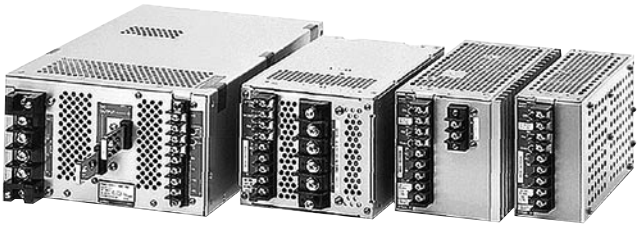
AC Input
Single Output, Long Life, UL/C-UL/TÜV Approved

Conformity to RoHS Directive

R Series RAW(100W to 1.5kW)

These products are meets the input harmonics current requirement and high-reliability power supplies, having the same shape as for the conventional ones. Dimensions are tailored for a compatible design with the RAX series that have given satisfactory results for years, therefor enabling a direct replacement between them. These power supplies comply with the safety standards with full countermeasures against EMI and answer a wide range of customers' needs with preparations of 35 models under five types of 100W to 1.5kW.



FEATURES

- Input harmonics current requirement IEC1000-3-2 meet.
- Universal input(AC.100 to 200V; Switching not required.), single output power supply.
- Alarm indicator and alarm signal output function(750W).
- Current balance function(1.5kW).
- Output voltage external variable function.
- Remote ON-OFF function.
- Remote sensing function.
- It is a product conforming to RoHS directive.

PART NUMBERS AND RATINGS

Output	100W Type		175W Type		350W Type		750W Type		1.5kW Type	
voltage(V)	Current(A)	Part No.	Current(A)	Part No.	Current(A)	Part No.	Current(A)	Part No.	Current(A)	Part No.
3	20	RAW03-20R	35	RAW03-35R	70	RAW03-70R	150	RAW03-150	300	RAW03-300
5	20	RAW05-20R	35	RAW05-35R	70	RAW05-70R	150	RAW05-150	300	RAW05-300
12	8.4	RAW12-8R4	14.6	RAW12-14R	30	RAW12-30R	62.5	RAW12-62R	125	RAW12-125
15	6.7	RAW15-6R7	11.7	RAW15-11R	24	RAW15-24R	50	RAW15-50R	100	RAW15-100
24	4.2	RAW24-4R2	7.3	RAW24-7R3	16	RAW24-16R	31.3	RAW24-31R	65	RAW24-65R
28	3.6	RAW28-3R6	6.3	RAW28-6R3	13	RAW28-13R	26.8	RAW28-26R	55	RAW28-55R
48	2.1	RAW48-2R1	3.7	RAW48-3R7	7.5	RAW48-7R5	15.7	RAW48-15R	32	RAW48-32R

- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

RAW100W Type

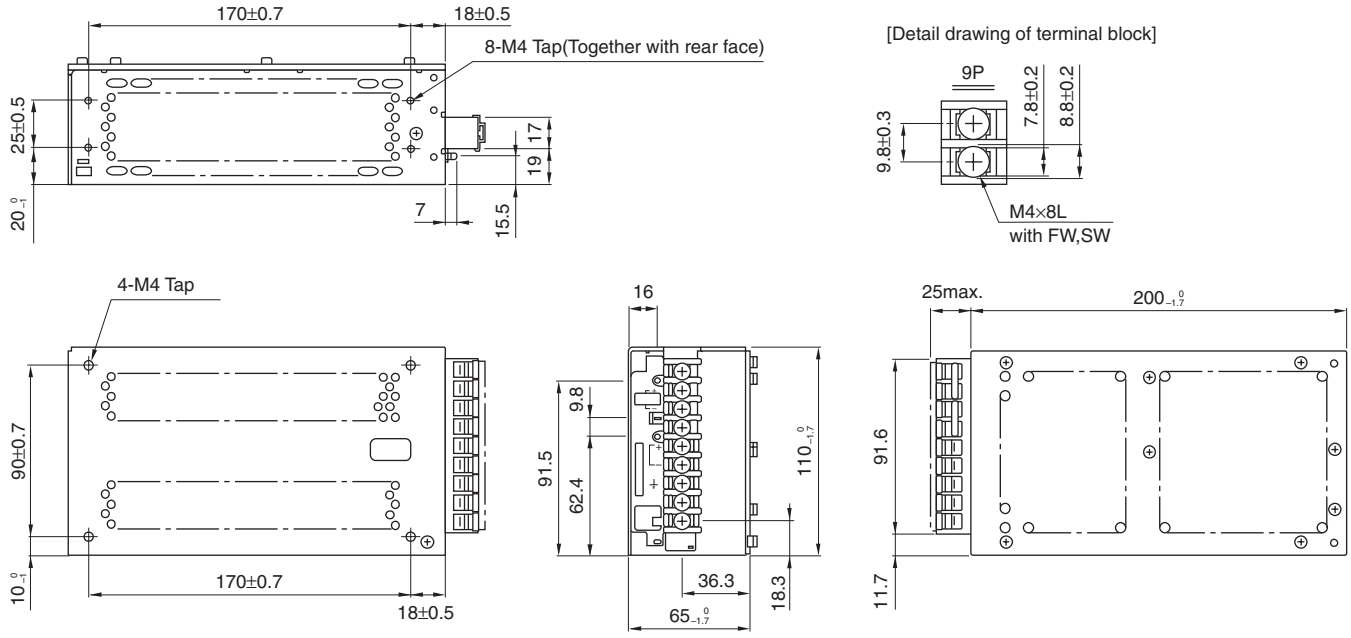
SPECIFICATIONS AND STANDARDS

Part No.			RAW03-20R	RAW05-20R	RAW12-8R4	RAW15-6R7	RAW24-4R2	RAW28-3R6	RAW48-2R1
Rated output voltage and current*			3V • 20A	5V • 20A	12V • 8.4A	15V • 6.7A	24V • 4.2A	28V • 3.6A	48V • 2.1A
Maximum output power		W	70	100	100.8	100.5	100.8	100.8	100.8
Input conditions									
Input voltage Eac		V	85 to 264[Rating: 100 to 240]						
Input frequency		Hz	47 to 66[Rating: 50 to 60](Single phase)						
Input current		A	1.9max./1.5max./0.62max.[AC.85/100/240V]						
		A	3V: 1.4max./1.2max./0.5max.[AC.85/100/240V]						
Fuse rating		A	3.15[Built-in]						
Surge current		A	17max./34max.[AC.120/240V, 1st surge current, reset after 30s minimum.]						
Leakage current		mA	0.38max./0.75max.[AC.120/240V]						
Power factor			0.99typ.						
Efficiency	%	100V	65typ.	74typ.	76typ.	77typ.	78typ.	79typ.	79typ.
	%	240V	67typ.	78typ.	81typ.	82typ.	83typ.	83typ.	83typ.
Output characteristics									
Output voltage Edc		V	3	5	12	15	24	28	48
Voltage variable range Edc		V	1.8 to 3.5	3.5 to 5.5	8.4 to 13.2	12 to 16.5	16.5 to 26.4	25.2 to 30.8	30.8 to 52.8
Maximum output current		A	20	20	8.4	6.7	4.2	3.6	2.1
Minimum output current		A	0	0	0	0	0	0	0
Overvoltage threshold Edc		V	3.8 to 4.6	6 to 6.9	13.7 to 15.7	17 to 19.5	27 to 30.5	31.4 to 34.5	55 to 59
Overcurrent threshold		A	22 to 24	22 to 24	9.2 to 10.1	7.4 to 8.1	4.7 to 5.1	4 to 4.3	2.3 to 2.5
Voltage stability	Source effect	%	0.6max.(0.1typ.)[Within the input voltage range]				Total effect ±2max.(±1typ.)		
	Load effect	%	1max.(0.6typ.)[0 to 100% load]						
	Temperature effect	%	2max.(0.4typ.)[Ambient temperature: –10 to +50°C]						
	Drift(Time effect)	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]						
	Recovery	%/ms	±4max./1max.[50 to 100% sudden load change, tr, tf ≧ 50μs]						
Ripple Ep-p		mV	50max.	50max.	80max.	80max.	100max.	100max.	150max.
Ripple noise Ep-p		mV	100max.	100max.	170max.	200max.	290max.	290max.	400max.
Start up time		ms	300max.(200typ.)/300max.(150typ.)[AC.100/240V]						
Hold up time		ms	20min.(45typ.)/20min.(55typ.)[AC.100/240V]						
Maximum load capacitor		μF	10000						
Auxiliary functions									
Indicator display			LED(Green) indicates when voltage output is ON.						
Overvoltage protection			Output voltage shut-down type, recovers upon reset(interval approx. 5s), set value fixed.						
Overcurrent protection			Rectangular type, automatic recovery.						
Remote ON-OFF			Yes(Floating)						
Remote sensing			Yes						
Current balance			No						
Output voltage external variable function			Yes						
Master slave operation			No						
Alarm signal			No						
Standards									
Safety standards			UL1950, CSA C22.2 No.950-95(C-UL), EN60950-1(TÜV) approved.						
Noise terminal voltage			FCC class B, VCCI class B, VDE0871 class B meet.						
Input harmonics current requirement			IEC1000-3-2 meet.						
Constructions									
External dimensions		mm	110×65×200[H×W×L]						
Weight		kg	1.3max.						
Mounting method			Can be attached to 3 sides.						
Case material			Frame and cover: Aluminum						

* Current rating(maximum output current) is determined for –10 to +50°C. Derating is required when used outside this temperature range.

RAW100W Type

SHAPES AND DIMENSIONS



Dimensions in mm
±1mm : without specified dimensions

• Do not insert M4 tap installation screws more than 7mm from surface of housing.

