

M SERIES MRW

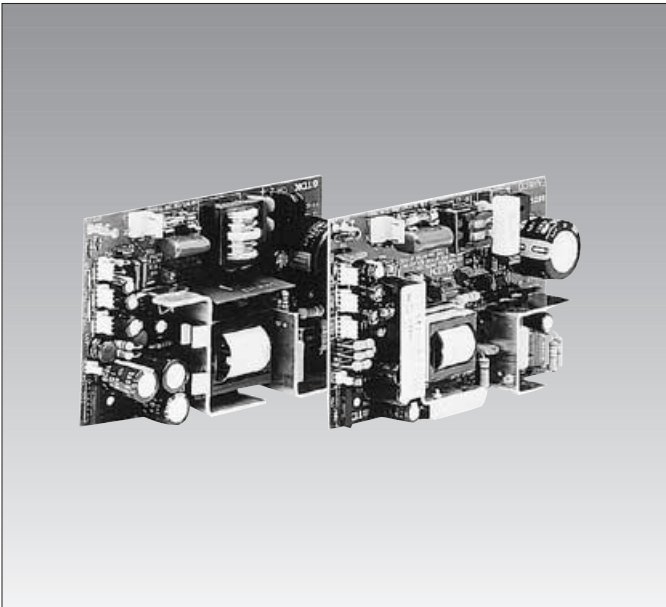
UL/CSA/TÜV approved

[FEATURES]

- Wide-input (AC.100V/200V switching not required) thin-type multi-output power supply.
- Open frame type.
- POK signal function (MRW-150/-151/-160/-161).
- Low noise (FCC class B).

[SUMMARY]

The M series MRW products are open-frame multi-output power supplies characterized by the wide input range and thin type. They are available at low prices and Safety standards certified with full EMC countermeasures. It is recommended to use them as economical export power supplies. In addition to the conventional products, the 170 series and 350 series are supported newly.



PART NUMBERS AND RATINGS

Part No.	Maximum output power*(W)	Output1[V ₁]		Output2[V ₂]		Output3[V ₃]	
		Voltage(V)	Current(A)	Voltage(V)	Current(A)	Voltage(V)	Current(A)
MRW-135	28	+5	0.5 to 2	+12	0.3 to 1.5(2.5, 3s)		
MRW-150	35	+5	1 to 2.2(Max.4)	+12	0.6 to 1.8(Max.2.5)	−12	0 to 0.1(Max.0.3)
MRW-151	35	+5	1 to 2.2(Max.4)	+15	0.5 to 1.4(Max.2)	−15	0 to 0.1(Max.0.25)
MRW-160	50	+5	1 to 5(Max.6)	+12	0.6 to 2(Max.2.5)	−12	0 to 0.1(Max.0.5)
MRW-161	50	+5	1 to 5(Max.6)	+15	0.5 to 1.5(Max.2)	−15	0 to 0.1(Max.0.4)
MRW-170	65	+5	0.8 to 5(Max.7)	+12	0.3 to 1.7(Max.2.5)	−12	0.3 to 1.7(Max.2.5)
MRW-171	65	+5	0.8 to 5(Max.7)	+15.8	0.3 to 1.3(Max.2)	−15.8	0.3 to 1.3(Max.2)
MRW-350	40	+5	0.5 to 3	+12	0.3 to 2	−12	0 to 0.1

* The total sum of the output voltage multiplied by the output current cannot exceed the maximum output power.
For the details, please refer to the next pages.

- : Stock products.

M SERIES MRW-135

UL/CSA/TÜV approved

SPECIFICATIONS AND STANDARDS

PART NO.		MRW-135
Rated output voltage and current ^{*1}	V ₁	+5V • 2A
	V ₂	+12V • 1.5A(Peak 2.5A, 3s max.) ^{*4}
Maximum output power	W	28

INPUT CONDITIONS

Input voltage Eac	V	90 to 264[Rating: 100 to 120/200 to 240]
Input frequency	Hz	47 to 66[Rating: 50 to 60](Single phase)
Input current	A	0.8max./0.5max.[AC.100 to 120/200 to 240V]
Fuse rating	A	2[Built-in]
Surge current	A	50max./100max.[AC.100 to 120/200 to 240V, 25°C, cold start]
Leakage current	mA	0.5max./0.75max.[AC.100 to 120/200 to 240V]
Efficiency	%	73typ.[AC.100 to 120V]

OUTPUT CHARACTERISTICS

Output voltage Edc	V	+5(V ₁)	+12(V ₂)
Voltage variable range	%	+5, -3	V ₂ varies simultaneously and in the same direction as V ₁ .
Maximum output current	A	2	1.5(Peak 2.5A, 3s) ^{*4}
Minimum output current ^{*3}	A	0.5	0.3
Output setting conditions	[Voltage]	V	5±0.02
	[Current]	A	2
Voltage stability	Input variation	%	1max.
	Load variation ^{*2}	%	2max.
	Temperature variation [0 to +50°C]	%	3max.
	Total variation	%	±5max.
	Drift	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]
	Dynamic load	%/ms	±4max./1max.[50 to 100% sudden load change]
Ripple Ep-p	mV	80max.	120max.
Ripple noise Ep-p	mV	150max.	290max.
Start up time	ms	750typ.	
Hold up time	ms	10min.(15typ.)[AC.100V input], 20min.(25typ.)[AC.120V input]	

AUXILIARY FUNCTIONS

Indicator display	No
Overvoltage protection	Only 5V built-in protection, voltage shut-down type(overvoltage threshold 5.8 to 6.9V), recovers upon reset.
Overcurrent protection	41W min., total power type
Remote ON-OFF	No
Remote sensing	No
Current balance	No
Output voltage external variable function	No

STANDARDS

Safety standards	UL1950-3, CSA950-95(C-UL), EN60950(TÜV) approved.
Noise terminal voltage	FCC class B, VDE0871 class B compliant.

CONSTRUCTIONS

External dimensions	mm	35×80×120[H×W×L]
Weight	g	300max.
Mounting method		Can be attached to 1 side.
Case and cover		—
Input and output cables		Sold separately(Part No.: 4EU20B241)

^{*1} Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.

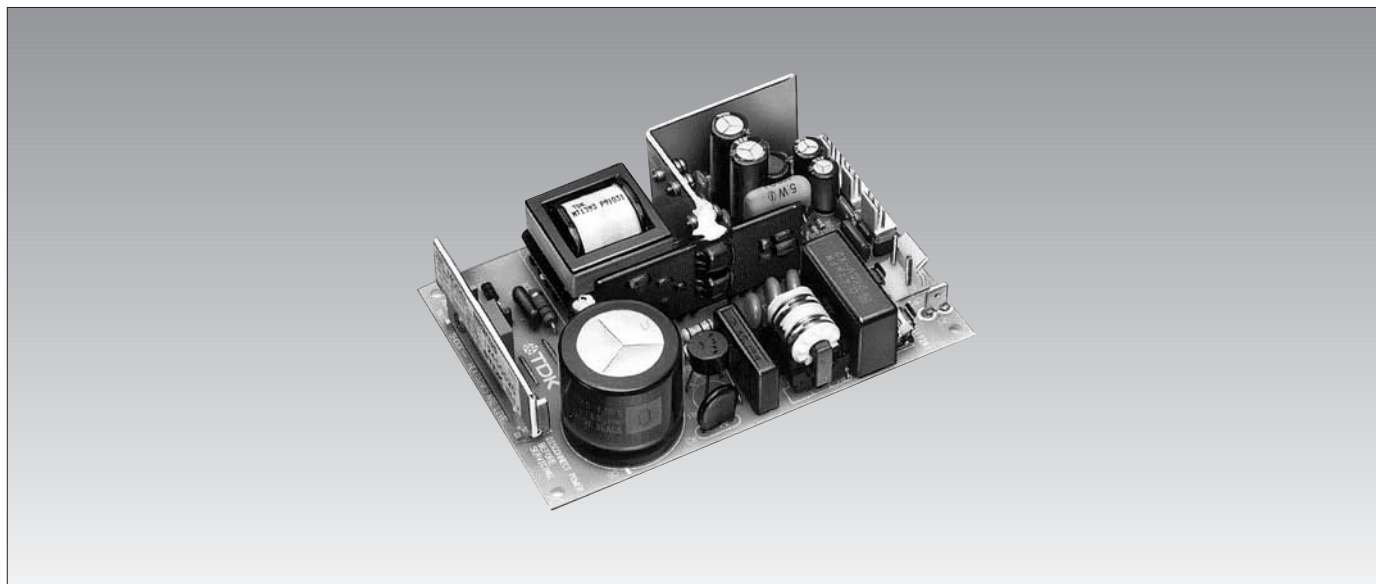
^{*2} Load variation only for an output to be measured with other outputs fixed to V₁ at 1.5A and V₂ at 1.5A.

^{*3} The output voltages V₁ and V₂ may not output regular voltages at the minimum output current or lower.

^{*4} If +12V load current exceeds 1.5A, the time should be limited to 3 sec or shorter with the effective current maintained at 1.5A or lower for use.

