eco

## Ordering information

# GHA300F

A 300





Recommended EMI/EMC Filter EAC-10-472



High voltage pulse noise type : EAP series Low leakage current type: EAM series

\*The EMI/EMC Filter is recommended to connect with several devices.

1) Series name 2) Single output 3) Output wattage 4) Universal input 5) Output voltage

6 Optional \*6

T3: mounting hole M3 J1: VH(J.S.T.)connector type R3: with Subfeatures (5VAUX,12VAUX,Remote, Power good)

Specification is changed at option, refer to Instruction manual.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, please handle the unit with care

MODEL MAX OUTPUT WATTAGE[W]			GHA300F-12	GHA300F-24	GHA300F-48
		300	300	302.4	
	Forced air	at 50℃	12V 25A	24V 12.5A	48V 6.3A
DC OUTPUT	Convection	at 40°C	12V 8.4A	24V 4.2A	48V 2.1A
	Convection	at 50°C	12V 4.5A	24V 2.2A	48V 1.1A

#### **SPECIFICATIONS**

	MODEL		GHA300F-12	GHA300F-24	GHA300F-48				
	VOLTAGE[V]		AC90 - 264 1 $\phi$ (output derating is	required at AC90V -115V *3)					
		ACIN 120V							
		ACIN 230V							
	FREQUENCY[Hz]	7.0	50 / 60 (47 - 63)						
		ACIN 120V		90typ	90typ				
INPUT		ACIN 230V		92typ	92typ				
			0.95typ	JZLYP	JZIJ D				
	(lo=100%)								
	4000		20typ (Io=100%) (At cold start) (	[a_25°)					
	INRUSH CURRENT[A]		40typ (10=100%) (At cold start) (1a=25℃)						
	LEAKAGE CURREN		0.125/0.250may (ACIN 1201//240)	V 60Hz,lo=100%, According to IEC	80601-1)				
	VOLTAGE[V]	ILIIIWI	12	24	48				
		Forced air		12.5	6.3				
		Convection		2.2	1.1				
	LINE REGULATION(I		48max	96max	1.1 192max				
				150max	240max				
	LOAD REGULATION	0 to 150°C	240max	240max	300max				
	RIPPLE[mVp-p] *1		320max	320max	400max				
OUTPUT	RIPPLE NOISE[mVp-p]*1		300max 360max	300max	480max 500max				
				360max					
	TEMPERATURE REGULATION[mV]		120max	240max	480max				
			150max	290max	600max				
	DRIFT[mV]	*2	48max	96max	192max				
	START-UP TIME[ms]		500typ (ACIN 120V, Io=100%)						
	HOLD-UP TIME[ms] OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		16typ (ACIN 120V, Io=100%)	1					
			10.80 to 13.20	21.60 to 26.40	43.20 to 52.80				
	OUTPUT VOLTAGE SETTING[V]		12.00 to 12.48	24.00 to 24.96	48.00 to 49.92				
	OVERCURRENT PROT		Works over 105% of rating and re						
PROTECTION	OVERVOLTAGE PROTEC	CTION[V]	13.80 to 16.80	27.60 to 33.60	55.20 to 67.20				
CIRCUIT AND	AUX1 (12V1A)		Optional						
OTHERS	AUX2 (5V1A)		Optional						
OTTLENO	REMOTE ON/OFF		Optional						
	PowerGood		Optional						
	INPUT-OUTPUT · RC ·	AUX *7							
ISOLATION	INPUT-FG			$t=10$ mA, DC500V 50M $\Omega$ min (At F					
ISOLATION	OUTPUT · RC · AUX-		AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)						
	OUTPUT-RC · AUX		AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)						
	OPERATING TEMP., HUMID. AND ALTITUDE								
ENVIRONMENT	STORAGE TEMP., HUMID. AND ALTITUDE								
F14 A IIVOI AINI F14 I	VIBRATION		10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis						
SAFETY AND	AGENCY APPROVAL				601-1), EN60950-1 ,EN60601-1 3rd				
NOISE	CONDUCTED NOISE			SPR11-B, CISPR22-B, EN55011-B,	EN55022-B				
REGULATIONS	HARMONIC ATTENU		Complies with IEC61000-3-2 (class						
	CASE SIZE/WEIGHT		76 2 X 35 X 127mm [3 0 X 1 4 X 5 0	inches] (WXHXD) / 400g max					
OTHERS	COOLING METHOD		76.2×35×127mm [3.0×1.4×5.0 inches] (W×H×D) / 400g max  Convection, Forced air (Require external fan)						

- \*1 This is the value that measured on measuring board with capacitor of 22 µF at 150mm from output terminal.
- Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with
- \*3 Derating is required.
- the input voltage held constant at the rated input/output. \*4 Please contact us about dynamic load and input response.\*5 Please contact us about another class.

