30W Reliable Railway DC-DC Converter

RSD-30 series

User's Manual

UL62368-1 AS/NZS62368-1 TPTC004 IEC62368-1

Railway Industrial Telecom Network

Features

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- Ultra compact and 1U low profile(25mm)
- 4:1 wide input range
- No minimum load required
- Protections: Short circuit / Overload / Over voltage / Input reverse polarity
- 4000VDC I/O isolation (reinforced isolation)
- Half encapsulated , cooling by free air convection
- -40~+70℃ wide working temperature
- Built-in constant current limiting circuit
- LED indicator for power on
- 3 years warranty

Applications

- Bus,tram,metro or railway system
- Wireless network
- Telecom or datacom system
- Highly vibrating, highly dusty, extremely low or high temperature harsh environment

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

Description

RSD-30 is a 30W enclosed type DC-DC reliable railway converter. This series is compliant with BS EN/EN50155/ IEC60571 railway standard, constituting three types of models with 4:1 wide but different input ranges 9~36V/18~72V/40~160V, suitable for railway and all kinds of transportation systems exploiting the frequently used standard input voltages such as 12V, 24V, 36V, 48V, 72V, 96V and 110V. Various output voltages, 3.3V, 5V, 12V and 24V are available for selection.

This series has the capability of working under -40~+70℃, low ripple and noise, supreme EMC characteristics, 4KVDC I/P-OP, low enclosure profile 25mm and an interior with semi-potted silicone. It does not only well fits the in-car systems or the facilities by rails for railway, trams and buses but also can be used in the harsh environment with high vibration, high dust, extremely low or high temperature, etc.

Model Encoding

RSD - 30 G - 5

- 5 — Output voltage (3.3/5/12/24Vdc)
- G — Input voltage (G: 9~36Vdc, L: 18~72Vdc, H: 40~160Vdc)
- 30 — Rated wattage
- RSD — Series name

SPECIFICATION

MODEL		RSD-30G-3.3	RSD-30G-5	RSD-30G-12	RSD-30G-24	RSD-30L-3.3	RSD-30L-5	RSD-30L-12	RSD-30L-24
OUTPUT	DC VOLTAGE	3.3V	5V	12V	24V	3.3V	5V	12V	24V
	RATED CURRENT	6A	6A	2.5A	1.25A	6A	6A	2.5A	1.25A
	CURRENT RANGE	0 ~ 6A	0 ~ 6A	0 ~ 2.5A	0 ~ 1.25A	0 ~ 6A	0 ~ 6A	0 ~ 2.5A	0 ~ 1.25A
	RATED POWER	19.8W	30W	30W	30W	19.8W	30W	30W	30W
	RIPPLE & NOISE (max.) Note.2	70mVp-p	70mVp-p	60mVp-p	50mVp-p	70mVp-p	70mVp-p	60mVp-p	50mVp-p
	VOLTAGE TOLERANCE Note.3	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION	±0.5%	±0.5%	±0.3%	±0.2%	±0.5%	±0.5%	±0.3%	±0.2%
	LOAD REGULATION	±0.5%	±0.5%	±0.3%	±0.2%	±0.5%	±0.5%	±0.3%	±0.2%
	SETUP, RISE TIME	120ms, 85ms at full load							
	HOLD UP TIME (Typ.)	Please refer to page 5 Hold up Time(Load de-rating curve)							
INPUT	VOLTAGE RANGE CONTINUOUS	9 ~ 36VDC				18 ~ 72VDC			
	EFFICIENCY (Typ.)	84%	84%	86.5%	89%	84%	86%	90%	91%
	DC CURRENT (Typ.)	1.1A/24V	1.5A/24V			0.52A/48V	0.8A/48V		
	INRUSH CURRENT (Typ.)	20A/24VDC				20A/48VDC			
	INTERRUPTION OF VOLTAGE SUPPLY	EN50155:2007-G type comply with S1 level(3ms) @full load,S2 level(10ms) @80% load; L type comply with S2 level(10ms) @full load							
		EN50155:2017-Comply with S1 level							
PROTECTION	OVERLOAD	105 ~ 135% rated output power							
		Protection type : Constant current limiting, recovers automatically after fault condition is removed							
	OVER VOLTAGE	3.8 ~ 4.5V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	3.8 ~ 4.5V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V
		Protection type : Shut down o/p voltage, re-power on to recover							
ENVIRONMENT	WORKING TEMP.	-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ (no derating with external base plate)							
	WORKING HUMIDITY	5 ~ 95% RH non-condensing							
	STORAGE TEMP.	-40 ~ +85℃							
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)							
	VIBRATION	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373							
	OPERATING ALTITUDE	5000 meters							
SAFETY & EMC (Note 4)	SAFETY STANDARDS	IEC 62368-1, UL 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1							
	WITHSTAND VOLTAGE	I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC							
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH							
	EMC EMISSION	**Parameter**	**Standard**	**Test Level / Note**					
		Conducted	BS EN/EN55032	Class A					
		Radiated	BS EN/EN55032	Class B					
		Harmonic Current	BS EN/EN61000-3-2	-----					
		Voltage Flicker	BS EN/EN61000-3-3	-----					
	EMC IMMUNITY	BS EN/EN55035							
		Parameter	**Standard**	**Test Level / Note**					
		ESD	BS EN/EN61000-4-2	Level 3, ±8KV air ; Level 3, ±6KV contact					
		Radiated Field	BS EN/EN61000-4-3	Level X, 20V/m					
		EFT / Burst	BS EN/EN61000-4-4	Level 3, 2KV at power					
		Surge	BS EN/EN61000-4-5	Level 3,1KV Line-Line, Level 3, 2KV Line-Earth					
		Conducted	BS EN/EN61000-4-6	Level 3					
	RAILWAY STANDARD	Compliance to BS EN/EN45545-2 for fire protection ;BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC							
OTHERS	MTBF	3093.5K hrs min. Telcordia SR-332 (Bellcore) ; 396.9K hrs min. MIL-HDBK-217F (25℃)							
	DIMENSION	113*60*25mm (L*W*H)							
	PACKING	0.25Kg; 56pcs/15Kg/0.81CUFT							

NOTE

1. All parameters NOT specially mentioned are measured at 24,48VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
5. Strongly recommended that external output capacitance should not exceed 5000uF.
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

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SPECIFICATION

MODEL		RSD-30H-3.3	RSD-30H-5	RSD-30H-12	RSD-30H-24
OUTPUT	DC VOLTAGE	3.3V	5V	12V	24V
	RATED CURRENT	6A	6A	2.5A	1.25A
	CURRENT RANGE	0 ~ 6A	0 ~ 6A	0 ~ 2.5A	0 ~ 1.25A
	RATED POWER	19.8W	30W	30W	30W
	RIPPLE & NOISE (max.) Note.2	70mVp-p	70mVp-p	60mVp-p	50mVp-p
	VOLTAGE TOLERANCE Note.3	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION	±0.5%	±0.5%	±0.3%	±0.2%
	LOAD REGULATION	±0.5%	±0.5%	±0.3%	±0.2%
	SETUP, RISE TIME	120ms, 85ms at full load			
	HOLD UP TIME (Typ.)	Please refer to page 5 Hold up Time(Load de-rating curve)			
INPUT	VOLTAGE RANGE CONTINUOUS	40 ~ 160VDC			
	EFFICIENCY (Typ.)	87%	87%	89%	89%
	DC CURRENT (Typ.)	0.23A/110V	0.35A/110V		
	INRUSH CURRENT (Typ.)	20A/110VDC			
	INTERRUPTION OF VOLTAGE SUPPLY	EN50155:2007-H-type comply with S2 level(10ms) @ full load			
		EN50155:2017-Comply with S1 level			
PROTECTION	OVERLOAD	105 ~ 135% rated output power			
		Protection type : Constant current limiting, recovers automatically after fault condition is removed			
	OVER VOLTAGE	3.8 ~ 4.5V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V
		Protection type : Shut down o/p voltage, re-power on to recover			
ENVIRONMENT	WORKING TEMP.	-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ (no derating with external base plate)			
	WORKING HUMIDITY	5 ~ 95% RH non-condensing			
	STORAGE TEMP.	-40 ~ +85℃			
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)			
	VIBRATION	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373			
	OPERATING ALTITUDE	5000 meters			
SAFETY & EMC (Note 4)	SAFETY STANDARDS	IEC 62368-1, UL 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1			
	WITHSTAND VOLTAGE	I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC			
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH			
	EMC EMISSION	**Parameter**	**Standard**	**Test Level / Note**	
		Conducted	BS EN/EN55032	Class A	
		Radiated	BS EN/EN55032	Class B	
		Harmonic Current	BS EN/EN61000-3-2	-----	
		Voltage Flicker	BS EN/EN61000-3-3	-----	
	EMC IMMUNITY	BS EN/EN55035			
		Parameter	**Standard**	**Test Level / Note**	
		ESD	BS EN/EN61000-4-2	Level 3, ±8KV air ; Level 3, ±6KV contact	
		Radiated Field	BS EN/EN61000-4-3	Level X, 20V/m	
		EFT / Burst	BS EN/EN61000-4-4	Level 3, 2KV at power	
		Surge	BS EN/EN61000-4-5	Level 3,1KV Line-Line, Level 3, 2KV Line-Earth	
		Conducted	BS EN/EN61000-4-6	Level 3	
	RAILWAY STANDARD	Compliance to BS EN/EN45545-2 for fire protection;BS EN/EN50155 /IEC60571 including IEC61373 for shock & vibration,BS EN/EN50121-3-2 for EMC			
OTHERS	MTBF	3093.5K hrs min. Telcordia SR-332 (Bellcore) ; 396.9K hrs min. MIL-HDBK-217F (25℃)			
	DIMENSION	113*60*25mm (L*W*H)			
	PACKING	0.25Kg; 56pcs/15Kg/0.81CUFT			

NOTE

1. All parameters NOT specially mentioned are measured at 110VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
5. Strongly recommended that external output capacitance should not exceed 5000uF.
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

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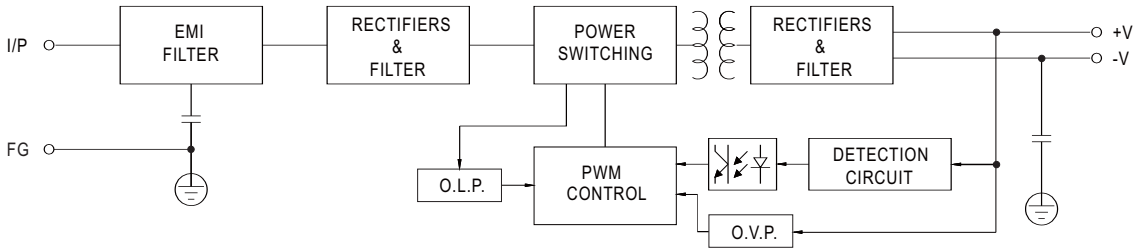
Block Diagram

fosc : 110KHz



Input Fuse

There is one fuse connected in series to the positive input line, which is used to protect against abnormal surge. Fuse specifications of each model are shown as below.

Type	Fuse Type	Reference and Rating
G	Time-Lag	CONQUE MST, 6.3A, 250V
L	Time-Lag	CONQUE MST, 3.15A, 250V
H	Time-Lag	CONQUE MST, 2A, 250V

Input Reverse Polarity Protection

There is a MOSFET connected in series to the negative input line. If the input polarity is connected reversely, the MOSFET opens and there will be no output to protect the unit.

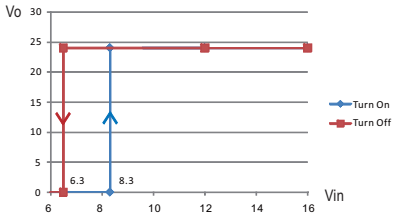
Input Range and Transient Ability

The series has a wide range input capability. With ±40% of rated input voltage, it can withstand that for 1 second.

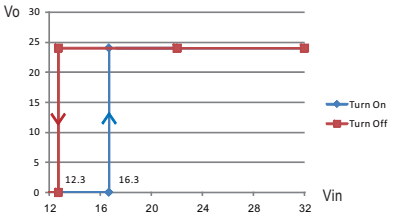
Input Under-Voltage Protection

If input voltage drops below Vimin, the internal control IC shuts down and there is no output voltage. It recovers automatically when input voltage reaches above Vimin, please refer to the cruve below.

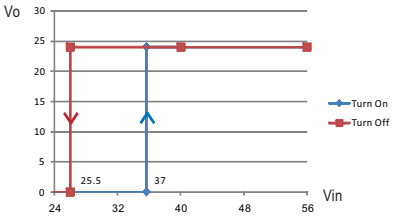
RSD-30G-24



RSD-30L-24



RSD-30H-24



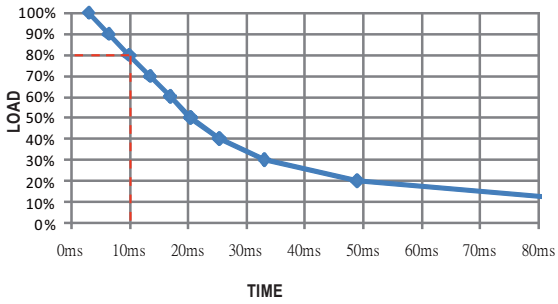
Inrush Current

Inrush current is suppressed by a resistor during the initial start-up, and then the resistor is bypassed by a MOSFET to reduce power consumption after accomplishing the start-up.

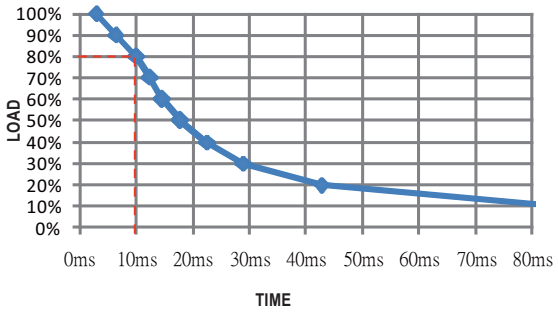
■ Hold-up Time

- EN50155: 2007 version - H type is in compliance with S2 level (10ms), while G and L types are in compliance with S1 level (3ms) at full load output condition. To fulfil the requirements of S2 level (10ms), G types require de-rating their output load to 80%, please refer to the curve diagrams below.

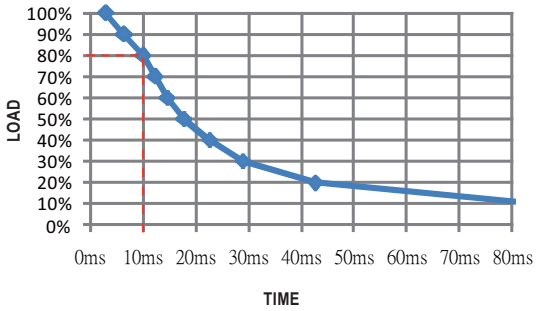
RSD-30G-3.3



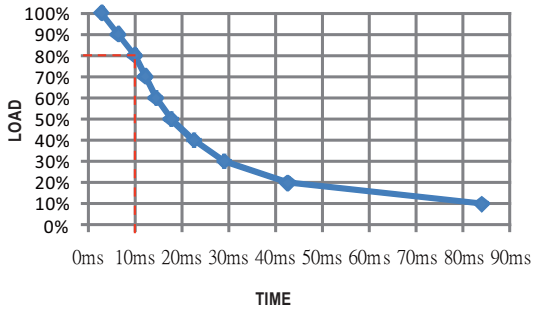
RSD-30G-5



RSD-30G-12



RSD-30G-24



- EN50155: 2017 version - Comply with S1 level (3ms)

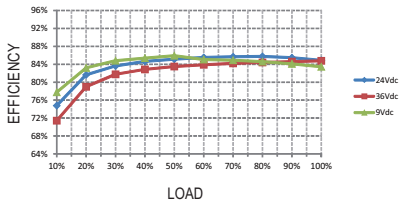
■ Output Voltage Adjustment

This function is optional, which the standard product does not have it. If you do need the function, please contact MW for details.