M SERIES MRW-135

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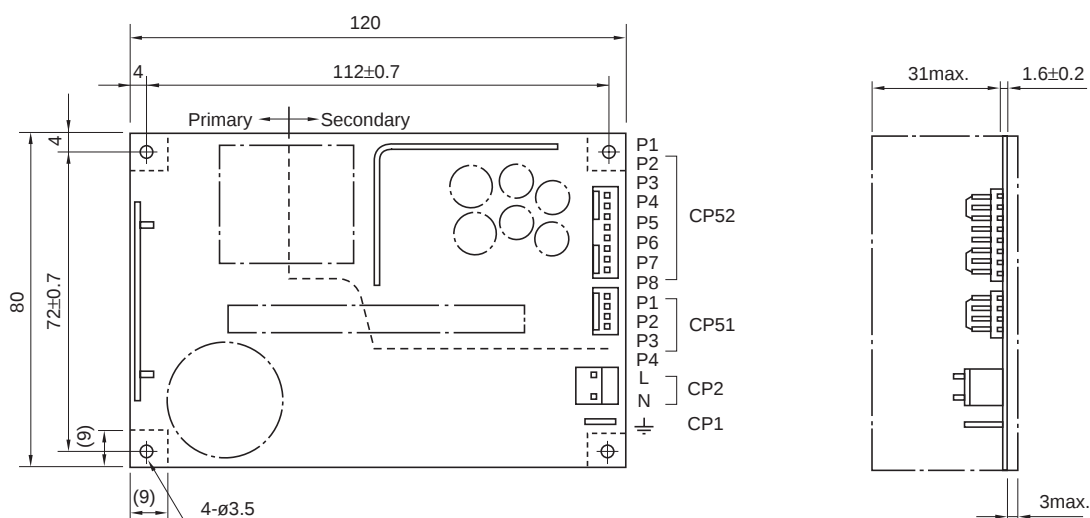


SHAPES AND DIMENSIONS

MRW-135

Dimensions in mm

±1mm : without specified dimensions



[Terminal place]

FG: CP1

Input: CP2

L	LIVE
N	NEUTRAL

Output

	CP51	CP52
P1	+12V	COMMON
P2	COMMON	COMMON
P3	+5V	+5V
P4	COMMON	COMMON
P5	—	COMMON
P6	—	COMMON
P7	—	+12V
P8	—	COMMON

- Use M3.5 installation screw holes and solder-land must not over than 9mm from edge of printed circuit board. Components surface must keep less than 6.5mm diameter from the hole center.
(When use metal cover or other metal installation parts, please keep more than 4mm from primary components and any lead wires for safety.)

M SERIES MRW-150/151

UL/CSA/TÜV approved

SPECIFICATIONS AND STANDARDS

PART NO.		MRW-150	MRW-151
Rated output voltage and current ^{*1}	V ₁	+5V • 2.2A(4A) ^{*4}	+5V • 2.2A(4A) ^{*4}
	V ₂	+12V • 1.8A(2.5A) ^{*4}	+15V • 1.4A(2A) ^{*4}
	V ₃	−12V • 0.1A(0.3A) ^{*4}	−15V • 0.1A(0.25A) ^{*4}
Maximum output power	W	35	35

INPUT CONDITIONS

Input voltage Eac	V	90 to 264[Rating: 100, 120, 200, 240]
Input frequency	Hz	47 to 66[Rating: 50 to 60](Single phase)
Input current	A	1max./0.5max.[AC.100/200V, maximum output rated power]
Fuse rating	A	2.5[Built-in]
Surge current	A	50max./100max.[AC.100/200V, 25°C, cold start]
Leakage current	mA	0.5max./0.75max.[AC.100/200V, 25°C, output rating]
Efficiency	%	70typ. 70typ.

OUTPUT CHARACTERISTICS

Output voltage E _{dc}		V	+5(V ₁)	+12(V ₂)	−12(V ₃)	+5(V ₁)	+15(V ₂)	−15(V ₃)
Voltage variable range		%	+5, −3	V ₂ varies simultaneously and in the same direction as V ₁ .		+5, −3	V ₂ varies simultaneously and in the same direction as V ₁ .	
Maximum output current* ¹		A	4	2.5	0.3	4	2	0.25
Rated output current		A	2.2	1.8	0.1	2.2	1.4	0.1
Minimum output current* ²		A	1	0.6	0	1	0.5	0
Output setting [Voltage]		V	5±0.02	—	—	5±0.02	—	—
conditions [Current]		A	2.2	1.8	0.1	2.2	1.4	0.1
Overvoltage threshold		V	5.8 to 6.9			5.8 to 6.9		
Voltage stability	Input variation	%	1typ.	1typ.	1typ.	1typ.	1typ.	1typ.
	Load variation* ³	%	3typ	5typ.	1typ.	3typ.	5typ.	1typ.
	Temperature variation [0 to +50°C]	%	2typ.	2typ.	1typ.	2typ.	2typ.	2typ.
	Total variation	%	+4, −2max.	±5max.	±6max.	+4, −2max.	+3, −8max.	±6max.
	Drift	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]					
	Dynamic load	%/ms	±4max./2max.[50 to 100% sudden load change]					
Ripple E _{p-p}		mV	50max.	80max.	30max.	80max.	120max.	30max.
Ripple noise E _{p-p}		mV	150max.	290max.	290max.	150max.	350max.	350max.
Start up time		ms	600max.[25°C, input and output ratings]			530max.[25°C, input and output ratings]		
Rise time		ms	20max.[25°C, input and output ratings]			10max.[25°C, input and output ratings]		
Hold up time		ms	15min.[25°C, input and output ratings]			15min.[25°C, input and output ratings]		

AUXILIARY FUNCTIONS

Indicator display	No
Overvoltage protection	Only 5V built-in protection, voltage shut-down type, recovers upon reset (interval approx. 45s).
Overcurrent protection	36W min., total power type
Remote ON-OFF	No
Remote sensing	No

STANDARDS

Safety standards	UL1950-3, CSA950-95(C-UL), EN60950(TÜV) approved.
Noise terminal voltage	FCC class B, VDE0871 class B compliant.

CONSTRUCTIONS

External dimensions	mm	30×100×160[H×W×L]
Weight	g	350max.
Mounting method		1 side(Open frame)
Case and cover		Frame/cover sold separately (Part No.: 2JF00B157/2JC0ZB156)
Input and output cables		Sold separately(Part No.: 4EU40B153)

^{*1} Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.

^{*2} Normal output voltages might possibly not be maintained if outputs V₂, V₃ fall below V₁ minimum current values.

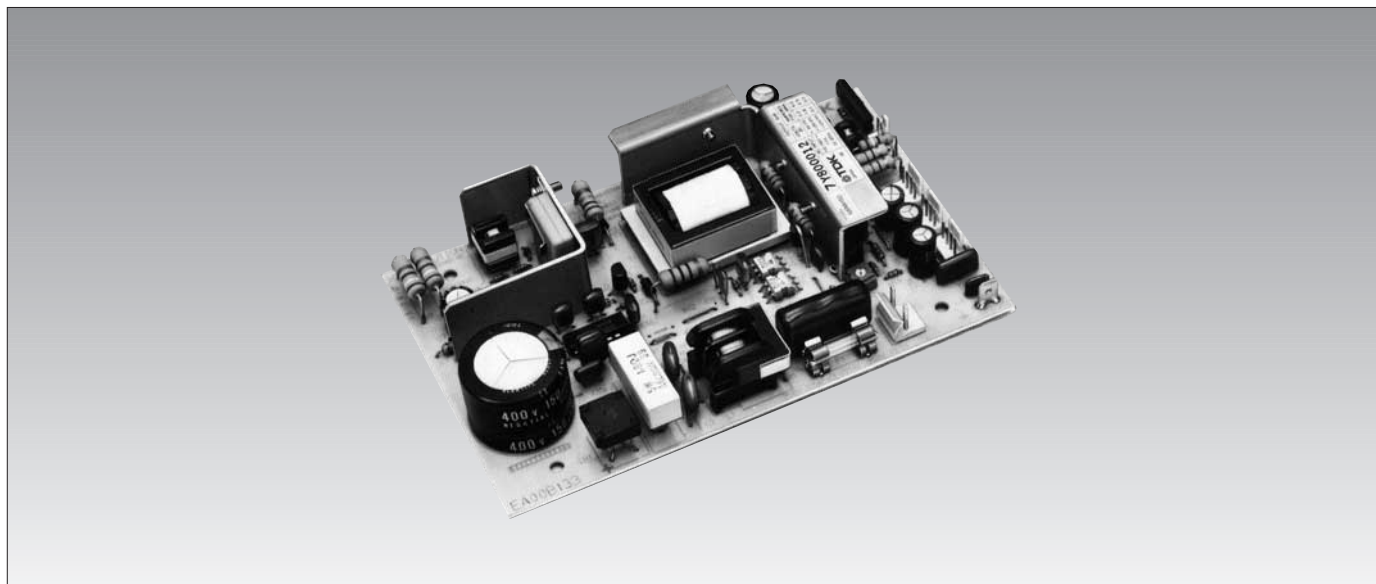
^{*3} Load range

V₁: 1 to 2.2A, V₂: 0.6 to 1.8A, V₃: 0 to 0.1A

^{*4} At the maximum output current value within the parentheses, the sum of all output(V₁, V₂ and V₃) power values can not exceed this maximum output power.

