**<b>&TDK** 

# DC Input Single Output, Long Life, UL/C-UL Approved

### R Series RDM/RDH(30 to 150W)

The R series RDM/RDH has realized a compact size by developing a high frequency of the oscillation frequency 300kHz. These products are high-reliability and multi-function power supplies having full auxiliary functions such as RC, RS, RV or the like as well as failure safeties of the overvoltage and overcurrent protections.

#### FEATURES

- DC.24V input (RDM) and 48V input (RDH), compact, and singleoutput power supply.
- High-reliability and long-life design.
- Remote ON-OFF function.
- Remote sensing function.
- Adjustable external output voltage function.
- Indicator display function.

#### PART NUMBERS AND RATINGS

#### RDM

	30W Type		60W Type	60W Type		100W Type		150W Type	
	Current(A)	Part No.							
5	6	RDM05-6R0	12	RDM05-12R	20	RDM05-20R	30	RDM05-30R	
12	2.5	RDM12-2R5	5	RDM12-5R0	8.3	RDM12-8R3	12	RDM12-12R	
15	2	RDM15-2R0	4	RDM15-4R0	6.6	RDM15-6R6	10	RDM15-10R	
24	1.3	RDM24-1R3	2.5	RDM24-2R5	4.2	RDM24-4R2	6	RDM24-6R0	

#### RDH

Output voltage(V)	30W Type		60W Type		100W Type		150W Type	
	Current(A)	Part No.						
5	6	RDH05-6R0	12	RDH05-12R	20	RDH05-20R	30	RDH05-30R
12	2.5	RDH12-2R5	5	RDH12-5R0	8.3	RDH12-8R3	12	RDH12-12R
15	2	RDH15-2R0	4	RDH15-4R0	6.6	RDH15-6R6	10	RDH15-10R
24	1.3	RDH24-1R3	2.5	RDH24-2R5	4.2	RDH24-4R2	6	RDH24-6R0



# RDM/RDH30W Type

#### SPECIFICATIONS AND STANDARDS

Part No. RDM: DC.24V inpu RDH: DC.48V inpu		RDM: DC.24V input		RDM05-6R0	RDM12-2R5	RDM15-2R0	RDM24-1R3		
		put	RDH05-6R0	RDH12-2R5	RDH15-2R0	RDH24-1R3			
Rated output voltage and current*1		5V•6A	12V • 2.5A	15V • 2A	24V • 1.3A				
Maximun	n output power		W	30	30	30	31.2		
Input con	ditions						i		
Input volt	age	RDM: 24V input	V	20 to 30[Rating: 24]	]				
Edc		RDH: 48V input	V	40 to 56[Rating: 48]	]				
Input our	ront	RDM: 24V input	А	2.2max.(1.6typ.)[Bu	ilt-in fuse rating: 4A]				
input cun	lent	RDH: 48V input	A	1.1max.(0.8typ.)[Bu	ilt-in fuse rating: 2.5A]				
Surge cu	rrent		А	200typ.[Input and o	utput ratings]				
Efficiency	/		%	77typ.[Input and out	tput ratings]				
Output ch	naracteristics								
Output vo	oltage Edc		V	5	12	15	24		
Voltage v	variable range*	<sup>2</sup> Edc	V	4 to 5.5	8.4 to 13.2	12 to 16.5	16.8 to 26.4		
Maximun	n output curren	t	А	6	2.5	2	1.3		
Minimum	output current		А	0	0	0	0		
Overvolta	age threshold E	Edc	V	6 to 6.9	13.7 to 15.7	17 to 19.5	27 to 30.5		
Overcurrent threshold A		А	6.6 to 7.1	2.8 to 3.1	2.3 to 2.6	1.5 to 1.8			
	Source effect	t	%	0.8max.(0.2typ.)[Wi	ithin the input voltage rang	je]			
Valtaga	Load effect %			1max.(0.3typ.)[10 to 100% load] Total effect 2max.(0.6typ.)					
vollage	Temperature	effect	%	1max.(0.3typ.)[Ambient temperature: 0 to +60°C]					
Stability	Drift(Time eff	ect)	%	0.5max.[25°C, input	t and output ratings, after i	input voltage ON for 30mi	n to 8h]		
	Recovery		%/ms	±4max./1max.[50 to 100% sudden load change]					
Ripple Ep	р-р		mV	50max.	80max.	80max.	100max.		
Ripple no	oise Ep-p		mV	100max.	170max.	200max.	290max.		
Auxiliary	functions								
Indicator	display			LED(Green) indicat	es when voltage output is	ON.			
Overvolta	age protection			Voltage shut-down type, recovers upon reset(interval approx. 5s).					
Overcurre	ent protection			Rectangular type, automatic recovery, set value fixed.					
Remote (	ON-OFF			Yes(Floating)					
Remote s	sensing			Yes					
Output voltage external variable function			Yes						
Standard	s								
Safety sta	andards			UL1950, CSA C22.2	2 No.950-95(C-UL) certifie	ed.			
Construc	tions								
External	dimensions		mm	95×35×130[H×W×L]					
Weight			g	400max.					
Mounting	method			Can be attached to 3 sides.					
Case ma	terial			Aluminum					