RAW175W Type

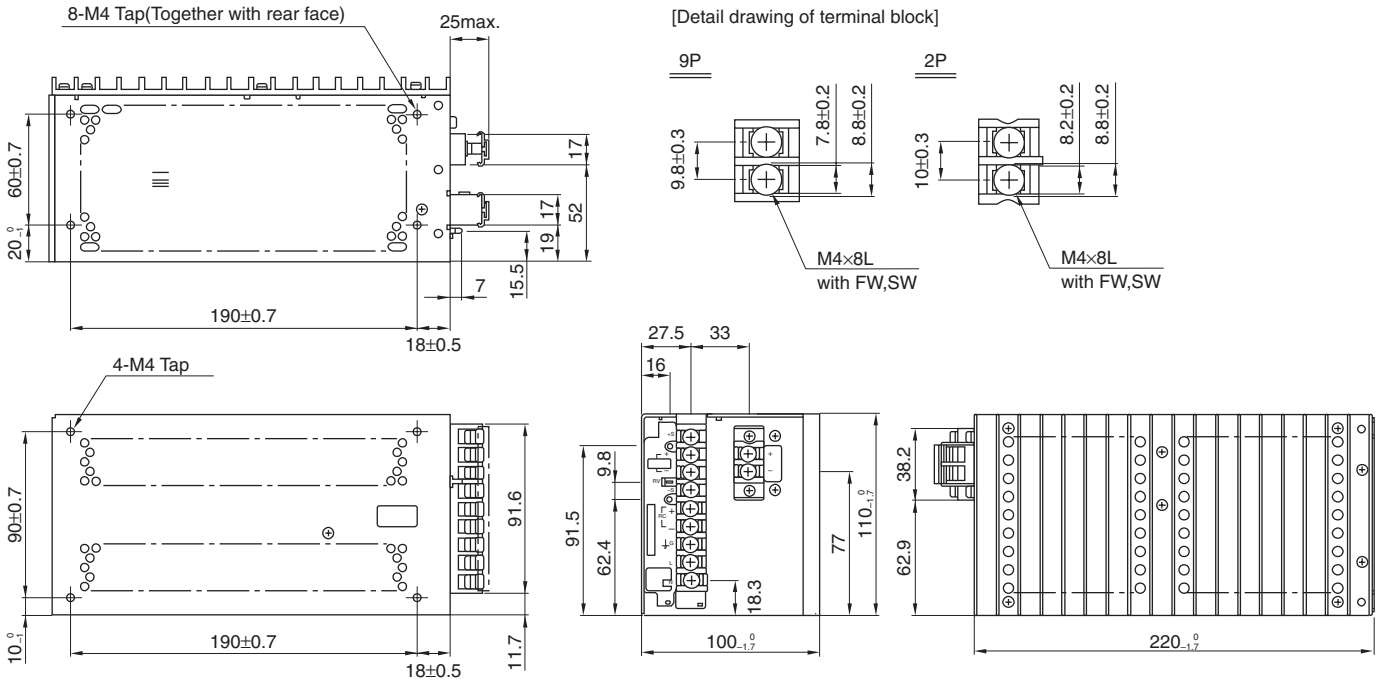
SPECIFICATIONS AND STANDARDS

Part No.			RAW03-35R	RAW05-35R	RAW12-14R	RAW15-11R	RAW24-7R3	RAW28-6R3	RAW48-3R7
Rated output voltage and current*			3V • 35A	5V • 35A	12V • 14.6A	15V • 11.7A	24V • 7.3A	28V • 6.3A	48V • 3.7A
Maximum output power		W	122.5	175	175.2	175.5	175.2	176.4	177.6
Input conditions									
Input voltage Eac		V	85 to 264[Rating: 100 to 240]						
Input frequency		Hz	47 to 66[Rating: 50 to 60](Single phase)						
Input current		A	3.3max./2.7max./1.15max.[AC.85/100/240V]						
		A	3V: 2.4max./2max./0.8max.[AC.85/100/240V]						
Fuse rating		A	5[Built-in]						
Surge current		A	17max./34max.[AC.120/240V, 1st surge current, reset after 30s minimum.]						
Leakage current		mA	0.38max./0.75max.[AC.120/240V]						
Power factor			0.99typ.						
Efficiency	%	100V	71typ.	76typ.	79typ.	80typ.	81typ.	81typ.	81typ.
	%	240V	74typ.	80typ.	83typ.	83typ.	86typ.	86typ.	86typ.
Output characteristics									
Output voltage Edc		V	3	5	12	15	24	28	48
Voltage variable range Edc		V	1.8 to 3.5	3.5 to 5.5	8.4 to 13.2	12 to 16.5	16.5 to 26.4	25.2 to 30.8	30.8 to 52.8
Maximum output current		A	35	35	14.6	11.7	7.3	6.3	3.7
Minimum output current		A	0	0	0	0	0	0	0
Overvoltage threshold Edc		V	3.8 to 4.6	6 to 6.9	13.7 to 15.7	17 to 19.5	27 to 30.5	31.4 to 34.5	55 to 59
Overcurrent threshold		A	36.8 to 38.5	36.8 to 38.5	15.3 to 16.1	12.3 to 12.9	8 to 8.3	6.9 to 7.2	4.3 to 4.5
Voltage stability	Source effect	%	0.6max.(0.1typ.)[Within the input voltage range]				Total effect ±2max.(±1typ.)		
	Load effect	%	1max.(0.6typ.)[0 to 100% load]						
	Temperature effect	%	2max.(0.4typ.)[Ambient temperature: –10 to +50°C]						
	Drift(Time effect)	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]						
	Recovery	%/ms	±4max./1max. [50 to 100% sudden load change, tr, tf ≧ 50μs]						
Ripple Ep-p		mV	50max.	50max.	80max.	80max.	100max.	100max.	150max.
Ripple noise Ep-p		mV	100max.	100max.	170max.	200max.	290max.	290max.	400max.
Start up time		ms	400max.(300typ.)/400max.(300typ.)[AC.100/240V]						
Hold up time		ms	20min.(45typ.)/20min.(55typ.)[AC.100/240V]						
Maximum load capacitor		μF	10000						
Auxiliary functions									
Indicator display			LED(Green) indicates when voltage output is ON.						
Overvoltage protection			Output voltage shut-down type, recovers upon reset(interval approx. 5s), set value fixed.						
Overcurrent protection			Rectangular type, automatic recovery.						
Remote ON-OFF			Yes(Floating)						
Remote sensing			Yes						
Current balance			No						
Output voltage external variable function			Yes						
Master slave operation			No						
Alarm signal			No						
Standards									
Safety standards			UL1950, CSA C22.2 No.950-95(C-UL), EN60950-1(TÜV) approved.						
Noise terminal voltage			FCC class B, VCCI class B, VDE0871 class B meet.						
Input harmonics current requirement			IEC1000-3-2 meet.						
Constructions									
External dimensions		mm	110×100×220[H×W×L]						
Weight		kg	1.9max.						
Mounting method			Can be attached to 3 sides.						
Case material			Frame and cover: Aluminum						

* Current rating(maximum output current) is determined for –10 to +50°C. Derating is required when used outside this temperature range.

RAW175W Type

SHAPES AND DIMENSIONS



Dimensions in mm
±1mm : without specified dimensions

• Do not insert M4 tap installation screws more than 7mm from surface of housing.

RAW350W Type

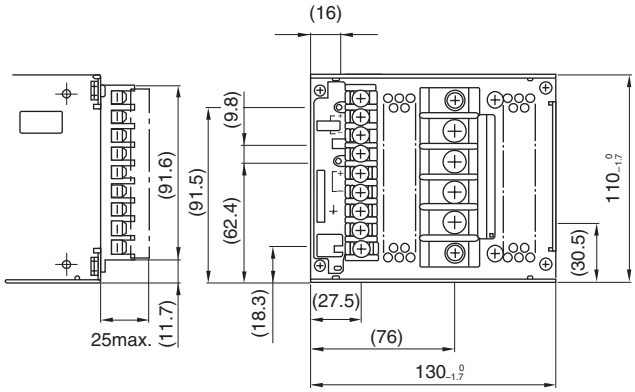
SPECIFICATIONS AND STANDARDS

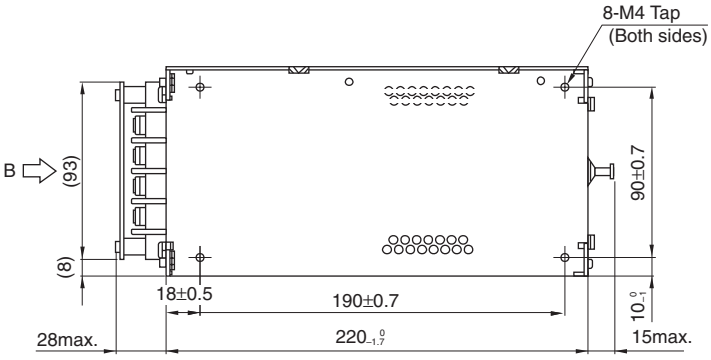
Part No.			RAW03-70R	RAW05-70R	RAW12-30R	RAW15-24R	RAW24-16R	RAW28-13R	RAW48-7R5
Rated output voltage and current※1			3V • 70A	5V • 70A	12V • 30A	15V • 24A	24V • 16A	28V • 13A	48V • 7.5A
Maximum output power		W	245	350	360	360	384	364	360
Input conditions									
Input voltage Eac		V	85 to 264[Rating: 100 to 240]						
Input frequency		Hz	47 to 66[Rating: 50 to 60](Single phase)						
Input current		A	6.6max./5.6max./2.3max.[AC.85/100/240V]						
		A	3V: 4.7max./4max./1.7max.[AC.85/200/240V]						
Fuse rating		A	10[Built-in]						
Surge current		A	20max./40max.[AC.120/240V, 1st surge current, reset after 30s minimum.]						
Leakage current		mA	0.5max./0.75max.[AC.120/240V]						
Power factor			0.99typ.						
Efficiency	%	100V	65typ.	72typ.	73typ.	75typ.	76typ.	77typ.	79typ.
	%	240V	68typ.	76typ.	77typ.	78typ.	79typ.	80typ.	82typ.
Output characteristics									
Output voltage Edc		V	3	5	12	15	24	28	48
Voltage variable range Edc		V	1.8 to 3.5	3.5 to 5.5	8.4 to 13.2	12 to 16.5	16.5 to 26.4	25.2 to 30.8	30.8 to 52.8
Maximum output current		A	70	70	30	24	16	13	7.5
Minimum output current		A	0	0	0	0	0	0	0
Overvoltage threshold Edc		V	3.8 to 4.6	6 to 6.9	13.7 to 15.7	17 to 19.5	27 to 30.5	31.4 to 34.5	55 to 59
Overcurrent threshold		A	73 to 84	73 to 84	31.5 to 36	25.2 to 28.8	16.8 to 19.2	13.6 to 15.6	7.8 to 9
Voltage stability	Source effect	%	0.1max.(0.05typ.)[Within the input voltage range]				Total effect ±1.5max.(±0.7typ.)		
	Load effect	%	0.3max.(0.1typ.)[0 to 100% load]						
	Temperature effect	%	1max.(0.5typ.)[Ambient temperature: –10 to +50°C]						
	Drift(Time effect)	%	0.5max.(0.2typ.)[25°C, input and output ratings, after input voltage ON for 30min to 8h]						
	Recovery	%/ms	±4max./1max.[50 to 100% sudden load change, tr, tf ≧ 50μs]						
Ripple Ep-p		mV	50max.	50max.	80max.	80max.	100max.	100max.	150max.
Ripple noise Ep-p		mV	100max.	100max.	170max.	200max.	290max.	290max.	400max.
Start up time		ms	900max.(500typ.)/900max.(300typ.)[AC.100/240V]						
Hold up time		ms	20min.(45typ.)/20max.(50typ.)[AC.100/240V]						
Maximum load capacitor		μF	10000						
Auxiliary functions									
Indicator display			LED(Green) indicates when voltage output is ON.						
Overvoltage protection※2			Output voltage shut-down type, set value fixed.						
Under voltage threshold※2			Output voltage shut-down type						
Overcurrent protection※2			Rectangular type(output limited when low voltage detected).						
Fan alarm※2			Output voltage shut-down type						
Overheat protection※2			Output voltage shut-down type						
Remote ON-OFF			Yes(Floating)						
Remote sensing			Yes						
Current balance			No						
Output voltage external variable function			Yes						
Master slave operation			No						
Alarm signal			No						
Standards									
Safety standards			UL1950, CSA C22.2 No.950-95(C-UL), EN60950-1(TÜV) approved.						
Noise terminal voltage			FCC class A, VCCI class A(500kHz to 30MHz) meet.						
Input harmonics current requirement			IEC1000-3-2 meet.						
Constructions									
External dimensions		mm	110×130×220[H×W×L]						
Weight		kg	2.5max.						
Mounting method			Can be attached to 4 sides.						
Case material			Frame and cover: Aluminum						