M SERIES MRW-150/151

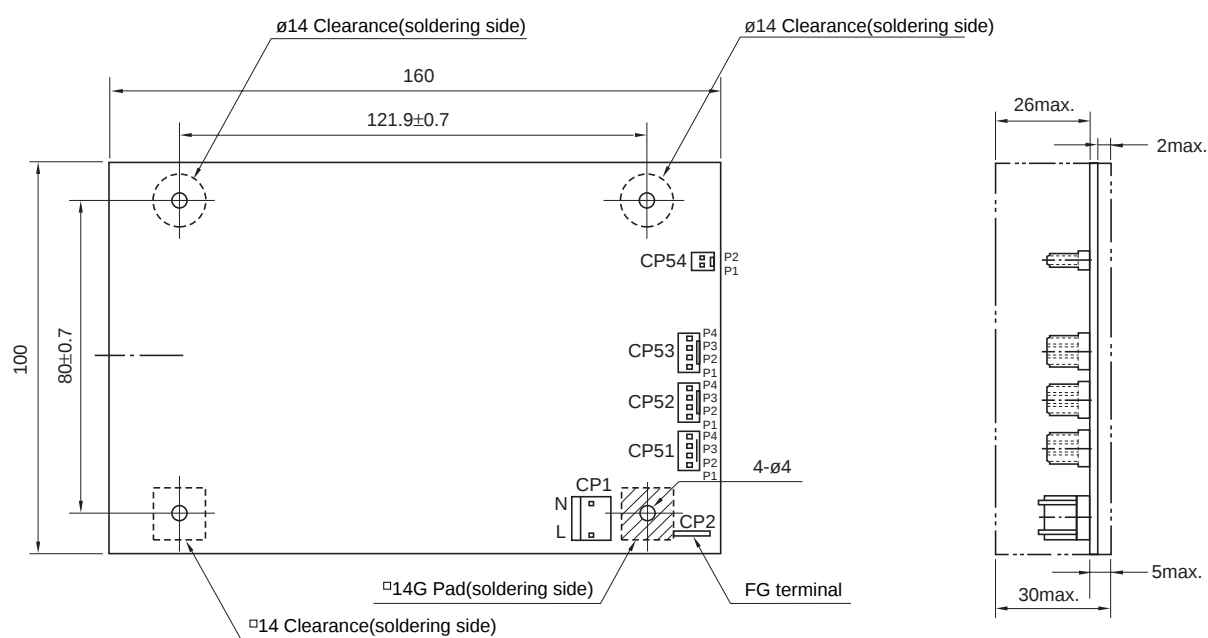
UL/CSA/TÜV approved



SHAPES AND DIMENSIONS

MRW-150/151

Dimensions in mm
±1mm : without specified dimensions



[Terminal place]

CP1: AC INPUT

L	LIVE
N	NEUTRAL

CP2: FG

CP51, CP52, CP53: OUTPUT

	MRW-150	MRW-151
P1	+5V	+5V
P2	COMMON	COMMON
P3	+12V	+15V
P4	-12V	-15V

CP54: POWER OK SIGNAL

P1	COMMON
P2	POWER OK SIGNAL

M SERIES MRW-160/161

UL/CSA/TÜV approved

SPECIFICATIONS AND STANDARDS

PART NO.		MRW-160	MRW-161
Rated output voltage and current ^{*1}	V ₁	+5V • 5A(6A) ^{*3}	+5V • 5A(6A) ^{*3}
	V ₂	+12V • 2A(2.5A) ^{*3}	+15V • 1.5A(2A) ^{*3}
	V ₃	−12V • 0.1A(0.5A) ^{*3}	−15V • 0.1A(0.4A) ^{*3}
Maximum output power	W	50	50

INPUT CONDITIONS

Input voltage Eac	V	90 to 264[Rating: 100 to 120/200 to 240]
Input frequency	Hz	47 to 66[Rating: 50 to 60](Single phase)
Input current	A	1.3max./0.8max.[AC.100 to 120/200 to 240V]
Fuse rating	A	3[Built-in]
Surge current	A	50max./100max.[AC.100 to 120/200 to 240V, 25°C, cold start]
Leakage current	mA	0.5max./0.75max.[AC.100 to 120/200 to 240V]
Efficiency	%	75typ. 73typ.

OUTPUT CHARACTERISTICS

Output voltage Edc	V	+5(V ₁)	+12(V ₂)	−12(V ₃)	+5(V ₁)	+15(V ₂)	−15(V ₃)
Voltage variable range	%	+5, −3	V ₂ varies simultaneously and in the same direction as V ₁ .		+5, −3	V ₂ varies simultaneously and in the same direction as V ₁ .	
Maximum output current ^{*1}	A	6	2.5	0.5	6	2	0.4
Rated output current	A	5	2	0.1	5	1.5	0.1
Minimum output current ^{*2}	A	1	0.6	0	1	0.5	0
Output setting [Voltage]	V	5±0.02	—	—	5±0.02	—	—
conditions [Current]	A	2.5	2	0.1	2.5	1.5	0.1
Voltage stability	Input variation	%	2max.	2max.	1max.	2max.	1max.
	Load variation ^{*2}	%	4max.	2max.	1max.	4max.	2max.
	Temperature variation [0 to +50°C]	%	2max.	2max.	1max.	2max.	1max.
	Total variation	%	±4max.	+6, −4max.	±6max.	±4max.	+8, −2max.
	Drift	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]				
	Dynamic load	%/ms	±4max./1max.[50 to 100% sudden load change]				
Ripple Ep-p	mV	80max.	80max.	30max.	80max.	80max.	30max.
Ripple noise Ep-p	mV	150max.	290max.	290max.	150max.	350max.	350max.
Start up time	ms	500typ.					
Hold up time	ms	20min.(30typ.)					

AUXILIARY FUNCTIONS

Indicator display	No
Overvoltage protection	Only 5V built-in protection, voltage shut-down type(overvoltage threshold 5.8 to 6.9V), recovers upon reset.
Overcurrent protection	60W min., total power type
Remote ON-OFF	No
Remote sensing	No
Current balance	No
Output voltage external variable function	No

STANDARDS

Safety standards	UL1950-3, CSA950-95(C-UL), EN60950(TÜV) approved.
Noise terminal voltage	FCC class B, VDE0871 class B compliant.

CONSTRUCTIONS

External dimensions	mm	38×100×160[H×W×L]
Weight	g	500max.
Mounting method		Can be attached to 1 side.
Case and cover		Frame/cover sold separately (Part No.: 2JF00B167/2JC0ZB166)
Input and output cables		Sold separately(Part No.: 4EU40B153)

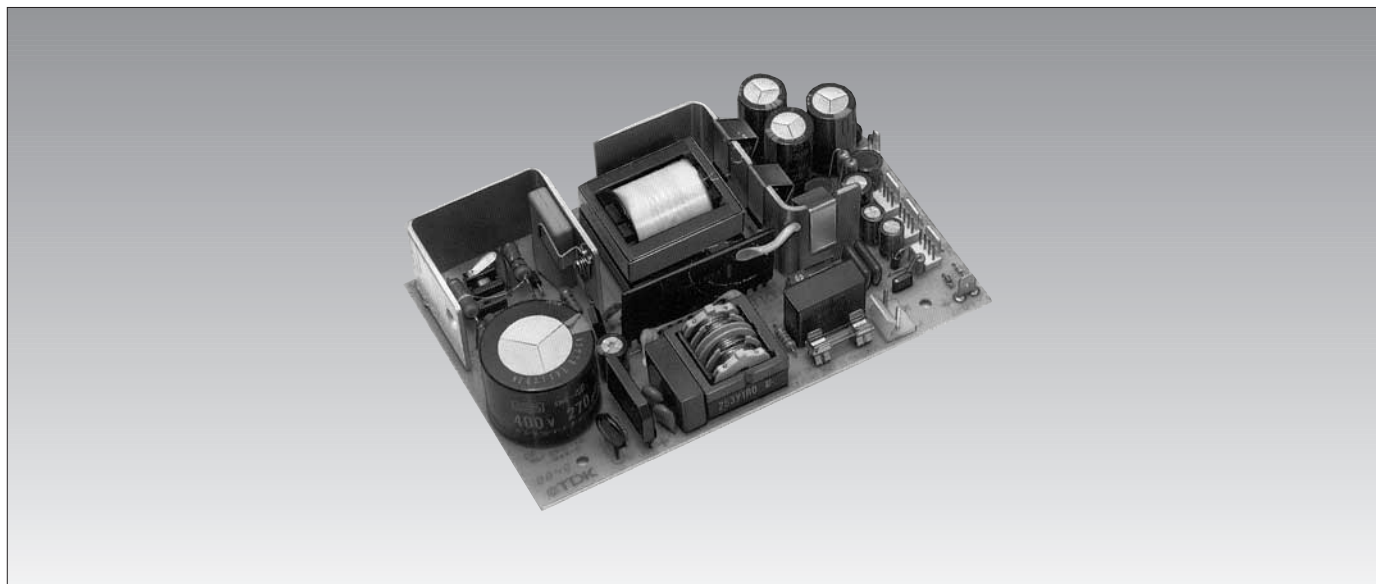
^{*1} Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.

^{*2} Normal output voltages might possibly not be maintained if outputs V₂, V₃ fall below V₁ minimum current values.

^{*3} At the maximum output current value within the parentheses, the sum of all output(V₁, V₂ and V₃) power values can not exceed this maximum output power.