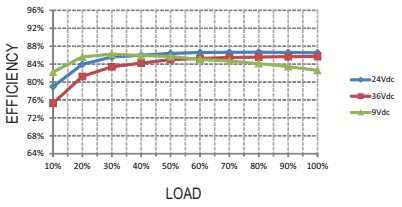
■ Efficiency vs Load & Vin Curve

The efficiency vs load & Vin curves of each model are shown as below.

RSD-30G-3.3



RSD-30G-5



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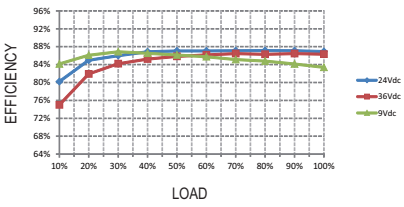

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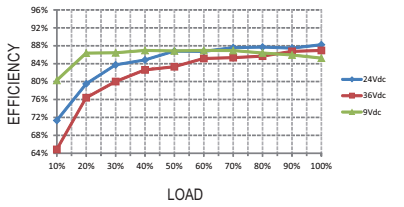
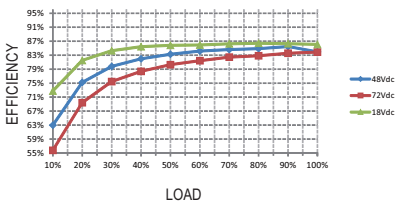
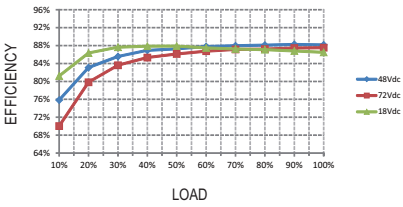


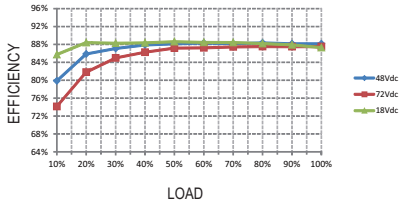
RSD-30L-3.3



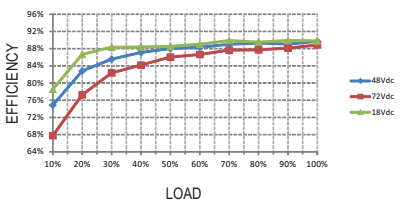
RSD-30L-5



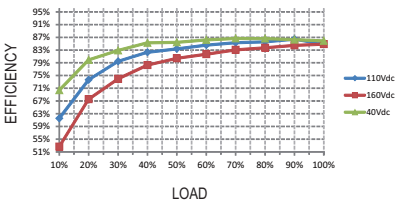
RSD-30L-12



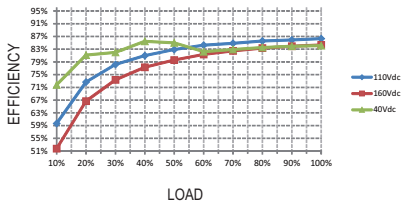
RSD-30L-24



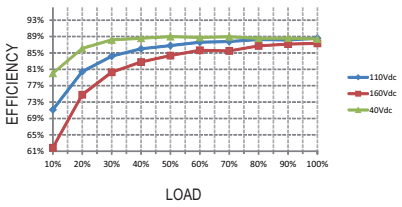
RSD-30H-3.3



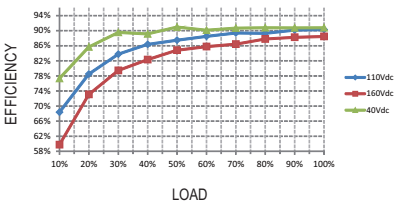
RSD-30H-5



RSD-30H-12



RSD-30H-24

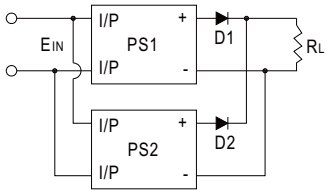


■ Parallel and Series Connection

A.Operation in Parallel

Since RSD-30 series don't have built-in parallel circuit, it can only use external circuits to achieve the redundant operation but not increase the current rating.

1.Add a diode at the positive-output of each power supply (as shown as below), the current rating of the diode should be larger than the maximum output current rating and attached to a suitable heat sink. This is only for redundant use (increase the reliability of the system) and users have to check suitability of the circuit by themselves.

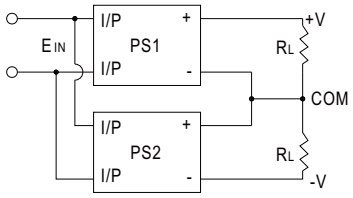


2.When using S.P.S. in parallel connection, the leakage current will increase at the same time. This could pose as a shock hazard for the user. So please contact the supplier if you have this kind of application.

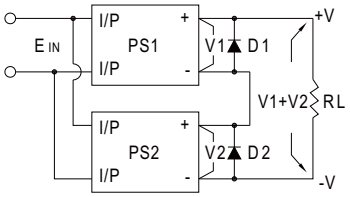
B.Operation in Series

RSD-30 can be operated in series. Here are the methods of doing it:

1.Positive and negative terminals are connected as shown as below. According to the connection, you can get the positive and negative output voltages for your loads.

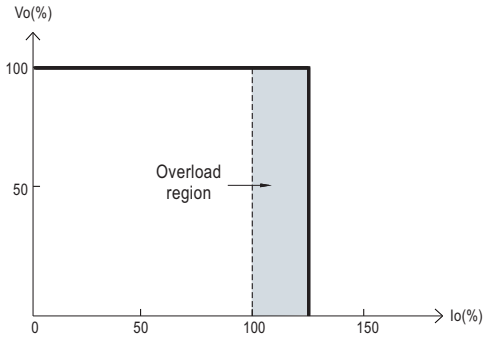


2.Increase the output voltage (current does not change). Because RSD-30 series have no reverse blocking diode in the unit, you should add an external blocking diode to prevent the damage of every unit while starting up. The voltage rating of the external diode should be larger than V1+V2 (as shown as below).



■ Overload Protection

If the output draw up to 105~135% of its output power rating, the converter will go into overload protection which is constant current mode. After the faulty condition is removed, it will recover automatically. Please refer to the diagram below for the detail operation characteristic. Please note that it's not suitable to operate within the overload region continuously, or it may cause to over temperature and reduce the life of the power supply unit or even damage it.



■ Over Voltage Protection

The converter shuts off to protect itself when the output voltage drawn exceeds 115~140% of its output rating. It must be repowered on to recover.

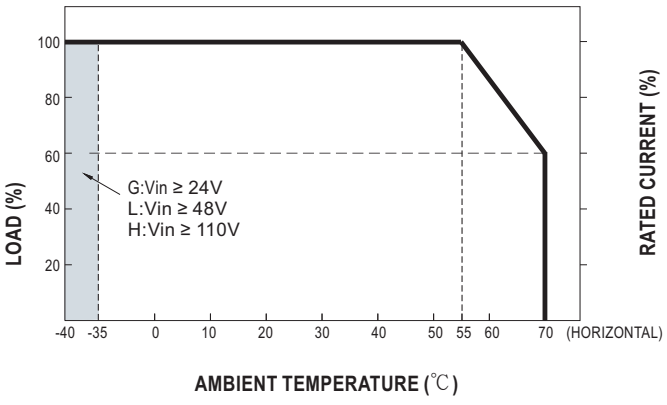
■ LED Indicator

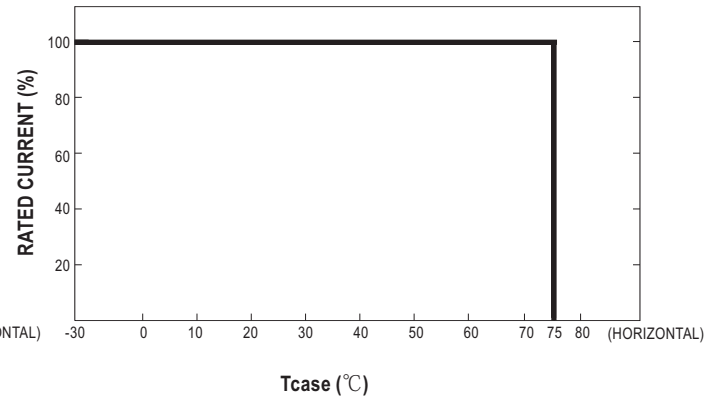
Equipped with a built-in LED indicator, the converter provides an easy way for users to check its condition through the LED indicator.
Green : normal operation; No signal: no power or failure.

■ Derating Curve

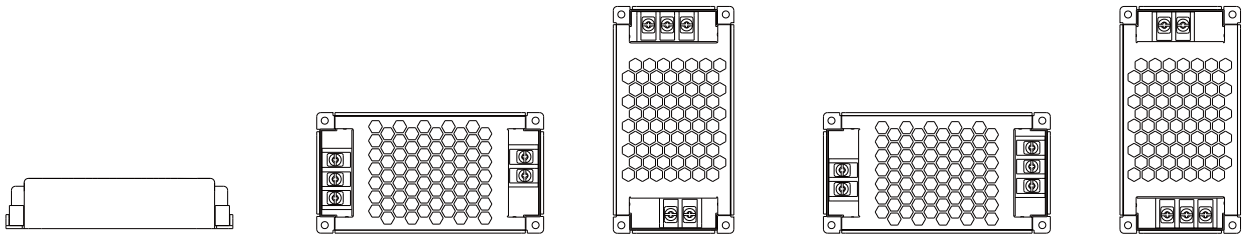
a.Single unit operation

If the unit has no iron plate mounted on its bottom, the maximum ambient temperature for the unit will be 55℃ as operating under full load condition. It requires de-rating output current when ambient temperature is between 55~70℃, please refer to the de-rating curve as below.





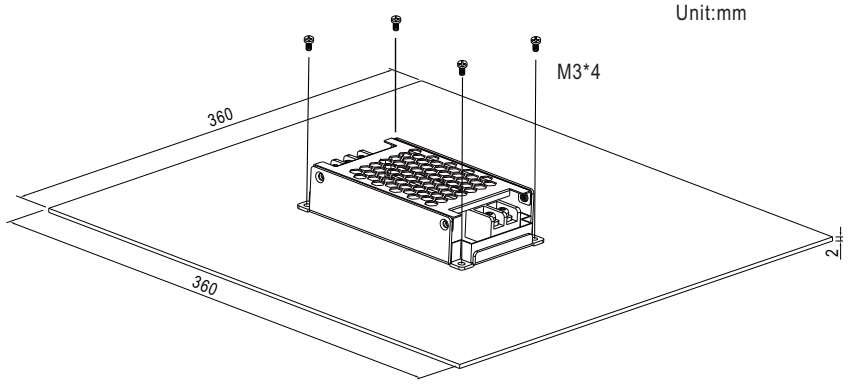
Suitable installation methods are shown as below. Since RSD-30 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



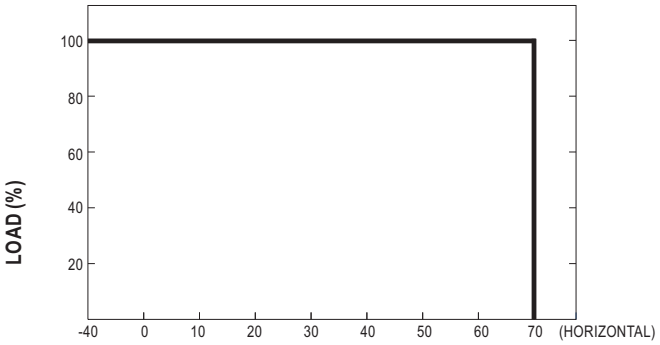
b.Operate with additional iron plate

If it is necessary to fulfil the requirements of EN50155 TX level that operate the unit fully-loaded at 70℃, RSD-30 series must be installed onto an iron plate on the bottom. The size of the suggested iron plate is shown as below. In order for optimal thermal performance, the iron plate must have an even & smooth surface and RSD-30 series must be firmly mounted at the center of the iron plate.

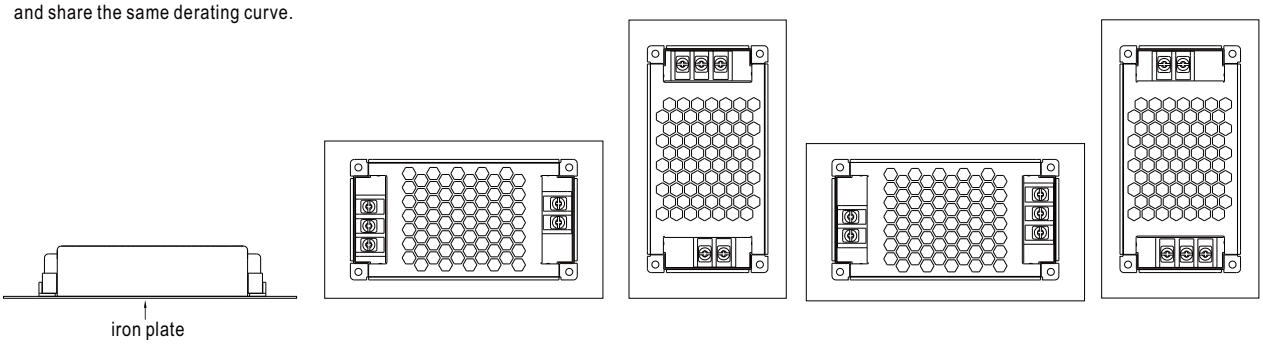
Unit:mm



The load vs ambient temperature curve is shown as below.



Suitable installation methods are shown as below. Since RSD-30 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



■ Immunity to Environmental Conditions

Test method	Standard	Test conditions	Status
Cooling Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 2 hrs/cycle	No damage
Dry Heat Test	EN 50155 section 12.2.4 (Column 2, Class TX) EN 50155 section 12.2.4 (Column 3, Class TX & Column 4, Class TX) EN 60068-2-2	Temperature: 70℃ / 85℃ Duration: 6 hrs / 10min	PASS
Damp Heat Test, Cyclic	EN 50155 section 12.2.5 EN 60068-2-30	Temperature: 25℃~55℃ Humidity: 90%~100% RH Duration: 48 hrs	PASS
Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 10 mins	PASS
Increased Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 5 hrs	PASS
Shock Test	EN 50155 section 12.2.11 EN 61373	Temperature: 21± 3℃ Humidity: 65 ± 5% Duration: 30ms*18	PASS
Low Temperature Storage Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 16 hrs	PASS
Salt Mist Test	EN 50155 section 12.2.10 (Class ST4)	Temperature: 35℃ ±2℃ Duration: 96 hrs	PASS

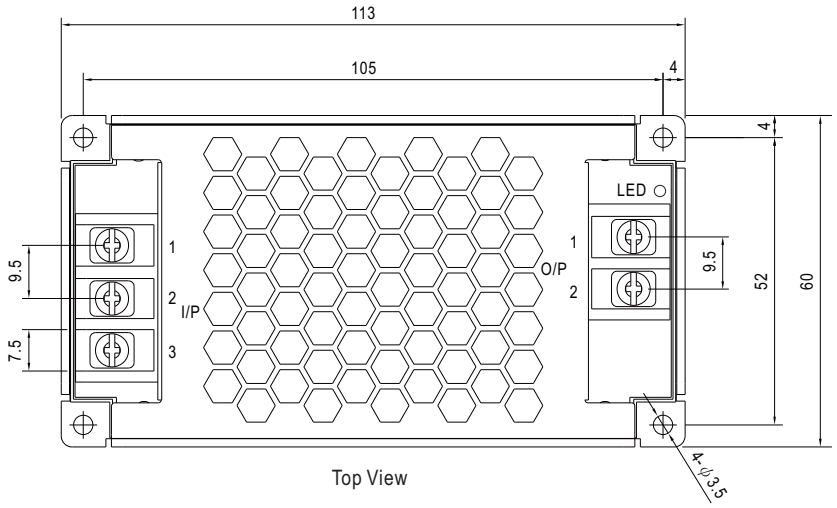
■ EN45545-2 Fire Test Conditions

Test Items			Hazard Level		
Items		Standard	HL1	HL2	HL3
R24	Oxygen index test	EN 45545-2:2013+A1:2015 EN ISO 4589-2:1996	PASS	PASS	PASS
R25	Glow-wire test	EN 45545-2:2013+A1:2015 EN 60695-2-11:2000	PASS	PASS	PASS
R26	Vertical flame test	EN 45545-2:2013+A1:2015 EN 60695-11:2003	PASS	PASS	PASS