※1 Current rating(maximum output current) is determined for –10 to +50°C. Derating is required when used outside this temperature range.
※2 Recovers upon reset(interval approx. 40s).

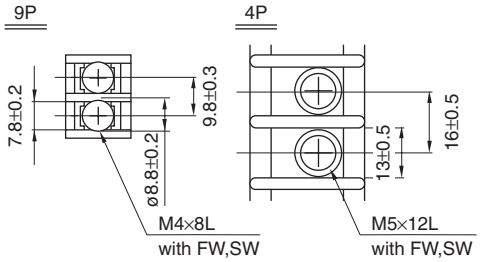
RAW350W Type

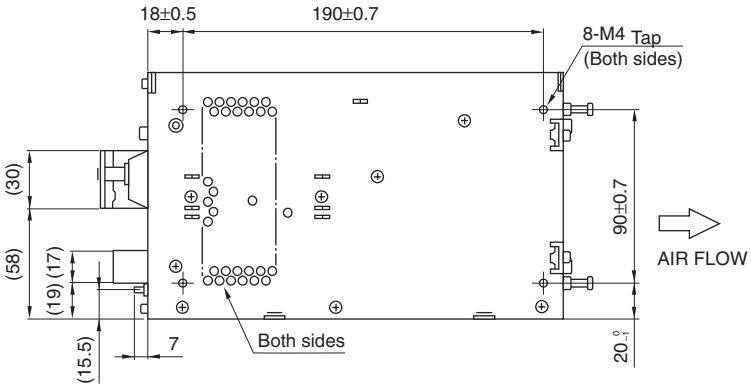
SHAPES AND DIMENSIONS



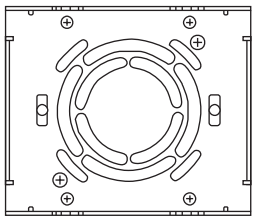


[Detail drawing of terminal block]





[Rear view]



Dimensions in mm
±1mm : without specified dimensions

• Do not insert M4 tap installation screws more than 7mm from surface of housing.

RAW1.5kW Type

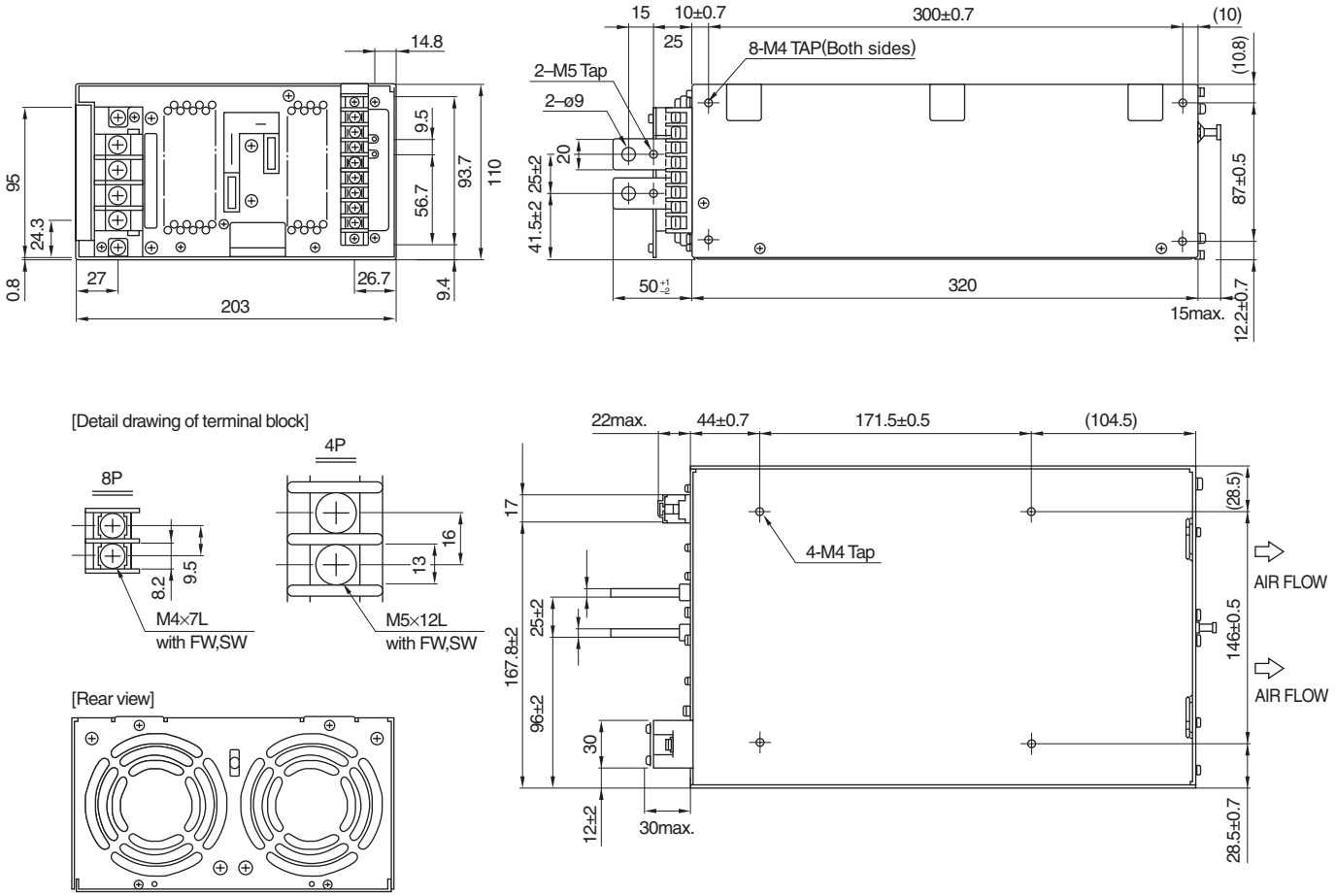
SPECIFICATIONS AND STANDARDS

Part No.			RAW03-300	RAW05-300	RAW12-125	RAW15-100	RAW24-65R	RAW28-55R	RAW48-32R
Rated output voltage and current*1			3V • 300A	5V • 300A	12V • 125A	15V • 100A	24V • 65A	28V • 55A	48V • 32A
Maximum output power		W	1050	1500	1500	1500	1560	1540	1536
Input conditions									
Input voltage Eac		V	85 to 264[Rating: 100 to 240]						
Input frequency		Hz	47 to 66[Rating: 50 to 60](Single phase)						
Input current		A	29max./22max./10max.[AC.85/100/240V]						
		A	3V: 18max./16max./7max.[AC.85/100/240V]						
Fuse rating		A	30[Built-in]						
Surge current		A	20max./40max.[AC.120/240V, 1st surge current, reset after 30s minimum.]						
Leakage current		mA	1max./2max.[AC.120/240V]						
Power factor			0.99typ.						
Efficiency	%	100V	70typ.	75typ.	76typ.	76typ.	78typ.	79typ.	80typ.
	%	240V	73typ.	80typ.	81typ.	81typ.	82typ.	83typ.	84typ.
Output characteristics									
Output voltage Edc		V	3	5	12	15	24	28	48
Voltage variable range Edc		V	1.8 to 3.5	3.5 to 5.5	8.4 to 13.2	12 to 16.5	16.5 to 26.4	25.2 to 30.8	30.8 to 52.8
Maximum output current		A	300	300	125	100	65	55	32
Minimum output current		A	0	0	0	0	0	0	0
Overvoltage threshold Edc		V	3.8 to 4.6	6 to 6.9	13.7 to 15.7	17 to 19.5	27 to 30.5	31.4 to 34.5	55 to 59
Overcurrent threshold		A	315 to 350	315 to 350	130 to 140	105 to 115	68 to 72	57.7 to 63.2	33.6 to 36.8
Voltage stability	Source effect	%	0.1max.(0.05typ.)[Within the input voltage range]				Total effect ±1.5max.(±0.7typ.)		
	Load effect	%	0.6max.(0.4typ.)[0 to 100% load]						
	Temperature effect	%	1max.(0.5typ.)[Ambient temperature: –10 to +50°C]						
	Drift(Time effect)	%	0.5max.(0.2typ.)[25°C, input and output ratings, after input voltage ON for 30min to 8h]						
	Recovery	%/ms	±4max./1typ.[50 to 100% sudden load change, tr, tf ≧ 50μs]						
Ripple Ep-p		mV	140max.	140max.	140max.	140max.	140max.	140max.	140max.
Ripple noise Ep-p		mV	200max.	200max.	250max.	250max.	300max.	300max.	400max.
Start up time		ms	900max.(600typ.)/900max.(300typ.)[AC.100/240V]						
Hold up time		ms	20min.(40typ.)/20min.(50typ.)[AC.100/240V]						
Maximum load capacitor		μF	10000						
Auxiliary functions									
Indicator display			LED(Green) illuminates when voltage output is ON.						
Overvoltage protection*2			Output voltage shut-down type, set value fixed.						
Under voltage threshold*2			Output voltage shut-down type, FAN alarm.						
Overcurrent protection*2			Rectangular type(output limited when low voltage detected).						
Fan alarm*2			Output voltage shut-down type						
Overheat protection*2			Output voltage shut-down type						
Remote ON-OFF			Yes(Floating)						
Remote sensing			Yes						
Current balance			Yes						
Output voltage external variable function			Yes						
Master slave operation			No						
Alarm signal			No						
Standards									
Safety standards			UL1950, CSA C22.2 No.950-95(C-UL), EN60950-1(TÜV) approved.						
Noise terminal voltage			FCC class A, VCCI class A(500kHz to 30MHz) meet.						
Input harmonics current requirement			IEC1000-3-2 meet.						
Constructions									
External dimensions		mm	110×203×320[H×W×L]						
Weight		kg	7.5max.						
Mounting method			Can be attached to 3 sides.						
Case material			Frame: Iron/Cover: Aluminum						