M SERIES MRW-160/161

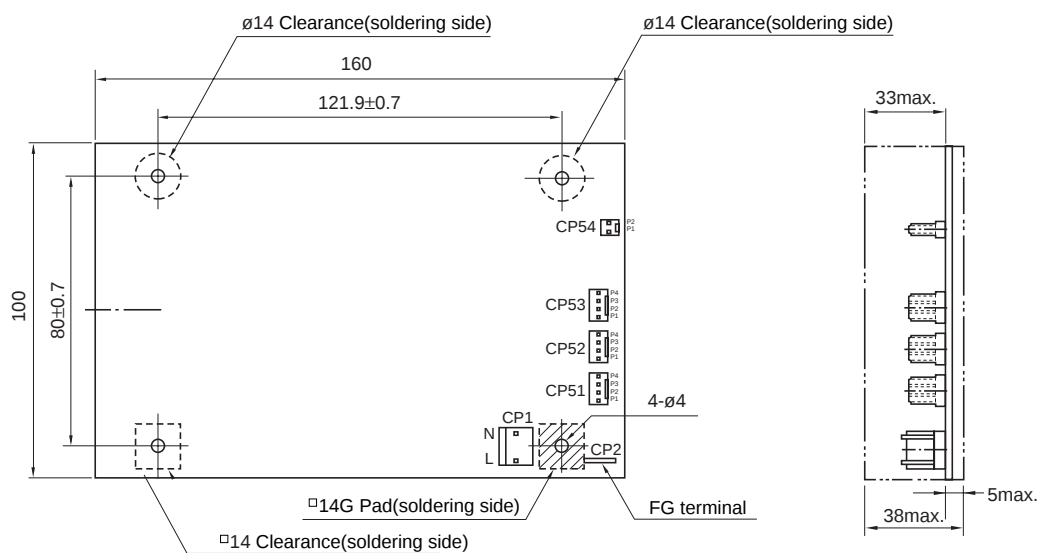
UL/CSA/TÜV approved



SHAPES AND DIMENSIONS

MRW-160/161

Dimensions in mm
±1mm : without specified dimensions



[Terminal place]

CP1: AC INPUT

L LIVE
N NEUTRAL

CP2: FG

CP51, CP52, CP53: OUTPUT

	MRW-160	MRW-161
P1	+5V	+5V
P2	COMMON	COMMON
P3	+12V	+15V
P4	-12V	-15V

CP54: POWER OK SIGNAL

P1 COMMON
P2 POWER OK SIGNAL

M SERIES MRW-170/171

UL/CSA/TÜV approved

SPECIFICATIONS AND STANDARDS

PART NO.		MRW-170	MRW-171
Rated output voltage and current ¹	V ₁	+5V • 5A(7A) ^{*4}	+5V • 5A(7A) ^{*4}
	V ₂	+12V • 1.7A(2.5A) ^{*4}	+15.8V • 1.3A(2A) ^{*4}
	V ₃	−12V • 1.7A(2.5A) ^{*4}	−15.8V • 1.3A(2A) ^{*4}
Maximum output power	W	65	65

INPUT CONDITIONS

Input voltage Eac	V	85 to 264[Rating: 100/240]
Input frequency	Hz	47 to 66[Rating: 50 to 60](Single phase)
Input current	A	1.7max./0.9max.[AC.100/240V]
Fuse rating	A	3.15[Built-in]
Surge current	A	50max./100max.[AC.115/230V, 25°C, cold start]
Leakage current	mA	0.5max./0.75max.[AC.115/230V, 25°C, output rating]
Efficiency	%	70typ. 70typ.

OUTPUT CHARACTERISTICS

Output voltage Edc	V	+5(V ₁)	+12(V ₂)	−12(V ₃)	+5(V ₁)	+15.8(V ₂)	−15.8(V ₃)
Voltage variable range	V	—	—	—	—	—	—
Maximum output current ^{*1}	A	7	2.5	2.5	7	2	2
Rated output current	A	5	1.7	1.7	5	1.3	1.3
Minimum output current ^{*2}	A	0.8	0.3	0.3	0.8	0.3	0.3
Output setting conditions	[Voltage]	V	5±0.02	—	5±0.02	—	—
	[Current]	A	5	1.7	1.7	5	1.3
Overvoltage threshold	V	5.8 to 6.9	5.8 to 6.9	5.8 to 6.9	5.8 to 6.9	5.8 to 6.9	5.8 to 6.9
Voltage stability	Input variation	%	1typ.	1typ.	1typ.	1typ.	1typ.
	Load variation ^{*3}	%	3.5typ.	5typ.	5typ.	3.5typ.	5typ.
	Temperature variation [0 to +50°C]	%	2typ.	3.5typ.	3.5typ.	2typ.	3.5typ.
	Total variation	%	±4max.	+8, −7max.	+8, −7max.	±4max.	+8, −7max.
	Drift	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]
	Dynamic load	%/ms	±4max./0.5max.[50 to 100% sudden load change]	±4max./0.5max.[50 to 100% sudden load change]	±4max./0.5max.[50 to 100% sudden load change]	±4max./0.5max.[50 to 100% sudden load change]	±4max./0.5max.[50 to 100% sudden load change]
Ripple	Source	mV	30max.	30max.	30max.	30max.	30max.
Ep-p	Switching	mV	50max.	50max.	50max.	50max.	50max.
Ripple noise Ep-p		mV	150max.	250max.	250max.	150max.	250max.
Start up time		ms	600typ.[AC.115V]	600typ.[AC.115V]	600typ.[AC.115V]	600typ.[AC.115V]	600typ.[AC.115V]
Hold up time		ms	15min.(20typ.)[AC.115V]	15min.(20typ.)[AC.115V]	15min.(20typ.)[AC.115V]	15min.(20typ.)[AC.115V]	15min.(20typ.)[AC.115V]

AUXILIARY FUNCTIONS

Indicator display	No
Overvoltage protection	Only 5V built-in protection, voltage shut-down type, recovers upon reset.
Overcurrent protection	66W min., total power type
Remote ON-OFF	No
Remote sensing	No

STANDARDS

Safety standards	UL1950-3, CSA950-95(C-UL), EN60950(TÜV) approved.
Noise terminal voltage	FCC class B, VDE0871 class B compliant.

CONSTRUCTIONS

External dimensions	mm	38×100×160[H×W×L]
Weight	g	450max.
Mounting method		1 side(Open frame)
Case and cover		—
Input and output cables		—

^{*1} Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.

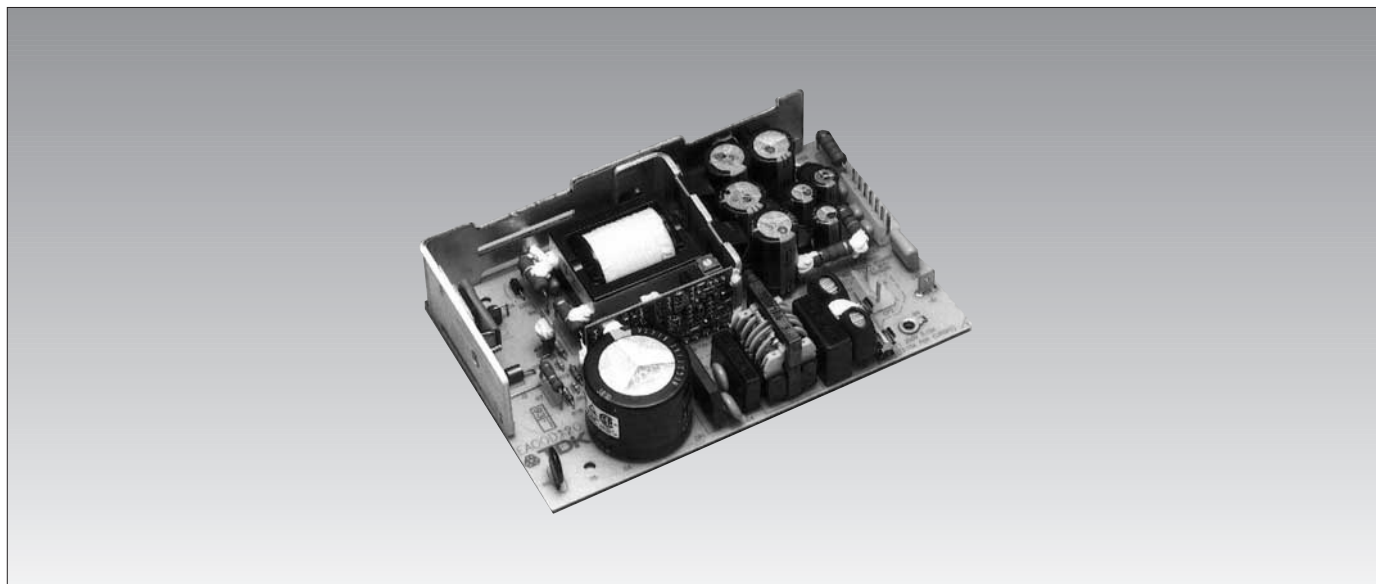
^{*2} Normal output voltages might possibly not be maintained if outputs V₂, V₃ fall below V₁ minimum current values.

^{*3} The load variation is determined within a range of the minimum output current to the rated output current.

^{*4} The value in parentheses indicates the maximum output current. The total output power of V₁ to V₃ cannot exceed the maximum output power.

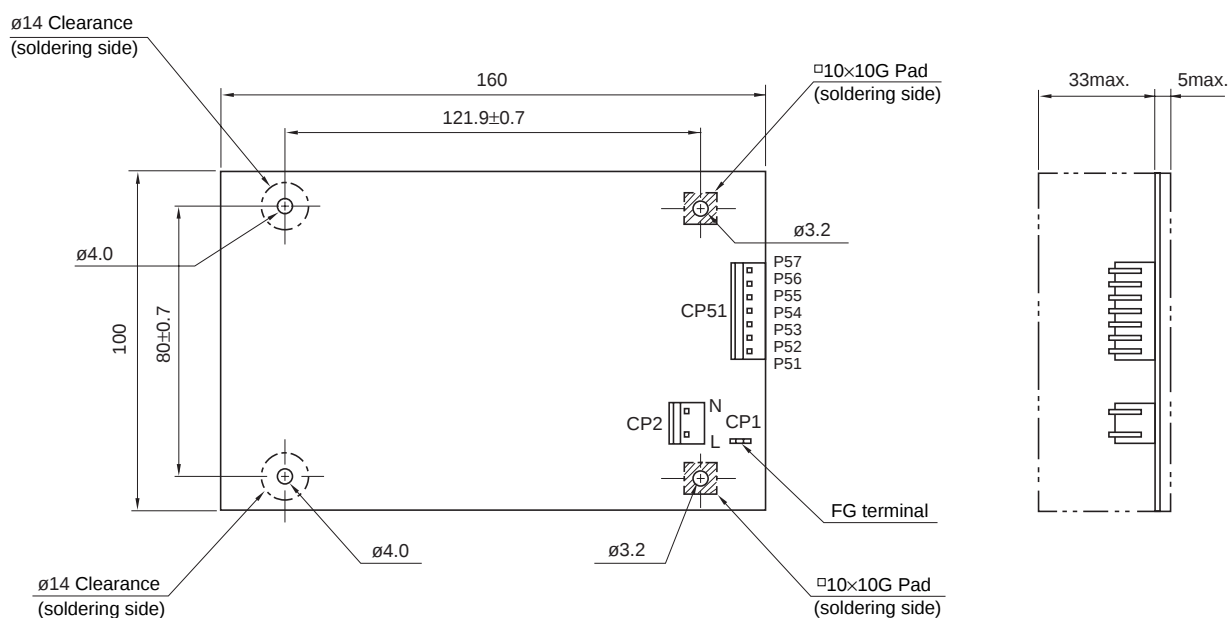
M SERIES MRW-170/171

UL/CSA/TÜV approved



SHAPES AND DIMENSIONS MRW-170/171

Dimensions in mm
±1mm : without specified dimensions



[Terminal place]

