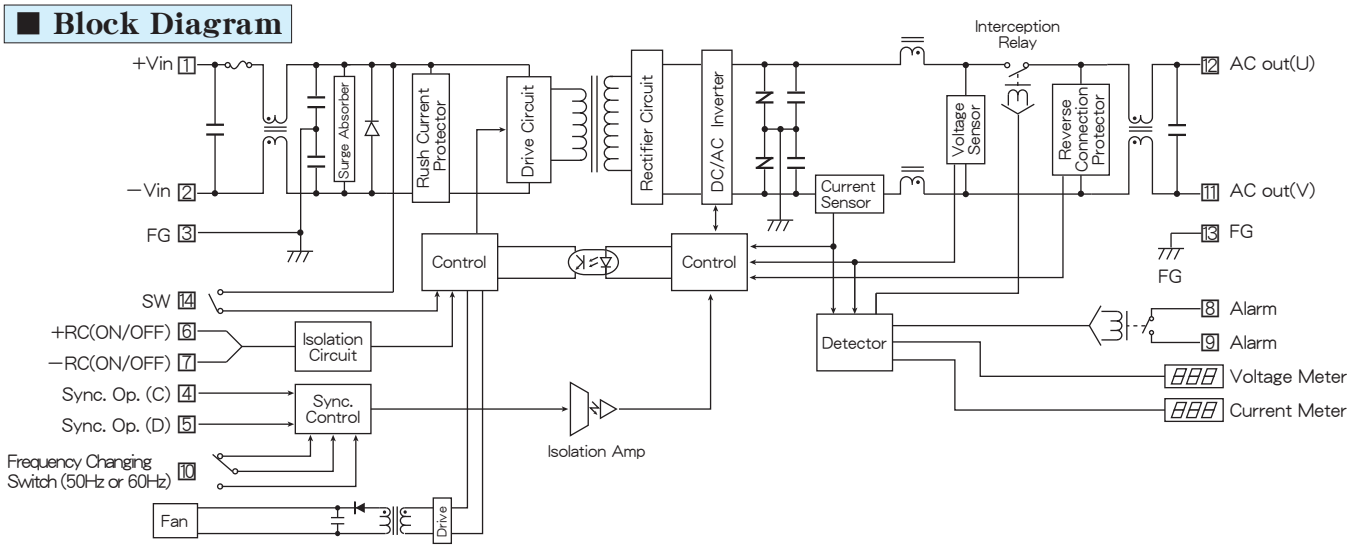
■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. AC)	Output Current (A rms)	※1Output Frequency (Hz)	Efficiency (Typical)(%) 20% Load	80% Load
ZA2000- 48-100S20A	48 (36～76)	100	20	50/60	86	87
ZA2000- 96-100S20A	96 (72～144)	100	20	50/60	86	87
ZA2000-144-100S20A	144 (108～216)	100	20	50/60	86	87

※1 出力周波数(50Hz又は60Hz)は周波数切替スイッチによって選択可能です。
Output frequency(50Hz or 60Hz) is selectable by a frequency Changing Switch.
※2 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

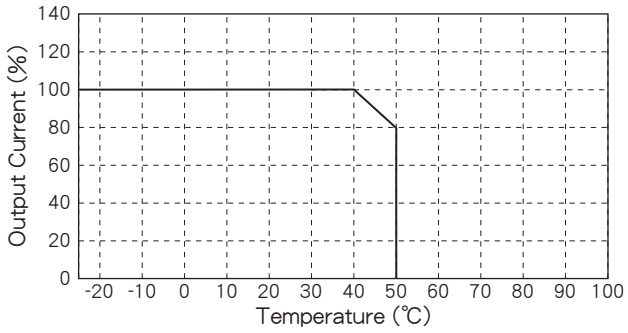
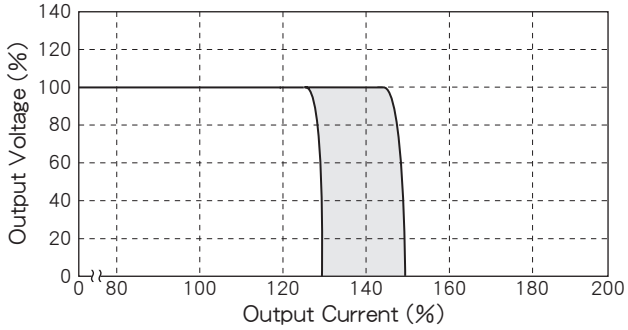


Fig. 2 Short Circuit Operating Area



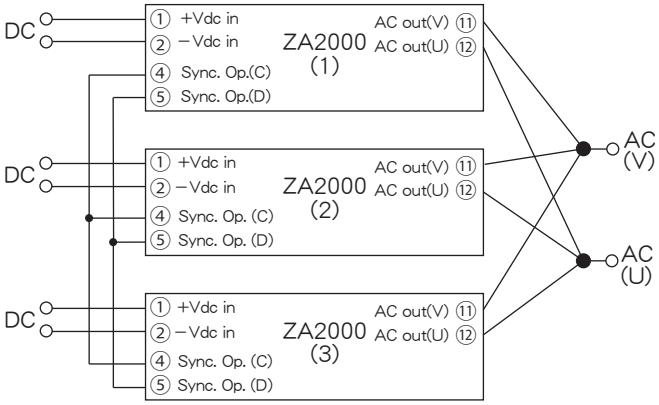
※出力過負荷が10～15秒間続くと、出力が停止します。
入力再投入で、出力電圧が復帰します。

※When an output overload continues 10-15 seconds, the output stops.
By an input reintroduction, the output voltage returns.

■ 主な機能及び注意事項 Function and direction in application

同期並列運転方法（3台まで可能）
（注：設定周波数は必ず同じにして下さい。）
（注：端子の接続を間違えると破損することがあります。）

Synchronized parallel operating method
(ZA2000 is able to synchronize to 3 sets.)
※Use all ZA2000 at the same frequency.
※ZA2000 may be damaged if you make a mistake in connection of terminals.



アラーム出力
出力方式：リレー接点出力 (DC30V-2A max.) (AC125V-0.4A max.)
（参考：最低電圧, 電流 DC10mV, 10mA）
異常検出時：接点間ショート

アラーム出力条件

直流入力異常時	交流出力異常時	並列接続異常時	その他
入力低電圧 入力過電圧 起動スイッチOFF リモート コントロールOFF	出力過電流 出力低電圧	周波数混在 出力結線逆接 同期信号線逆接	過熱保護 内蔵ヒューズ断線 内部パワー素子破損

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本カタログの掲載内容は、技術の進歩などにより、
予告なく変更することがありますので、あらかじめご了承ください。

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