\*1 Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.
\*2 The output voltage is variable by using a trimmer V.ADJ. In addition it is externally controllable by using an RV terminal..

# RDM/RDH30W Type

#### SHAPES AND DIMENSIONS





# RDM/RDH60W Type

#### SPECIFICATIONS AND STANDARDS

-									
Part No. RDM: DC.24V inp RDH: DC.48V inpu		RDM: DC.24V input		RDM05-12R	RDM12-5R0	RDM15-4R0	RDM24-2R5		
		out	RDH05-12R	RDH12-5R0	RDH15-4R0	RDH24-2R5			
Rated output voltage and current*1		5V • 12A	12V • 5A	15V • 4A	24V • 2.5A				
Maximum	n output power		W	60	60	60	60		
Input con	ditions								
Input volt	age	RDM: 24V input	V	20 to 30[Rating: 24]					
Edc		RDH: 48V input	V	40 to 56[Rating: 48]					
Input our	ront	RDM: 24V input	Α	4.3max.(3.3typ.)[Built-in fuse rating: 6.3A]					
input cun	lent	RDH: 48V input	Α	2.1max.(1.6typ.)[Bu	ilt-in fuse rating: 4A]				
Surge cu	rrent		А	200typ.[Input and o	utput ratings]				
Efficiency	/		%	79typ.[Input and out	tput ratings]				
Output ch	naracteristics								
Output vo	oltage Edc		V	5	12	15	24		
Voltage v	variable range*2	2 Edc	V	4 to 5.5	8.4 to 13.2	12 to 16.5	16.8 to 26.4		
Maximum	n output current	t	А	12	5	4	2.5		
Minimum	output current		А	0	0	0	0		
Overvolta	age threshold E	dc	V	6 to 6.9	13.7 to 15.7	17 to 19.5	27 to 30.5		
Overcurrent threshold A		А	13.2 to 13.8	5.6 to 6	4.5 to 4.9	2.8 to 3.1			
	Source effect %			0.8max.(0.2typ.)[Within the input voltage range]					
Vallaria	Load effect		%	1max.(0.3typ.)[10 to 100% load] Total effect 2max.(0.6typ.)					
vollage	Temperature	effect	%	1max.(0.3typ.) [Ambient temperature: 0 to +60°C]					
Stability	Drift(Time effe	ect)	%	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]					
Ripple Ep	о-р		mV	50max.	80max.	80max.	100max.		
Ripple no	oise Ep-p		mV	100max.	170max.	200max.	290max.		
Auxiliary	functions					•	+		
Indicator	display			LED(Green) indicat	es when voltage output is	ON.			
Overvolta	age protection			Voltage shut-down type, recovers upon reset(interval approx. 5s).					
Overcurre	ent protection			Rectangular type, automatic recovery, set value fixed.					
Remote (	ON-OFF			Yes(Floating)					
Remote s	sensing			Yes					
Output vo	oltage external	variable function		Yes					
Standard	S								
Safety sta	andards			UL1950, CSA C22.	2 No.950-95(C-UL) certifie	ed.			
Construc	tions								
External	dimensions		mm	95×43×160[H×W×L]					
Weight			g	550max.	-				
Mounting	method			Can be attached to	3 sides.				
Case material				Aluminum					

\*1 Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.
\*2 The output voltage is variable by using a trimmer V.ADJ. In addition it is externally controllable by using an RV terminal..