CP2: AC INPUT

L LIVE

N NEUTRAL

CP1: FG

CP51: OUTPUT

P57 +12V

P56 +5V

P55 +5V

P54 COMMON

P53 COMMON

P52 COMMON

P51 -12V

(MRW-170)

P57 +15V

P56 +5V

P55 +5V

P54 COMMON

P53 COMMON

P52 COMMON

P51 -15V

(MRW-171)

M SERIES MRW-350

UL/CSA/TÜV approved

SPECIFICATIONS AND STANDARDS

PART NO.		MRW-350		
Rated output voltage and current ^{*1}	V ₁	+5V • 3A		
	V ₂	+12V • 2A		
	V ₃	−12V • 0.1A		
Maximum output power	W	40		
INPUT CONDITIONS				
Input voltage Eac	V	90 to 264[Rating: 100/120/220/240]		
Input frequency	Hz	47 to 66[Rating: 50 to 60Hz](Single phase)		
Input current	A	0.9max./0.55max.[AC.100/240V]		
Fuse rating	A	2[Built-in]		
Surge current	A	50max./100max.[AC.115/230V, 25°C, cold start]		
Leakage current	mA	0.5max./0.75max.[AC.115/230V, 25°C, output rating]		
Efficiency	%	70typ.		
OUTPUT CHARACTERISTICS				
Output voltage Edc	V	+5(V ₁)	+12(V ₂)	−12(V ₃)
Voltage variable range	V	—		
Maximum output current ^{*1}	A	3	2	0.1
Minimum output current ^{*2}	A	0.5	0.3	0
Output setting [Voltage]	V	5±0.02	—	—
conditions [Current]	A	3	2	0
Overvoltage threshold	V	5.8 to 6.9	—	—
Voltage stability	Input variation	%	1typ.	1typ.
	Load variation ^{*3}	%	2typ.	1typ.
	Temperature variation [0 to +50°C]	%	2typ.	1typ.
	Total variation	%	±3.5max.	±7max.
	Drift	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]	
	Dynamic load	%/ms	±4max./0.5typ.[50 to 100% sudden load change]	
Ripple Source	mV	30max.	100max.	10max.
Ep-p Switching	mV	25max.	20max.	20max.
Ripple noise Ep-p	mV	150max.	250max.	250max.
Start up time	ms	500typ.[AC.120V]		
Hold up time	ms	15min.(20typ.)[AC.120V]		

AUXILIARY FUNCTIONS

Indicator display	No
Overvoltage protection	Only 5V built-in protection, voltage shut-down type, recovers upon reset.
Overcurrent protection	41W min., total power type
Remote ON-OFF	No
Remote sensing	No

STANDARDS

Safety standards	UL1950-3, CSA950-95(C-UL), EN60950(TÜV) approved.
Noise terminal voltage	FCC class B, VDE0871 class B compliant.

CONSTRUCTIONS

External dimensions	mm	36.75×76×127[H×W×L]
Weight	g	240max.
Mounting method		1 side(Open frame)
Case and cover		—
Input and output cables		—

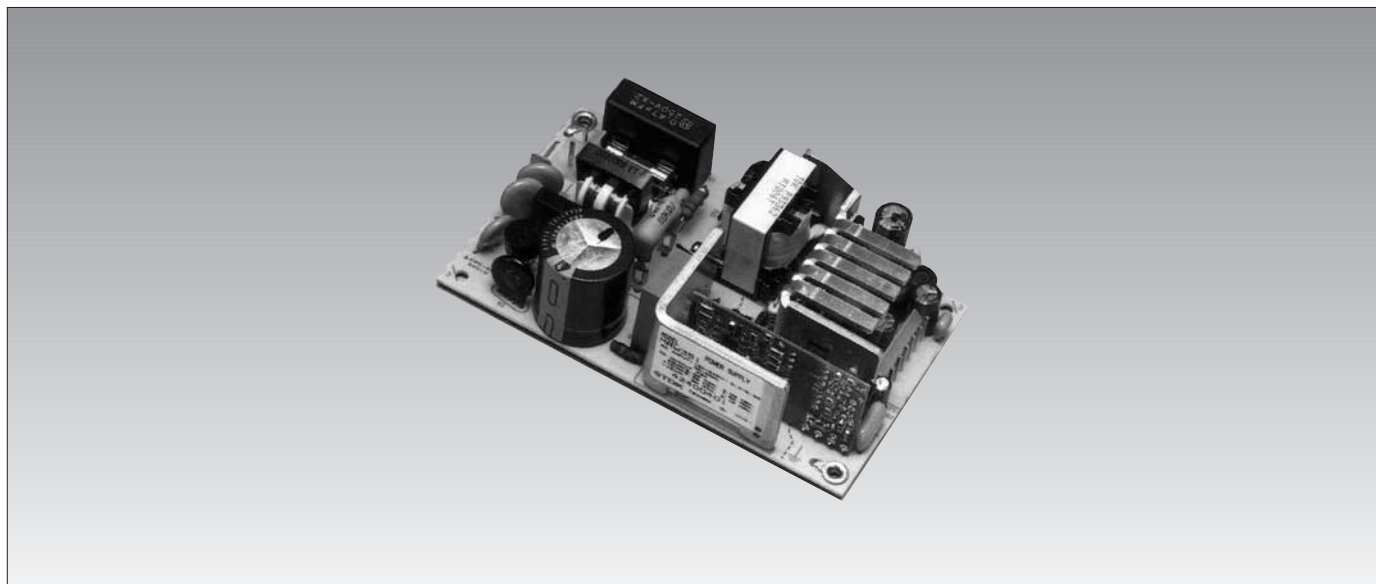
¹ Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.

² Normal output voltages might possibly not be maintained if outputs V₂, V₃ fall below V₁ minimum current values.

³ Load variation will be specified from the minimum output current to the rated output current range.

M SERIES MRW-350

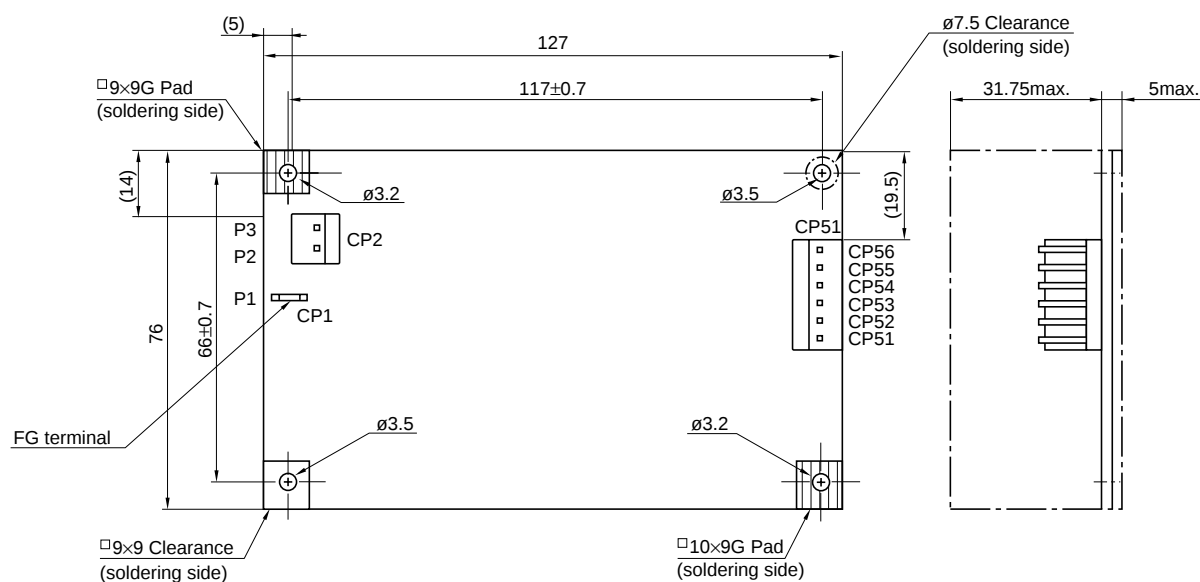
UL/CSA/TÜV approved



SHAPES AND DIMENSIONS

MRW-350

Dimensions in mm
±1mm : without specified dimensions



[Terminal place]

CP1

P1	FG
----	----

CP2: AC INPUT

P2	L(LIVE)
P3	N(NEUTRAL)

