CWB Series - Switch Mode Power Supply

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Safety Precautions 

Be sure to observe the precautions explained below.

1. Be sure to read “Operation Manual” and “Detailed Specifications” before using these products.

2. The products are DC stabilized power supplies with special structures created for mounting on devices. Use only for mounting on devices.

3. Although Sanken strives to improve the quality and the reliability of the products, please implement safety design of the devices under customers' responsibility not to endanger human life, health and property due to malfunction and/or failures of the products when using.

4. Sanken products listed in this publication are NOT intended to use for equipment and applications where extremely high reliability is required such as aerospace equipment, nuclear power-control stations and medical equipment, for which there is enhanced risk that the products could endanger human life or health due to malfunction and/or failures of the products (Classified Ⅲ or above per GHTF, Global Harmonization Task Force, Medical Equipment Class) Sanken assumes no responsibility for any damage to any customer and/or any third party due to use of Sanken products for the such use.

5. When considering use of the products for the following equipment and applications, for which there is the risk that may heavily endanger human life or affect maintenance of public function, be sure to secure sufficient fail-safe function at customers' devices by means of multiplexing of systems and other method.
   - ・Electric train and elevator, etc. that may result in personal injury.
   - ・Vehicles and vessels, etc. that may be affected by oscillation and shock.
   - ・Traffic system, etc. that may exert an important influence on society and public.
   - ・Any other applications and equipment similar to those mentioned above.

6. Be sure to observe the items below
   - • Do not disassemble, repair or modify these products.
   - • Do not touch inside the power supplies because of high voltage.
   - • Use the products within designated input voltage, frequency, output voltage and output current ranges.
   - • Be sure to observe designated ambient environment conditions such as ambient temperature and humidity.]
   - • Each power supply model has a designated method for installation and mounting. Observe installation and mounting directions.

Appearance and Meaning of Safety Warnings

In this document, the levels of safety warnings are divided into two categories, Hazard and Caution.

 Hazard	Disregarding a Hazard display and incorrectly using the product could result in death and / or serious injury.
 Caution	Disregarding a Caution display and incorrectly using the product could result in personal injury and / or physical damage.

Be sure to observe the safety precautions indicated on the product and in documentation by symbols and text. The general meaning of symbols is as follows:

	Prohibited action
	Strong warning
	Electric shock hazard
	Fire hazard

Hazard and Caution Safety Warnings

General Cautionary Notices

! Hazard	
	• Shock hazard • Never take off the cover • There is a high voltage circuit inside and touching it mistakenly could result in death and / or serious injury
	• Fire hazard • If any abnormal odour, noise, smoking or ignition arises in the product, immediately turn off the product and cut the power input to the product by opening an external circuit breaker or other means • Please contact the vendor from which the product was purchased and / or Sanken • In case of fire, use a fire extinguisher of a powder / ABC type approved for the use on electrical fires Note: Never use water

Other Precautions

! Caution	
	Each power supply model has a designated input / output range. Be sure to use the products within the designated Input / out put range
	Be sure that the total power consumption connecting with the load does not exceed the rated output capacity per each power supply. I f a power supply is used under an overload condition, it could cause fire.
	Be sure to use thick wire for input / output wiring, and that it is appropriate for the input / output power. If thin wires are used it could cause fire.
	Be sure not to use and / or store the products in temperature, humidity and dew condensation conditions beyond the ambient environmental conditions specified in the catalogue and / or operation manual, otherwise failure of the product could occur.
	When the power supply is operated in dusty conditions, please apply appropriate dust proof measures. The dust could interfere in heat dissipation and cause failure and / or fire.
	When the power supply is installed, be sure to use designated screws (paying particular attention to the screw length diameter), otherwise electric shock and / or fore could occur.
	The products are not intended for use in equipment that requires high reliability for sustaining human life. Be sure not to use the products for any particular application such as in nuclear reactor and / or power control systems, aerospace applications, special medical equipment, and so forth
	When installing the products, be sure to connect each input terminal and output terminal without fail, otherwise malfunction and damage to the products, personal injury and fire could occur.
	Be sure not to apply any external voltage to output terminals of the products, otherwise damage to the internal devices of the products could occur.
	Be sure not to use and / or store the products in an environment with corrosive gases such as hydrogen, sulphide, sulphur dioxide and so forth, otherwise damage to the products could occur.
	When operating the products in an environment with interference from radio waves, electric fields, or magnetic fields, the products may malfunction, which could lead to failure. Be sure not to use the products under such conditions.
	Although Sanken strives to improve the quality and the reliability of the products, the customer and user are responsible to be apply safe design of their equipment before using the products.

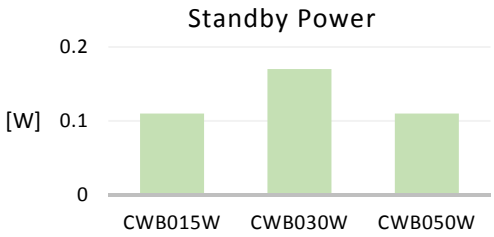
Introduction to CWB Series

General Description

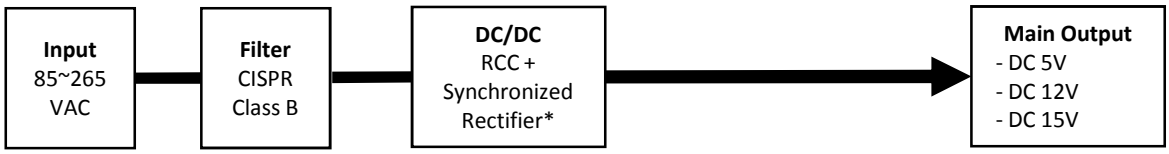
The **CWB Series** are compact, single output, wide ranging power supplies, providing low standby power at low cost. The series make ideal secondary power supplies to support microprocessors or control functions on SWH and SWF models.

Features and Benefits

- Key Features: High efficiency, low noise, low leakage & **low standby power <0.2W** (100VAC)
- Input Voltage: World wide input (AC 85V ~ AC 265V)
- Power Range: 3 power ranges available 15W, 30W & 50W
- Output: Single output 5V / 12V / 15V
- Protection: OCP, OVP
- Options L Chassis and Cover



Block diagram

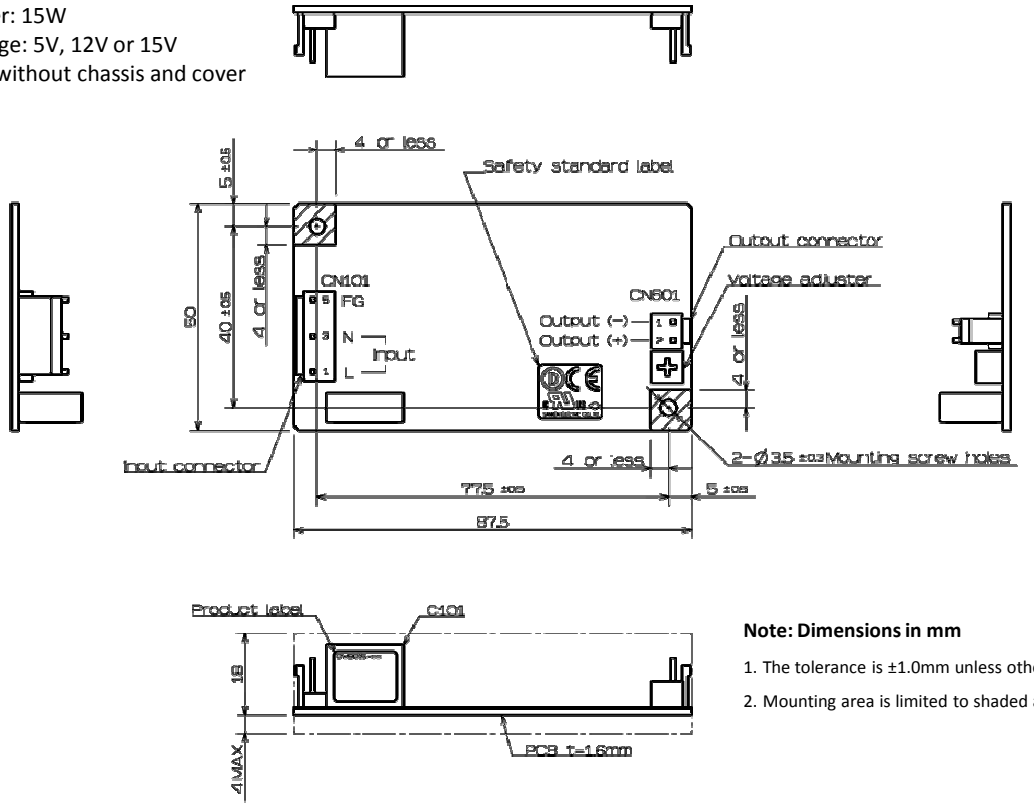


- Adopted proprietary IC and achieved high efficiency, low noise and low leakage
- Synchronized rectifier for CWB050-05 only

External Dimensions

Model: CWB015-OO

Output Power: 15W
Output Voltage: 5V, 12V or 15V
Weight: 55g without chassis and cover