# RDM/RDH60W Type

#### SHAPES AND DIMENSIONS





# RDM/RDH100W Type

#### SPECIFICATIONS AND STANDARDS

Dort No.		RDM: DC.24V in	put	RDM05-20R	RDM12-8R3	RDM15-6R6	RDM24-4R2		
Part NO.		RDH: DC.48V in	put	RDH05-20R	RDH12-8R3	RDH15-6R6	RDH24-4R2		
Rated output voltage and current*1		5V • 20A	12V • 8.3A	15V • 6.6A	24V • 4.2A				
Maximun	n output power		W	100	99.6	99	100.8		
Input con	ditions						<b>I</b>		
Input volt	age	RDM: 24V input	V	20 to 30[Rating: 24]	]				
Edc	-	RDH: 48V input	V	40 to 56[Rating: 48]	]				
Innut our	ront	RDM: 24V input	А	6.8max.(5.3typ.)[Built-in fuse rating: 10A]					
input cun	rent	RDH: 48V input	А	3.3max.(2.6typ.)[Bu	uilt-in fuse rating: 6.3A]				
Surge cu	rrent		А	200typ.[Input and o	utput ratings]				
Efficiency	/		%	79typ.[Input and ou	tput ratings]				
Output cl	naracteristics								
Output vo	oltage Edc		V	5	12	15	24		
Voltage v	variable range*2	<sup>2</sup> Edc	V	4 to 5.5	8.4 to 13.2	12 to 16.5	16.8 to 26.4		
Maximun	n output curren	t	А	20	8.3	6.6	4.2		
Minimum	output current		А	0	0	0	0		
Overvolta	age threshold E	Edc	V	6 to 6.9	13.7 to 15.7	17 to 19.5	27 to 30.5		
Overcurr	Overcurrent threshold A		А	22 to 24	9.3 to 9.9	7.4 to 7.9	4.7 to 5.1		
	Source effect		%	0.8max.(0.2typ.)[Within the input voltage range]					
Valtaga	Load effect %		1max.(0.3typ.)[10 to 100% load] Total effect 2max.(0.6typ.)						
vollage	Temperature	effect	%	1max.(0.3typ.)[Ambient temperature:0 to +60°C]					
Stability	Drift(Time eff	ect)	%	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]					
Ripple Ep	р-р		mV	50max.	80max.	80max.	100max.		
Ripple no	oise Ep-p		mV	100max.	170max.	200max.	290max.		
Auxiliary	functions			- <u>!</u>					
Indicator	display			LED(Green) indicat	es when voltage output is	ON.			
Overvolta	age protection			Voltage shut-down type, recovers upon reset(interval approx. 5s).					
Overcurr	ent protection			Rectangular type, automatic recovery, set value fixed.					
Remote (	ON-OFF			Yes(Floating)					
Remote s	sensing			Yes					
Output voltage external variable function			Yes						
Standard	S								
Safety standards			UL1950, CSA C22.2 No.950-95(C-UL) certified.						
Construc	tions								
External	dimensions		mm	95×60×220[H×W×L]					
Weight			kg	1max.	1max.				
Mounting	method			Can be attached to 3 sides.					
Case ma	terial			Aluminum					

\*1 Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.
\*2 The output voltage is variable by using a trimmer V.ADJ. In addition it is externally controllable by using an RV terminal..