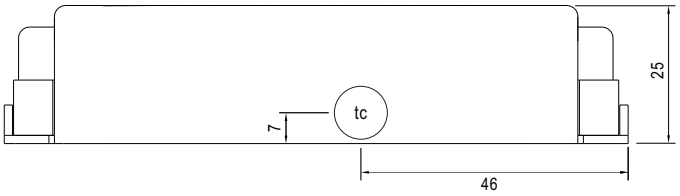
■ Mechanical Specification

Case No.253A

(Unit: mm , tolerance ± 1mm)



Top View



• (tc) : Max. Case Temperature

Side View

Input Terminal Pin No. Assignment :

Pin No.	Assignment
1	DC INPUT V+
2	DC INPUT V-
3	FG ⏚

Output Terminal Pin No. Assignment :

Pin No.	Assignment
1	DC OUTPUT -V
2	DC OUTPUT +V

■ Installation Manual

Please refer to : http://www.meanwell.com/manual.html

60W Reliable Railway DC-DC Converter

RSD-60 series

User's Manual

UL62368-1 AS/NZS62368-1 TPTC004 IEC62368-1

Railway Industrial Telecom Network

Features

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- Ultra compact and 1U low profile(25mm)
- 4:1 wide input range
- No minimum load required
- Protections: Short circuit / Overload / Over voltage / Input reverse polarity
- 4000VDC I/O isolation (Reinforced isolation)
- Half encapsulated , cooling by free air convection
- -40~+70℃ wide working temperature
- Built-in constant current limiting circuit
- LED indicator for power on
- 3 years warranty

Applications

- Bus,tram,metro or railway system
- Highly vibrating, highly dusty, extremely low or high temperature harsh environment
- Wireless network
- Telecom or datacom system
- Industry control system

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

Description

RSD-60 is a 60W enclosed type DC-DC reliable railway converter. This series is compliant with BS EN/EN50155/ IEC60571 railway standard, constituting three types of models with 4:1 wide but different input ranges 9~36V/18~72V/40~160V, suitable for railway and all kinds of transportation systems exploiting the frequently used standard input voltages such as 12V, 24V, 36V, 48V, 72V, 96V and 110V. Various output voltages, 3.3V, 5V, 12V and 24V are available for selection.

This series has the capability of working under -40~+70℃, low ripple and noise, supreme EMC characteristics, 4KVDC I/P-OP, low enclosure profile 25mm and an interior with semi-potted silicone. It does not only well fits the in-car systems or the facilities by rails for railway, trams and buses but also can be used in the harsh environment with high vibration, high dust, extremely low or high temperature, etc.

Model Encoding

RSD - 60G - 5

- 5 — Output voltage (3.3/5/12/24Vdc)
- G — Input voltage (G: 9~36Vdc, L: 18~72Vdc, H: 40~160Vdc)
- 60 — Rated wattage
- RSD — Series name

SPECIFICATION

MODEL		RSD-60G-3.3	RSD-60G-5	RSD-60G-12	RSD-60G-24	RSD-60L-3.3	RSD-60L-5	RSD-60L-12	RSD-60L-24
OUTPUT	DC VOLTAGE	3.3V	5V	12V	24V	3.3V	5V	12V	24V
	RATED CURRENT	12A	12A	5A	2.5A	12A	12A	5A	2.5A
	CURRENT RANGE	0 ~ 12A	0 ~ 12A	0 ~ 5A	0 ~ 2.5A	0 ~ 12A	0 ~ 12A	0 ~ 5A	0 ~ 2.5A
	RATED POWER	39.6W	60W	60W	60W	39.6W	60W	60W	60W
	RIPPLE & NOISE (max.) Note.2	60mVp-p	100mVp-p	50mVp-p	50mVp-p	60mVp-p	60mVp-p	50mVp-p	50mVp-p
	VOLTAGE TOLERANCE Note.3	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION	±0.5%	±0.5%	±0.3%	±0.2%	±0.5%	±0.5%	±0.3%	±0.2%
	LOAD REGULATION	±0.5%	±0.5%	±0.3%	±0.2%	±0.5%	±0.5%	±0.3%	±0.2%
	SETUP, RISE TIME	100ms, 60ms at full load							
	HOLD UP TIME (Typ.)	Please refer to page 5 Hold up Time(Load de-rating curve)							
INPUT	VOLTAGE RANGE CONTINUOUS	9 ~ 36VDC				18 ~ 72VDC			
	EFFICIENCY (Typ.)	86.5%	88%	92%	90%	88.5%	89%	93%	91.5%
	DC CURRENT (Typ.)	2.1A/24VDC	3A/24VDC			0.95A/48VDC	1.5A/48VDC		
	INRUSH CURRENT (Typ.)	20A/24VDC				20A/48VDC			
	INTERRUPTION OF VOLTAGE SUPPLY	EN50155:2007-G type comply with S1 level(3ms) @full load,S2 level(10ms) @50% load; L type comply with S2 level(10ms) @full load							
		EN50155:2017-Comply with S1 level							
PROTECTION	OVERLOAD	105 ~ 135% rated output power							
		Protection type : Constant current limiting, recovers automatically after fault condition is removed							
	OVER VOLTAGE	4.3 ~ 5.3V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	4.3 ~ 4.95V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V
		Protection type : Shut down o/p voltage, re-power on to recover							
ENVIRONMENT	WORKING TEMP.	-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ (no derating with external base plate)							
	WORKING HUMIDITY	5 ~ 95% RH non-condensing							
	STORAGE TEMP.	-40 ~ +85℃							
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)							
	VIBRATION	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373							
	OPERATING ALTITUDE	5000 meters							
SAFETY & EMC (Note 4)	SAFETY STANDARDS	IEC 62368-1, UL 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1							
	WITHSTAND VOLTAGE	I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC							
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH							
	EMC EMISSION	**Parameter**	**Standard**	**Test Level / Note**					
		Conducted	BS EN/EN55032	Class A					
		Radiated	BS EN/EN55032	Class B					
		Harmonic Current	BS EN/EN61000-3-2	-----					
		Voltage Flicker	BS EN/EN61000-3-3	-----					
	EMC IMMUNITY	BS EN/EN55035							
		Parameter	**Standard**	**Test Level / Note**					
		ESD	BS EN/EN61000-4-2	Level 3, ±8KV air ; Level 3, ±6KV contact					
		Radiated Field	BS EN/EN61000-4-3	Level X, 20V/m					
		EFT / Burst	BS EN/EN61000-4-4	Level 3, 2KV at power					
		Surge	BS EN/EN61000-4-5	Level 3,1KV Line-Line, Level 3, 2KV Line-Earth					
		Conducted	BS EN/EN61000-4-6	Level 3					
	RAILWAY STANDARD	Compliance to BS EN/EN45545-2 for fire protection ; BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC							
OTHERS	MTBF	2738.8K hrs min. Telcordia SR-332 (Bellcore) ; 593.9K hrs min. MIL-HDBK-217F (25℃)							
	DIMENSION	128*60*25mm (L*W*H)							
	PACKING	0.29Kg; 48pcs/14.9Kg/0.75CUFT							

NOTE

1. All parameters NOT specially mentioned are measured at 24,48VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
5. Strongly recommended that external output capacitance should not exceed 5000uF.
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

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SPECIFICATION

MODEL		RSD-60H-3.3	RSD-60H-5	RSD-60H-12	RSD-60H-24
OUTPUT	DC VOLTAGE	3.3V	5V	12V	24V
	RATED CURRENT	12A	12A	5A	2.5A
	CURRENT RANGE	0 ~ 12A	0 ~ 12A	0 ~ 5A	0 ~ 2.5A
	RATED POWER	39.6W	60W	60W	60W
	RIPPLE & NOISE (max.) Note.2	80mVp-p	60mVp-p	50mVp-p	50mVp-p
	VOLTAGE TOLERANCE Note.3	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION	±0.5%	±0.5%	±0.3%	±0.2%
	LOAD REGULATION	±0.5%	±0.5%	±0.3%	±0.2%
	SETUP, RISE TIME	100ms, 60ms at full load			
	HOLD UP TIME (Typ.)	Please refer to page 5 Hold up Time(Load de-rating curve)			
INPUT	VOLTAGE RANGE CONTINUOUS	40 ~ 160VDC			
	EFFICIENCY (Typ.)	87.5%	89%	92.5%	91.5%
	DC CURRENT (Typ.)	0.415A/110VDC	0.62A/110V		
	INRUSH CURRENT (Typ.)	20A/110VDC			
	INTERRUPTION OF VOLTAGE SUPPLY	EN50155:2007-H-type comply with S2 level(10ms) @ full load			
		EN50155:2017-Comply with S1 level			
PROTECTION	OVERLOAD	105 ~ 135% rated output power			
		Protection type : Constant current limiting, recovers automatically after fault condition is removed			
	OVER VOLTAGE	4.3 ~ 4.95V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V
		Protection type : Shut down o/p voltage, re-power on to recover			
ENVIRONMENT	WORKING TEMP.	-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ (no derating with external base plate)			
	WORKING HUMIDITY	5 ~ 95% RH non-condensing			
	STORAGE TEMP.	-40 ~ +85℃			
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)			
	VIBRATION	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373			
	OPERATING ALTITUDE	5000 meters			
SAFETY & EMC (Note 4)	SAFETY STANDARDS	IEC 62368-1, UL 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1			
	WITHSTAND VOLTAGE	I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC			
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH			
	EMC EMISSION	**Parameter**	**Standard**	**Test Level / Note**	
		Conducted	BS EN/EN55032	Class A	
		Radiated	BS EN/EN55032	Class B	
		Harmonic Current	BS EN/EN61000-3-2	-----	
		Voltage Flicker	BS EN/EN61000-3-3	-----	
	EMC IMMUNITY	BS EN/EN55035			
		Parameter	**Standard**	**Test Level / Note**	
		ESD	BS EN/EN61000-4-2	Level 3, ±8KV air ; Level 3, ±6KV contact	
		Radiated Field	BS EN/EN61000-4-3	Level X, 20V/m	
		EFT / Burst	BS EN/EN61000-4-4	Level 3, 2KV at power	
		Surge	BS EN/EN61000-4-5	Level 3,1KV Line-Line, Level 3, 2KV Line-Earth	
		Conducted	BS EN/EN61000-4-6	Level 3	
	RAILWAY STANDARD	Compliance to BS EN/EN45545-2 for fire protection ; BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC			
OTHERS	MTBF	2738.8K hrs min. Telcordia SR-332 (Bellcore) ; 593.9K hrs min. MIL-HDBK-217F (25℃)			
	DIMENSION	128*60*25mm (L*W*H)			
	PACKING	0.29Kg; 48pcs/14.9Kg/0.75CUFT			

NOTE

1. All parameters NOT specially mentioned are measured at 110VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
5. Strongly recommended that external output capacitance should not exceed 5000uF.
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

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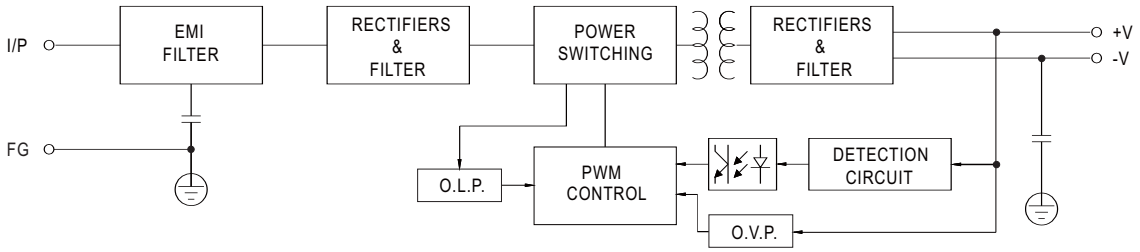
Block Diagram

fosc : 130KHz



Input Fuse

There is one fuse connected in series to the positive input line, which is used to protect against abnormal surge. Fuse specifications of each model are shown as below.

Type	Fuse Type	Reference and Rating
G	Time-Lag	CONQUE MST, 10A, 250V
L	Time-Lag	CONQUE MST, 5A, 250V
H	Time-Lag	CONQUE MST, 2.5A, 250V

Input Reverse Polarity Protection

There is a MOSFET connected in series to the negative input line. If the input polarity is connected reversely, the MOSFET opens and there will be no output to protect the unit.

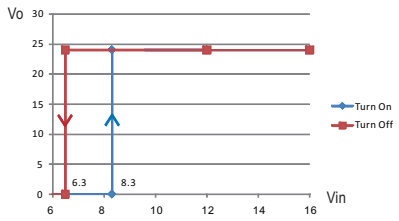
Input Range and Transient Ability

The series has a wide range input capability. With ±40% of rated input voltage, it can withstand that for 1 second.

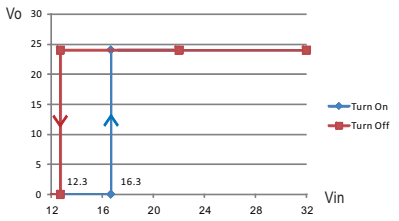
Input Under-Voltage Protection

If input voltage drops below Vimin, the internal control IC shuts down and there is no output voltage. It recovers automatically when input voltage reaches above Vimin,please refer to the cruve below.

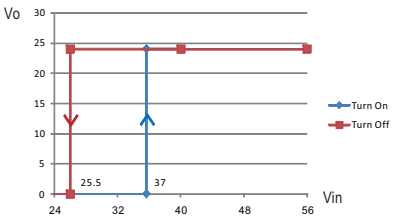
RSD-60G-24



RSD-60L-24



RSD-60H-24



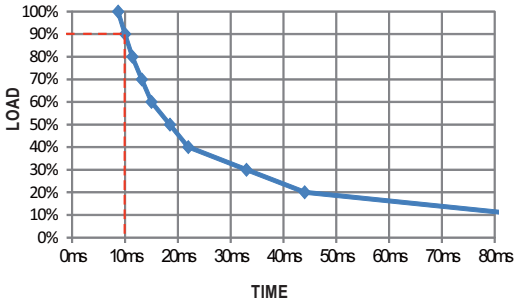
Inrush Current

Inrush current is suppressed by a resistor during the initial start-up, and then the resistor is bypassed by a MOSFET to reduce power consumption after accomplishing the start-up.

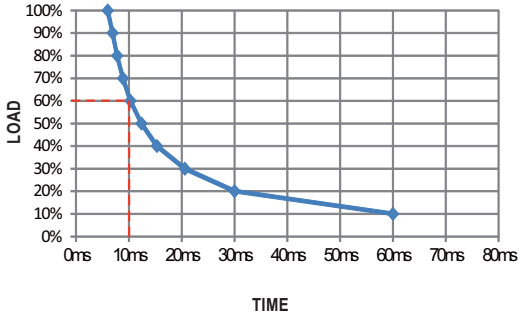
■ Hold-up Time

- En50155: 2007 version - L/H type is in compliance with S2 level (10ms), while G types are in compliance with S1 level (3ms) at full load output condition. To fulfil the requirements of S2 level (10ms), G types require de-rating their output load to 50%, please refer to the curve diagrams below.