- \*6 Specification is changed at option, refer to Instruction Manual.
- Applicable when AUX and remote control (optional) is added. To meet the specifications. Do not operate over-loaded condition.
- Sound noise may be generated by power supply in case of pulse load
- Parallel operation is not possible.
- Forced air cooling is required to output up to MAX OUTPUT WATTAGE.
- Bottom layer P.C.B has electric potential which is required isolation from FG by clearance or creepage as the safety design issue.

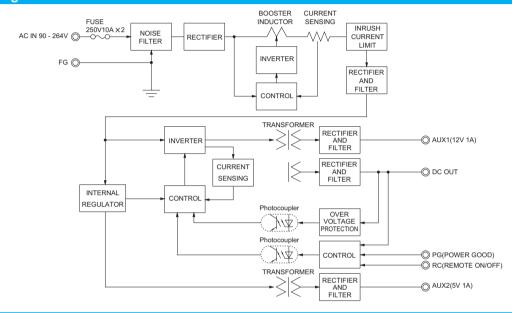
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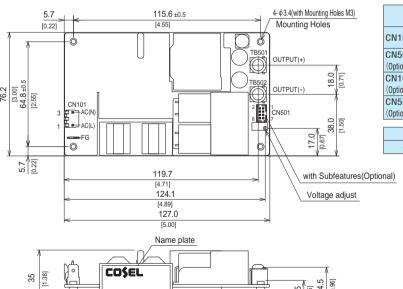
### **Features**

- · High Power density:14.3W/inch³
- · High efficiency 92% typ (Input Voltage 230V, Output Voltage 24V)
- · 3"× 5 "standard footprint
- · Fits 1U applications
- Industrial and Medical safety approvals
- · Low leakage current
- With Remote On/Off (Optional)
   With AUX1 (5V), AUX2 (12V) (Optional)
- · No minimum load is required

#### **Block diagram**



#### **External view**



35 CO\$ET 5.45 10.96
1 1

- Tolerance ±1 [±0.04]
- Weight: 400g max
- There is a total of four attachment holes.
  This power supply requires mounting on metal standoffs 5mm in height.
- (Insulating sheet is required if you do not use a spacer).
- Dimensions in mm, [ ]=inches Screw tightening torque : (TB501, 502) : 1.5N · m max
- Mounting toque : 0.6N · m max
   Avoid contact between TB501 and 502 wiring with mounting parts.
   Option : -J1 : (J.S.T) connector type. Refer to Instruction Manual 5.

1/0	Connector	Mating Terminal		Mfr	
CN101	A-41671-A03A197-2	09-50-8031	08-50-0105 08-65-0114	MOLEX	
CN501 (Optional)	087831-0820	51110-0851	50394-8051		
CN101 (Optional)	B2P3-VH	VHR-3N	SVH-21T-P1.1	J.S.T.	
CN501 (Optional)	B8B-PHDSS	PHDR-08VS	SPHD-002T-P0.5	J.O. I.	

FG		Mating connector	Terminal	Mfr	
-	250 Series	-	170603-2	Tyco Electronics	

#### <Pin Assignments>

#### <CN101>

Pin No.	Input
1	AC(L)
2	
3	AC(N)

#### <CN501(Optional)>

Contoo (Optional)>					
Function					
AUX1 : AUX1 (12V1A)					
AUX1G: AUX1 (GND)					
RC : REMOTE ON/OFF					
RCG : REMOTE ON/OFF (GND)					
PG : Power good					
PGG : Power good (GND)					
AUX2 : AUX2 (5V1A)					
AUX2G: AUX2 (GND)					



**GHA** 

CN501



eco

# GHA500F

A 500





Recommended EMI/EMC Filter EAC-10-472



High voltage pulse noise type : EAP series Low leakage current type: EAM series

\*The EMI/EMC Filter is recommended to connect with several devices.