# RDM/RDH100W Type

#### SHAPES AND DIMENSIONS







# RDM/RDH150W Type

#### SPECIFICATIONS AND STANDARDS

Part No. RDM: DC.24V inpu RDH: DC.48V inpu		RDM: DC.24V input		RDM05-30R	RDM12-12R	RDM15-10R	RDM24-6R0			
		put	RDH05-30R	RDH12-12R	RDH15-10R	RDH24-6R0				
Rated output voltage and current*1		5V • 30A	12V • 12A	15V • 10A	24V • 6A					
Maximum	n output power		W	150	144	150	144			
Input con	ditions		1		H		<sup>1</sup>			
Input volt	age	RDM: 24V input	V	20 to 30[Rating: 24]	20 to 30[Rating: 24]					
Edc		RDH: 48V input	V	40 to 56[Rating: 48]	]					
Innut our	ront	RDM: 24V input	А	10.5max.(8typ.)[Bui	ilt-in fuse rating: 15A]					
input cun	rent	RDH: 48V input	А	5max.(3.8typ.)[Built-in fuse rating: 8A]						
Surge cu	rrent		А	200typ.[Input and o	utput ratings]					
Efficiency	/		%	79typ.[Input and out	tput ratings]					
Output ch	naracteristics		1							
Output vo	oltage Edc		V	5	12	15	24			
Voltage v	variable range*2	2 Edc	V	4 to 5.5	8.4 to 13.2	12 to 16.5	16.8 to 26.4			
Maximum	n output current	t	А	30	12	10	6			
Minimum	output current		А	0	0	0	0			
Overvolta	age threshold E	dc	V	6 to 6.9	13.7 to 15.7	17 to 19.5	27 to 30.5			
Overcurre	Overcurrent threshold A		А	33 to 35	13.4 to 14.4	11.2 to 12	6.8 to 7.2			
	Source effect		%	0.8max.(0.2typ.)[Wi	ithin the input voltage rang	je]				
Valtana	Load effect		%	1max.(0.3typ.)[10 to 100% load] Total effect 2max.(0.6typ.)						
vollage	Temperature	effect	%	1max.(0.3typ.)[Ambient temperature: 0 to +60°C]						
Stability	Drift(Time eff	ect)	%	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]						
Ripple Ep	о-р		mV	50max.	80max.	80max.	100max.			
Ripple no	oise Ep-p		mV	100max.	170max.	200max.	290max.			
Auxiliary	functions		*							
Indicator	display			LED(Green) indicat	es when voltage output is	ON.				
Overvolta	age protection			Voltage shut-down type, recovers upon reset(interval approx. 5s).						
Overcurre	ent protection			Rectangular type, automatic recovery, set value fixed.						
Remote (	ON-OFF			Yes(Floating)						
Remote s	sensing			Yes						
Output vo	oltage external	variable function		Yes						
Standard	s									
Safety sta	andards			UL1950, CSA C22.	2 No.950-95(C-UL) certifie	ed.				
Construc	tions									
External	dimensions		mm	95×80×220[H×W×L]						
Weight			kg	1.2max.						
Mounting	method			Can be attached to 3 sides.						
Case material			Aluminum							

\*1 Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.
\*2 The output voltage is variable by using a trimmer V.ADJ. In addition it is externally controllable by using an RV terminal..

# RDM/RDH150W Type

#### SHAPES AND DIMENSIONS



 $\label{eq:dimensions} \begin{array}{c} \text{Dimensions in mm} \\ \pm 1 \text{mm}: \text{without specified dimensions} \end{array}$ 



### Characteristics, Functions, and Applications

# TERMINAL DESIGNATIONS AND FUNCTIONS30W TYPE60W TYPE



Terminal No.	Designations and functions	
1	Operation indicator LED(ON)	This Green LED becomes indicated when voltage is output.
2	Output voltage external variable terminal(RV)	The output voltage can be controlled by connecting a resistance between the RV terminal and the output using the state of the output to the output to the state of the output to the
3	Output voltage adjustment trim(V.ADJ)	Adjusts output voltage.
4	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.
5	DC output terminals(DC OUTPUT, +, -)	Connect to load.
6	Remote ON-OFF terminals(RC, +, -)	Output is turned ON-OFF by disconnecting-connecting the RC terminals(output ON when open). RC terminals are floating.
7	DC input terminals(DC INPUT, +, -)	Connected to DC input line. RDM: DC.24V input RDH: DC.48V input
8	Frame ground terminal(G)	Connect to earth ground. This is connected to the case.
9	Direct output terminals (DC OUTPUT, +, -, +, -) 150W Type	Connect a load line to this terminal. Allowable current per pin is 25A max. A use of two pins each is recommended.

#### **OUTPUT POWER-AMBIENT TEMPERATURE(DERATINGS)**



#### SURGE CURRENT, START UP / HOLD UP TIMES

The input surge current is to be charged to a capacitor of an input smoothing circuit. This type of power supply is not provided with any special circuit for protection from surge current since surge current continues only for a short time in case of its occurrence. The magnitude of surge current depends upon a capacity (internal resistance) of the power supply for an input to this power supply and therefore an input source having a sufficiently large capacity is used at measurement. In a practical use, the surge current is lower than the value shown in the specifications.