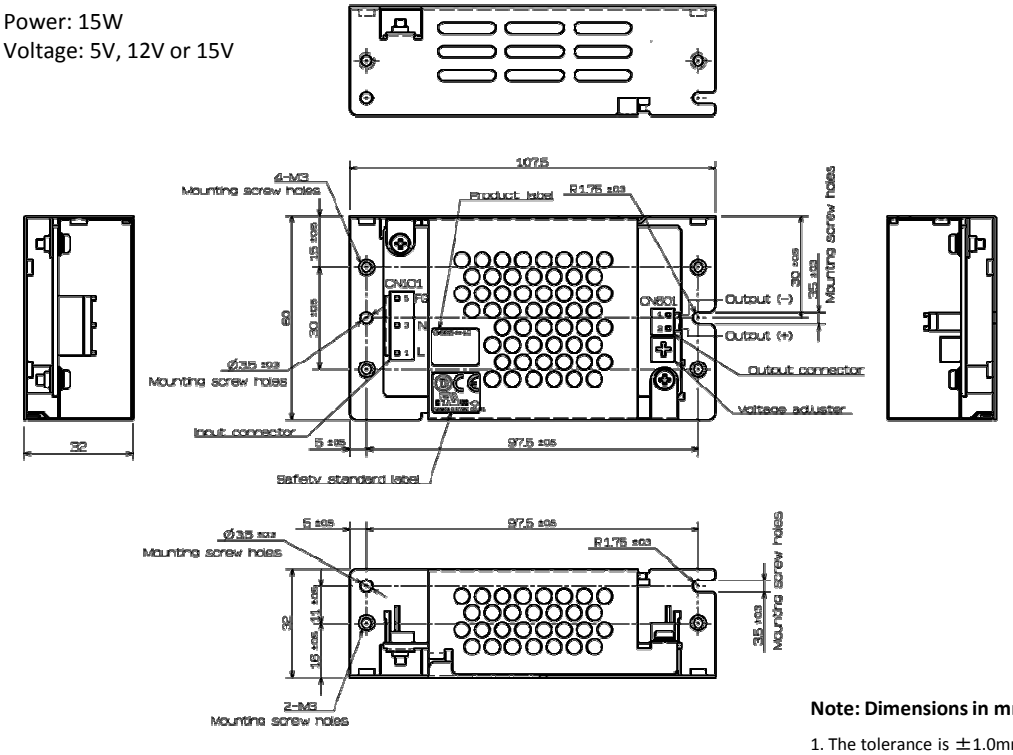


Note: Dimensions in mm

1. The tolerance is ±1.0mm unless otherwise specified.
2. Mounting area is limited to shaded area in the drawing.

Model: CWB015-OO-LC

Output Power: 15W
Output Voltage: 5V, 12V or 15V



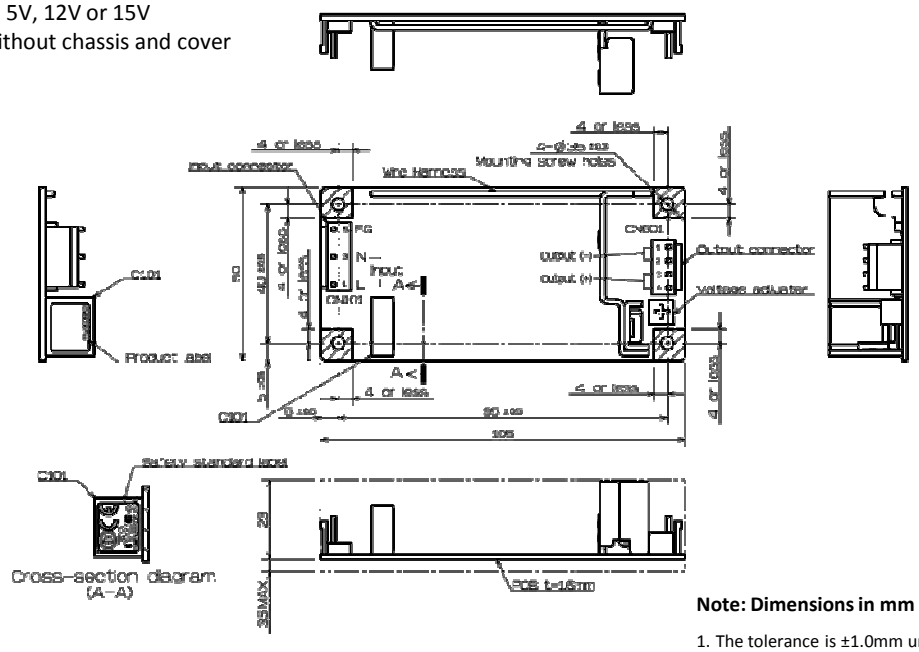
Note: Dimensions in mm

1. The tolerance is ±1.0mm unless otherwise specified.

External Dimensions

Model: CWB030-OO

Output Power: 30W
Output Voltage: 5V, 12V or 15V
Weight: 100g without chassis and cover

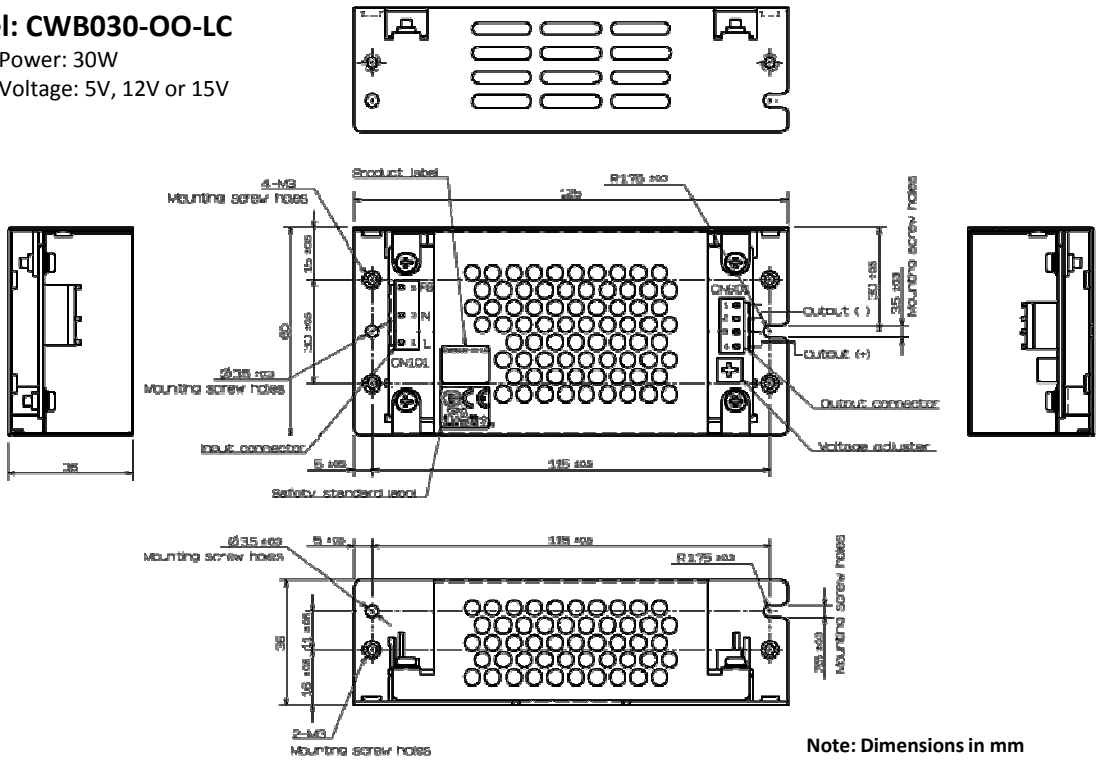


Note: Dimensions in mm

1. The tolerance is ±1.0mm unless otherwise specified.
2. Mounting area is limited to shaded area in the drawing.

Model: CWB030-OO-LC

Output Power: 30W
Output Voltage: 5V, 12V or 15V



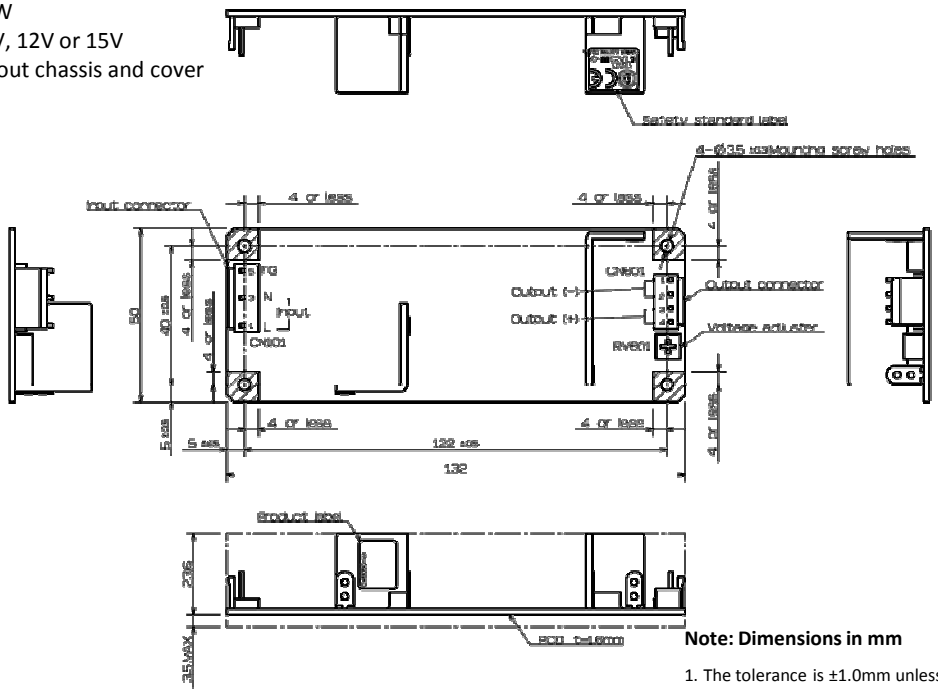
Note: Dimensions in mm

1. The tolerance is ±1.0mm unless otherwise specified.

External Dimensions

Model: CWB050-OO

Output Power: 50W
Output Voltage: 5V, 12V or 15V
Weight: 140g without chassis and cover