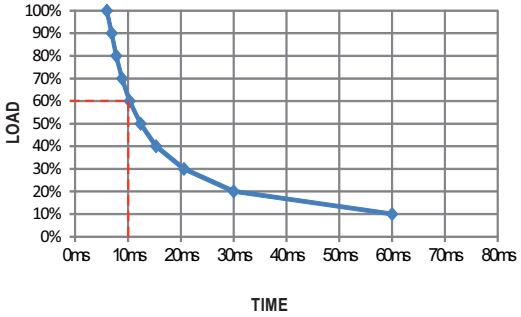
RSD-60G-3.3



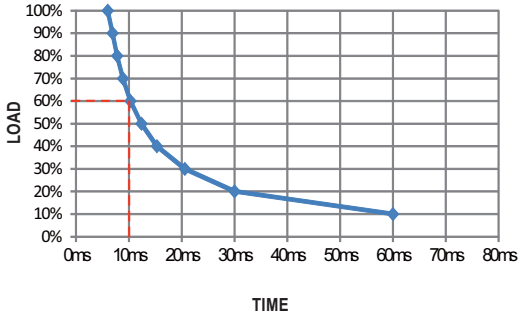
RSD-60G-5



RSD-60G-12



RSD-60G-24



- EN50155: 2017 version - Comply with S1 level (3ms)

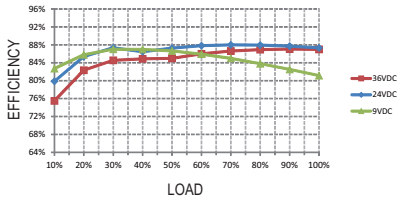
■ Output Voltage Adjustment

This function is optional, which the standard product does not have it. If you do need the function, please contact MW for details.

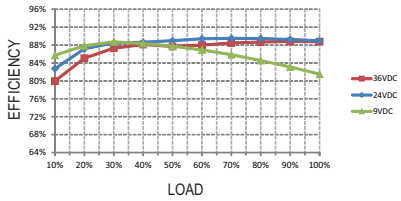
■ Efficiency vs Load & Vin Curve

The efficiency vs load & Vin curves of each model are shown as below.

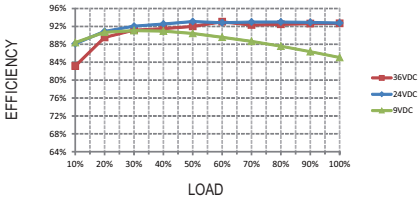
RSD-60G-3.3



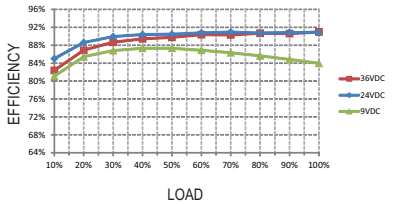
RSD-60G-5



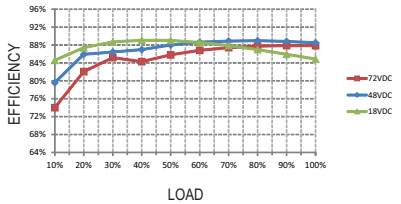
RSD-60G-12



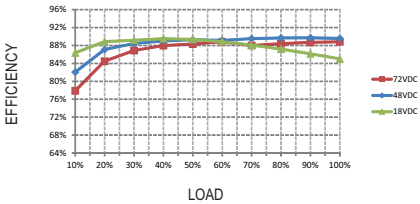
RSD-60G-24



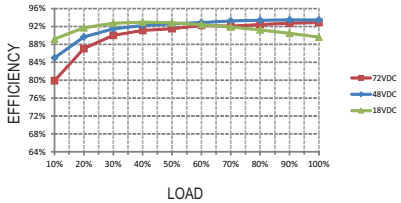
RSD-60L-3.3



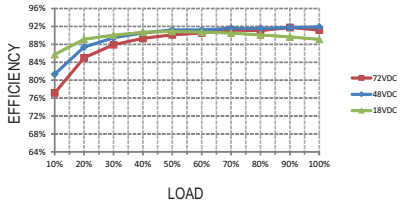
RSD-60L-5



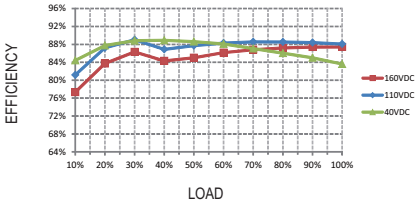
RSD-60L-12



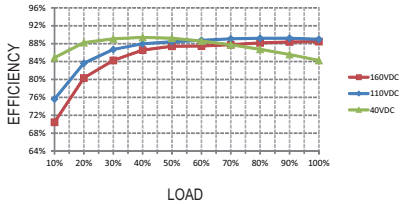
RSD-60L-24



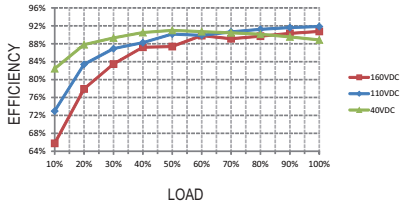
RSD-60H-3.3



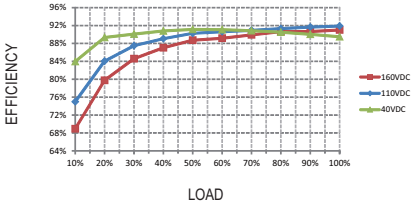
RSD-60H-5



RSD-60H-12



RSD-60H-24

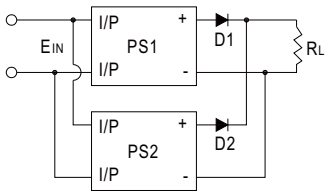


■ Parallel and Series Connection

A.Operation in Parallel

Since RSD-60 series don't have built-in parallel circuit, it can only use external circuits to achieve the redundant operation but not increase the current rating.

1.Add a diode at the positive-output of each power supply (as shown as below), the current rating of the diode should be larger than the maximum output current rating and attached to a suitable heat sink. This is only for redundant use (increase the reliability of the system) and users have to check suitability of the circuit by themselves.

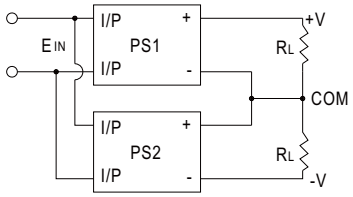


2.When using S.P.S. in parallel connection, the leakage current will increase at the same time. This could pose as a shock hazard for the user. So please contact the supplier if you have this kind of application.

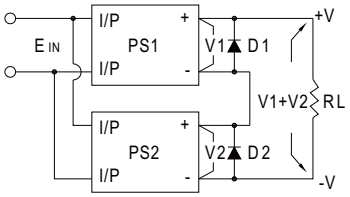
B.Operation in Series

RSD-60 can be operated in series. Here are the methods of doing it:

1.Positive and negative terminals are connected as shown as below. According to the connection, you can get the positive and negative output voltages for your loads.

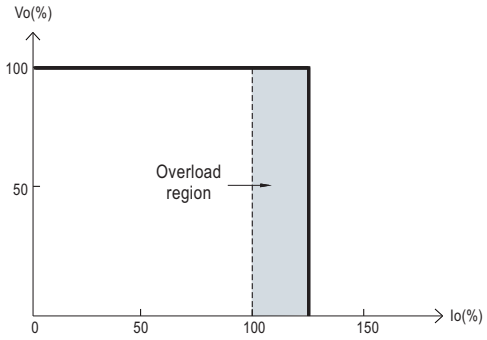


2.Increase the output voltage (current does not change). Because RSD-60 series have no reverse blocking diode in the unit, you should add an external blocking diode to prevent the damage of every unit while starting up. The voltage rating of the external diode should be larger than V1+V2 (as shown as below).



■ Overload Protection

If the output draw up to 105~135% of its output power rating, the converter will go into overload protection which is constant current mode. After the faulty condition is removed, it will recover automatically. Please refer to the diagram below for the detail operation characteristic. Please note that it's not suitable to operate within the overload region continuously, or it may cause to over temperature and reduce the life of the power supply unit or even damage it.



■ Over Voltage Protection

The converter shuts off to protect itself when the output voltage drawn exceeds 115~140% of its output rating. It must be repowered on to recover.

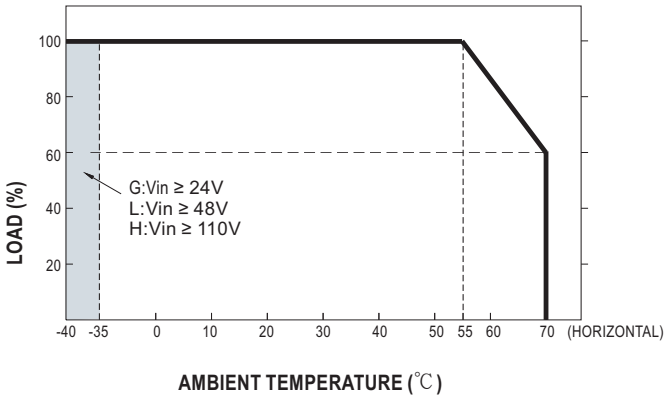
■ LED Indicator

Equipped with a built-in LED indicator, the converter provides an easy way for users to check its condition through the LED indicator.
Green : normal operation; No signal: no power or failure.

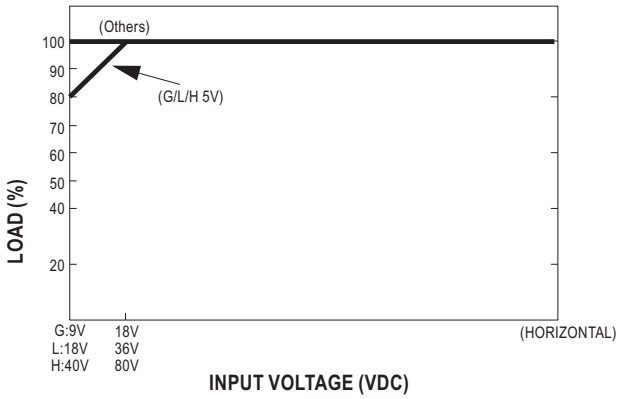
■ Derating Curve

a.Single unit operation

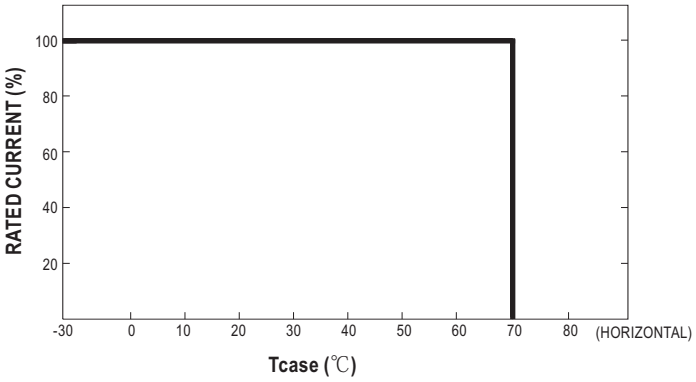
If the unit has no iron plate mounted on its bottom, the maximum ambient temperature for the unit will be 55℃ as operating under full load condition. It requires de-rating output current when ambient temperature is between 55~70℃, please refer to the de-rating curve as below.



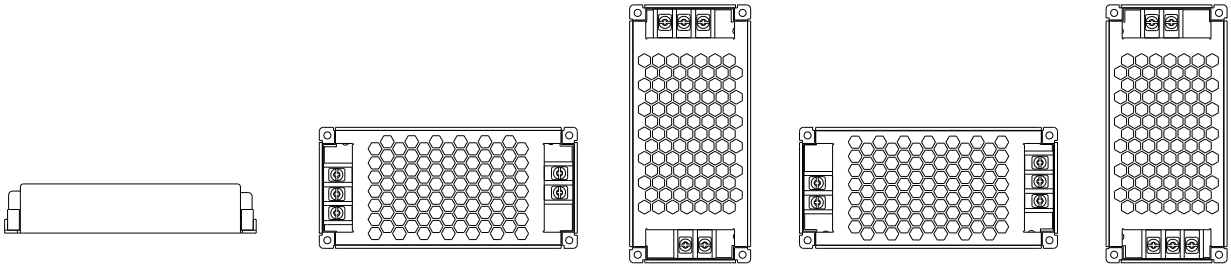
AMBIENT TEMPERATURE (℃)



INPUT VOLTAGE (VDC)



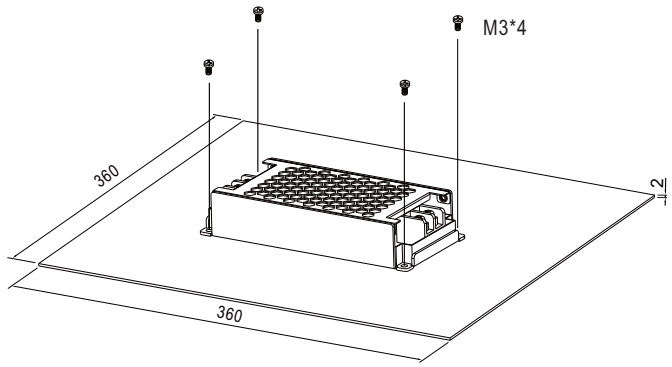
Suitable installation methods are shown as below. Since RSD-60 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



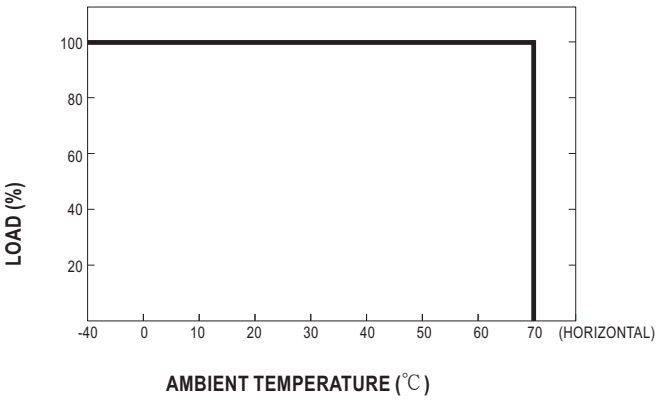
b.Operate with additional iron plate

If it is necessary to fulfil the requirements of EN50155 TX level that operate the unit fully-loaded at 70℃, RSD-60 series must be installed onto an iron plate on the bottom. The size of the suggested iron plate is shown as below. In order for optimal thermal performance, the iron plate must have an even & smooth surface and RSD-60 series must be firmly mounted at the center of the iron plate.

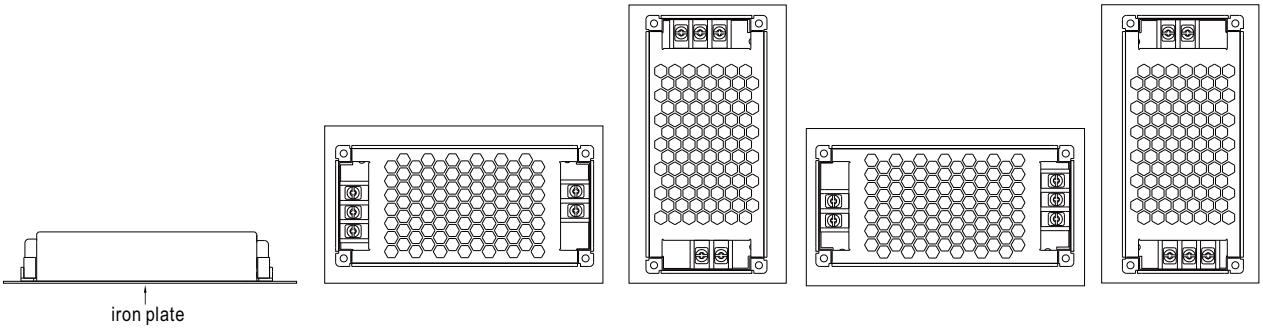
Unit:mm



The load vs ambient temperature curve is shown as below.