1) Series name 2) Single output 3) Output wattage 4) Universal input 5) Output voltage 6 Optional \*6

T3: mounting hole M3
J1: VH(J.S.T.)connector type
R3: with Subfeatures
(5VAUX,12VAUX,Remote,
Power good)

P : Pallarel Operation

Specification is changed at option, refer to Instruction manual.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, please handle the unit with care

MODEL			GHA500F-12	GHA500F-15	GHA500F-24	GHA500F-30	GHA500F-48	GHA500F-56
MAX OUTPUT WATTAG	E[W]		500.8	501	504	501	504	504
	Forced air	at 50°C	12V 41.7A	15V 33.4A	24V 21.0A	30V 16.7A	48V 10.5A	56V 9.0A
	Convection	at 40°C	12V 12.5A	15V 10.0A	24V 6.3A	30V 5.0A	48V 3.2A	56V 2.7A
DC OUTPUT		at 50°C	12V 9.2A	15V 7.4A	24V 4.6A	30V 3.7A	48V 2.3A	56V 1.9A
	conduction	at 0°C	12V 30.0A	15V 24.0A	24V 15.0A	30V 12.0A	48V 7.5A	56V 6.4A
	cooling	at 50°C	12V 16.7A	15V 13.4A	24V 8.4A	30V 6.7A	48V 4.2A	56V 3.6A

#### **SPECIFICATIONS**

	MODEL		GHA500F-12	GHA500F-15	GHA500F-24	GHA500F-30	GHA500F-48	GHA500F-56	
	VOLTAGE[V]			output derating is	required at AC90V	-115V *3)			
	CURRENT[A] ACIN 120V		5.4typ						
	CURRENT[A]	ACIN 230V							
	FREQUENCY[Hz]		50 / 60 (47 - 63)						
		ACIN 120V	88typ	90typ	90typ	90typ	90typ	90typ	
INPUT	EFFICIENCY[%]	ACIN 230V	90typ	92typ	92typ	92typ	92typ	92typ	
	POWER FACTOR	ACIN 120V	0.95typ						
	(lo=100%)		0.90typ						
	ACIN 120			) (At cold start) (T					
	INKUSH CUKKENT[A]	ACIN 230V	40typ (lo=100%) (At cold start) (Ta=25°C)						
	LEAKAGE CURREN	T[mA]				According to IEC6			
	VOLTAGE[V]		12	15	24	30	48	56	
		Forced air		33.4	21.0	16.7	10.5	9.0	
	CURRENT[A]	Convection		7.4	4.6	3.7	2.3	1.9	
		conduction cooling		13.4	8.4	6.7	4.2	3.6	
	LINE REGULATION[			60max	96max	120max	192max	192max	
	LOAD REGULATION			120max	150max	180max	240max	240max	
	RIPPLE[mVp-p] *1		240max	240max	240max	300max	300max	400max	
	Kii i EE[iiivp-p]		320max	320max	320max	400max	400max	500max	
OUTPUT	RIPPLE NOISE[mVp-p]*1		300max	300max	300max	480max	480max	500max	
	KIPPLE NOISE[IIIVP-P]*		360max	360max	360max	500max	500max	580max	
	TEMPERATURE REGULATION[mV]		120max	150max	240max	300max	480max	480max	
			150max	180max	290max	360max	600max	600max	
	DRIFT[mV] *2		48max	60max	96max	120max	192max	192max	
	START-UP TIME[ms]		500typ (ACIN 120V, Io=100%)						
	HOLD-UP TIME[ms]		16typ (ACIN 120		01.001.00.10	07.001.01.50	40.00   50.00	T50.001 50.00	
	OUTPUT VOLTAGE ADJUSTMENT	RANGE[V]	10.80 to 13.20	13.50 to 16.50	21.60 to 26.40	27.00 to 31.50	43.20 to 52.80	52.00 to 56.00	
	OUTPUT VOLTAGE SET		12.00 to 12.48	15.00 to 15.30	24.00 to 24.96	30.00 to 31.20	48.00 to 49.92	55.00 to 56.00	
	OVERCURRENT PROT				covers automatica		FF 00 +- 07 00	CO 00 to 00 00	
PROTECTION	OVERVOLTAGE PROTECTION[V]		13.80 to 16.80   17.25 to 21.00   27.60 to 33.60   34.50 to 42.00   55.20 to 67.20   60.00 to 69.00						
CIRCUIT AND	AUX1 (12V1A)		Optional						
OTHERS	AUX2 (5V1A) REMOTE ON/OFF		Optional						
	PowerGood		Optional Optional						
		· AllY ±7	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)						
	INPUT-FG	AUX */	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)						
ISOLATION	OUTPUT · RC · AUX-	FG *7							
	OUTPUT-RC · AUX		AC500V 1minute, Cutoff current = 25mA, DC500V 50M $\Omega$ min (At Room Temperature)						
	OPERATING TEMP., HUMID, AND ALTITUDE								
	STORAGE TEMP., HUMID. AND ALTITUDE		-30 to +80°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max						
ENVIRONMENT	VIBRATION		10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis						
SAFETY AND	AGENCY APPROVAL	LS				0-1, CAN/CSA606	01-1), EN60950-1	, EN60601-1 3rd	
NOISE	CONDUCTED NOISE					2-B, EN55011-B, E			
REGULATIONS	HARMONIC ATTENU	JATOR		C61000-3-2 (clas		<u> </u>			
	CASE SIZE/WEIGHT				inches] (W×H×D	) / 420g max			
OTHERS COOLING METHOD			Convection, Forced air (Require external fan), Conduction cooling						