# Characteristics, Functions, and Applications

#### **BLOCK DIAGRAM**



#### **COMMON SPECIFICATIONS**

Temperature and humidi	ty			
Tomporatura rango	Operating(°C)	0 to +60[Derating is necessary when operating environment temperature exceed 50°C.]		
remperature range	Storage(°C)	-25 to +75		
	Operating(%)RH	- 20 to 95[Maximum wet-bulb temperature: 35°C, without dewing]		
numicity range	Storage(%)RH			
Vibration and shock				
Vibration	5 to 10Hz	All amplitude 10mm[3 directions, each 1h]		
VIDIALION	10 to 55Hz	Acceleration 19.6m/s <sup>2</sup> (2G)[3 directions, each 1h]		
Shook	Acceleration	196m/s <sup>2</sup> (20G)[3 directions, each 3 times]		
ONOCK	Pulse duration	11±5ms		
Withstand voltage and in	sulation resistance			
	Input terminal to case(G)	Eac: 2kV, 1min		
Will Island Vollage	Input terminal to output terminal	[Normal temperature, normal humidity, cutout current 10mA, 150W: cutout current 20mA]		
	Input terminal to case(G)			
Insulation resistance	Input terminal to output terminal	Edc: 500V, 100M $\Omega$ min. [Normal temperature, normal humidity]		
	Output terminal to case(G)	-		

### Characteristics, Functions, and Applications

#### INPUT VOLTAGE RANGE

A stable DC input is intrinsically ideal for an input voltage of a switching power supply. Actually, however, a voltage of the power supply may vary with an elapse of a time in use like a battery. This kind of variation is covered by an input voltage width of the switching power supply. The specification for the input voltage range DC.40 to 56V (RDH type) means that the DC.48V input voltage is required ideally while there is no effect on an output in case of fluctuation within DC.40 to 56V range.

In addition some power supplies are used as input power supplies to lower a voltage from an AC line by using a transformer for using the rectified current at the voltage as an input of the power supplies (Refer to the diagram shown below). In this condition the lower limit VL of the voltage of the rectified current need be within the input voltage range of the power supply. Therefore, it is necessary to arrange a smoothing circuit such as a capacitor in order to adjust the circuit so that the VH and VL levels are within the input voltage range even if there is a little derivative current as shown in the diagram 2.

#### **EXAMPLE OF USING GENERAL RECTIFIER CIRCUIT**



#### Input voltage waveform of power supply

1. Without smoothing capacitor

The input voltage of the power supply is insufficient since  $\mathsf{VL}$  is too low, thus causing an erroneous operation.

2. With smoothing capacitor

If VH and VL are within the input voltage range, the voltage is stable.

# START UP VOLTAGE AND MINIMUM REGULATION VOLTAGE (Example: RDH24-6R0)



Temperature(°C)

# Characteristics, Functions, and Applications

#### INPUT CURRENT RDM 30W TYPE



#### **RDM 100W TYPE**



**RDH 30W TYPE** 



#### **RDH 50W TYPE**



#### **RDH 150W TYPE**



### Characteristics, Functions, and Applications

#### **REMOTE ON-OFF**

The RC circuit is provided so that a sequence can be easily prepared for a power supply output in the case of a use of multiple power supplies. The power supply output can be sent out or stopped by an open or close control of this signal (+RC, –RC).

Electric characteristics of RC circuit

Input condition for high level (Power supply output ON): 2.4 to 24V or open

Input condition for low level (Power supply output OFF): 0 to 0.4V IoL: 1.6mA (max.)

1. Equivalent to IC control(IC7404/74LS04)

_^	
GND	
	——• –RC

2. Control with relay



#### 3. Control with switch

م ما	+RC
L(	-RC

#### **OUTPUT VOLTAGE EXTERNAL VARIABLE FUNCTION (RV)**

The output voltage is enabled to be variable by using a built-in V.ADJ trimmer. An RV terminal is used for performing this operation at a place far from the power supply.



Remove a bar between +S and + terminals.

Attach one of the following trimmer between the + and RV terminals in the side of the load terminal:

- 3 to 15V output type:  $2k\Omega$  trimmer
- 24V output type:  $5k\Omega$  trimmer

A clockwise rotation of the trimmer control increases the output voltage.

The wire should be as short as possible for preventing an erroneous operation.

#### **OTHER CONDITIONS**

- Unless conditions are otherwise specified in the specifications or standards, 25°C and rated input-output should be applied.
- Ripple and noise (50MHz max.) were determined for 0 to +50°C temperature range and 10 to 100% load.