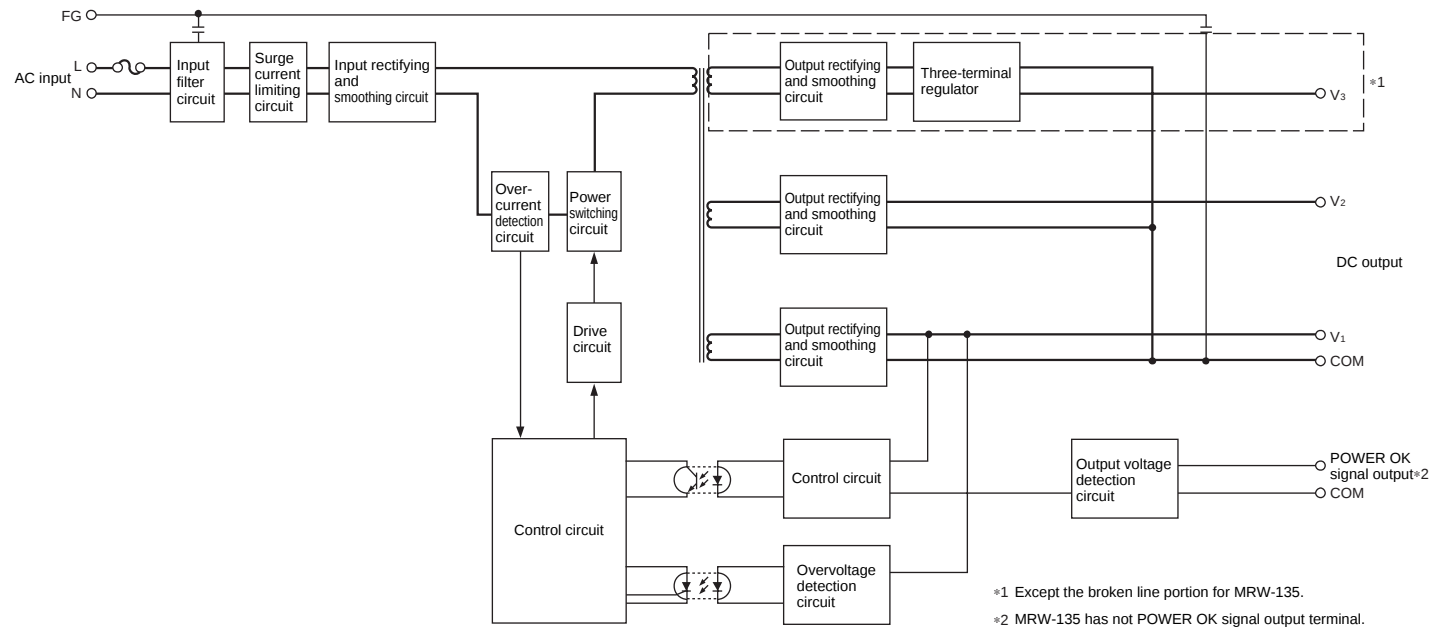
CP51: DC OUTPUT

P56	+12V
P55	+5V
P54	+5V
P53	COMMON
P52	COMMON
P51	-12V

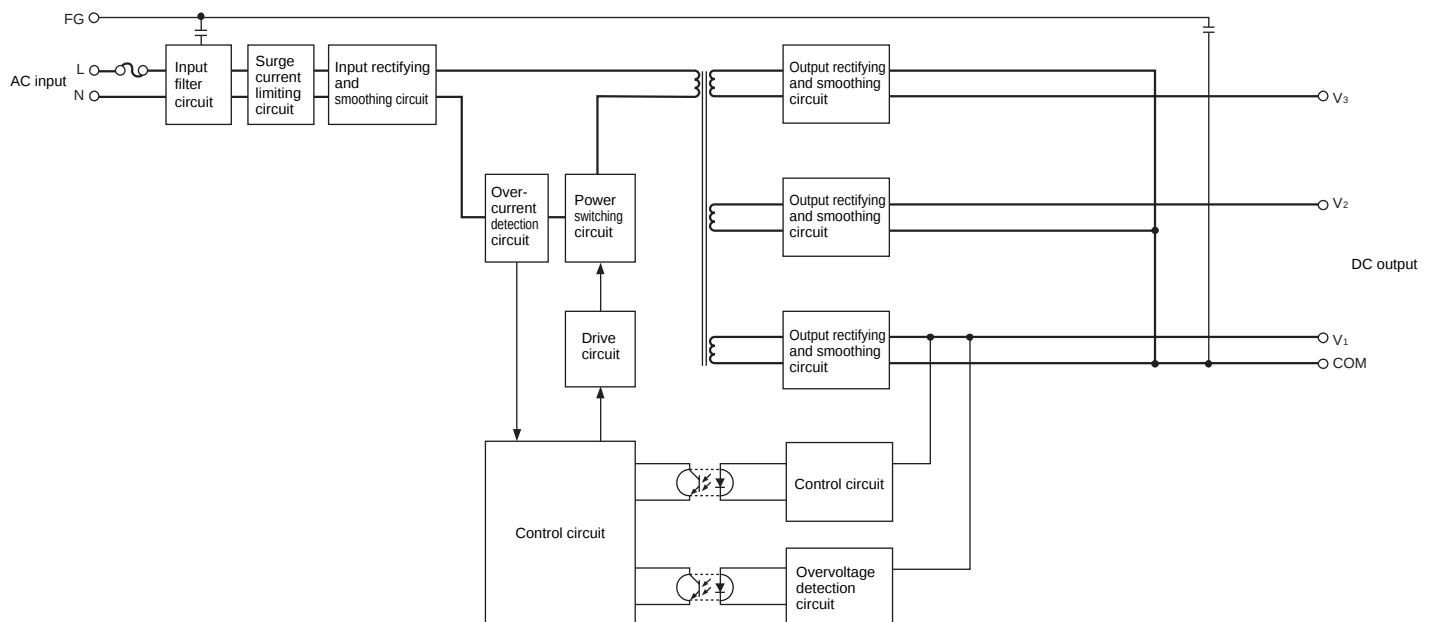
Characteristics, Functions, and Applications

BLOCK DIAGRAM

MRW-135/150/151/160/161

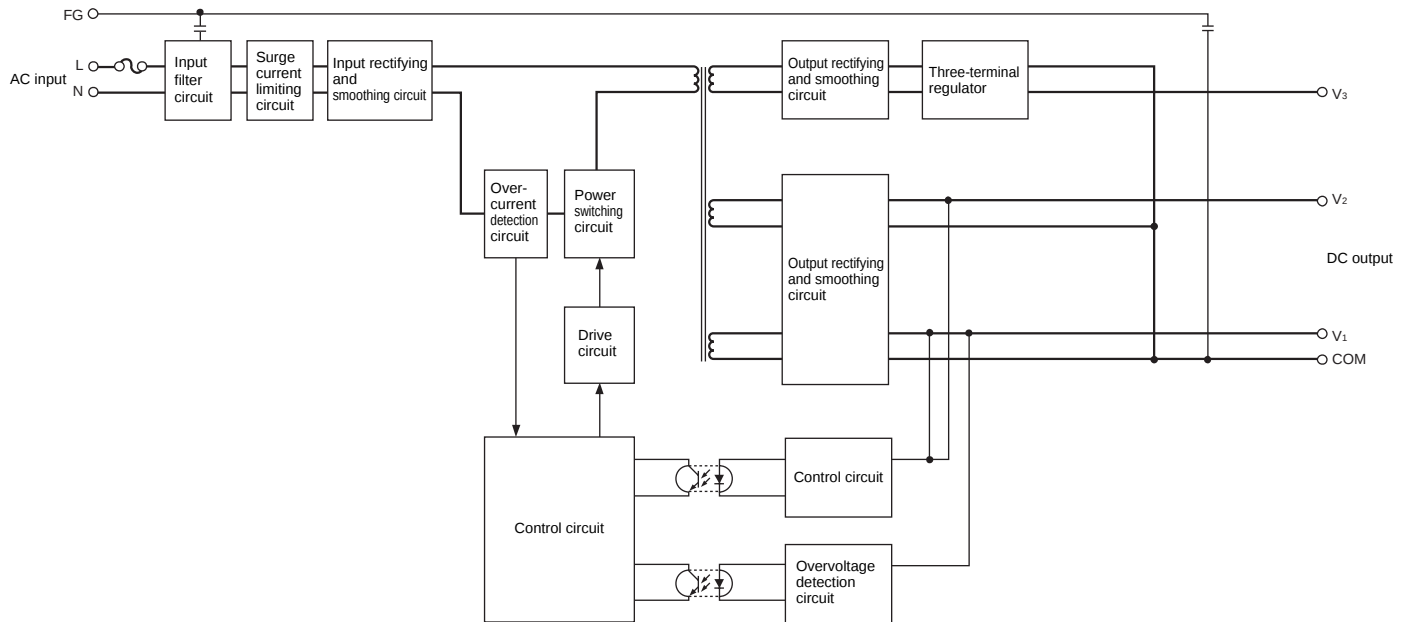


MRW-170/171



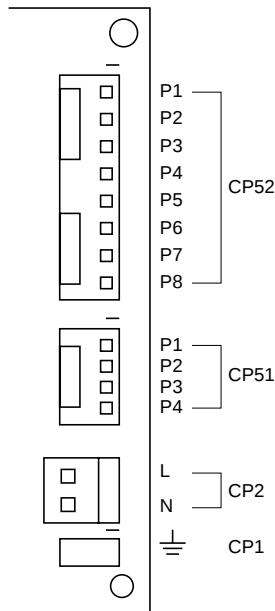
Characteristics, Functions, and Applications

MRW-350



TERMINAL DESIGNATIONS AND FUNCTIONS

MRW-135

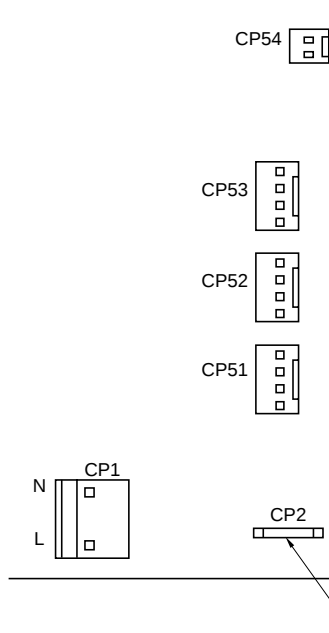


Pin location

2 MRW135

CP1	1	FG
CP2	2	Input(L)
	1	Input(N)
CP51	P1	V ₂
	P2	COMMON
	P3	V ₁
	P4	COMMON
CP52	P1	COMMON
	P2	COMMON
	P3	V ₁
	P4	V ₁
	P5	COMMON
	P6	COMMON
	P7	V ₂
	P8	V ₂

MRW-150, 151, 160, 161



Pin location

4 MRW150, 160, 161

CP1	1	Input(L)
	2	Input(N)
CP2	1	FG
CP51	P1	V ₁
	P2	COMMON
	P3	V ₂
	P4	V ₃
CP52	P1	V ₁
	P2	COMMON
	P3	V ₂
	P4	V ₃
CP53	P1	V ₁
	P2	COMMON
	P3	V ₂
	P4	V ₃
CP54	P1	COMMON
	P2	POWER OK SIGNAL

1 AC input terminals(L, N)

Connect to AC.100/120V or AC.200/240V single phase input line.