Suitable installation methods are shown as below. Since RSD-60 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



■ Immunity to Environmental Conditions

Test method	Standard	Test conditions	Status
Cooling Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 2 hrs/cycle	No damage
Dry Heat Test	EN 50155 section 12.2.4 (Column 2, Class TX) EN 50155 section 12.2.4 (Column 3, Class TX & Column 4, Class TX) EN 60068-2-2	Temperature: 70℃ / 85℃ Duration: 6 hrs / 10min	PASS
Damp Heat Test, Cyclic	EN 50155 section 12.2.5 EN 60068-2-30	Temperature: 25℃~55℃ Humidity: 90%~100% RH Duration: 48 hrs	PASS
Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 10 mins	PASS
Increased Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 5 hrs	PASS
Shock Test	EN 50155 section 12.2.11 EN 61373	Temperature: 21± 3℃ Humidity: 65 ± 5% Duration: 30ms*18	PASS
Low Temperature Storage Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 16 hrs	PASS
Salt Mist Test	EN 50155 section 12.2.10 (Class ST4)	Temperature: 35℃ ±2℃ Duration: 96 hrs	PASS

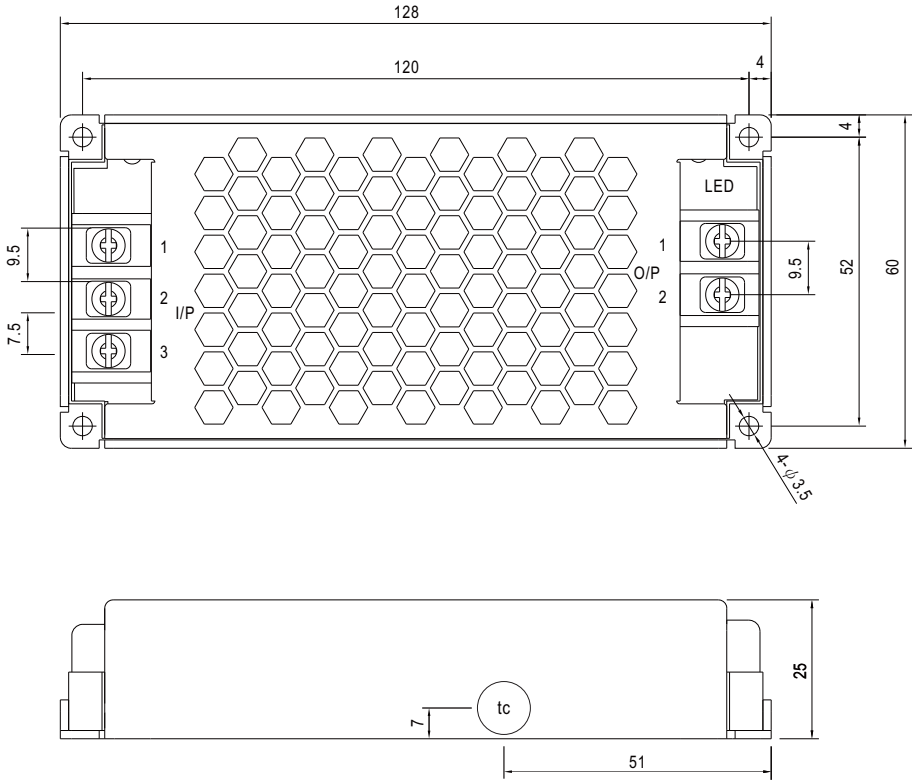
■ EN45545-2 Fire Test Conditions

Test Items			Hazard Level		
Items		Standard	HL1	HL2	HL3
R22	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
	Smoke density test	EN 45545-2:2013 EN ISO 5659-2:2006	PASS	PASS	PASS
	Smoke toxicity test	EN 45545-2:2013 NF X70-100:2006	PASS	PASS	PASS
R24	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
R25	Glow-wire test	EN 45545-2:2013 EN 60695-2-11:2000	PASS	PASS	PASS
R26	Vertical flame test	EN 45545-2:2013 EN 60695-11:2003	PASS	PASS	PASS

■ Mechanical Specification

(Unit: mm , tolerance ± 1mm)

Case No.255



• ⓣⓒ : Max. Case Temperature

Input Terminal Pin No. Assignment :

Pin No.	Assignment
1	DC INPUT V+
2	DC INPUT V-
3	FG ⏚

Output Terminal Pin No. Assignment :

Pin No.	Assignment
1	DC OUTPUT -V
2	DC OUTPUT +V

■ Installation Manual

Please refer to : http://www.meanwell.com/manual.html

100W Railway Single Output DC-DC Converter RSD-100 series

Features :

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- 2:1 wide input range
- Protections: Short circuit / Overload / Over voltage / Input reverse polarity
- 4000VDC I/O isolation
- Cooling by free air convection
- Half encapsulated
- Built-in constant current limiting circuit
- 1U low profile 36mm
- All using 105℃ long life electrolytic capacitors
- LED indicator for power on
- 100% full load burn-in test
- 3 years warranty

User's Manual

UL62368-1 AS/NZS62368-1 TPTC004 IEC62368-1

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

SPECIFICATION

MODEL			RSD-100B-5	RSD-100B-12	RSD-100B-24	RSD-100C-5	RSD-100C-12	RSD-100C-24	RSD-100D-5	RSD-100D-12	RSD-100D-24
OUTPUT	DC VOLTAGE		5V	12V	24V	5V	12V	24V	5V	12V	24V
	RATED CURRENT		20A	8.4A	4.2A	20A	8.4A	4.2A	20A	8.4A	4.2A
	CURRENT RANGE		0 ~ 20A	0 ~ 8.4A	0 ~ 4.2A	0 ~ 20A	0 ~ 8.4A	0 ~ 4.2A	0 ~ 20A	0 ~ 8.4A	0 ~ 4.2A
	RATED POWER		100W	100.8W	100.8W	100W	100.8W	100.8W	100W	100.8W	100.8W
	RIPPLE & NOISE (max.) Note.2		100mVp-p	120mVp-p	150mVp-p	100mVp-p	120mVp-p	150mVp-p	100mVp-p	120mVp-p	150mVp-p
	VOLTAGE TOLERANCE Note.3		±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION		±0.5%	±0.3%	±0.2%	±0.5%	±0.3%	±0.2%	±0.5%	±0.2%	±0.2%
	LOAD REGULATION		±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME		800ms, 50ms at full load								
	HOLD UP TIME (Typ.)		Please refer to page 3 Hold up Time(Load de-rating curve)								
INPUT	VOLTAGE RANGE	CONTINUOUS	16.8 ~ 31.2VDC			33.6 ~ 62.4VDC			67.2 ~ 143VDC		
		1 SEC.	14.4 ~ 33.6VDC			28.8 ~ 67.2VDC			57.6 ~ 154VDC		
	EFFICIENCY (Typ.)		88%	89%	89%	89%	91%	91%	89.5%	91%	90%
	DC CURRENT (Typ.)		4.8A/24V	4.8A/24V	4.8A/24V	2.4A/48V	2.4A/48V	2.4A/48V	1.2A/110V	1.2A/110V	1.2A/110V
	INRUSH CURRENT (Typ.)		30A/24VDC			30A/48VDC			30A/110VDC		
	INTERRUPTION OF VOLTAGE SUPPLY		EN50155:2007-B/C- type comply with S1 level @ full load, comply with S2 level @ 70% load ; D-type comply with S2 level @ full load								
			EN50155:2017-Comply with S1 level								
PROTECTION	OVERLOAD		105 ~ 135% rated output power								
			Protection type : Constant current limiting, recovers automatically after fault condition is removed								
	OVER VOLTAGE		5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V
			Protection type : Shut down o/p voltage, re-power on to recover								
ENVIRONMENT	WORKING TEMP.		-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ no derating with external base plate, TX class compliance								
	WORKING HUMIDITY		5 ~ 95% RH non-condensing								
	STORAGE TEMP.		-40 ~ +85℃								
	TEMP. COEFFICIENT		±0.03%/℃ (0 ~ 50℃)								
	VIBRATION		10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373								
	OPERATING ALTITUDE		5000 meters								
SAFETY & EMC (Note 5)	SAFETY STANDARDS		IEC 62368-1, UL 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1								
	WITHSTAND VOLTAGE		I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC								
	ISOLATION RESISTANCE		I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH								
	EMC EMISSION		Compliance to BS EN/EN55032 (CISPR32) Conduction Emission: Class A, Radiation Emission: Class B, EAC TP TC 020								
	EMC IMMUNITY		Compliance to BS EN/EN61000-4-2,3,4,5,6,8, BS EN/EN55035, light industry level, EAC TP TC 020								
	RAILWAY STANDARD		BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC ; BS EN/EN45545-2 for fire protection								
OTHERS	MTBF		2446.2K hrs min. Telcordia SR-332 (Bellcore) ; 254.2K hrs min. MIL-HDBK-217F (25℃)								
	DIMENSION		161*68*36mm (L*W*H)								
	PACKING		0.563Kg; 24pcs/14.5Kg/0.91CUFT								

NOTE

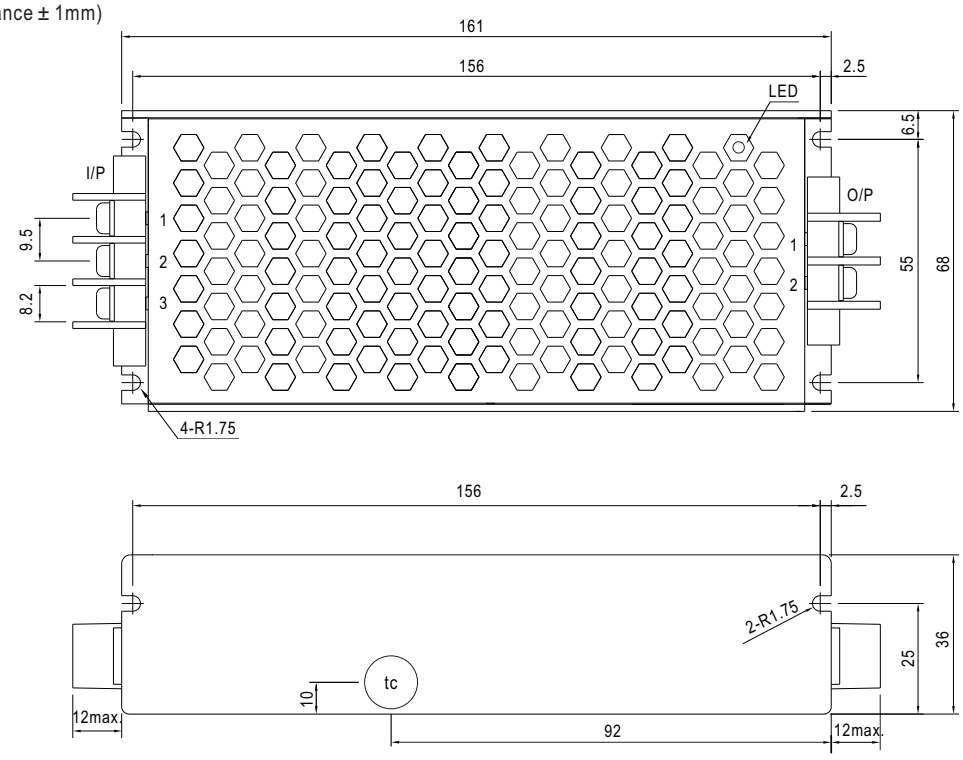
1. All parameters NOT specially mentioned are measured at 24,48,110VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Strongly recommended that external output capacitance should not exceed 5000uF. (Only for: RSD-100-5 / -12)
5. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

■ Mechanical Specification

(Unit: mm , tolerance ± 1mm)

Case No.999A



• ⓣⓒ : Max. Case Temperature

Input Terminal Pin No. Assignment :

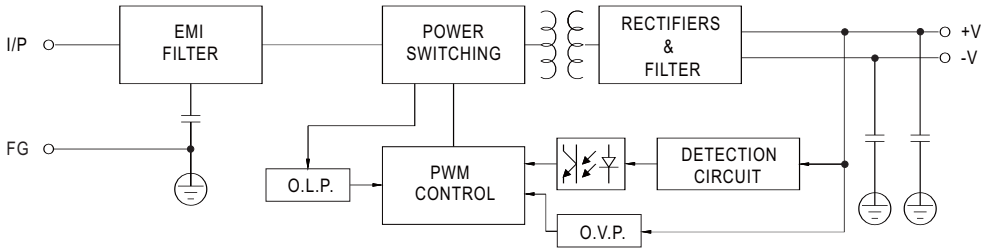
Pin No.	Assignment
1	DC INPUT V+
2	DC INPUT V-
3	FG ⏚

Output Terminal Pin No. Assignment :

Pin No.	Assignment
1	DC OUTPUT -V
2	DC OUTPUT +V

■ Block Diagram

fosc : 130KHz



■ Input Fuse

There is one fuse connected in series to the positive input line, which is used to protect against abnormal surge. Fuse specifications of each model are shown as below.

Type	Fuse Type	Reference and Rating
B	Time-Lag	Conquer UDA-A, 10A, 250V
C	Time-Lag	Conquer UDA-A, 5A, 250V
D	Time-Lag	Conquer UDA-A, 3.15A, 250V

■ Input Reverse Polarity Protection

There is a MOSFET connected in series to the negative input line. If the input polarity is connected reversely, the MOSFET opens and there will be no output to protect the unit.

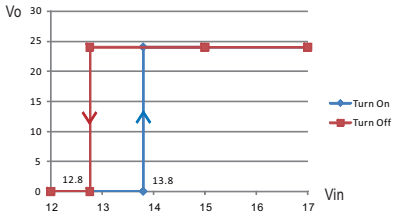
■ Input Range and Transient Ability

The series has a wide range input capability. Within ±30% of rated input voltage, it can be executed at full-load operation and operate properly; with ±40% of rated input voltage, it can withstand that for 1 second.

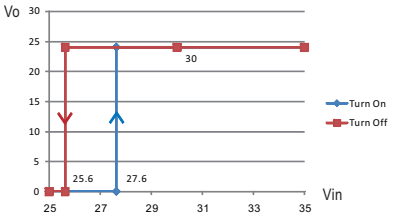
■ Input Under-Voltage Protection

If input voltage drops below Vimin, the internal control IC shuts down and there is no output voltage. It recovers automatically when input voltage reaches above Vimin, please refer to the cruve below.

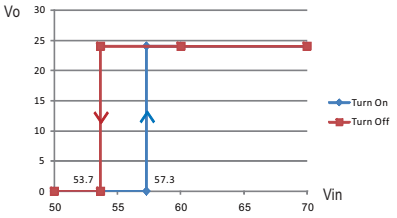
RSD-100B-24



RSD-100C-24



RSD-100D-24



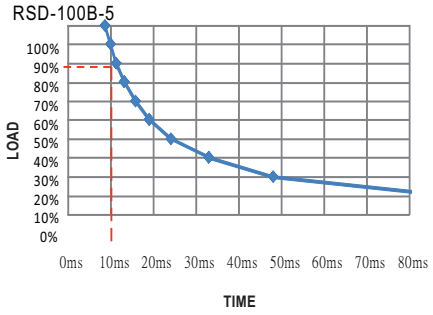
■ Inrush Current

Inrush current is suppressed by a resistor during the initial start-up, and then the resistor is bypassed by a MOSFET to reduce power consumption after accomplishing the start-up.

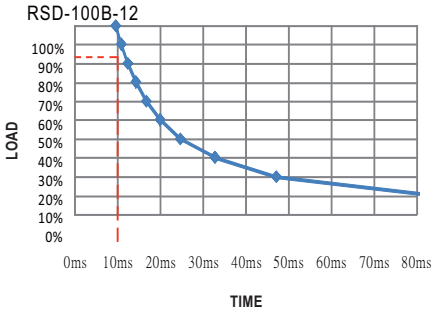
■ Hold-up Time

- EN50155: 2007 version - D type is in compliance with S2 level, while B and C types are in compliance with S1 level at full load output condition. To fulfil the requirements of S2 level, B and C types require de-rating their output load to 70%, please refer to the curve diagrams below.