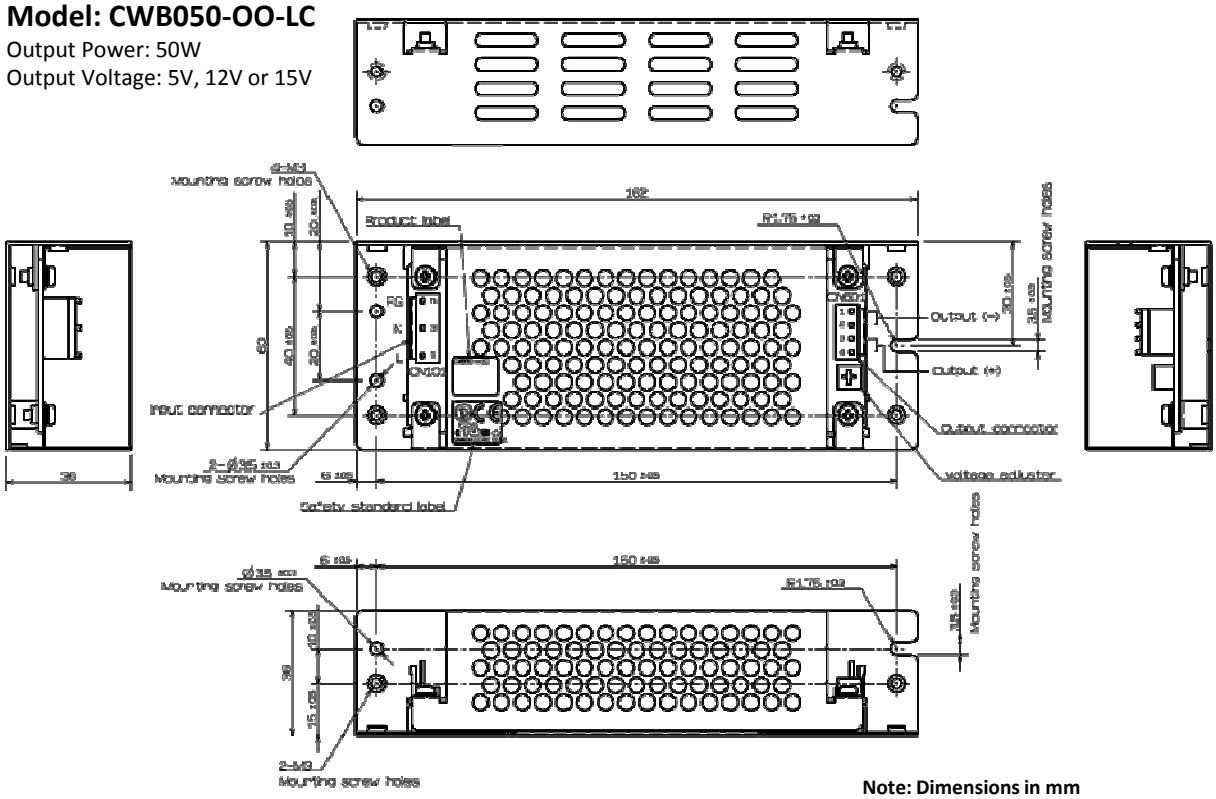


Note: Dimensions in mm

1. The tolerance is ±1.0mm unless otherwise specified.
2. Mounting area is limited to shaded area in the drawing.

Model: CWB050-OO-LC

Output Power: 50W
Output Voltage: 5V, 12V or 15V



Note: Dimensions in mm

1. The tolerance is ±1.0mm unless otherwise specified.

Options

Wattage	Output Voltage	Model Name	Standard	Chassis and cover
15W/30W/50W	5V/12V/15V	CWBXXX-OO	O	N/A
		CWBXXX-OO-LC	N/A	O

Model Number Description

[AAA] [NNN] –[NN]–[N]

- Optional (LC for L-type chassis and cover)
- Nominal total rated output voltage (05: 5V, 12: 12V, 15: 15V)
- Nominal total rated output wattage (015:15W, 030: 30W, 050: 50W)
- Series identifier, for example, CWB for CWB series

Input and Output Terminals, Connections and Pin Assignments

Input / Output electrical connector manufacturer: JST Mfg. Co., Ltd.

CWB015

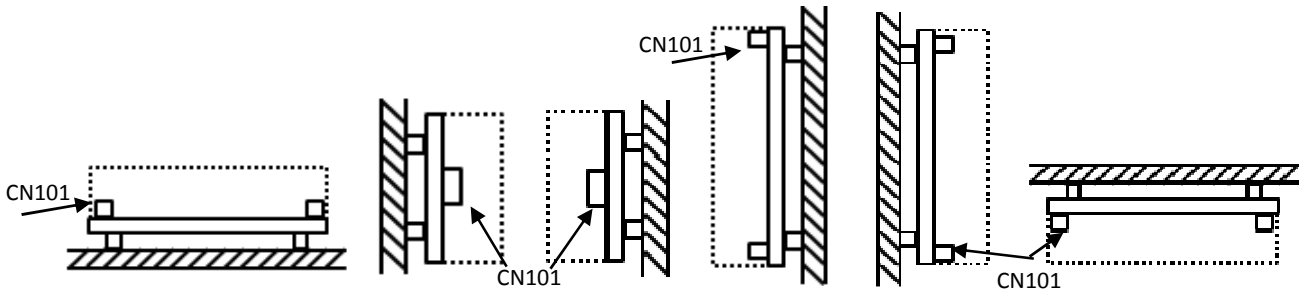
Connector Socket			Mating Plug	Connector Contacts
Identifier	Pins	Manufacturer Part Number		
CN101	1: AC(L) 3: AC(N) 5: FG	B3P5-VH	VHR-5N	SVH-21T-P1.1 (strip) BVH-21T-P1.1 (reel)
CN601	1: -V 2: +V	B2P-VH	VHR-2N	SVH-21T-P1.1 (strip) BVH-21T-P1.1 (reel)

CWB030, CWB050

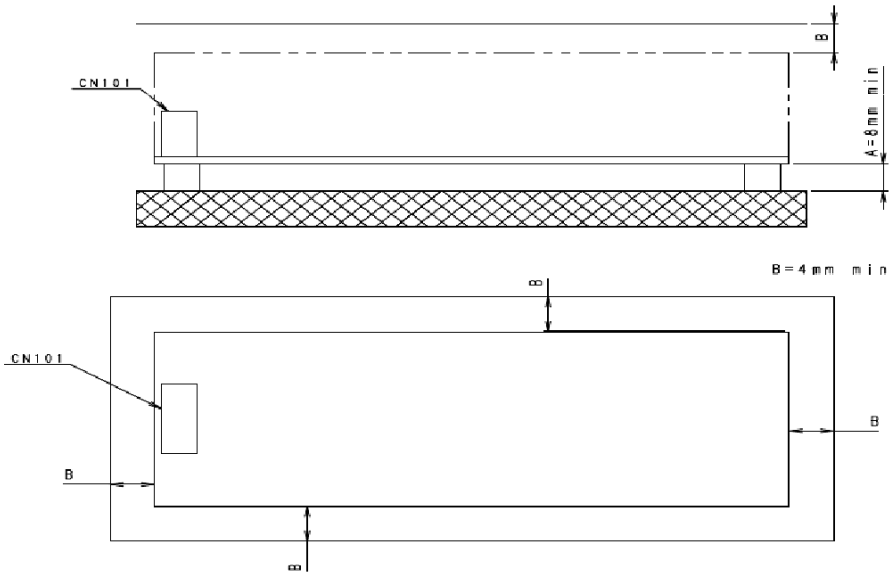
Connector Socket			Mating Plug	Connector Contacts
Identifier	Pins	Manufacturer Part Number		
CN101	1: AC(L) 3: AC(N) 5: FG	B3P5-VH	VHR-5N	SVH-21T-P1.1 (strip) BVH-21T-P1.1 (reel)
CN601	1: -V 2: -V 3: +V 4: +V	B4P-VH	VHR-4N	SVH-21T-P1.1 (strip) BVH-21T-P1.1 (reel)

Mounting, Derating and Lifetime

Mounting



- **Do not touch inside the product because high voltage can be present that may lead to electric shock.**

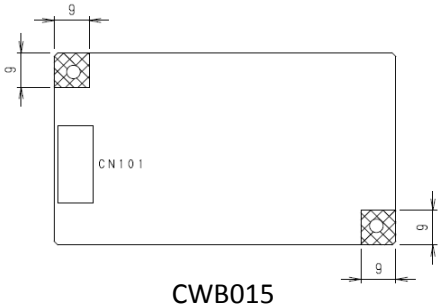


- When the product is used with metal case, be sure to secure insulation distance between the product and the case as described in the above drawings, A for minimum 8mm and B for minimum 4mm. The insulation distance is crucial for insulation purpose and it is insufficient for cooling conditions

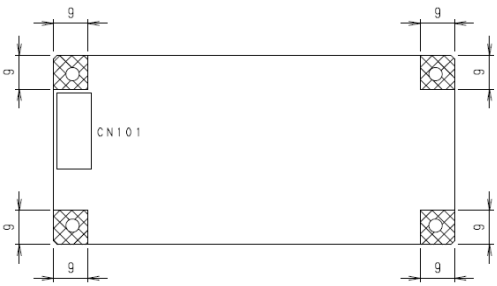
- Be sure to ground input FG terminal or mounting hole FG in proper way when installing the product.
  Do not directly connect FG inside the power supply to the safety ground.