*1 Current rating(maximum output current) is determined for –10 to +50°C. Derating is required when used outside this temperature range.
*2 Recovers upon reset(interval approx. 40s).

RAW1.5kW Type

SHAPES AND DIMENSIONS



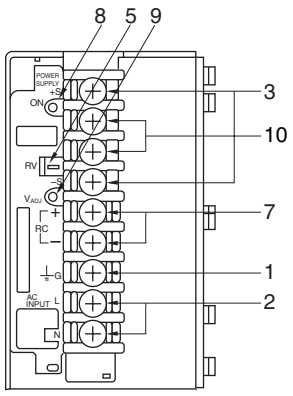
Dimensions in mm
±1mm : without specified dimensions

• Do not insert M4 tap installation screws more than 7mm from surface of housing.

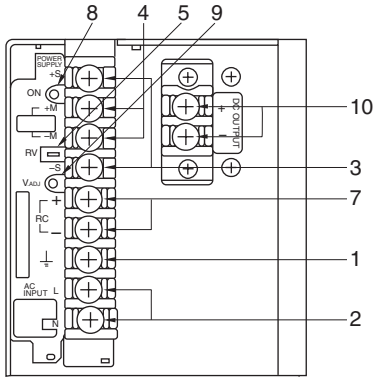
Characteristics, Functions, and Applications

TERMINAL DESIGNATIONS AND FUNCTIONS

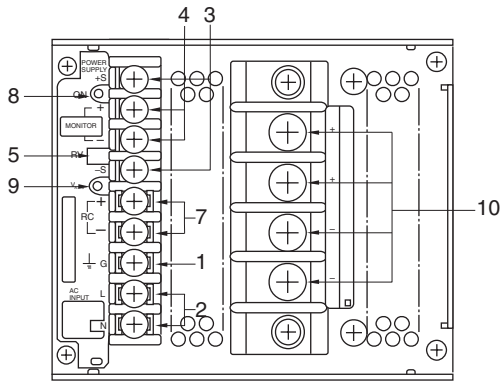
100W TYPE



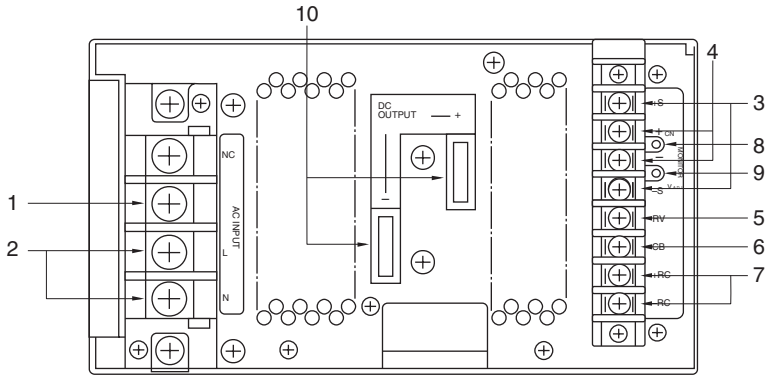
175W TYPE



350W TYPE



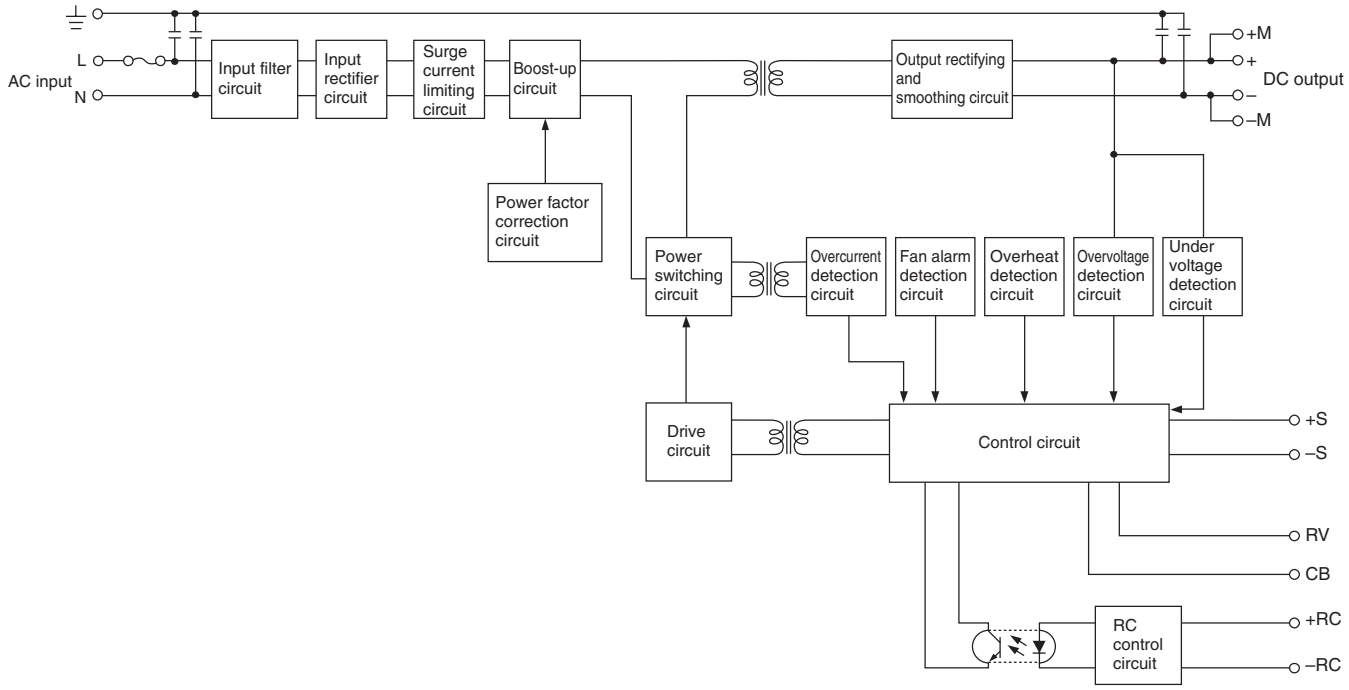
1.5kW TYPE



Terminal No.	Designations and functions	
1	Frame ground terminal(G)	Connect to earth ground. This is connected to the case.
2	AC input terminals(L, N)	Connect to AC.100 to 120V or AC.200 to 240V input line.
3	Remote sensing terminals(+S, –S)	These terminals are used to compensate voltage loss from the output terminal to a load. Normally they are shorted with a metal bar.
4	DC output monitor terminals(+M, –M)	This terminal is used to monitor DC current output. Load lines should not be connected to these monitor terminals. These monitor terminals should be jumpered when the remote monitoring feature is not in use.
5	Output voltage adjustment terminal(RV)	This terminal is used for controlling output voltage from outside.
6	Current balance terminal(CB)	This terminal is used when several power supplies are connected in parallel to connect the respective CB and –S terminals in parallel.
7	Remote ON-OFF terminals(+RC, –RC)	Output is turned ON-OFF by disconnecting-connecting the RC terminals(output ON when open). RC terminals are floating.
8	Operation indicator LED(Green)	This Green LED becomes indicated when voltage is output.
9	Output voltage adjustment trim(V.ADJ)	Adjusts output voltage.
10	DC output terminals(+, –)	Connect to load. • The 175W and 350W Types are provided with four output terminals. For the DC output terminals, current should be less than 20A per pin for the 175W Type and less than 40A per pin for the 350W Type.

Characteristics, Functions, and Applications

RAW100W, 175W, 350W, 1.5kW TYPES
BLOCK DIAGRAM



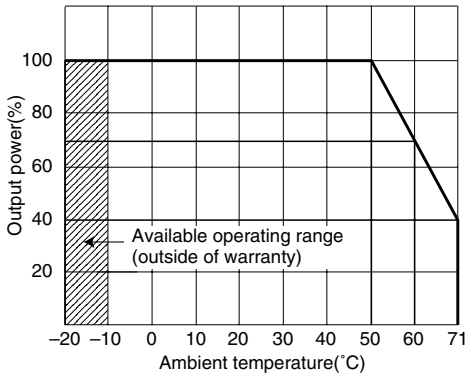
• The 350W Type has no CB function.
• The 100W and 175W Types have no CB function, fan alarm detection circuit, under voltage detection circuit, nor overheat detection circuit.