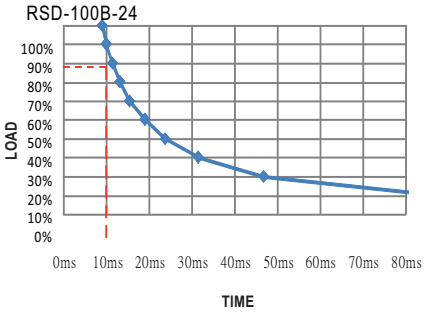
RSD-100B-5



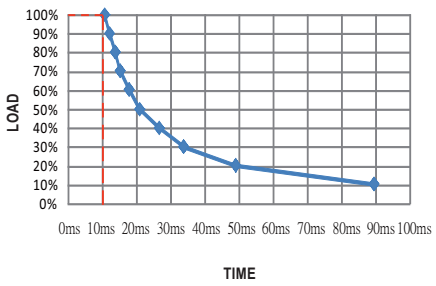
RSD-100B-12



RSD-100B-24



RSD-100C-5



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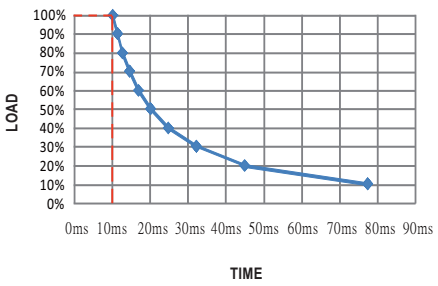

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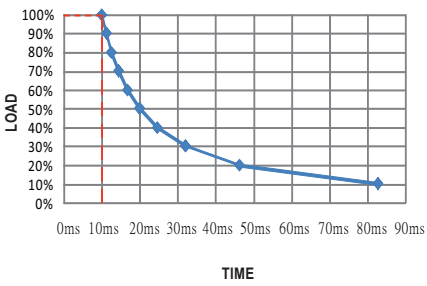


- EN50155: 2017 version - Comply with S1 level

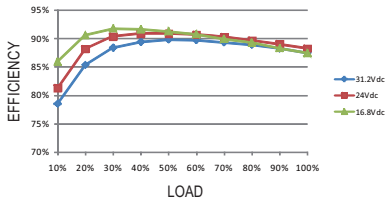
■ Output Voltage Adjustment

This function is optional, which the standard product does not have it. If you do need the function, please contact MW for details.

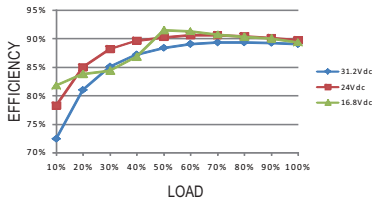
■ Efficiency vs Load & Vin Curve

The efficiency vs load & Vin curves of each model are shown as below.

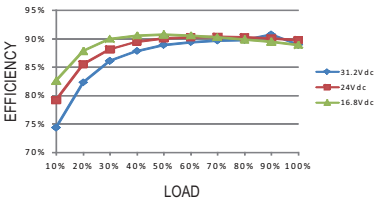
RSD-100B-5



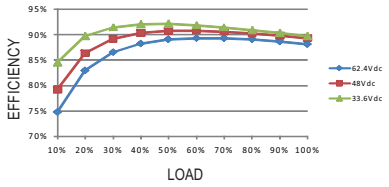
RSD-100B-12



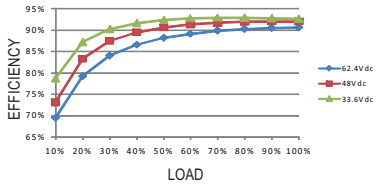
RSD-100B-24



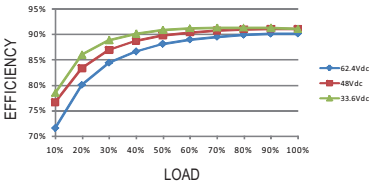
RSD-100C-5



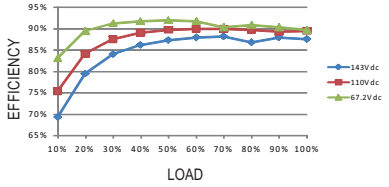
RSD-100C-12



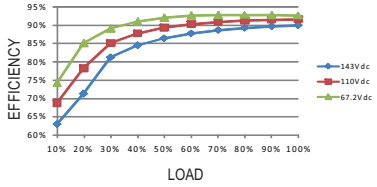
RSD-100C-24



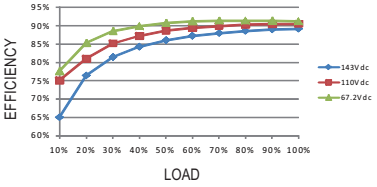
RSD-100D-5



RSD-100D-12



RSD-100D-24

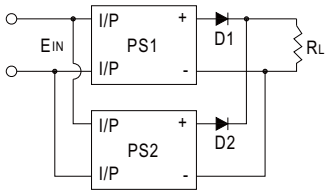


■ Parallel and Series Connection

A.Operation in Parallel

Since RSD-100 series don't have built-in parallel circuit, it can only use external circuits to achieve the redundant operation but not increase the current rating.

1.Add a diode at the positive-output of each power supply (as shown as below), the current rating of the diode should be larger than the maximum output current rating and attached to a suitable heat sink. This is only for redundant use (increase the reliability of the system) and users have to check suitability of the circuit by themselves.

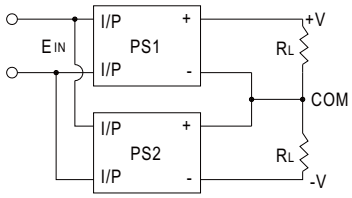


2.When using S.P.S. in parallel connection, the leakage current will increase at the same time. This could pose as a shock hazard for the user. So please contact the supplier if you have this kind of application.

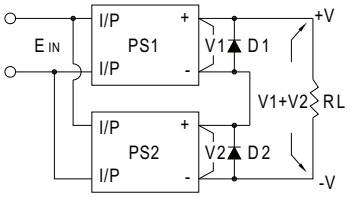
B.Operation in Series

RSD-100 can be operated in series. Here are the methods of doing it:

1.Positive and negative terminals are connected as shown as below. According to the connection, you can get the positive and negative output voltages for your loads.

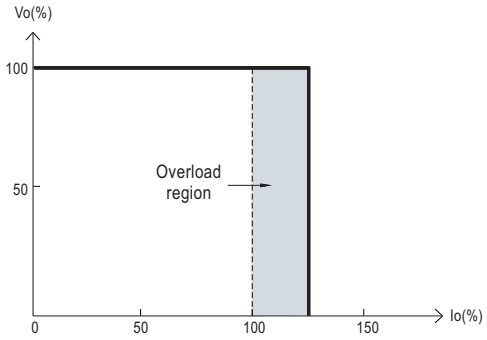


2.Increase the output voltage (current does not change). Because RSD-100 series have no reverse blocking diode in the unit, you should add an external blocking diode to prevent the damage of every unit while starting up. The voltage rating of the external diode should be larger than V1+V2 (as shown as below).



■ Overload Protection

If the output draw up to 105~135% of its output power rating, the converter will go into overload protection which is constant current mode. After the faulty condition is removed, it will recover automatically. Please refer to the diagram below for the detail operation characteristic. Please note that it's not suitable to operate within the overload region continuously, or it may cause to over temperature and reduce the life of the power supply unit or even damage it.



■ Over Voltage Protection

The converter shuts off to protect itself when the output voltage drawn exceeds 115~140% of its output rating. It must be repowered on to recover.

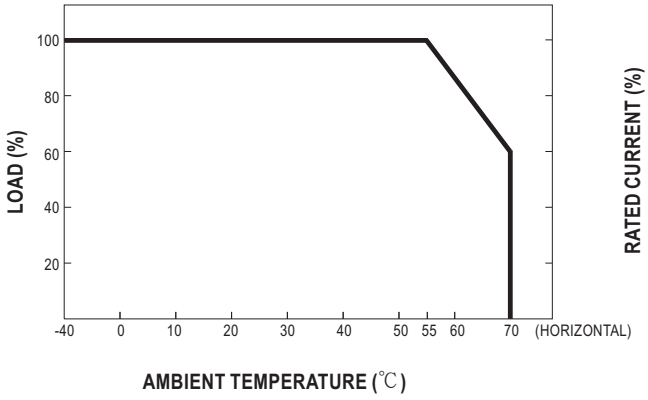
■ LED Indicator

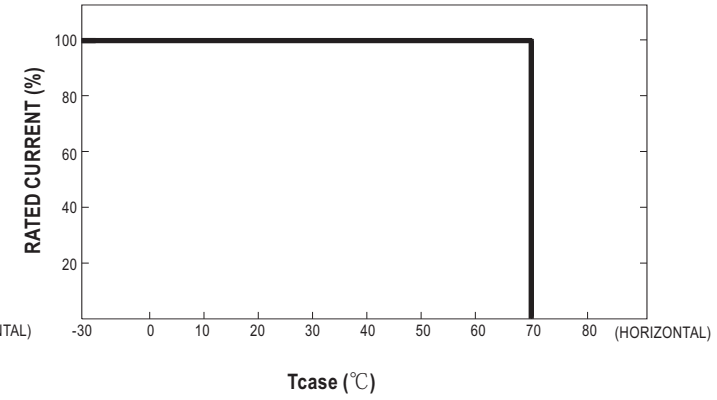
Equipped with a built-in LED indicator, the converter provides an easy way for users to check its condition through the LED indicator.
Green : normal operation; No signal: no power or failure.

■ Derating Curve

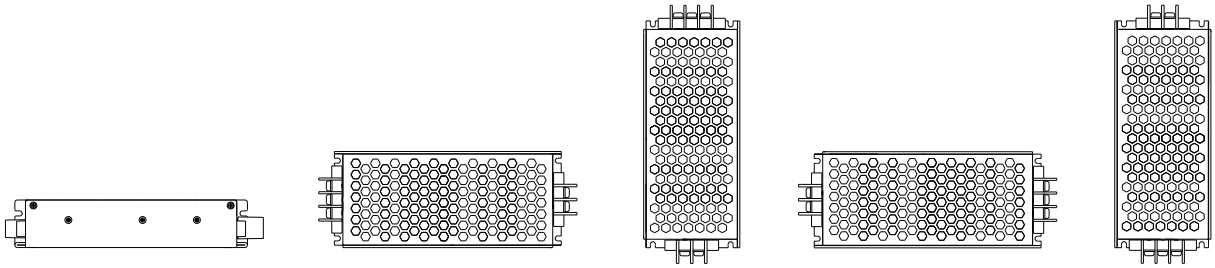
a.Single unit operation

If the unit has no iron plate mounted on its bottom, the maximum ambient temperature for the unit will be 55℃ as operating under full load condition. It requires de-rating output current when ambient temperature is between 55-70℃, please refer to the de-rating curve as below.





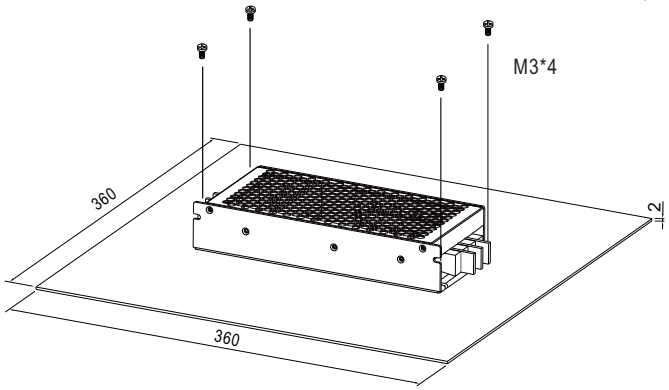
Suitable installation methods are shown as below. Since RSD-100 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



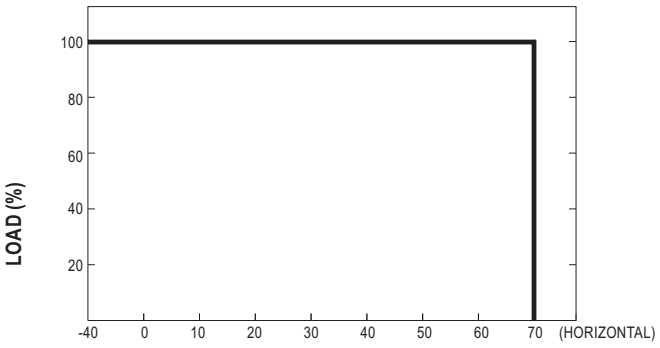
b.Operate with additional iron plate

If it is necessary to fulfil the requirements of EN50155 TX level that operate the unit fully-loaded at 70℃, RSD-100 series must be installed onto an iron plate on the bottom. The size of the suggested iron plate is shown as below. In order for optimal thermal performance, the iron plate must have an even & smooth surface and RSD-100 series must be firmly mounted at the center of the iron plate.

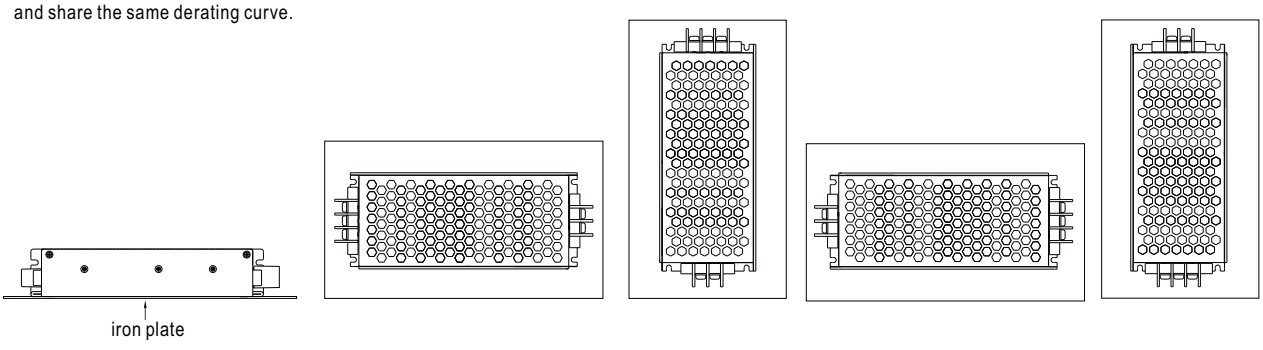
Unit:mm



The load vs ambient temperature curve is shown as below.