- This is the value that measured on measuring board with capacitor of  $22\,\mu\,F$  at 150mm from output terminal.
- Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*3 Derating is required.
- Please contact us about dynamic load and input response.
- \*5 Please contact us about another class.

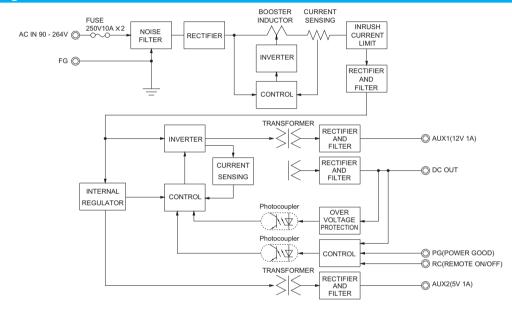
- Specification is changed at option, refer to Instruction Manual.
- Applicable when AUX and remote control (optional) is added.
- To meet the specifications. Do not operate over-loaded condition.
- Sound noise may be generated by power supply in case of pulse load. Parallel operation is available with -P option. Refer to 5.1on the instruction manual.
- Forced air cooling is required to output up to MAX OUTPUT WATTAGE.



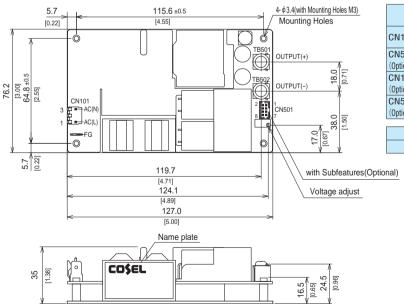
### **Features**

- · Wattage 500W max
- · High Power density:24.1W/inch3
- · High efficiency 92% typ (Input Voltage 230V,Output Voltage 24V)
- · Conduction cooling
- 3"× 5 "standard footprint
- · Fits 1U applications
- · Industrial and Medical safety approvals
- · Low leakage current
- · With Remote On/Off (Optional) · With AUX1 (5V), AUX2 (12V) (Optional)
- · No minimum load is required

### **Block diagram**



# **External view**



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- Tolerance ±1 [±0.04]
- Weight : 420g max
   There is a total of four attachment holes.
- Base Plate : Aluminum
- \*\* Dimensions in mm, [ ]=inches
  \*\* Screw tightening torque : (TB501, 502) : 1.5N · m max
- Mounting toque: 0.6N · m max
- Avoid contact between TB501 and 502 wiring with mounting parts.
   Option: -J1: (J.S.T) connector type. Refer to Instruction Manual 5.

I/O	I/OConnector Mating connector		Terminal	Mfr
CN101	A-41671-A03A197-2	09-50-8031 08-50-0105 08-65-0114 087831-0820 51110-0851 50394-8051		MOLEV
CN501 (Optional)	087831-0820			MOLEX
CN101 (Optional)	B2P3-VH	VHR-3N	SVH-21T-P1.1	J.S.T.
CN501 (Ontional)	B8B-PHDSS	PHDR-08VS	SPHD-002T-P0.5	J.O.I.