COMMON SPECIFICATIONS

Type		100W, 175W	350W, 1.5kW
Temperature and humidity			
Temperature range	Operating(°C)	–10 to +71[Derating is necessary when operating environment temperature exceed 50°C.]	–10 to +71[Derating is necessary when operating environment temperature exceed 50°C.]
	Storage(°C)	–30 to +75	–30 to +75
Humidity range	Operating(%)RH	10 to 95[Maximum wet-bulb temperature: 35°C, without dewing]	10 to 95[Maximum wet-bulb temperature: 35°C, without dewing]
	Storage(%)RH		
Vibration and shock			
Vibration		5 to 13Hz: All amplitude 10mm [3 directions, each 1h]	5 to 10Hz: All amplitude 10mm [3 directions, each 1h]
		13 to 200Hz: Acceleration 29.4m/s^2(3G) [3 directions, each 1h]	10 to 200Hz: Acceleration 19.6m/s^2(2G) [3 directions, each 1h]
Shock	Acceleration	588m/s^2(60G)[3 directions, each 3 times]	294m/s^2(30G)[3 directions, each 3 times]
	Pulse duration	11±5ms	11±5ms
Withstand voltage and insulation resistance			
Withstand voltage	Input terminal to case(G)	Eac: 2.5kV, 1min[Normal temperature, normal humidity, cutout current 20mA]	Eac: 2.5kV, 1min[Normal temperature, normal humidity, cutout current 20mA]
	Input terminal to output terminal		
	Output terminal to case(G)	Eac: 500V, 1min [Normal temperature, normal humidity cutout]	Eac: 500V, 1min [Normal temperature, normal humidity cutout]
Insulation resistance	Input terminal to case(G)	Edc: 500V, 100MΩ min. [Normal temperature, normal humidity]	Edc: 500V, 100MΩ min. [Normal temperature, normal humidity]
	Input terminal to output terminal		
	Output terminal to case(G)		

Characteristics, Functions, and Applications

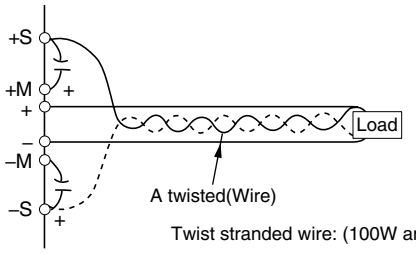
OUTPUT POWER-AMBIENT TEMPERATURE (DERATINGS)



REMOTE SENSING

Remote Sensing compensates to provide stability at the load terminal when voltage drop in the line between the power supply and the load causes instability. Remote sensing is possible if the voltage drop per wire between the output and load terminals is 0.15V max. for 3V models, 0.25V max. for 5V models and 0.4V max. for 12 to 48V models.

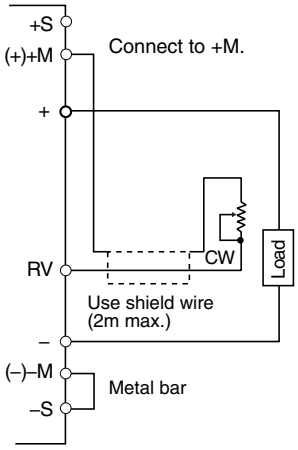
If the overvoltage protection operations too easily, install an external electrolytic capacitor, rated 470µF min., between +, +S and –, –S for 100W and 175W types or between +M, +S and –M, –S for 350W and 1.5kW types.



Twist stranded wire: (100W and 175W types)

OUTPUT VOLTAGE EXTERNAL VARIABLE FUNCTION (RV)

The output voltage settings can be adjusted by attaching an external trimmer to the RV terminal. In this case, make the following wiring (Note that, however, a rise time has a delay). When using this function, care must be taken to make sure that the wires are not disconnected or miswired.



(1) Remove a short piece between the +S and +M (+S, +) terminals.
(2) Rotate V.ADJ full counterclockwise.
(3) Connect a 5kΩ trimmer at the load end between the +M and RV terminals.
The symbols in parentheses are intended for the 100W and 175W Types.

CURRENT BALANCE (CB TERMINAL)

This terminal has a monitoring function to control and equalize the output current of power supplies connected in parallel by mutually connecting the respective CB terminals and the –S terminals of each power supply. Voltage almost proportional to the output current can be obtained between the CB and –S terminals.

(1)Conditions for current balance

The variation in output voltage between the respective power supplies cannot exceed 5%

(Highest voltage–lowest voltage) ÷ rated voltage=5% max.

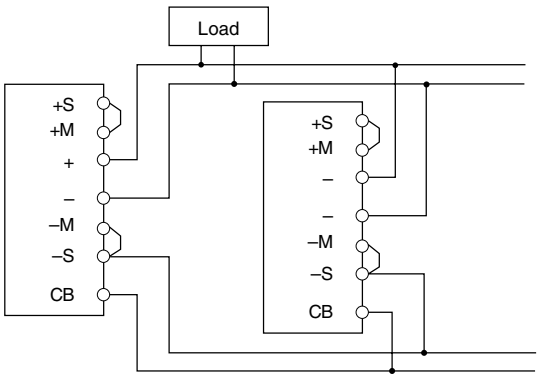
The output current is 20 to 90% of the total output rated current.

(2) Uniform performance (for two power supplies)

The variation in output current between the respective power supplies does not exceed 10%

(Highest current–lowest current) ÷ (rated voltage×the number of power supplies in parallel)=10% max.

(3) CB terminal connection diagram



- Equalize the impedance of the load wires coming from each power supply. Use a stranded wire or a shielded wire for the wiring from CB and –S (shielded wire for –S).

Characteristics, Functions, and Applications

REMOTE ON-OFF

Power supply output voltage can be turned ON/OFF externally at the Remote ON-OFF terminals(+RC, –RC) by activating one of the following signals:

Output voltage is turned on when the level is high between the +RC and –RC terminals(open or external voltage application of 2.4 to 24V; incoming current 1mA max.)

Output voltage is turned off when the level is low between the +RC and –RC terminals(short or terminal voltage of 0 to 0.4V; outgoing current 1.6mA max.)(also stops fan on 350W Type).

Keep the +RC terminal open when not in use, because it is internally pulled up.

±RC terminals are insulated from AC input terminals and the DC output terminals.

Insulation between the ±RC terminals and the output conforms to the common specifications (Output to case). Withstand voltage between AC input terminals and ±RC terminals conforms to the common specifications (Input to case).

POWER SUPPLY PROTECTION

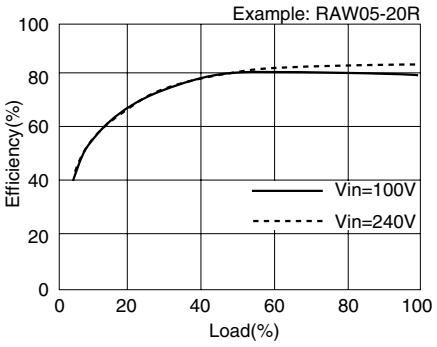
In readiness for abnormal occurrences, the power supplies are equipped with fault detection circuit. Operation upon detection is as follows:

Protective function	Operation
OV Output overvoltage protection	Output is shut down upon detection of an abnormal output voltage rise (See the specifications and standard list for information of the detection point). The output recovers after removing the cause upon input shutdown and a reset after a 40s minimum interval.
UV Output under-voltage protection	Output is shut down when the output voltage drops to 60% or lower of the rated output voltage (3V: approx. 45%) and the condition continues for approx. 20s on over current protection and others. The output recovers after removing the cause upon input shutdown and a reset after a 40s minimum interval.
FAN Fan alarm	Output is shut down when the fan speed drops or if the fan movement is restricted. The output recovers after removing the cause upon input shutdown and a reset after a 40s minimum interval.
Overheat protection	Output is shut down when the internal temperature of the power supply rises abnormally. The output recovers in the same manner as for the above OV. The output, however, recovers only after the internal temperature drops.

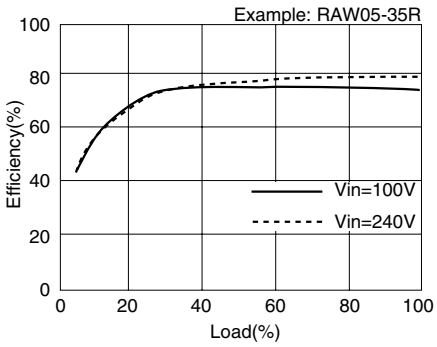
- The 100W and 175W Types have OV (overvoltage protection) only. The operation is the same as for the above list excepting that the recovery interval is approx. 5s.

EFFICIENCY

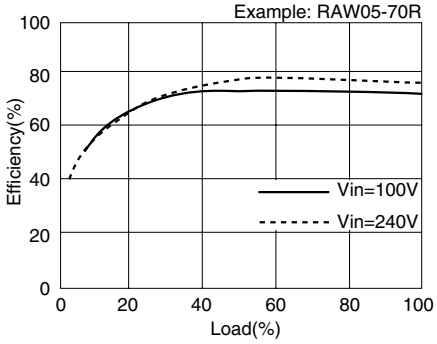
100W TYPE



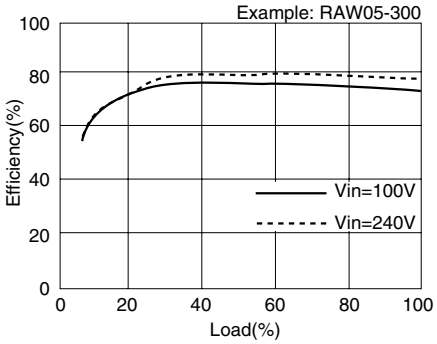
175W TYPE



350W TYPE



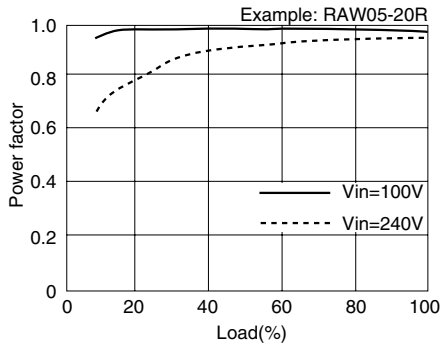
1.5kW TYPE



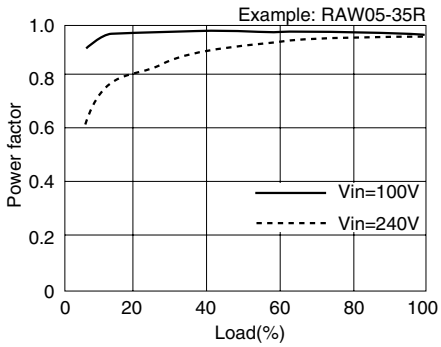
Characteristics, Functions, and Applications