Suitable installation methods are shown as below. Since RSD-100 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



■ Immunity to Environmental Conditions

Test method	Standard	Test conditions	Status
Cooling Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 2 hrs/cycle	No damage
Dry Heat Test	EN 50155 section 12.2.4 (Column 2, Class TX) EN 50155 section 12.2.4 (Column 3, Class TX & Column 4, Class TX) EN 60068-2-2	Temperature: 70℃ / 85℃ Duration: 6 hrs / 10min	PASS
Damp Heat Test, Cyclic	EN 50155 section 12.2.5 EN 60068-2-30	Temperature: 25℃~55℃ Humidity: 90%~100% RH Duration: 48 hrs	PASS
Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 10 mins	PASS
Increased Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 5 hrs	PASS
Shock Test	EN 50155 section 12.2.11 EN 61373	Temperature: 21± 3℃ Humidity: 65 ± 5% Duration: 30ms*18	PASS
Low Temperature Storage Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 16 hrs	PASS
Salt Mist Test	EN 50155 section 12.2.10 (Class ST4)	Temperature: 35℃ ±2℃ Duration: 96 hrs	PASS

■ EN45545-2 Fire Test Conditions

Test Items			Hazard Level		
Items		Standard	HL1	HL2	HL3
R22	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
	Smoke density test	EN 45545-2:2013 EN ISO 5659-2:2006	PASS	PASS	PASS
	Smoke toxicity test	EN 45545-2:2013 NF X70-100:2006	PASS	PASS	PASS
R24	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
R25	Glow-wire test	EN 45545-2:2013 EN 60695-2-11:2000	PASS	PASS	PASS
R26	Vertical flame test	EN 45545-2:2013 EN 60695-11:2003	PASS	PASS	PASS

150W Railway Single Output DC-DC Converter RSD-150 series

User's Manual

Features :

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- 2:1 wide input range
- Protections: Short circuit / Overload / Over voltage / Over temperature / Input reverse polarity
- 4000VDC I/O isolation
- Cooling by free air convection
- Half encapsulated
- Built-in constant current limiting circuit
- 1U low profile 36mm
- All using 105℃ long life electrolytic capacitors
- LED indicator for power on
- 100% full load burn-in test
- 3 years warranty

UL62368-1 AS/NZS62368-1 TPTC004 IEC62368-1

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

SPECIFICATION

MODEL			RSD-150B-5	RSD-150B-12	RSD-150B-24	RSD-150C-5	RSD-150C-12	RSD-150C-24	RSD-150D-5	RSD-150D-12	RSD-150D-24
OUTPUT	DC VOLTAGE		5V	12V	24V	5V	12V	24V	5V	12V	24V
	RATED CURRENT		30A	12.5A	6.3A	30A	12.5A	6.3A	30A	12.5A	6.3A
	CURRENT RANGE		0 ~ 30A	0 ~ 12.5A	0 ~ 6.3A	0 ~ 30A	0 ~ 12.5A	0 ~ 6.3A	0 ~ 30A	0 ~ 12.5A	0 ~ 6.3A
	RATED POWER		150W	150W	151.2W	150W	150W	151.2W	150W	150W	151.2W
	RIPPLE & NOISE (max.) Note.2		100mVp-p	120mVp-p	150mVp-p	100mVp-p	120mVp-p	150mVp-p	100mVp-p	120mVp-p	150mVp-p
	VOLTAGE TOLERANCE Note.3		±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION		±0.5%	±0.3%	±0.2%	±0.5%	±0.3%	±0.2%	±0.5%	±0.2%	±0.2%
	LOAD REGULATION		±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME		800ms, 50ms at full load								
	HOLD UP TIME (Typ.)		Please refer to page 3 Hold up Time(Load de-rating curve)								
INPUT	VOLTAGE RANGE	CONTINUOUS	16.8 ~ 31.2VDC			33.6 ~ 62.4VDC			67.2 ~ 143VDC		
		1 SEC.	14.4 ~ 33.6VDC			28.8 ~ 67.2VDC			57.6 ~ 154VDC		
	EFFICIENCY (Typ.)		89%	90%	90%	90%	92%	91%	90%	92%	91%
	DC CURRENT (Typ.)		7.3A/24V	7.3A/24V	7.3A/24V	3.6A/48V	3.6A/48V	3.6A/48V	1.5A/110V	1.5A/110V	1.5A/110V
	INRUSH CURRENT (Typ.)		45A/24VDC			45A/48VDC			45A/110VDC		
	INTERRUPTION OF VOLTAGE SUPPLY		EN50155:2007-B/C- type comply with S1 level @ full load, comply with S2 level @ 70% load (except RSD-150B-5 @ 60% load) ; D-type comply with S2 level @ full load								
			EN50155:2017-Comply with S1 level								
PROTECTION	OVERLOAD		105 ~ 135% rated output power								
			Protection type : Constant current limiting, recovers automatically after fault condition is removed								
	OVER VOLTAGE		5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V
			Protection type : Shut down o/p voltage, re-power on to recover								
	OVER TEMPERATURE		Shut down o/p voltage, recovers automatically after temperature goes down								
ENVIRONMENT	WORKING TEMP.		-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ no derating with external base plate, TX class compliance								
	WORKING HUMIDITY		5 ~ 95% RH non-condensing								
	STORAGE TEMP.		-40 ~ +85℃								
	TEMP. COEFFICIENT		±0.03%/℃ (0 ~ 50℃)								
	VIBRATION		10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373								
	OPERATING ALTITUDE		5000 meters								
SAFETY & EMC (Note 4)	SAFETY STANDARDS		IEC 62368-1, UL 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1								
	WITHSTAND VOLTAGE		I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC								
	ISOLATION RESISTANCE		I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH								
	EMC EMISSION		Compliance to BS EN/EN55032 (CISPR32) Conduction Emission: Class A, Radiation Emission: Class B, EAC TP TC 020								
	EMC IMMUNITY		Compliance to BS EN/EN61000-4-2,3,4,5,6,8, BS EN/EN55035, light industry level, EAC TP TC 020								
	RAILWAY STANDARD		BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration,BS EN/EN50121-3-2 for EMC;BS EN/EN45545-2 for fire protection								
OTHERS	MTBF		2405.1K hrs min. Telcordia SR-332 (Bellcore) ; 223.3K hrs min. MIL-HDBK-217F (25℃)								
	DIMENSION		189*77*36mm (L*W*H)								
	PACKING		0.8Kg; 15pcs/13Kg/0.75CUFT								

NOTE

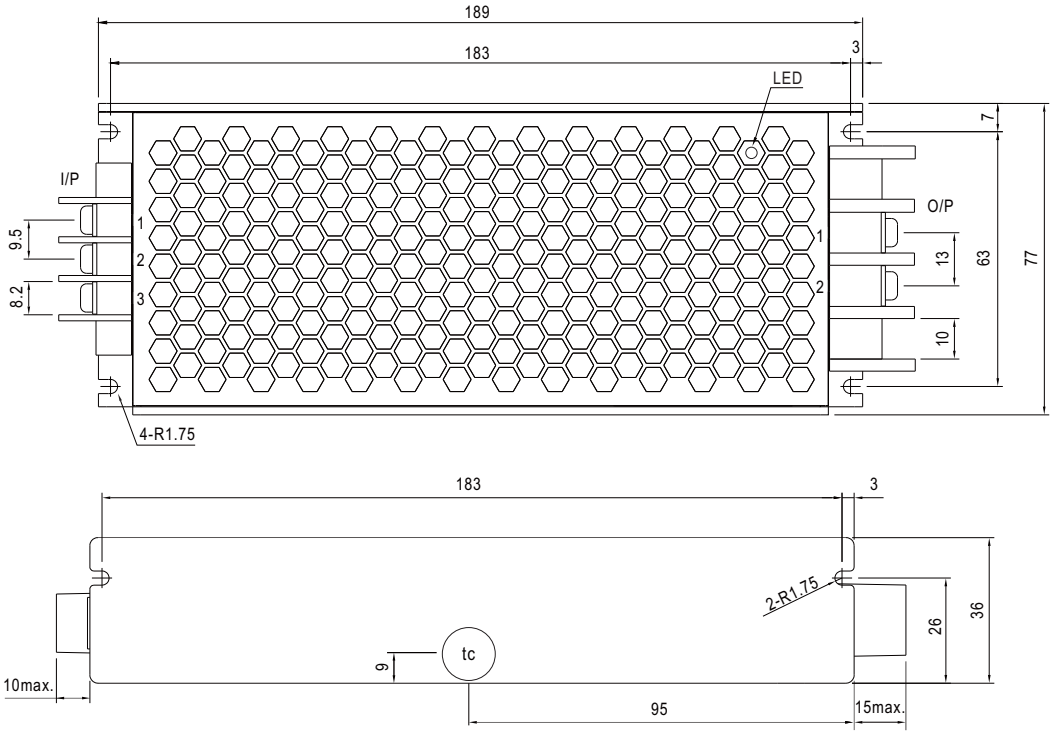
1. All parameters NOT specially mentioned are measured at 24,48,110VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
5. Strongly recommended that external output capacitance should not exceed 5000uF. (Only for: RSD-150-5/-12)
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

■ Mechanical Specification

(Unit: mm , tolerance ± 1mm)

Case No.978A



• (tc) : Max. Case Temperature

Input Terminal Pin No. Assignment :

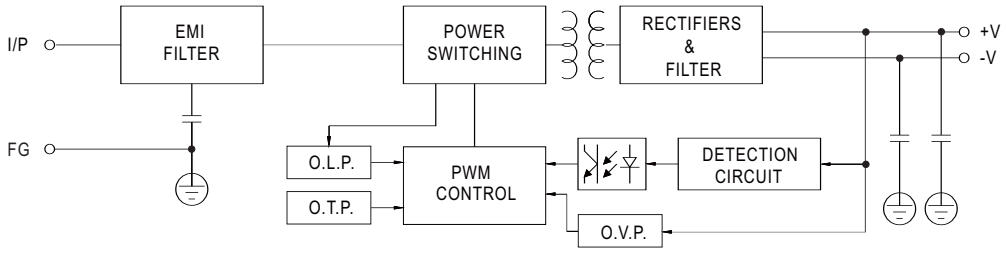
Pin No.	Assignment
1	DC INPUT V+
2	DC INPUT V-
3	FG ⏚

Output Terminal Pin No. Assignment :

Pin No.	Assignment
1	DC OUTPUT -V
2	DC OUTPUT +V

■ Block Diagram

fosc : 130KHz



■ Input Fuse

There is one fuse connected in series to the positive input line, which is used to protect against abnormal surge. Fuse specifications of each model are shown as below.

Type	Fuse Type	Reference and Rating
B	Time-Lag	Conquer UDA-A, 15A, 250V
C	Time-Lag	Conquer UDA-A, 10A, 250V
D	Time-Lag	Conquer UDA-A, 4A, 250V

■ Input Reverse Polarity Protection

There is a MOSFET connected in series to the negative input line. If the input polarity is connected reversely, the MOSFET opens and there will be no output to protect the unit.

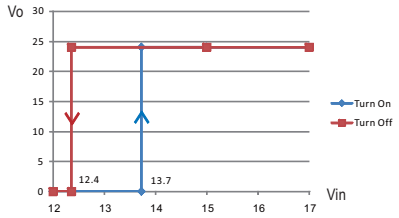
■ Input Range and Transient Ability

The series has a wide range input capability. Within ±30% of rated input voltage, it can be executed at full-load operation and operate properly; with ±40% of rated input voltage, it can withstand that for 1 second.

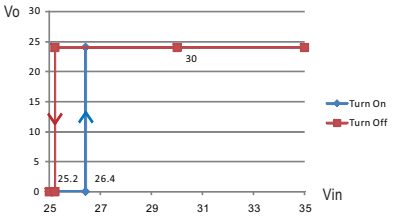
■ Input Under-Voltage Protection

If input voltage drops below Vimin, the internal control IC shuts down and there is no output voltage. It recovers automatically when input voltage reaches above Vimin, please refer to the cruve below.

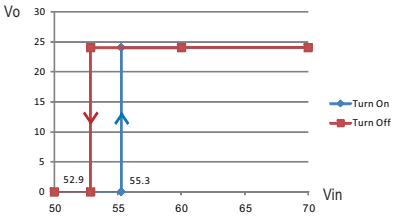
RSD-150B-24



RSD-150C-24



RSD-150D-24



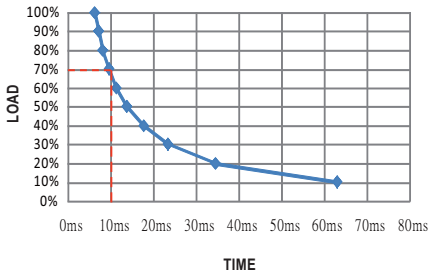
■ Inrush Current

Inrush current is suppressed by a resistor during the initial start-up, and then the resistor is bypassed by a MOSFET to reduce power consumption after accomplishing the start-up.

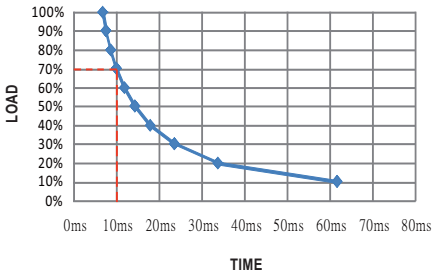
■ Hold-up Time

- EN50155: 2007 version - D type is in compliance with S2 level, while B and C types are in compliance with S1 level at full load output condition. To fulfil the requirements of S2 level, B and C types require de-rating their output load to 70% (except RSD-150B-5 requires de-rating its output load to 60%), please refer to the curve diagrams below.

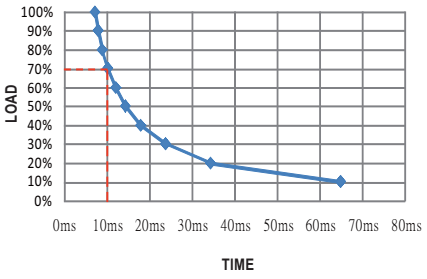
RSD-150B-5



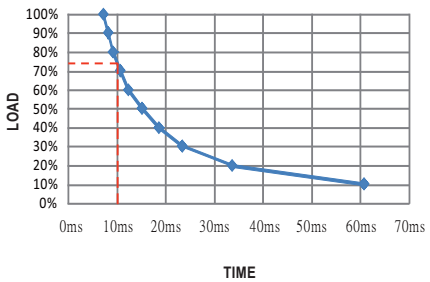
RSD-150B-12



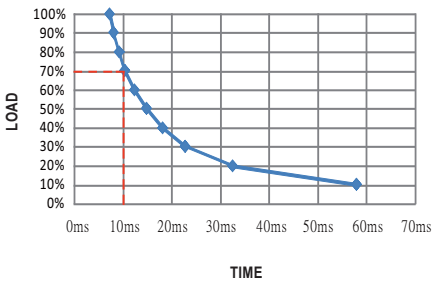
RSD-150B-24



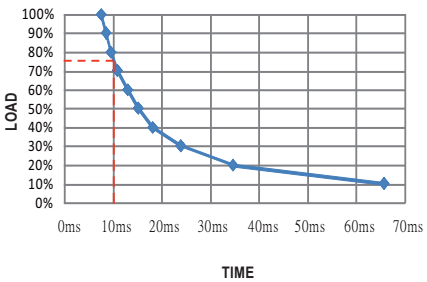
RSD-150C-5



RSD-150C-12



RSD-150C-24



- EN50155: 2017 version - Comply with S1 level

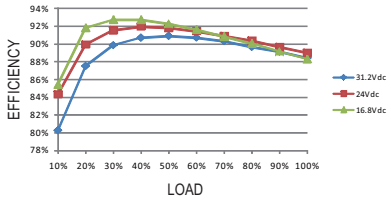
■ Output Voltage Adjustment

This function is optional, which the standard product does not have it. If you do need the function, please contact MW for details.

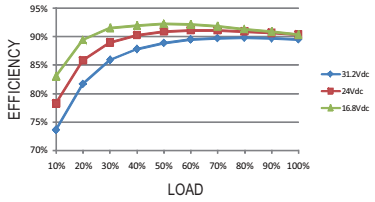
■ Efficiency vs Load & Vin Curve

The efficiency vs load & Vin curves of each model are shown as below.

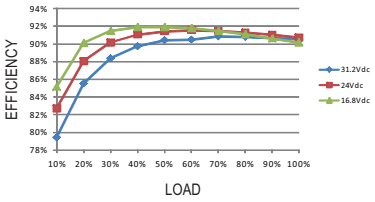
RSD-150B-5



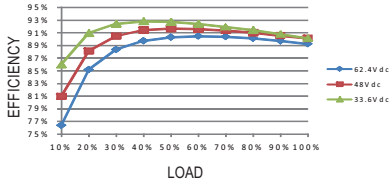
RSD-150B-12



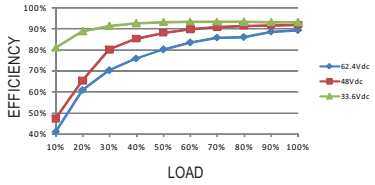
RSD-150B-24



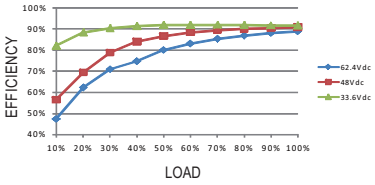
RSD-150C-5



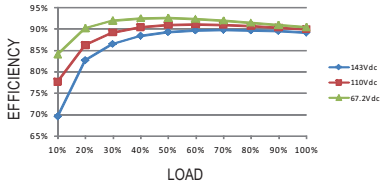
RSD-150C-12



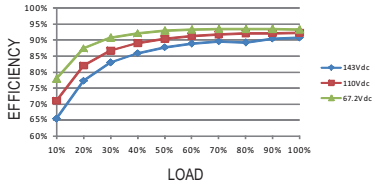
RSD-150C-24



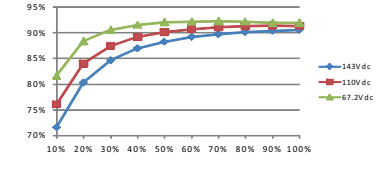
RSD-150D-5



RSD-150D-12



RSD-150D-24

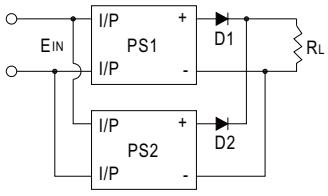


■ Parallel and Series Connection

A.Operation in Parallel

Since RSD-150 series don't have built-in parallel circuit, it can only use external circuits to achieve the redundant operation but not increase the current rating.