2 Frame ground terminal(G)

Connect to earth ground. This is connected to the case.

3 DC output terminals(V₁, V₂, V₃)

Connect to load.

4 DC output common terminal(COMMON)

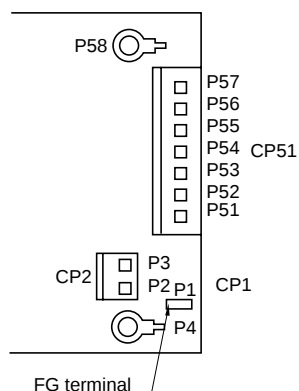
Connect to load.

5 POWER OK signal output terminal (POWER OK SIGNAL)

Outputs the signal at 4.5V min. of the +5V output voltage (Applied to MRW-150, 151, 160, and 161).

Characteristics, Functions, and Applications

MRW-170, 171

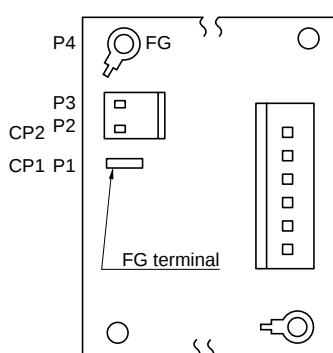


Pin location

2 MRW170, 171

CP1	P1	FG(Primary)
CP2	P2	Input(L)
	P3	Input(N)
CP51	P57	V ₂
	P56	V ₁
	P55	V ₁
	P54	COMMON
CP52	P53	COMMON
	P52	COMMON
	P51	V ₃
	P4	FG(Primary)
	P58	FG(Secondary)

MRW-350



Pin location

2 MRW350

CP1	P1	FG(Primary)
CP2	P2	Input(L)
	P3	Input(N)
CP51	P56	V ₂
	P55	V ₁
	P54	V ₁
	P53	COMMON
	P52	COMMON
	P51	V ₃
	P4	FG(Primary)
	P57	FG(Secondary)

1 AC input terminals(L, N)

Connect to AC.100/120V or AC.200/240V single phase input line.

2 Frame ground terminal(G)

Connect to earth ground. This is connected to the case.

3 DC output terminals(V₁, V₂, V₃)

Connect to load.

4 DC output common terminal(COMMON)

Connect to load.

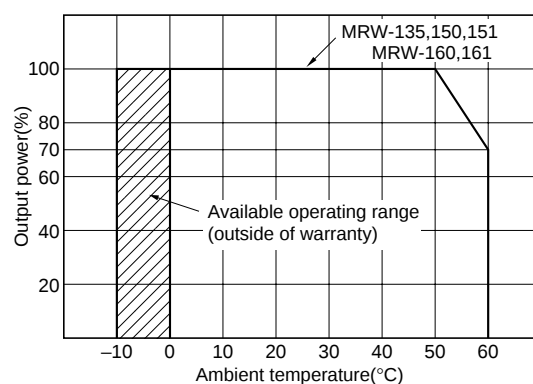
COMMON SPECIFICATIONS

Temperature and humidity		MRW-135 MRW-150, 151, 160, 161	MRW-170, 171 MRW-350
Temperature range	Operating(°C)	0 to +60 ^{*1}	0 to +70 ^{*1}
	Storage(°C)	−25 to +75	−40 to +75
Humidity range	Operating(%)RH	20 to 95[Maximum wet-bulb temperature: 35°C, without dewing]	
	Storage(%)RH		
Amplitude and vibration			
Amplitude	5 to 10Hz	All amplitude 10mm[3 directions, each 1h]	
	10 to 55Hz	Acceleration 19.6m/s ² [2G, 3 directions, each 1h]	
Vibration	Acceleration	196m/s ² [20G, 3 directions, each 3 times]	
	Vibration time	11±5ms	
Withstand voltage and insulation resistance			
Withstand voltage	Input terminal to ground terminal($\frac{1}{2}$)	Eac(kV)2, 1min[Normal temperature, normal humidity, cutout current 10mA]	
	Input terminal to output terminal		
Insulation resistance	Input terminal to ground terminal($\frac{1}{2}$)	Edc(V)500, 100MΩ min. [Normal temperature, normal humidity]	
	Input terminal to output terminal		
	Output terminal to ground terminal($\frac{1}{2}$)		

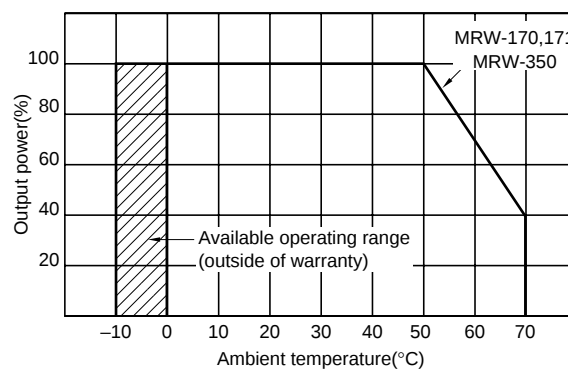
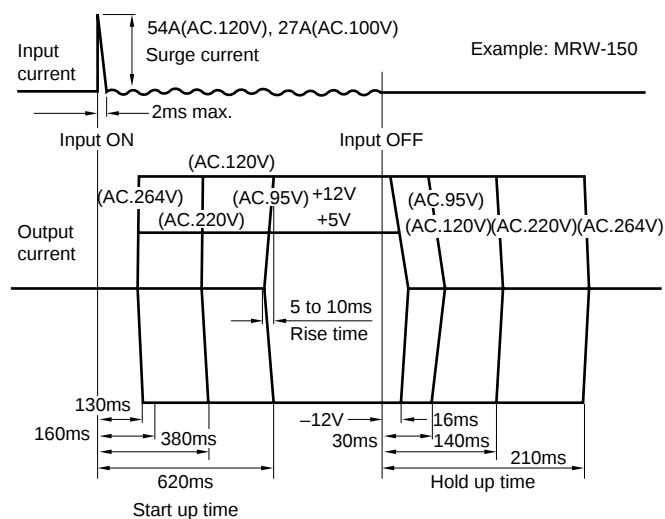
^{*1} Derating is necessary when operating environment temperature exceed 50°C.

Characteristics, Functions, and Applications

OUTPUT POWER-AMBIENT TEMPERATURE(DERATINGS)

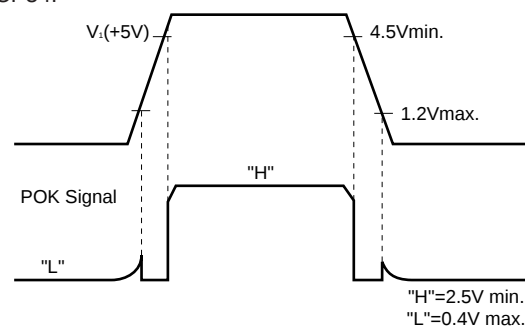


OUTPUT POWER-AMBIENT TEMPERATURE(DERATINGS)

SURGE CURRENT, START UP TIME AND HOLD UP TIME
TEMPERATURE: 25°C

POWER OK SIGNAL

If the output voltage level of V_1 (+5V) is 4.5V or higher, the POK (POWER OK SIGNAL) signal is outputted from the connector CP54.



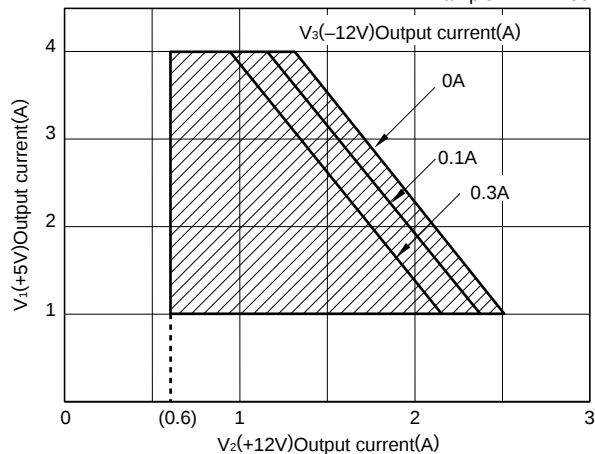
- The POK signal relates to an output voltage. An abnormality of an input voltage is not detected.