POWER FACTOR

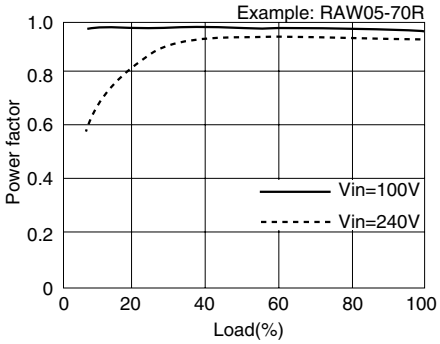
100W TYPE



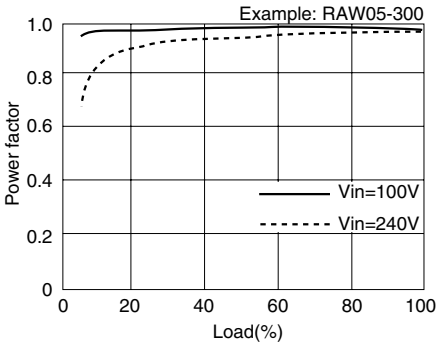
175W TYPE



350W TYPE

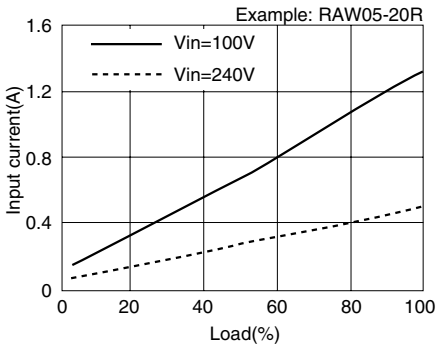


1.5kW TYPE

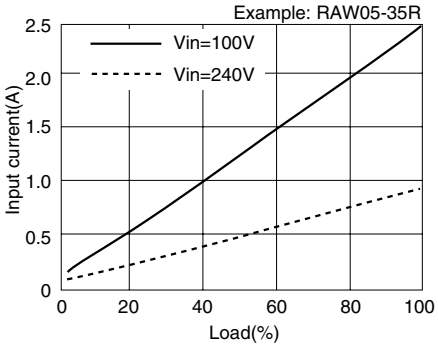


INPUT CURRENT

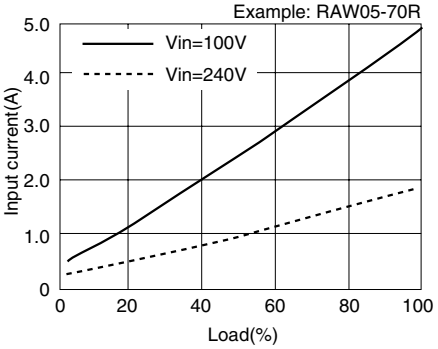
100W TYPE



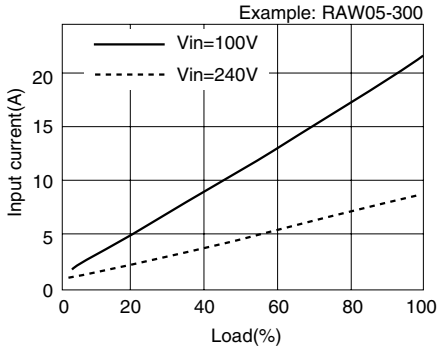
175W TYPE



350W TYPE



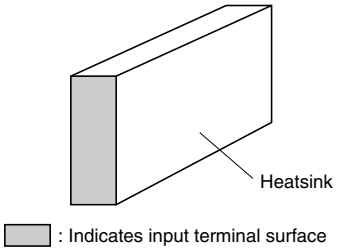
1.5kW TYPE



Characteristics, Functions, and Applications

INSTALLATIONS

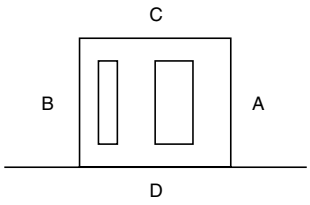
100W AND 175W TYPES



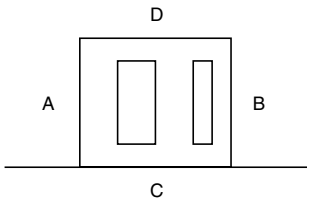
Maintain a 10mm min. distance between each power supply surface and surrounding equipment, etc. and install in such a way as to cause heat convection to occur.

350W TYPE

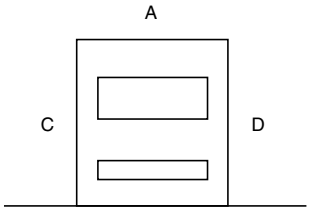
(1)



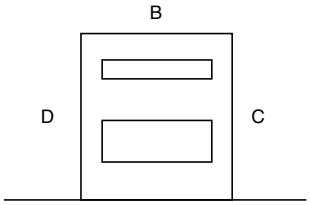
(2)



(3)



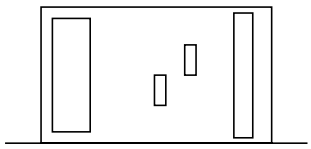
(4)



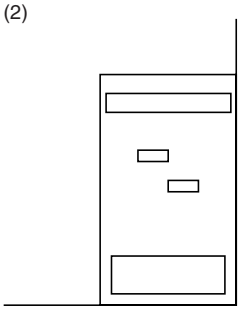
- Maintain a 20mm min. distance between the ventilation holes, fan surface and surrounding equipment, etc.
- When a 10mm min. distance cannot be maintained between surface A and surrounding equipment, etc. operate 3V and 5V output models at 60A max.
- Do not forget to maintain a 10mm min. distance between either surface C or D and surrounding equipment, etc.
- Install so as to provide heat-outside air exchange.

1.5kW TYPE

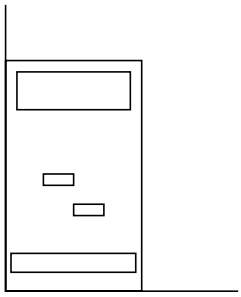
(1)



(2)



(3)



Maintain a 20mm min. distance between the ventilation holes, fan surface and surrounding equipment, etc. and install so as to provide heat-outside air exchange.

FAN REPLACEMENT

Contact TDK for fan replacement. Consult with us if customer fan replacement is inevitable. In this case, however, the responsibility for quality assurance on the replacement lies on the customer.