Mounting, Derating and Lifetime

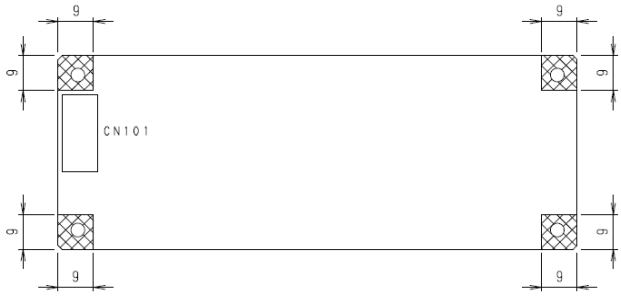
Mounting flanges



CWB015



CWB030



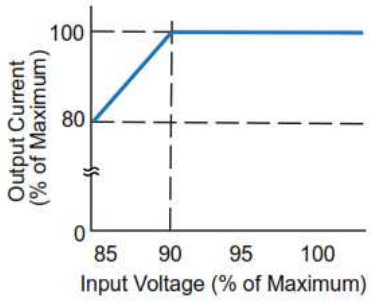
CWB050

- Be sure to use M3 mounting screw and fix mounting points by screws. Recommended screw fastening torque is 0.6N・m (6.3Kg・cm) maximum.
- Shaded area in the above drawings is allowable area of metal fastenings at soldering side. The specified dimension in the shaded area is essential to insulation purpose.
- Be sure to pay special attention not to vibrate, impact and touch the product when installing because surface mount components are used for the product. Be sure not install the product in the way to apply force to PCB.
- When connecting or disconnecting of input/output connectors, be sure not to touch peripheral components around connectors and apply stress to PCB.
- After applying electric test to the product, residual high voltage may be present in the product. Be sure not to touch any electrode, patter and component thoughtlessly to prevent danger of electric shock.
- Electronic components in the product may be damaged due to static . Be sure to handle the product with care in the conditions with adequate antistatic measures.

Mounting, Derating and Lifetime

Derating

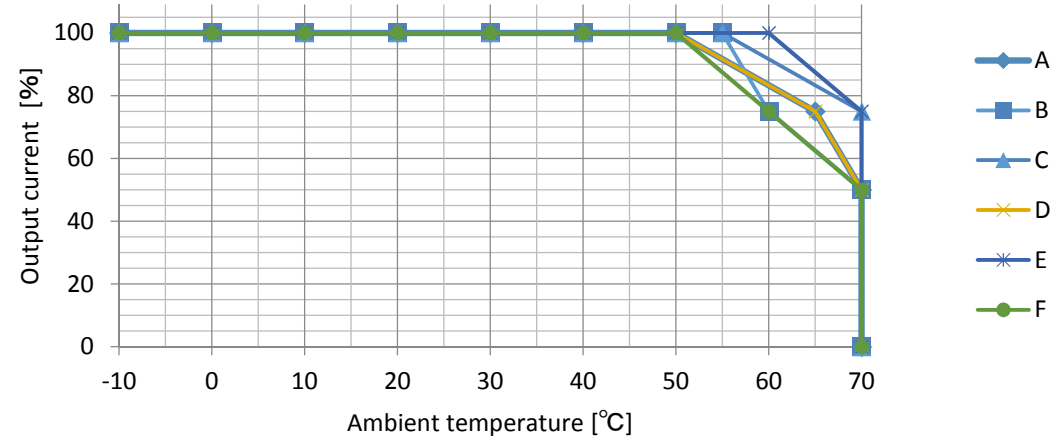
- Derating curve per input voltage



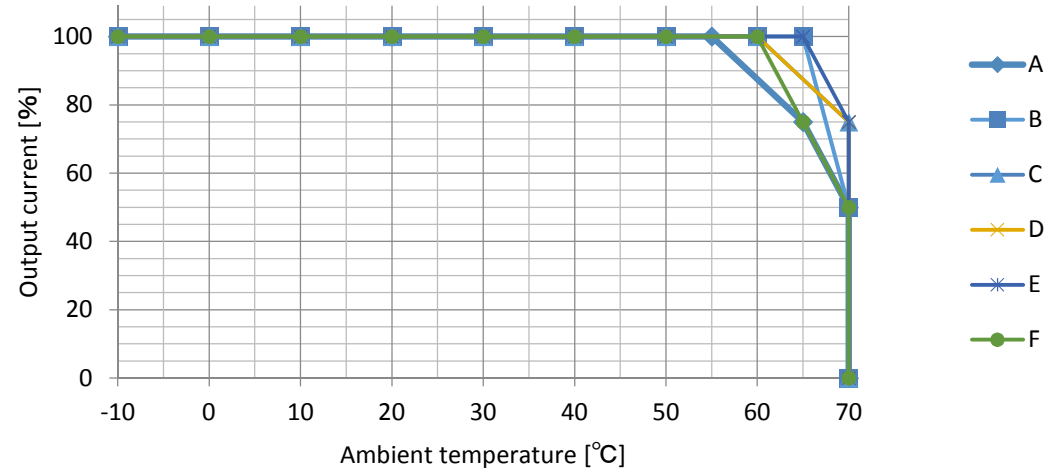
The derating characteristics of the products at various ambient temperatures are shown in the following pages.
Each mounting orientation results in a different airflow and a different derating characteristic.
The individual traces are labelled according to the recommended mounting orientations shown in the mounting section.

Derating curve (without chassis & cover)

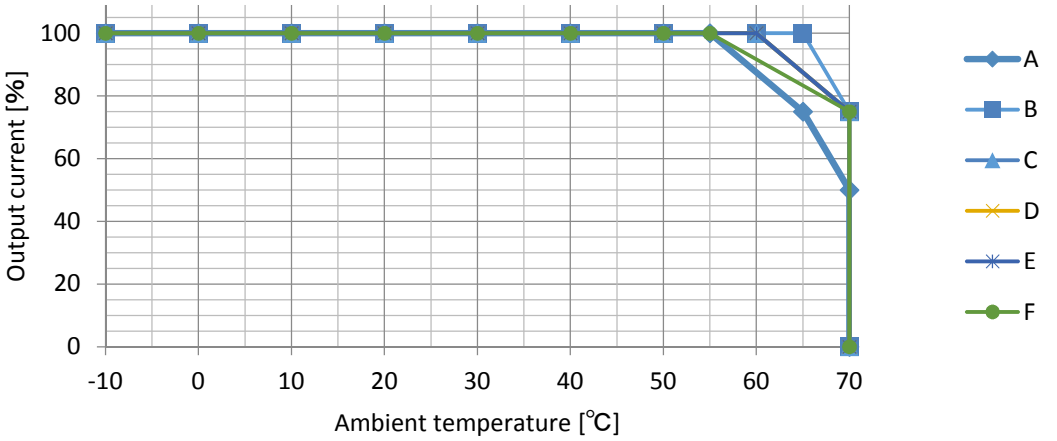
CWB015-05



CWB015-12

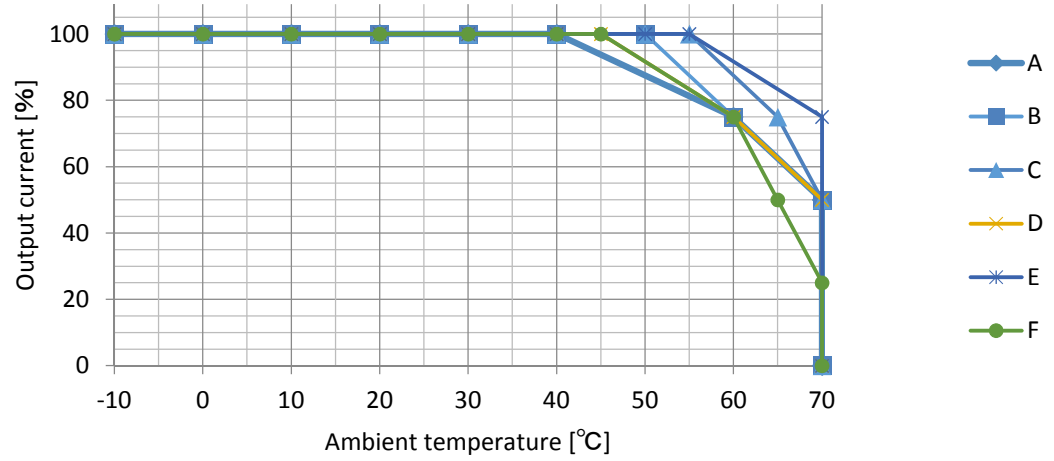


CWB015-15

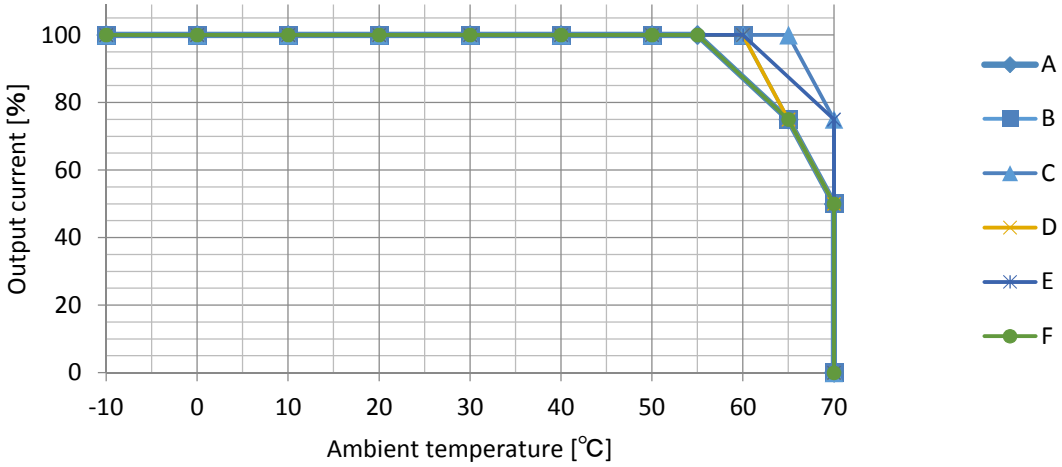


Derating curve (with chassis & cover)