Characteristics, Functions, and Applications

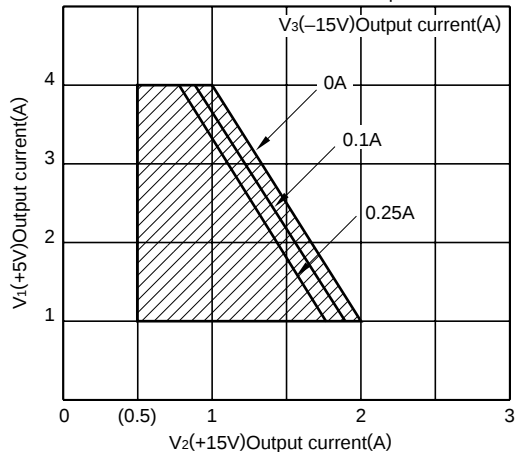
OUTPUT CURRENT COMBINATION

Use the output currents within the shaded range.

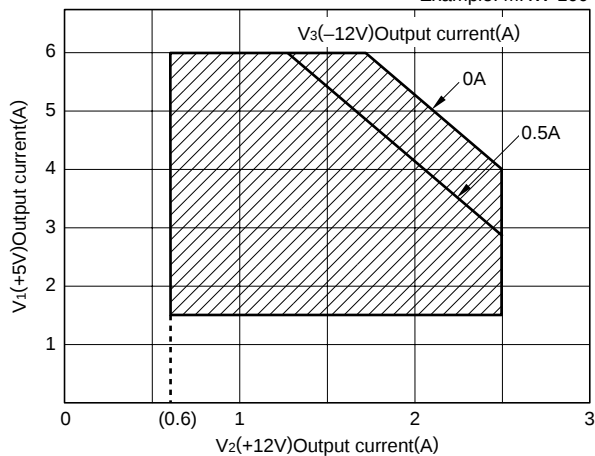
Example: MRW-150



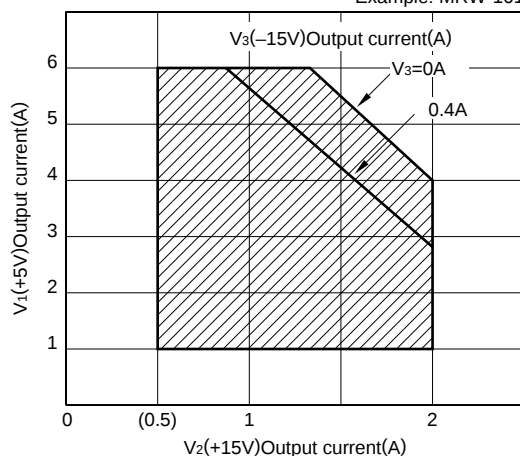
Example: MRW-151



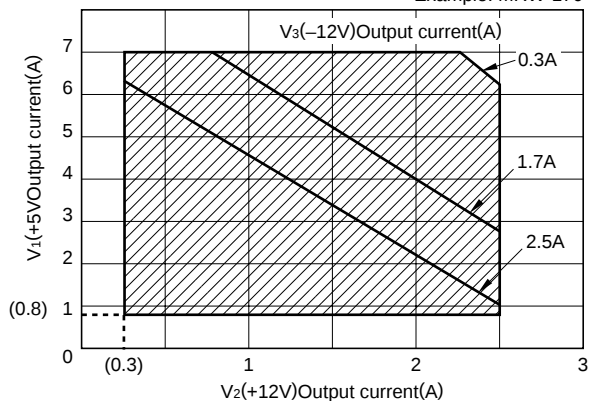
Example: MRW-160



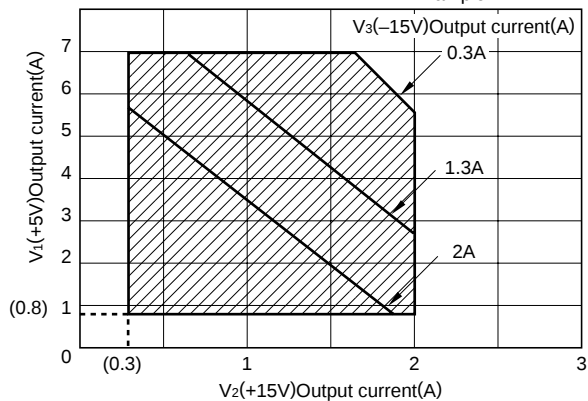
Example: MRW-161



Example: MRW-170



Example: MRW-171



Characteristics, Functions, and Applications

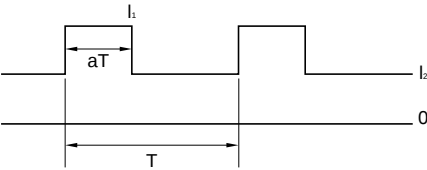
V2 (+12) OUTPUT PEAK CURRENT

While the peak current can be outputted at the V2 (+12) output in the MRW-135, use it within the range described below.

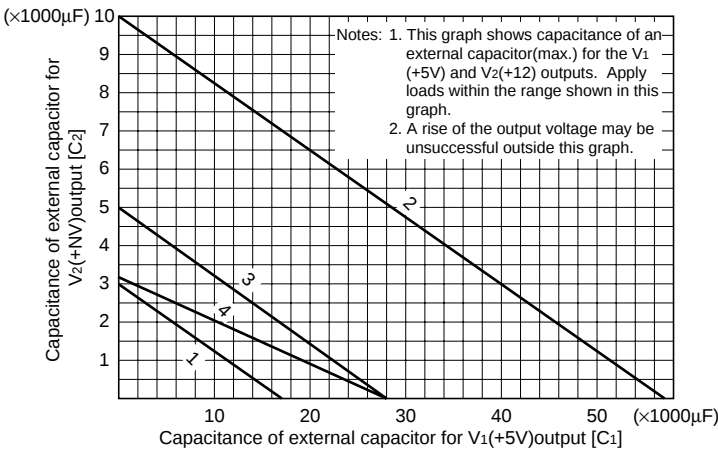
MRW-135

If the 12V output exceeds 1.5A, the time should be 3 sec max. and the effective current be 1.5A max.
For example, use the following current in the case of a waveform shown below:

$aT \leq 3(s)$
 $\sqrt{aI_1^2 + (1-a)I_2^2} \leq 1.5(A)$



ALLOWABLE LOAD CAPACITY OF OUTPUT EXTERNAL CAPACITOR



Part No.	Maximum load capacity			Allowable value	Graph
	V ₁ (+5V)	V ₂ (+NV)	V ₃ (-NV)		
	C ₁ max.(μF)	C ₂ max.(μF)	C ₃ max.(μF)	C ₁ V ₁ ² +C ₂ V ₂ ² ≤	
MRW-135	57,000	10,000	—	1,425,000	2
MRW-150	17,000	3,000	2,400	425,000	1
MRW-160	28,000	5,000	2,400	700,000	3
MRW-161	28,000	3,200	2,400	700,000	4

Note: For information other than the above, please contact us.

Characteristics, Functions, and Applications

CONNECTOR

Input or output connectors and the FG terminal connectors are as follows.

MRW-135

Part No.	Designation	Installation connector	Housing	Contact	Suitable sample wire
CP2	Input	5096-02C(MOLEX)	5195-03	5194TL	AWG#18-#24
CP1	$\perp$	82200	Faston® 250 SERIES		
CP51	Output	5045-04A(MOLEX)	5102-04	5103TL	AWG#22-#28
CP52	Output	5045-08A(MOLEX)	5102-08	5103TL	AWG#22-#28

MRW-150, 151, 160, 161

Part No.	Designation	Installation connector	Housing	Contact	Suitable sample wire
CP1	Input	5277-02A(MOLEX)	5195-03	5194TL	AWG#18-#24
CP2	$\perp$	P90(KOHWA) or 170267-1(AMP)	Faston® 250 SERIES		
CP51	Output	5045-04A(MOLEX)	5102-04	5103TL	AWG#22-#28
CP52					
CP53					
CP54	POK	5045-02A(MOLEX)	5102-02	5103TL	AWG#18-#28(MRW-150) AWG#22-#28(MRW-140,160,161)

MRW-170, 171

Part No.	Designation	Installation connector	Housing	Contact	Suitable sample wire
CP2	Input	5289-02A(MOLEX)	5199-02	5194TL	AWG#18-#24
CP1	$\perp$	82200(KYOSHIN) 170267-1(AMP)	Faston® 250 SERIES		
CP51	Output	5273-07A(MOLEX)	5239-07	5168TL	AWG#22-#28

MRW-350

Part No.	Designation	Installation connector	Housing	Contact	Suitable sample wire
CP1	Input	5289-02A(MOLEX)	5199-02	5194TL	AWG#18-#24
CP2	$\perp$	82200(KYOSHIN) or 170267-1(AMP)	Faston® 250 SERIES		
CP51	Output	5273-06A(MOLEX)	5239-06	5168TL	AWG#22-#28

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Characteristics, Functions, and Applications

SOLD SEPARATELY PRODUCTS

(1) FRAME AND COVER

Item	Part No.	Applicable type	Shapes and dimensions(mm)
Frame Cover	2JF00B157 2JC0ZB156	MRW-150 MRW-151	
Frame Cover	2JF00B167 2JC0ZB166	MRW-160 MRW-161	

- An order should be placed with the part number.

(2) INPUT AND OUTPUT CABLES

Applicable type	Input and output set	Type of wire in use			
		Input cable	Output cable	FG cable	Power OK signal cable
MRW-135	4EU20B241	AWG18	AWG24	AWG18	No
MRW-150 -151	4EU40B153				AWG24
MRW-160 -161	4EU40B153				

- Length of wire: 1m type in all cases
- An order should be placed with the input-output cable set part number. A set of required cables are included.