RAW750W Type

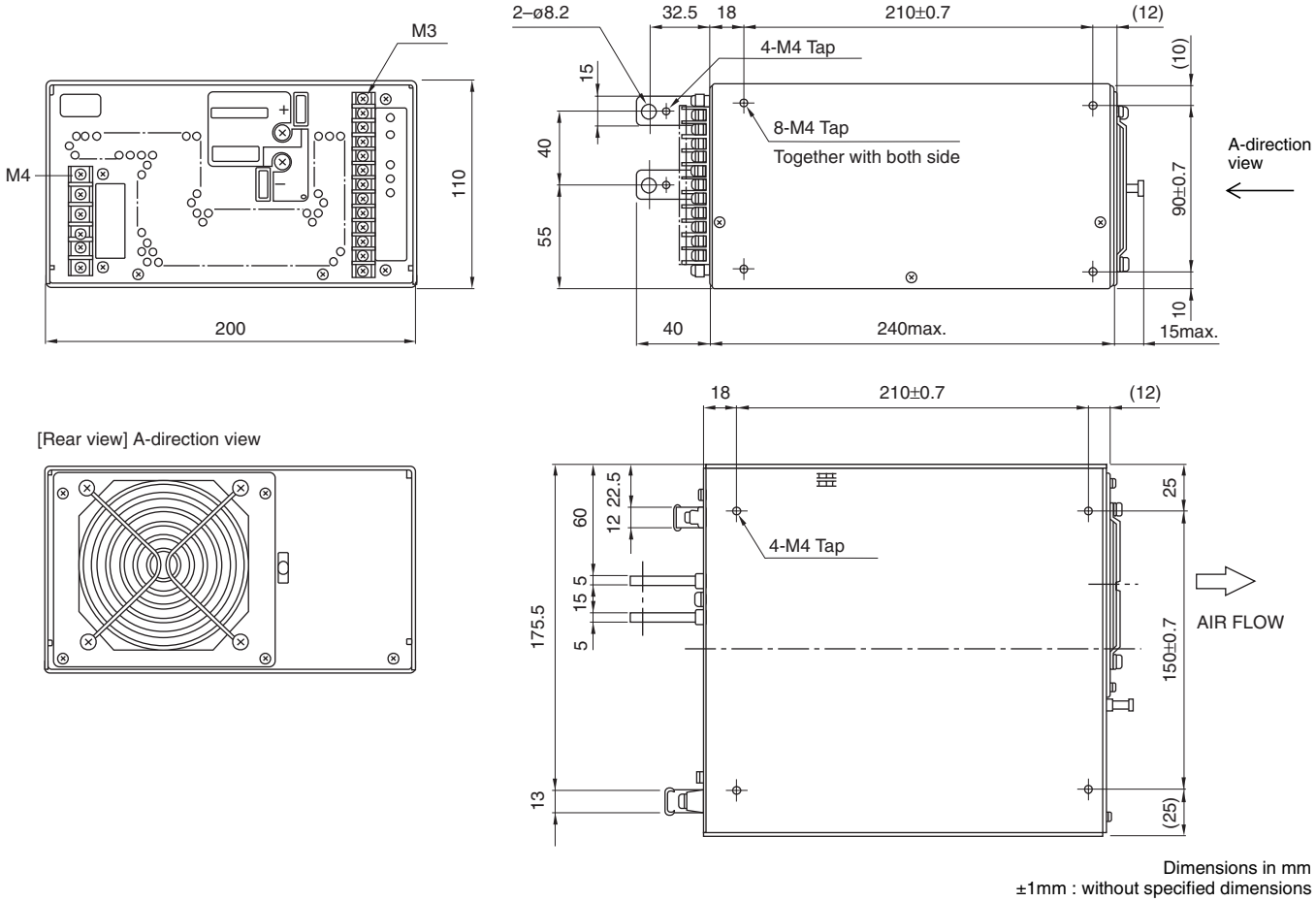
SPECIFICATIONS AND STANDARDS

Part No.			RAW03-150	RAW05-150	RAW12-62R	RAW15-50R	RAW24-31R	RAW28-26R	RAW48-15R
Rated output voltage and current※1			3V • 150A	5V • 150A	12V • 62.5A	15V • 50A	24V • 31.3A	28V • 26.8A	48V • 15.7A
Maximum output power		W	450	750	750	750	751.2	750.4	753.6
Input conditions									
Input voltage Eac		V	85 to 264[Rating: 100 to 240]						
Input frequency		Hz	47 to 66[Rating: 50 to 60](Single phase)						
Input current		A	12max./6max.[AC.100/240V]						
		A	3V: 8max./4max.[AC.100/240V]						
Fuse rating		A	20[Built-in]						
Surge current		A	20max./40max.[AC.100/240V, 1st surge current, reset after 30s minimum.]						
Leakage current		mA	1max./2max.[AC.100/240V]						
Power factor			0.99typ.						
Efficiency	%	100V	68typ.	74typ.	75typ.	75typ.	76typ.	77typ.	79typ.
	%	240V	70typ.	77typ.	78typ.	78typ.	79typ.	80typ.	82typ.
Output characteristics									
Output voltage Edc		V	3	5	12	15	24	28	48
Voltage variable range Edc		V	2.7 to 3.6	4 to 5.5	8.4 to 13.2	12 to 16.5	16.5 to 26.4	22.4 to 30.8	32.6 to 52.8
Maximum output current		A	150	150	62.5	50	31.3	26.8	15.7
Minimum output current		A	0	0	0	0	0	0	0
Overvoltage threshold Edc		V	3.8 to 4.6	6 to 6.9	13.7 to 15.7	17 to 19.5	27 to 30.5	31.4 to 34.5	55 to 59
Overcurrent threshold		A	157 to 175	157 to 175	65 to 71	52.5 to 58.5	32.8 to 36	28.1 to 30.8	16.4 to 18.1
Voltage stability	Source effect	%	0.3max.(0.1typ.)[Within the input voltage range]				Total effect ±2max.(±1typ.)		
	Load effect	%	1max.(0.5typ.)[10 to 100% load]						
	Temperature effect	%	1max.(0.5typ.)[Ambient temperature: –10 to +50°C]						
	Drift(Time effect)	%	0.5max.(0.2typ.)[25°C, input and output ratings, after input voltage ON for 30min to 8h]						
	Recovery	%/ms	±4max./5max.[50 to 100% sudden load change, tr, tf ≧ 50μs]						
Ripple Ep-p		mV	100max.	100max.	180max.	180max.	190max.	200max.	200max.
Ripple noise Ep-p		mV	200max.	200max.	250max.	250max.	300max.	350max.	500max.
Start up time		ms	900max.(500typ.)[AC.100V]						
Hold up time		ms	20min.[AC.100V]						
Maximum load capacitor		μF	10000						
Auxiliary functions									
Indicator display			LED(Green) indicates when voltage output is ON.						
Overvoltage protection※2			Output voltage shut-down type, LED(Red) indicates when AL signal goes to OV LED.						
Under voltage threshold※2			Output voltage shut-down type, LED(Red) indicates when AL signal goes to UV LED.						
Overcurrent protection※2			Rectangular type(output limited when low voltage detected).						
Fan alarm※2			Output voltage shut-down type, LED(Red) indicates when AL signal goes to FAN LED.						
Overheat protection※2			Output voltage shut-down type, LED(Red) indicates when AL signal goes to OV LED.						
Remote ON-OFF			Yes(Floating)						
Remote sensing			Yes						
Current balance			Yes						
Output voltage external variable function			Yes						
Master slave operation			No						
Alarm signal			Yes						
Standards									
Safety standards			UL1950, CSA C22.2 No.950-95(C-UL), EN60950-1(TÜV) approved.						
Noise terminal voltage			FCC class A meet.						
Input harmonics current requirement			IEC1000-3-2 meet.						
Constructions									
External dimensions		mm	110×200×240[H×W×L]						
Weight		kg	5max.						
Mounting method			Can be attached to 3 sides.						
Case material			Frame: Iron/Cover: Aluminum						

※1 Current rating(maximum output current) is determined for –10 to +50°C. Derating is required when used outside this temperature range.
※2 Recovers upon reset(interval approx. 40s).

RAW750W Type

SHAPES AND DIMENSIONS

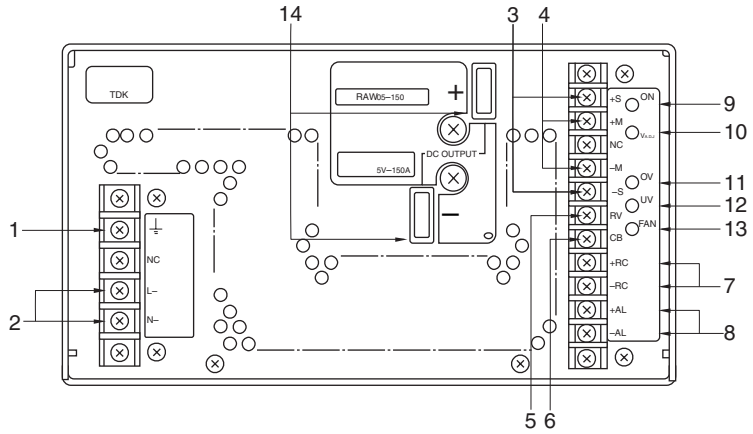


Dimensions in mm
±1mm : without specified dimensions

• Do not insert M4 tap installation screws more than 7mm from surface of housing.

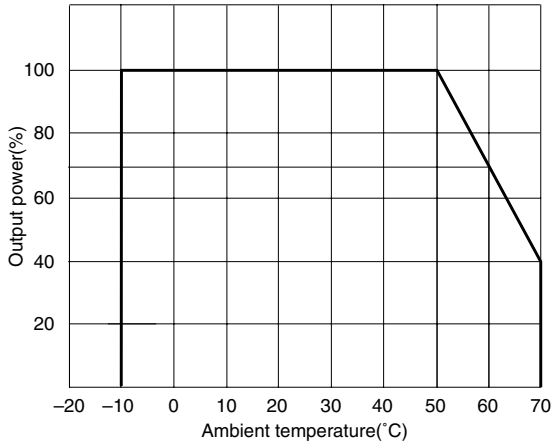
Characteristics, Functions, and Applications

RAW750W TYPE
TERMINAL DESIGNATIONS AND FUNCTIONS



Terminal No.	Designations and functions	
1	Frame ground terminal(G)	Connect to earth ground. This is connected to the case.
2	AC input terminals(L, N)	Connect to AC.100 to 120V or AC.200 to 240V input line.
3	Remote sensing terminals(+S, –S)	These terminals are used to compensate voltage loss from the output terminal to a load. Normally they are shorted with a metal bar.
4	DC output monitor terminals(+M, –M)	This terminal is used to monitor DC current output. Load lines should not be connected to these monitor terminals,. These monitor terminals should be jumpered when the remote monitoring function is not in use.
5	Output voltage adjustment terminal(RV)	This terminal is used for controlling output voltage from outside.
6	Current balance terminal(CB)	This terminal is used when several power supplies are connected in parallel to connect the respective CB and –S terminals in parallel.
7	Remote ON-OFF terminals(+RC, –RC)	Output is turned ON-OFF by disconnecting-connecting the RC terminals(output ON when open). RC terminals are floating.
8	Alarm terminal(AL +, –)	Transmits an alarm signal to stop the output upon an operation of the abnormal detection circuit for output overvoltage protection, output low voltage protection, and overheat protection.
9	Operation indicator LED(Green)	This Green LED becomes indicated when voltage is output.
10	Output voltage adjustment trim(V.ADJ)	Adjusts output voltage.
11	Output overvoltage indicator LED(Red)	This LED(Red) indicates with the output shutdown and the fan stop when the output voltage drops or the internal temperature of the power supply rises up abnormally.
12	Output low voltage indicator LED(Red)	This LED(Red) indicates with the output shutdown and the fan stop when the output voltage drops or the internal temperature of the power supply rises up abnormally.
13	Fan alarm indicator LED(Red)	This LED(Red) indicates when the fan speed is down or the fan movement is restricted. The output is not shut down.
14	DC output terminals(+, –)	Connect to load.

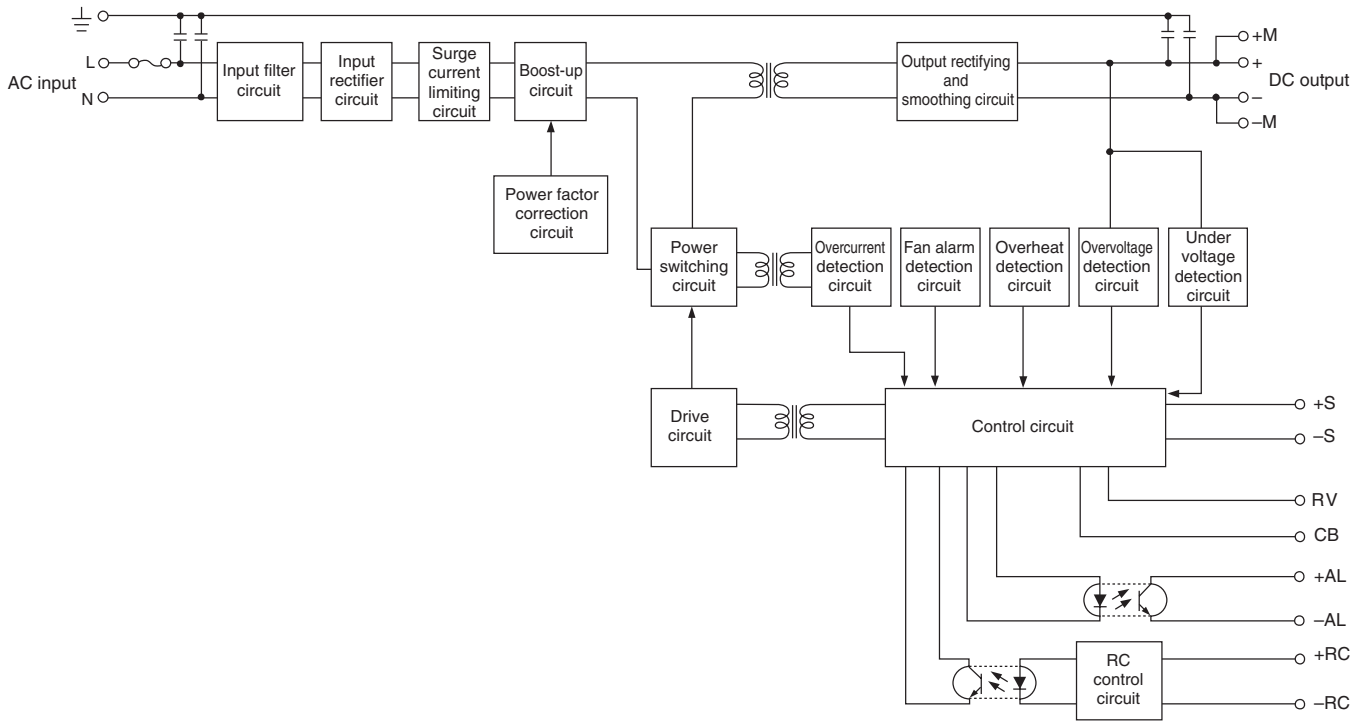
OUTPUT POWER-AMBIENT TEMPERATURE(DERATINGS)