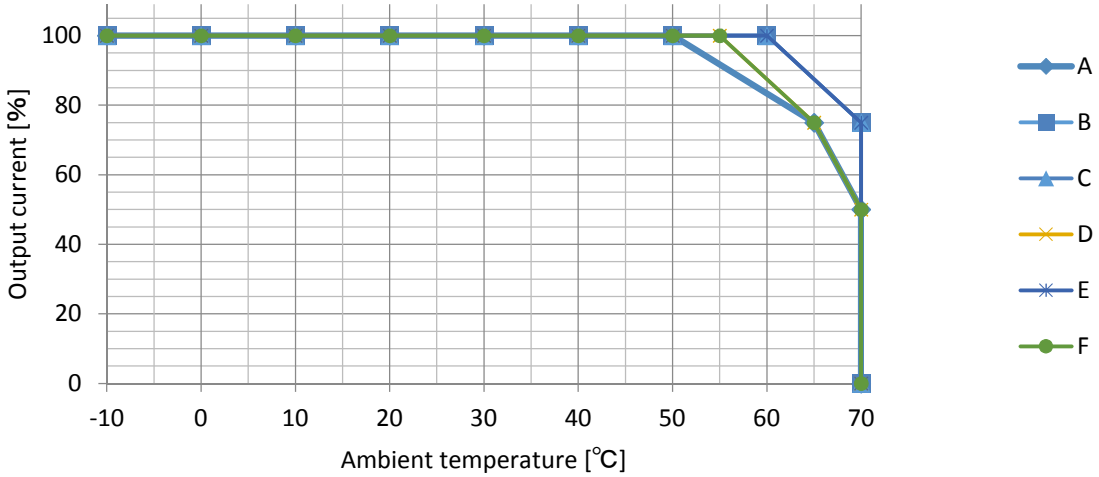
CWB015-05-LC



CWB015-12-LC

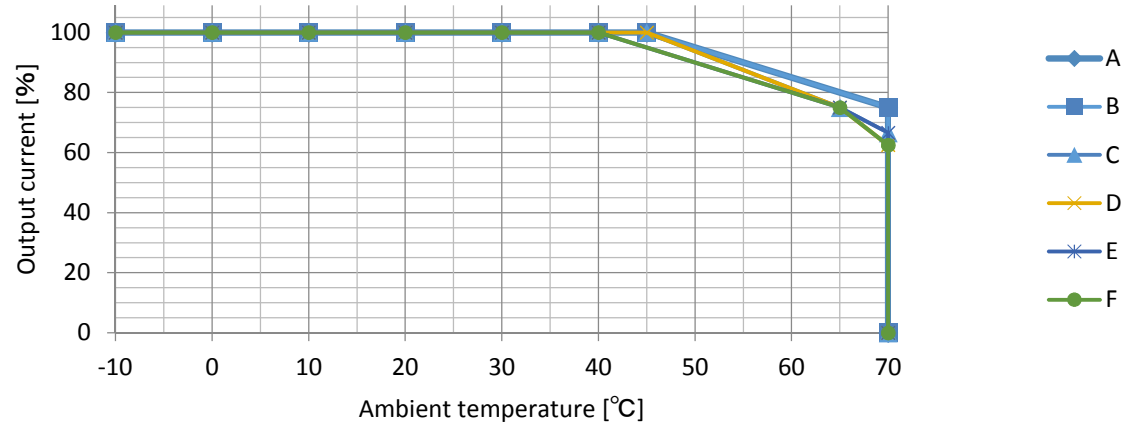


CWB015-15-LC

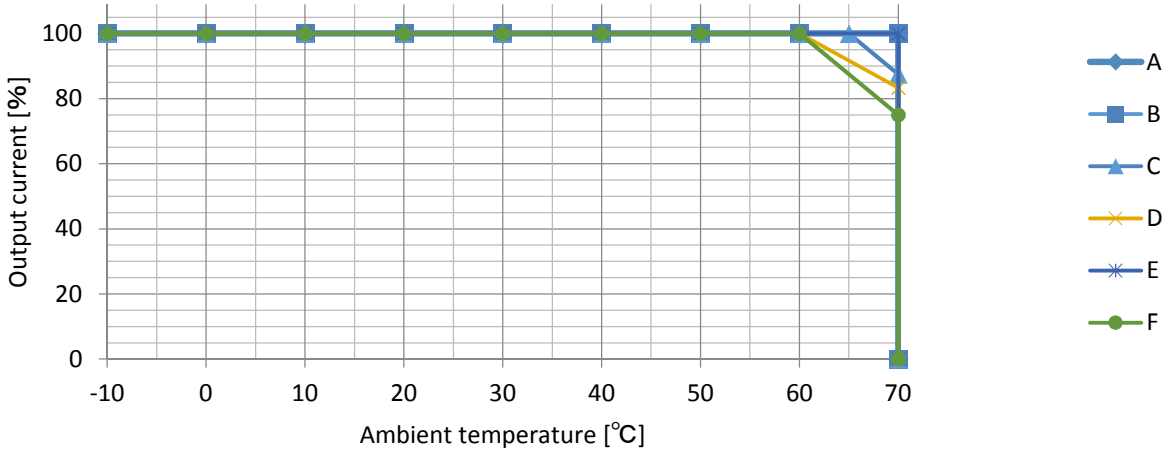


Derating curve (without chassis & cover)