FG		Mating connector	Terminal	Mfr	
-	250 Series	-	170603-2	Tyco Electronics	

#### <Pin Assignments>

# <CN101>

Pin No.	Input
1	AC(L)
2	
3	AC(N)

## <CN501(Optional)>

	' '
Pin No.	Function
1	AUX1 : AUX1 (12V1A)
2	AUX1G: AUX1 (GND)
3	RC : REMOTE ON/OFF
4	RCG : REMOTE ON/OFF (GND)
5	PG : Power good
6	PGG : Power good (GND)
7	AUX2 : AUX2 (5V1A)
8	AUX2G: AUX2 (GND)



GHA

CN501

# **GHA500F-SNF**

A 500



Recommended EMI/EMC Filter EAC-10-472

High voltage pulse noise type : EAP series Low leakage current type: EAM series

\*The EMI/EMC Filter is recommended to connect with several devices.

1) Series name 2) Single output 3) Output wattage 4) Universal input 5) Output voltage

®Optional ∗6

J1 : CN501 VH(J.S.T.)connector type P : Pallarel Operation

Refer to the instruction manual

MODEL		GHA500F-12-SNF	GHA500F-15-SNF	GHA500F-24-SNF	GHA500F-30-SNF	GHA500F-48-SNF	GHA500F-56-SNF
MAX OUTPUT WATTAG	E[W]	450	501	504	501	504	504
DC OUTPUT	Forced air +50°C	12V 37.5A	15V 33.4A	24V 21.0A	30V 16.7A	48V 10.5A	56V 9.0A

## **SPECIFICATIONS**

	MODEL		GHA500F-12-SNF	GHA500F-15-SNF	GHA500F-24-SNF	GHA500F-30-SNF	GHA500F-48-SNF	GHA500F-56-SNI		
	VOLTAGE[V]		AC90 - 264 1 φ (	AC90 - 264 1 ¢ (output derating is required at AC90V -115V *3)						
INPUT	CURRENT[A]	ACIN 120V								
	CURRENT[A]	ACIN 230V	2.6typ	2.9typ						
	FREQUENCY[Hz]			50 / 60 (47 - 63)						
	EFFICIENCY[%]	ACIN 120V	87typ	89typ	89typ	89typ	89typ	89typ		
	EFFICIENCY[%]	ACIN 230V	89typ	91typ	91typ	91typ	91typ	91typ		
	POWER FACTOR		0.95typ							
	(lo=100%)	ACIN 230V								
		ACIN 120V	- 3  ( ) ( )							
		ACIN 230V	40typ (Io=100%) (At cold start) (Ta=25℃)							
	LEAKAGE CURREN	T[mA]		·	60Hz,Io=100%, A		<del>. '</del>			
	VOLTAGE[V]		12	15	24	30	48	56		
	CURRENT[A]	Forced air		33.4	21.0	16.7	10.5	9.0		
	LINE REGULATION[		48max	60max	96max	120max	192max	192max		
	LOAD REGULATION			120max	150max	180max	240max	240max		
	RIPPLE[mVp-p] *1		240max	240max	240max	300max	300max	400max		
	Kii i EE[iiivp p]		320max	320max	320max	400max	400max	500max		
	RIPPLE NOISE[mVp-p]*1		300max	300max	300max	480max	480max	500max		
	Kill I EE NOIDE[IIIVP P]		360max	360max	360max	500max	500max	580max		
	TEMPERATURE REGULATION[mV]		120max	150max	240max	300max	480max	480max		
				180max	290max	360max	600max	600max		
		DRIFT[mV] *2		60max	96max	120max	192max	192max		
	START-UP TIME[ms]		500typ (ACIN 120V, Io=100%)							
	HOLD-UP TIME[ms]		16typ (ACIN 120V, Io=100%)							
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		10.80 to 13.20	13.50 to 16.50	21.60 to 26.40	27.00 to 31.50	43.20 to 52.80	52.00 to 56.00		
	OUTPUT VOLTAGE SETTING[V]		12.00 to 12.48	15.00 to 15.30	24.00 to 24.96	30.00 to 31.20	48.00 to 49.92	55.00 to 56.00		
OVERCURRENT PROTECTION				% of rating and rec	covers automatical		T== 00 + 0== 00	Taa aa		
PROTECTION	OVERVOLTAGE PROTECTION[V]		13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	34.50 to 42.00	55.20 to 67.20	60.00 to 69.00		
CIRCUIT AND	AUX1		12V 0.5A							
OTHERS	AUX2		5V 1A							
	REMOTE ON/OFF		Possible, AUX2 is available							
	PowerGood	41117	Open corrector							
ICOL ATION	INPUT-OUTPUT · RC · AUX		AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
	OUTPUT RC · AUX-FG		AC500V 1minute, Cutoff current = 25mA, DC500V 50M $\Omega$ min (At Room Temperature)							
	OUTPUT-RC · AUX		AC500V 1minute, Cutoff current = 25mA, DC500V 50M $\Omega$ min (At Room Temperature)							
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE		-20 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max *3							
	STORAGE TEMP., HUMID. AND ALTITUDE		-30 to +80°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max							
	VIBRATION IMPACT		10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis 196.1m/s² (20G), 11ms, once each X, Y and Z axis							
		1.0				1 CAN/CCACCC	11 1) ENGOGEO 1	ENCOCO1 1 2"		
	AGENCY APPROVALS UL60950-1, ANSI/AAMI ES60601-1, C-UL(CSA60950-1, CAN/CSA60601-1), EN60950-1, EN60601-1							בוזטטטטו-ו 3۲۵		
			Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B Complies with IEC61000-3-2 (class A) *5							
SAFETY AND NOISE REGULATIONS	CONDUCTED NOISE					2, 2.100011 2, 2.				
NOISE	HARMONIC ATTENUTIONS  CASE SIZE/WEIGHT	JATOR	Complies with IE	C61000-3-2 (class						