Characteristics, Functions, and Applications

RAW750W TYPE

BLOCK DIAGRAM



COMMON SPECIFICATIONS

Temperature and humidity		
Temperature range	Operating(°C)	–10 to +70 [Derating is necessary when operating environment temperature exceed 50°C.]
	Storage(°C)	–25 to +75
Humidity range	Operating(%)RH	20 to 95[Maximum wet-bulb temperature: 35°C, without dewing]
	Storage(%)RH	
Vibration and shock		
Vibration	5 to 10Hz	All amplitude 10mm[3 directions, each 1h]
	10 to 55Hz	19.6m/s^2(2G)[3 directions, each 1h]
Shock	Acceleration	294m/s^2(30G)[3 directions, each 3 times]
	Pulse duration	11±5ms
Withstand voltage and insulation resistance		
Withstand voltage	Input terminal to case(G)	Eac: 2kV, 1min[Normal temperature, normal humidity, cutout current 20mA]
	Input terminal to output terminal	
Insulation resistance	Input terminal to case(G)	Edc: 500V, 100MΩ min. [Normal temperature, normal humidity]
	Input terminal to output terminal	
	Output terminal to case(G)	

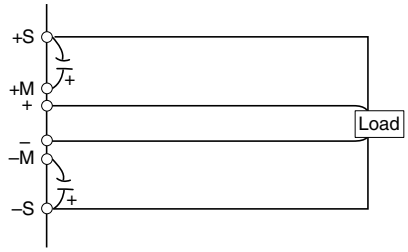
Characteristics, Functions, and Applications

RAW750W TYPE

REMOTE SENSING

Remote Sensing compensates to provide stability at the load terminal when voltage drop in the line between the power supply and the load causes instability. Remote sensing is possible if the voltage drop per wire between the output and load terminals is 0.15V max. for 3V models, 0.25V max. for 5.0V models and 0.4V max. for 12 to 48V models.

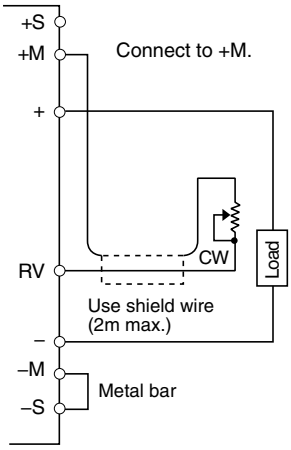
If the overvoltage protection operations too easily, install an external electrolytic capacitor, rated 1µF min. between the +S, +M and –S, –M terminals in the diagram shown below.



- Sensing lines should be twist or use shielded wire.

OUTPUT VOLTAGE EXTERNAL VARIABLE FUNCTION (RV)

The output voltage settings specified in four items can be adjusted by attaching an external trimmer to the RV terminal. In this case, make the following wiring (Note that, however, a rise time has a delay). When using this function, care must be taken to make sure that the wires are not disconnected or miswired.



(1) Remove a short piece (metal bar) between the +S and +M terminals.
(2) Rotate V.ADJ full counterclockwise.
(3) Connect a 5kΩ (3V, 5V, 12V, 15V, 24V, and 28V) or 10kΩ (48V) trimmer at the load end between the +M and RV terminals.

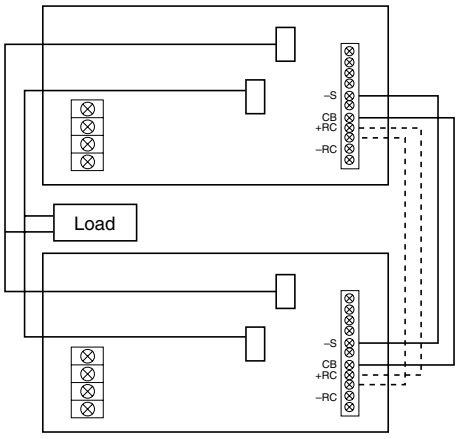
CURRENT BALANCE (CB TERMINAL)

This terminal has a monitoring function to control and equalize the output current of power supplies connected in parallel by mutually connecting the respective CB terminals and the –S terminals of each power supply (Use eight power supplies connected in parallel.).

(1) Conditions for current balance
The variation in output voltage between the respective power supplies cannot exceed 5%
(Highest voltage–lowest voltage) ÷ rated voltage=5% max.
The output current is 20 to 90% of the total output rated current.

(2) Uniform performance (for two power supplies)
The variation in output current between the respective power supplies does not exceed ±10% under the conditions for current balance.

(3) Connection diagram



- When using the CB and Remote ON-OFF concurrently, connect the respective RC terminals of each power supply in parallel.

REMOTE ON-OFF

The output voltage can be turned on or off at a TTL level externally.

Between +RC and –RC: Turned on upon setting to high level (2.4 to 24V) or being open.

Between +RC and –RC: Turned off upon setting to low level (0 to 0.4V) (Outgoing current 1.6mA max.). The fan stops, too.

The ±RC terminals are at a floating level to the DC output terminals. Keep the +RC terminal open when not in use since it is internally pulled up. Insulation between the RC terminals and the output conforms to the common specifications (Insulation resistance; output to case) and withstand voltage between AC input terminals and RC terminals conforms to the common specifications (Withstand voltage; input to output, input to case, output to case).

Characteristics, Functions, and Applications

RAW750W TYPE

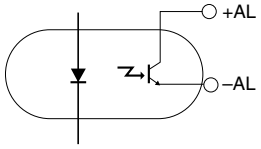
POWER SUPPLY PROTECTION

In readiness for abnormal occurrences, the power supplies are equipped with fault detection circuit. Operation upon detection is as follows:

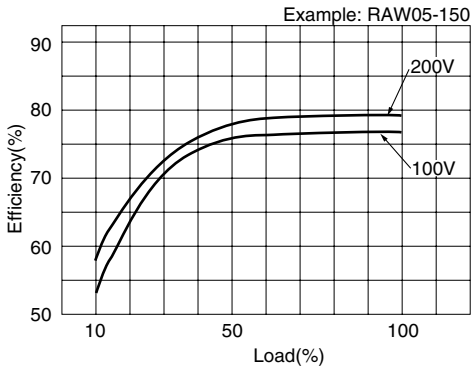
Protective function	Operation	LED indicator	External alarm
OV Output overvoltage protection (Overheat)	Output is shut down and the fan stops upon detection of an abnormal output voltage rise or an abnormal internal temperature rise. The output recovers after functional operation upon input shutdown and a reset after a 40s minimum interval. Note that, however, reset only after the internal temperature drops sufficiently in case of the abnormal internal temperature rise.	Yes (Red)	Yes(in all cases) Normal: Photo-coupler closed; output between collector and emitter. Abnormal: Photo-coupler opens.
UV Output under-voltage protection	Output is shut down and the fan stops when the output voltage drops to 60% or lower of the rated output voltage (3V: approx. 45%) and the condition continues for approx. 40s on over current protection and others. The output recovers after functional operation upon input shutdown and a reset after a 40s minimum interval.	Yes (Red)	
FAN Fan alarm	Output is shut down and the fan stops if the fan movement is restricted. The output recovers after functional operation upon input shutdown and a reset after a 40s minimum interval.	Yes (Red)	

- For external alarm, use photo-coupler having max. 8mA collector current and max. 40V emitter voltage.

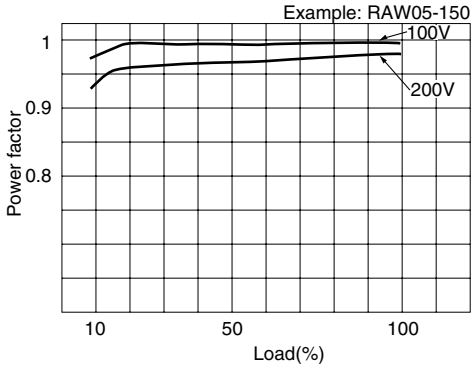
OUTPUT FORM



EFFICIENCY(TYPICAL)



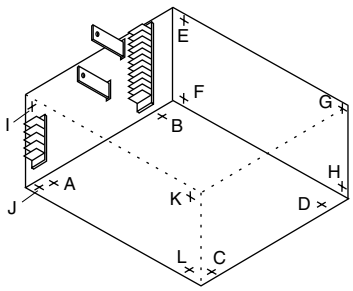
POWER FACTOR(TYPICAL)



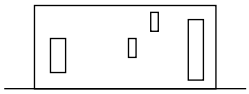
FAN REPLACEMENT

Contact TDK for fan replacement. Consult with us if customer fan replacement is inevitable. In this case, however, the responsibility for quality assurance on the replacement lies on the customer.

INSTALLATIONS

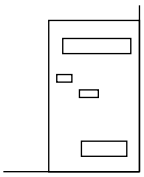


(1)



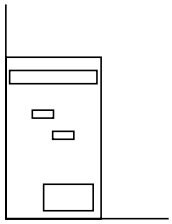
Use installation holes A, B, C, and D for securing the power supply.

(2)



Use installation holes A, B, C, D, I, J, K, and L for securing the power supply.

(3)



Use installation holes A, B, C, D, E, F, G, and H for securing the power supply.

- Maintain a 20mm min. distance between the ventilation holes, fan surface and surrounding equipment, etc. and install so as to provide heat-outside air exchange.