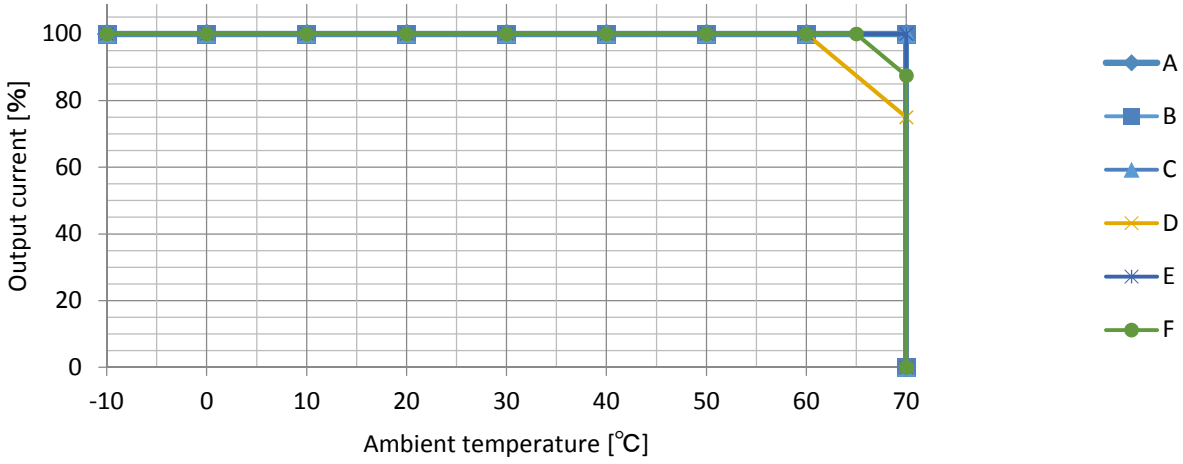
CWB030-05



CWB030-12

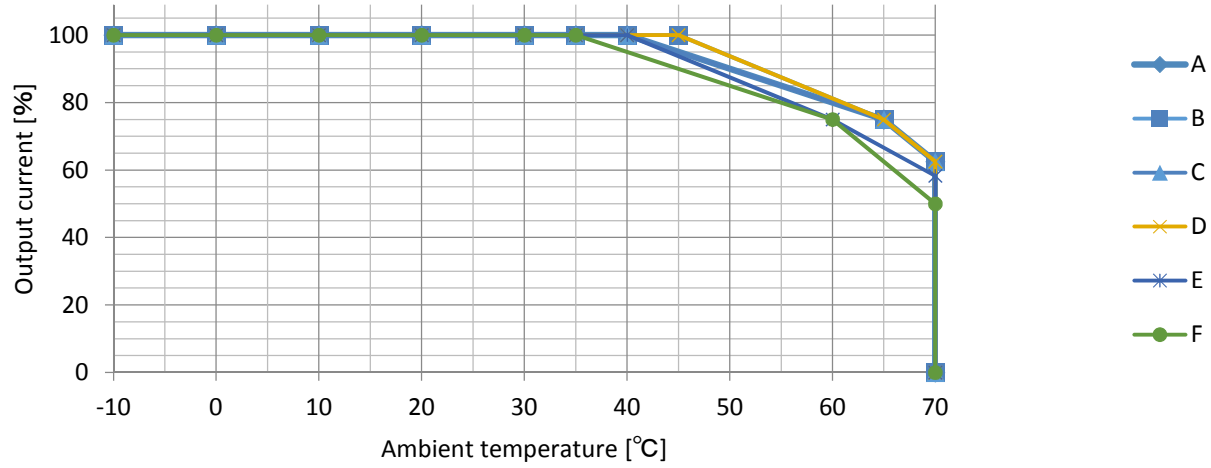


CWB030-15

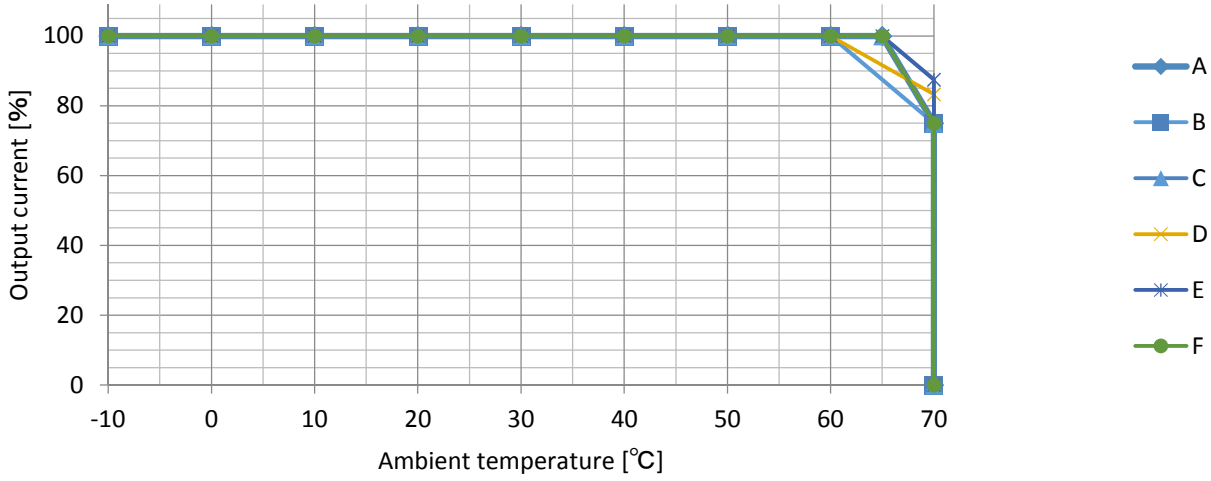


Derating curve (with chassis & cover)

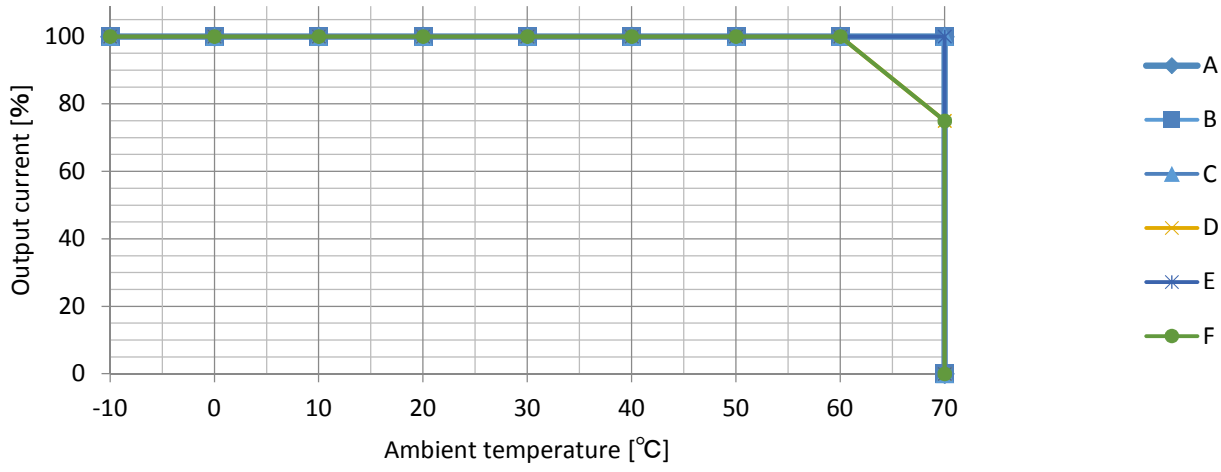
CWB030-05-LC



CWB030-12-LC

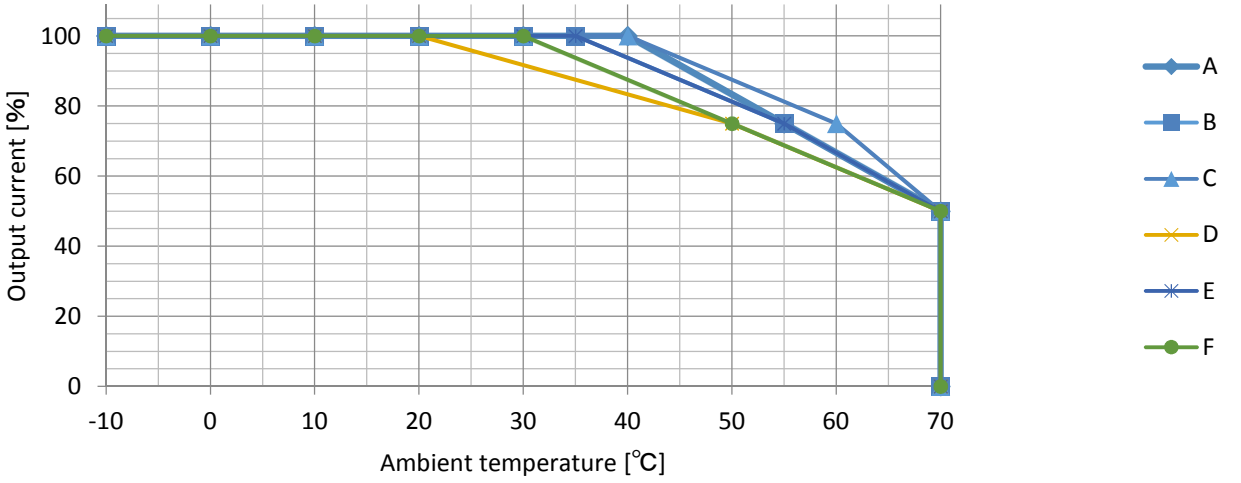


CWB030-15-LC

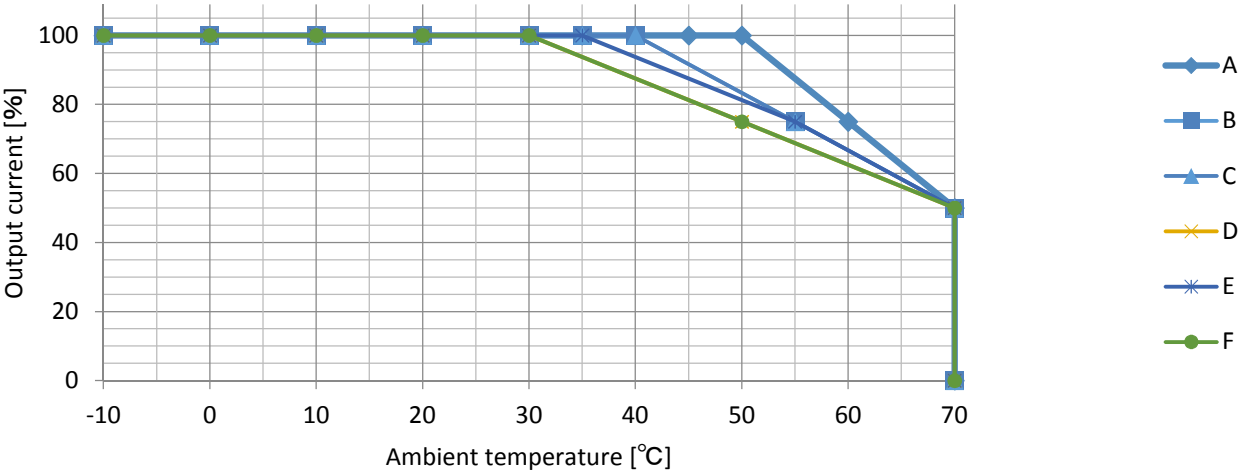


Derating curve (without chassis & cover)