- This is the value that measured on measuring board with capacitor of 22 µF at 150mm from
- Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*3 Derating is required.
- \*4 Please contact us about dynamic load and input response.\*5 Please contact us about another class.

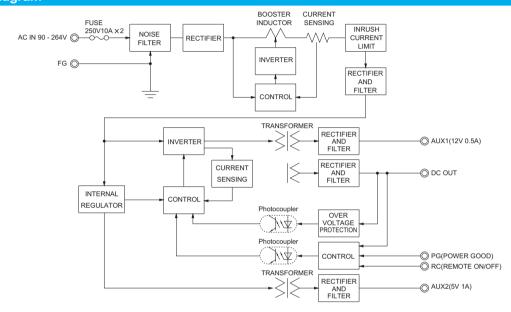
- Specification is changed at option, refer to Instruction Manual.
- When output current more than rated, output will shut down after 5 seconds or more.
- Recycle input after 3 minutes to reset the protection.
- To meet the specifications. Do not operate over-loaded condition.
- Sound noise may be generated by power supply in case of pulse load
- Parallel operation is available with -P option. Refer to 5.1on the instruction manual.



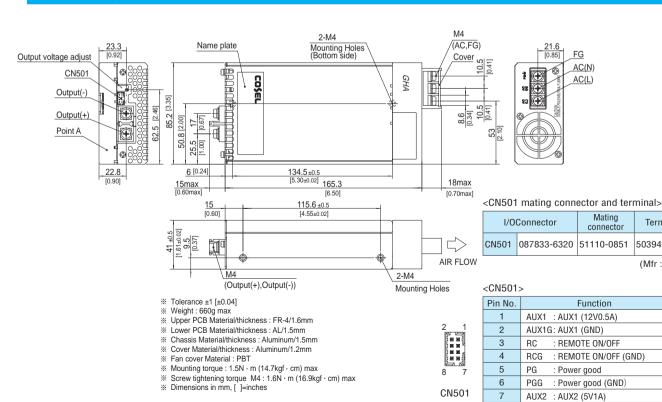
### **Features**

- · Full packaged desin united with GHA's features and additional robastness..
- · High efficiency 91% typ (Input voltage 230V.Output voltage 24V)
- · 50% minimized size compare with privious products.
- · Optical for 1U applications
- · Medical and Industrial safety approvals
- · Low leakage current
- · Conformal coating
- · Single remote ON/OFF control for DC output, AUX1 and Fan.
- · Isolated dual AUX (AUX1 12V 0.5A, AUX2 5V 1A)

#### Block diagram



#### **External view**



**GHA** 

AUX2G: AUX2 (GND)

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Terminal

50394-8051

(Mfr : Molex)