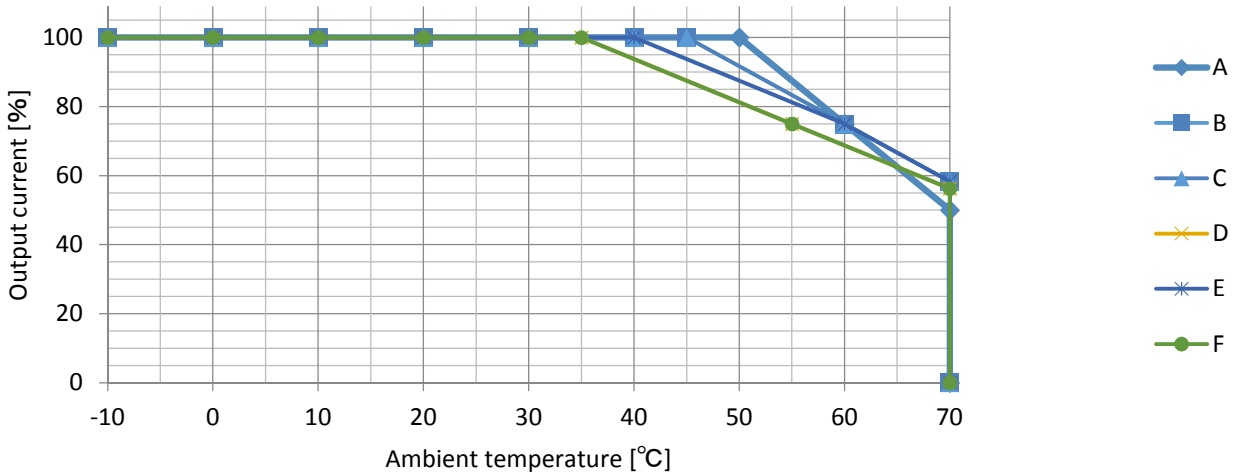
CWB050-05



CWB050-12

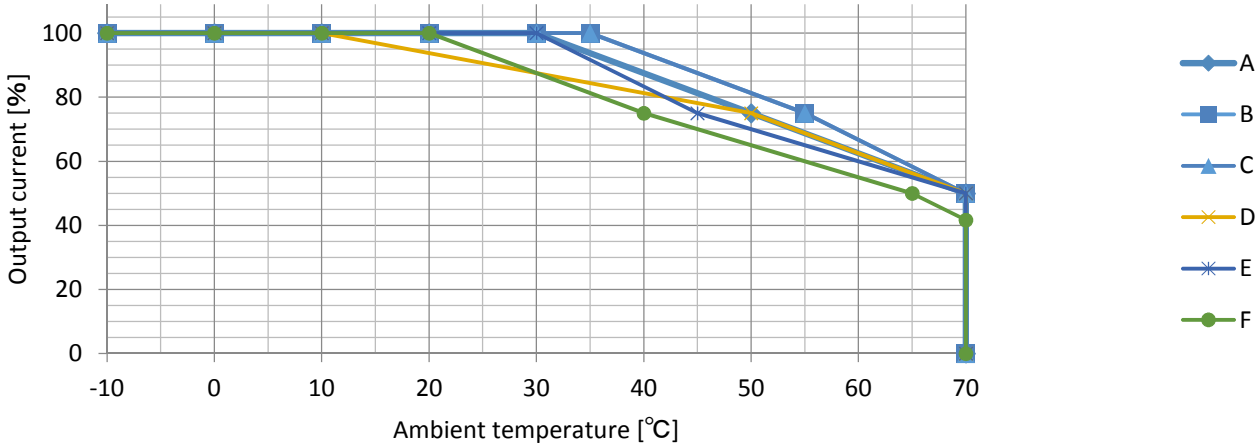


CWB050-15

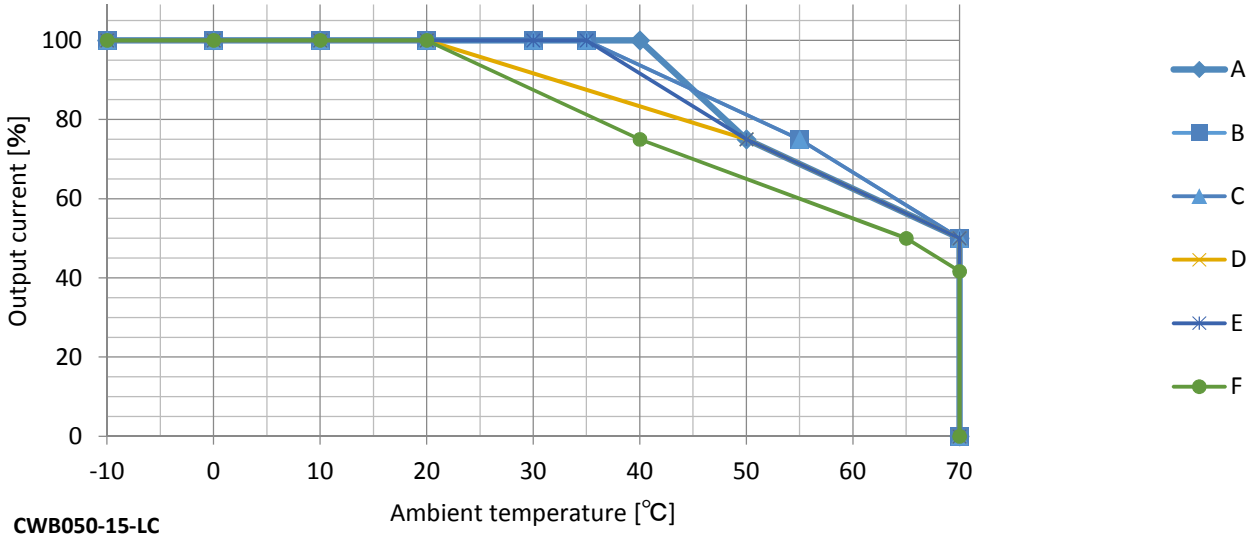


Derating curve (with chassis & cover)

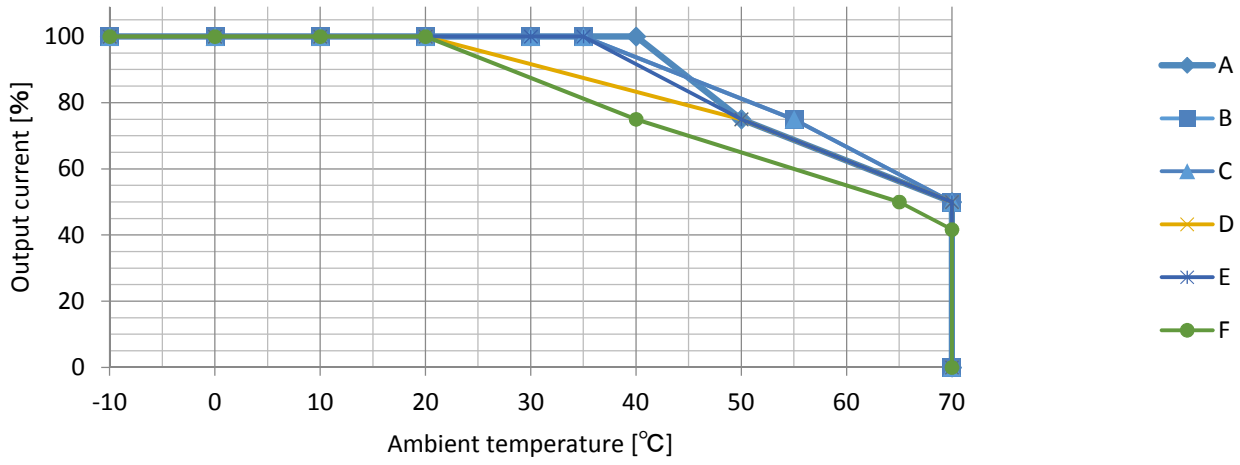
CWB050-05-LC



CWB050-12-LC



CWB050-15-LC



Mounting, Derating and Lifetime

Lifetime

- Lifetime expectancy

Mounting orientation	Model Name	Ambient Temperature	Load Factor	
			50%	100%
A	CWB015-**	Less than Ta=40℃	More than 10 years	More than 10 years
		Less than Ta=50℃	More than 10 years	8 years
	CWB030-**	Less than Ta=40℃	More than 10 years	More than 10 years
		Less than Ta=50℃	More than 10 years	More than 10 years
	CWB050-**	Less than Ta=40℃	More than 10 years	More than 10 years
		Less than Ta=50℃	More than 10 years	More than 10 years

Specification and Standards

Model CWB015-05/-12/-15

Parameter			CWB015-05	CWB015-12	CWB015-15
Input Conditions	Rated Input Voltage		100 to 240VAC		
	Allowable Input Voltage		85 to 265VAC		
	Input Current (typ)		0.4A(VIN=100V)/0.2A (VIN = 240V)		
	Rated Frequency		50 / 60 Hz		
	Allowable Frequency Range		47 to 440 Hz		
	Efficiency (typ)	100VAC	76%	80%	81%
		240VAC	78%	83%	84%
	Input Wattage at no load		0.2W(VIN=100V)/0.5W(VIN=200V)		
	Inrush Current (typ) 1,2 Io=100%		15A (VIN = 100V) / 30A (VIN = 200V)		
	Leakage Current (max) 10		0.15mA(VIN=100V)/0.3mA (VIN = 230V) 60Hz		
Output Conditions	Rated Output Voltage		5V	12V	15V
	Rated Output Current		3.0A	1.3A	1.0A
	Rated Output Power		15W		
	Constant Voltage Accuracy 4		±3%		
	Ripple Noise 3	-10 to 0℃	160mVP-P max	180mVP-P max	180mVP-P max
		0 to 70℃	120mVP-P max	150mVP-P max	150mVP-P max
	Output Holding Time (typ) 1		20ms (VIN=100V Io=100%)		
	Voltage variation range 9		4.5 to 5.50V	10.8 to 13.2V	13.5 to 16.5V
Additional Functions	Over current Protection		Detection above 105% of rated current (automatic recovery)		
	Over voltage Protection 5		Protection by simple over voltage detector		
Environmental Conditions	Operating Temperature Range 6		–10°C to 70°C (with derating)		
	Storage Temperature Range		–30°C to 75°C		
	Operating Humidity Range		20 to 90% RH (No condensation)		
	Storage Humidity Range		10 to 90% RH (No condensation)		
	Cooling Requirements		Natural air cooling		
	Vibration Resistance	Vibration Frequency	10 to 55 Hz		
		Sweep Time	3 minutes		
		Acceleration	19.6 m / s² (2 G)		
		Vibration Detection	x, y, z		
		Vibration Time	One hour in each of three directions		
	Shock Resistance		196.1 m / s² (20 G)		
	Installation Conditions		Derating may be required due to mounting orientation		

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Model CWB015-05/-12/-15

Parameter			Value
Insulation [7]	Insulation Withstand Voltage	Input-Output	3000 VAC one minute (leakage current 15 mA or less)
		Input-FG	2000 VAC one minute (leakage current 15 mA or less)
		Output-FG	500 VAC one minute (leakage current 15 mA or less)
	Insulation Resistance	Input-Output	More than 100 MΩ (measured with 500 VDC megger)
		Input-FG	
		Output-FG	
Others	Dimensions		50 (W)x 22(H) x 87.5(D) mm without chassis and cover
	Weight		55g max without chassis and cover
	Safety Standards		UL60950-1, C-UL(CSA60950-1), EN60950-1. Designed to meet EN50178 and Electrical Appliance and Material Safety law
	EMC		Designed to meet FCC Class B, VCCI Class B, CISPR22 Class B and EN55011 Class B/EN55022 Class B
	Options 8		With chassis and cover

1. Specified under rated input/output conditions at an ambient temperature of 25°C.
2. More current above noted values may flow at restart (ambient temperature of 25°C).
3. Ripple noise is measured with a 100 MHz oscilloscope using a 1:1 probe. Output conditions are measured at a point 15 cm from the output connector, with a 100µF electrolytic capacitor and a 0.1µF film capacitor connected to that point.
4. The constant voltage accuracy is measured with a static input variation, a static load variation, a time drift, and an ambient temperature variation.
5. Reset is performed by reapplying input voltage.
6. Output derating needs to be considered.
7. Insulation conditions are specified at normal temperature and humidity.
8. With chassis and cover, derating needs to be considered.
9. In the case where output voltage is variable, set a voltage such that Output Voltage Variation, Rated Output Current, and Rated Output Power are not exceeded.
10. At 60Hz Io=100% as per measuring methods of IEC60950-1 and Electrical Appliance and Material Safety law

Specification and Standards

Model CWB030-05/-12/-15

Parameter			CWB030-05	CWB030-12	CWB030-15
Input Conditions	Rated Input Voltage		100 to 240VAC		
	Allowable Input Voltage		85 to 265VAC		
	Input Current (typ)		0.6A(VIN=100V)/0.3A (VIN = 240V)		
	Rated Frequency		50 / 60 Hz		
	Allowable Frequency Range		47 to 440 Hz		
	Efficiency (typ)	100VAC	80%	84%	86%
		240VAC	82%	86%	88%
	Input Wattage at no load		0.2W(VIN=100V)/0.5W(VIN=200V)		
	Inrush Current (typ) 1,2 Io=100%		15A (VIN = 100V) / 30A (VIN = 200V)		
	Leakage Current (max) 10		0.15mA(VIN=100V)/0.3mA (VIN = 230V) 60Hz		
Output Conditions	Rated Output Voltage		5V	12V	15V
	Rated Output Current		6.0A	2.5A	2.0A
	Rated Output Power		30W		
	Constant Voltage Accuracy 4		±3%		
	Ripple Noise 3	-10 to 0℃	160mVP-P max	180mVP-P max	180mVP-P max
		0 to 70℃	120mVP-P max	150mVP-P max	150mVP-P max
	Output Holding Time (typ) 1		20ms (VIN=100V Io=100%)		
	Voltage variation range 9		4.5 to 5.50V	10.8 to 13.2V	13.5 to 16.5V
Additional Functions	Over current Protection		Detection above 105% of rated current (automatic recovery)		
	Over voltage Protection 5		5.75 to 7.00V	13.8 to 16.8V	17.25 to 21.00V
Environmental Conditions	Operating Temperature Range 6		–10°C to 70°C (with derating)		
	Storage Temperature Range		–30°C to 75°C		
	Operating Humidity Range		20 to 90% RH (No condensation)		
	Storage Humidity Range		10 to 90% RH (No condensation)		
	Cooling Requirements		Natural air cooling		
	Vibration Resistance	Vibration Frequency	10 to 55 Hz		
		Sweep Time	3 minutes		
		Acceleration	19.6 m / s² (2 G)		
		Vibration Detection	x, y, z		
		Vibration Time	One hour in each of three directions		
	Shock Resistance		196.1 m / s² (20 G)		
	Installation Conditions		Derating may be required due to mounting orientation		

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Model CWB030-05/-12/-15

Parameter			Value
Insulation [7]	Insulation Withstand Voltage	Input-Output	3000 VAC one minute (leakage current 15 mA or less)
		Input-FG	2000 VAC one minute (leakage current 15 mA or less)
		Output-FG	500 VAC one minute (leakage current 15 mA or less)
	Insulation Resistance	Input-Output	More than 100 MΩ (measured with 500 VDC megger)
		Input-FG	
		Output-FG	
Others	Dimensions		50 (W)x 26.5(H) x 105(D) mm without chassis and cover
	Weight		100g max without chassis and cover
	Safety Standards		UL60950-1, C-UL(CSA60950-1), EN60950-1. Designed to meet EN50178 and Electrical Appliance and Material Safety law
	EMC		Designed to meet FCC Class B, VCCI Class B, CISPR22 Class B and EN55011 Class B/EN55022 Class B
	Options 8		With chassis and cover

1. Specified under rated input/output conditions at an ambient temperature of 25°C.
2. More current above noted values may flow at restart (ambient temperature of 25°C).
3. Ripple noise is measured with a 100 MHz oscilloscope using a 1:1 probe. Output conditions are measured at a point 15 cm from the output connector, with a 100µF electrolytic capacitor and a 0.1µF film capacitor connected to that point.
4. The constant voltage accuracy is measured with a static input variation, a static load variation, a time drift, and an ambient temperature variation.
5. Reset is performed by reapplying input voltage.
6. Output derating needs to be considered.
7. Insulation conditions are specified at normal temperature and humidity.
8. With chassis and cover, derating needs to be considered.
9. In the case where output voltage is variable, set a voltage such that Output Voltage Variation, Rated Output Current, and Rated Output Power are not exceeded.
10. At 60Hz Io=100% as per measuring methods of IEC60950-1 and Electrical Appliance and Material Safety law

Specification and Standards

Model CWB050-05/-12/-15

Parameter			CWB050-05	CWB050-12	CWB050-15
Input Conditions	Rated Input Voltage		100 to 240VAC		
	Allowable Input Voltage		85 to 265VAC		
	Input Current (typ)		1.0A(VIN=100V)/0.5A (VIN = 240V)		
	Rated Frequency		50 / 60 Hz		
	Allowable Frequency Range		47 to 440 Hz		
	Efficiency (typ)	100VAC	81%	84%	85%
		240VAC	84%	86%	87%
	Input Wattage at no load		0.2W(VIN=100V)/0.5W(VIN=200V)		
	Inrush Current (typ) 1,2 Io=100%		15A (VIN = 100V) / 30A (VIN = 200V)		
	Leakage Current (max) 10		0.15mA(VIN=100V)/0.3mA (VIN = 230V) 60Hz		
Output Conditions	Rated Output Voltage		5V	12V	15V
	Rated Output Current		10.0A	4.3A	3.5A
	Rated Output Power		50W		
	Constant Voltage Accuracy 4		±3%		
	Ripple Noise 3	-10 to 0℃	160mVP-P max	180mVP-P max	180mVP-P max
		0 to 70℃	120mVP-P max	150mVP-P max	150mVP-P max
	Output Holding Time (typ) 1		20ms (VIN=100V Io=100%)		
	Voltage variation range 9		4.00 to 5.50V	10.8 to 13.2V	13.5 to 16.5V
Additional Functions	Over current Protection		Detection above 105% of rated current (automatic recovery)		
	Over voltage Protection 5		5.75 to 7.00V	13.8 to 16.8V	17.25 to 21.00V
Environmental Conditions	Operating Temperature Range 6		–10°C to 70°C (with derating)		
	Storage Temperature Range		–30°C to 75°C		
	Operating Humidity Range		20 to 90% RH (No condensation)		
	Storage Humidity Range		10 to 90% RH (No condensation)		
	Cooling Requirements		Natural air cooling		
	Vibration Resistance	Vibration Frequency	10 to 55 Hz		
		Sweep Time	3 minutes		
		Acceleration	19.6 m / s² (2 G)		
		Vibration Detection	x, y, z		
		Vibration Time	One hour in each of three directions		
	Shock Resistance		196.1 m / s² (20 G)		
	Installation Conditions		Derating may be required due to mounting orientation		

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Model CWB050-05/-12/-15

Parameter			Value
Insulation [7]	Insulation Withstand Voltage	Input-Output	3000 VAC one minute (leakage current 15 mA or less)
		Input-FG	2000 VAC one minute (leakage current 15 mA or less)
		Output-FG	500 VAC one minute (leakage current 15 mA or less)
	Insulation Resistance	Input-Output	More than 100 MΩ (measured with 500 VDC megger)
		Input-FG	
		Output-FG	
Others	Dimensions		50 (W)x 27.1(H) x 132(D) mm without chassis and cover
	Weight		140g max without chassis and cover
	Safety Standards		UL60950-1, C-UL(CSA60950-1), EN60950-1. Designed to meet EN50178 and Electrical Appliance and Material Safety law
	EMC		Designed to meet FCC Class B, VCCI Class B, CISPR22 Class B and EN55011 Class B/EN55022 Class B
	Options 8		With chassis and cover

1. Specified under rated input/output conditions at an ambient temperature of 25°C.
2. More current above noted values may flow at restart (ambient temperature of 25°C).
3. Ripple noise is measured with a 100 MHz oscilloscope using a 1:1 probe. Output conditions are measured at a point 15 cm from the output connector, with a 100µF electrolytic capacitor and a 0.1µF film capacitor connected to that point.
4. The constant voltage accuracy is measured with a static input variation, a static load variation, a time drift, and an ambient temperature variation.
5. Reset is performed by reapplying input voltage.
6. Output derating needs to be considered.
7. Insulation conditions are specified at normal temperature and humidity.
8. With chassis and cover, derating needs to be considered.
9. In the case where output voltage is variable, set a voltage such that Output Voltage Variation, Rated Output Current, and Rated Output Power are not exceeded.
10. At 60Hz Io=100% as per measuring methods of IEC60950-1 and Electrical Appliance and Material Safety law

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