1.Add a diode at the positive-output of each power supply (as shown as below), the current rating of the diode should be larger than the maximum output current rating and attached to a suitable heat sink. This is only for redundant use (increase the reliability of the system) and users have to check suitability of the circuit by themselves.

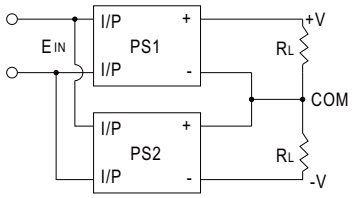


2.When using S.P.S. in parallel connection, the leakage current will increase at the same time. This could pose as a shock hazard for the user. So please contact the supplier if you have this kind of application.

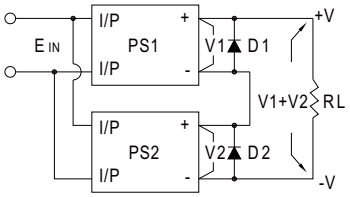
B.Operation in Series

RSD-150 can be operated in series. Here are the methods of doing it:

1.Positive and negative terminals are connected as shown as below. According to the connection, you can get the positive and negative output voltages for your loads.

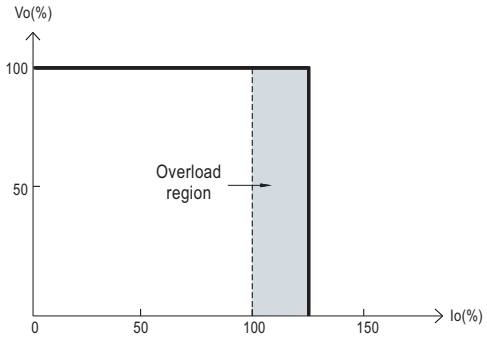


2.Increase the output voltage (current does not change). Because RSD-150 series have no reverse blocking diode in the unit, you should add an external blocking diode to prevent the damage of every unit while starting up. The voltage rating of the external diode should be larger than V1+V2 (as shown as below).



■ Overload Protection

If the output draw up to 105~135% of its output power rating, the converter will go into overload protection which is constant current mode. After the faulty condition is removed, it will recover automatically. Please refer to the diagram below for the detail operation characteristic. Please note that it's not suitable to operate within the overload region continuously, or it may cause to over temperature and reduce the life of the power supply unit or even damage it.



■ Over Voltage Protection

The converter shuts off to protect itself when the output voltage drawn exceeds 115~140% of its output rating. It must be repowered on to recover.

■ Over Temperature Protection

The converter shuts off to protect itself when the built-in temperature sensor mounted on the main power transformer senses a high temperature. The output recovers automatically if the temperature drops below the limit.

■ LED Indicator

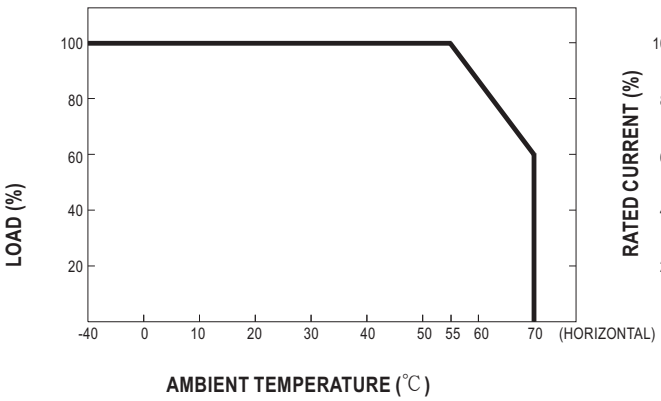
Equipped with a built-in LED indicator, the converter provides an easy way for users to check its condition through the LED indicator.

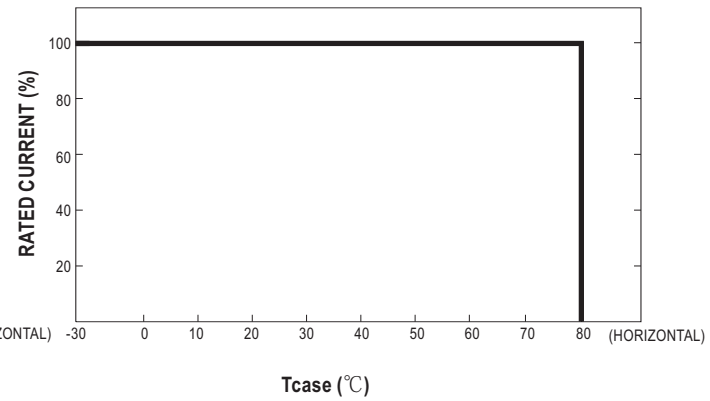
Green : normal operation; No signal: no power or failure.

■ Derating Curve

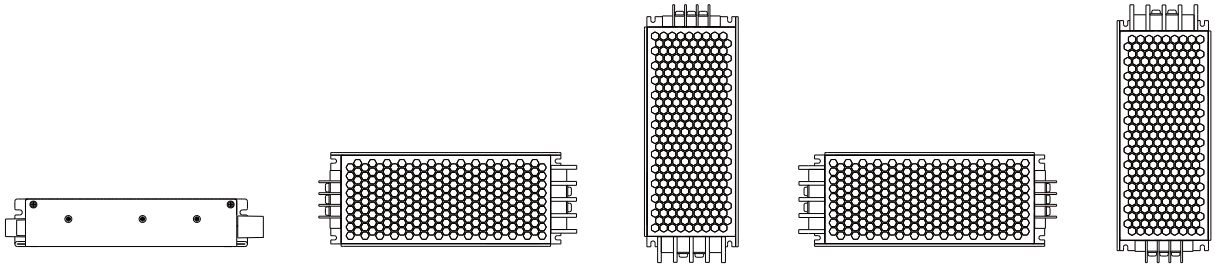
a.Single unit operation

If the unit has no iron plate mounted on its bottom, the maximum ambient temperature for the unit will be 55℃ as operating under full load condition. It requires de-rating output current when ambient temperature is between 55-70℃, please refer to the de-rating curve as below.





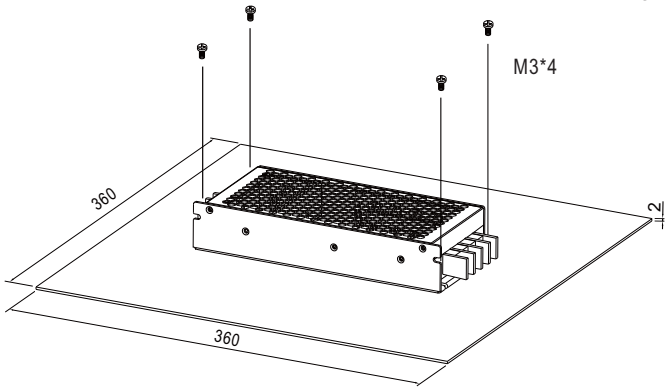
Suitable installation methods are shown as below. Since RSD-150 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



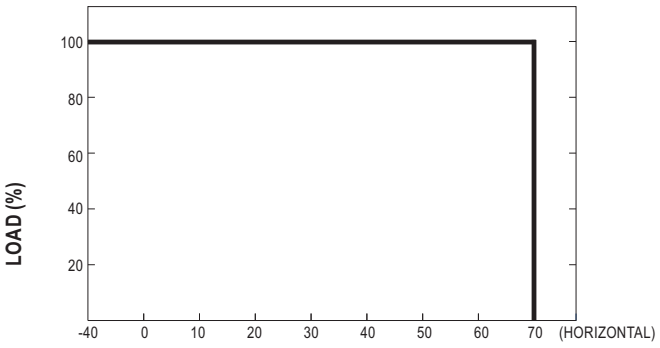
b.Operate with additional iron plate

If it is necessary to fulfil the requirements of EN50155 TX level that operate the unit fully-loaded at 70℃, RSD-150 series must be installed onto an iron plate on the bottom. The size of the suggested iron plate is shown as below. In order for optimal thermal performance, the iron plate must have an even & smooth surface and RSD-150 series must be firmly mounted at the center of the iron plate.

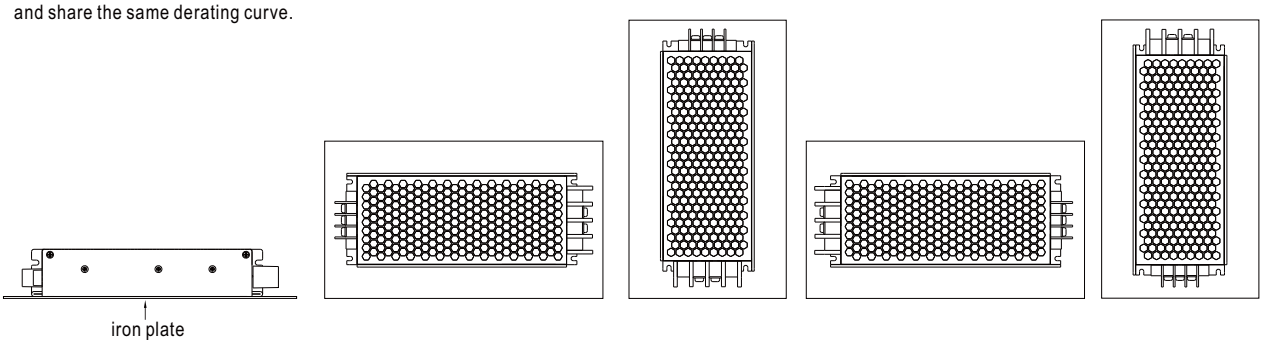
Unit:mm



The load vs ambient temperature curve is shown as below.



Suitable installation methods are shown as below. Since RSD-150 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



■ Immunity to Environmental Conditions

Test method	Standard	Test conditions	Status
Cooling Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 2 hrs/cycle	No damage
Dry Heat Test	EN 50155 section 12.2.4 (Column 2, Class TX) EN 50155 section 12.2.4 (Column 3, Class TX & Column 4, Class TX) EN 60068-2-2	Temperature: 70℃ / 85℃ Duration: 6 hrs / 10min	PASS
Damp Heat Test, Cyclic	EN 50155 section 12.2.5 EN 60068-2-30	Temperature: 25℃~55℃ Humidity: 90%~100% RH Duration: 48 hrs	PASS
Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 10 mins	PASS
Increased Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 5 hrs	PASS
Shock Test	EN 50155 section 12.2.11 EN 61373	Temperature: 21± 3℃ Humidity: 65 ± 5% Duration: 30ms*18	PASS
Low Temperature Storage Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 16 hrs	PASS
Salt Mist Test	EN 50155 section 12.2.10 (Class ST4)	Temperature: 35℃ ±2℃ Duration: 96 hrs	PASS

■ EN45545-2 Fire Test Conditions

Test Items			Hazard Level		
Items		Standard	HL1	HL2	HL3
R22	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
	Smoke density test	EN 45545-2:2013 EN ISO 5659-2:2006	PASS	PASS	PASS
	Smoke toxicity test	EN 45545-2:2013 NF X70-100:2006	PASS	PASS	PASS
R24	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
R25	Glow-wire test	EN 45545-2:2013 EN 60695-2-11:2000	PASS	PASS	PASS
R26	Vertical flame test	EN 45545-2:2013 EN 60695-11:2003	PASS	PASS	PASS

200W Railway Single Output DC-DC Converter RSD-200 series

Features :

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- 2:1 wide input range
- Protections: Short circuit / Overload / Over voltage / Over temperature / Input reverse polarity
- 4000VDC I/O isolation
- Cooling by free air convection
- Half encapsulated
- Built-in constant current limiting circuit
- 1U low profile 40mm
- All using 105℃ long life electrolytic capacitors
- LED indicator for power on
- 100% full load burn-in test
- 3 years warranty

User's Manual

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

UL62368-1 AS/NZS62368-1 TPTC004 IEC62368-1

SPECIFICATION

MODEL			RSD-200B-12	RSD-200B-24	RSD-200B-48	RSD-200C-12	RSD-200C-24	RSD-200C-48	RSD-200D-12	RSD-200D-24	RSD-200D-48
OUTPUT	DC VOLTAGE		12V	24V	48V	12V	24V	48V	12V	24V	48V
	RATED CURRENT		16.7A	8.4A	4.2A	16.7A	8.4A	4.2A	16.7A	8.4A	4.2A
	CURRENT RANGE		0 ~ 16.7A	0 ~ 8.4A	0 ~ 4.2A	0 ~ 16.7A	0 ~ 8.4A	0 ~ 4.2A	0 ~ 16.7A	0 ~ 8.4A	0 ~ 4.2A
	RATED POWER		200.4W	201.6W	201.6W	200.4W	201.6W	201.6W	200.4W	201.6W	201.6W
	RIPPLE & NOISE (max.) Note.2		120mVp-p	150mVp-p	180mVp-p	120mVp-p	150mVp-p	180mVp-p	120mVp-p	150mVp-p	180mVp-p
	VOLTAGE TOLERANCE Note.3		±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION		±0.2%	±0.2%	±0.5%	±0.2%	±0.2%	±0.5%	±0.2%	±0.2%	±0.5%
	LOAD REGULATION		±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME		800ms, 50ms at full load								
	HOLD UP TIME (Typ.)		Please refer to page 3 Hold up Time(Load de-rating curve)								
INPUT	VOLTAGE RANGE	CONTINUOUS	16.8 ~ 31.2VDC			33.6 ~ 62.4VDC			67.2 ~ 143VDC		
		1 SEC.	14.4 ~ 33.6VDC			28.8 ~ 67.2VDC			57.6 ~ 154VDC		
	EFFICIENCY (Typ.)		89%	89%	89%	91%	91%	91%	91%	91%	91%
	DC CURRENT (Typ.)		9.6A/24V	9.6A/24V	9.6A/24V	4.8A/48V	4.8A/48V	4.8A/48V	2.1A/110V	2.1A/110V	2.1A/110V
	INRUSH CURRENT (Typ.)		45A/24VDC			45A/48VDC			45A/110VDC		
	INTERRUPTION OF VOLTAGE SUPPLY		EN50155:2007-B/C- type comply with S1 level @ full load, comply with S2 level @ 70% load ; D-type comply with S2 level @ full load								
			EN50155:2017-Comply with S1 level								
PROTECTION	OVERLOAD		105 ~ 135% rated output power								
			Protection type : Constant current limiting, recovers automatically after fault condition is removed								
	OVER VOLTAGE		13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V	13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V	13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V
			Protection type : Shut down o/p voltage, re-power on to recover								
	OVER TEMPERATURE		Shut down o/p voltage, recovers automatically after temperature goes down								
ENVIRONMENT	WORKING TEMP.		-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ no derating with external base plate, TX class compliance								
	WORKING HUMIDITY		5 ~ 95% RH non-condensing								
	STORAGE TEMP.		-40 ~ +85℃								
	TEMP. COEFFICIENT		±0.03%/℃ (0 ~ 50℃)								
	VIBRATION		10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373								
	OPERATING ALTITUDE		5000 meters								
SAFETY & EMC (Note 4)	SAFETY STANDARDS		UL 62368-1, IEC 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1								
	WITHSTAND VOLTAGE		I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC								
	ISOLATION RESISTANCE		I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH								
	EMC EMISSION		Compliance to BS EN/EN55032 (CISPR32) Conduction Emission: Class A, Radiation Emission: Class B, EAC TP TC 020								
	EMC IMMUNITY		Compliance to BS EN/EN61000-4-2,3,4,5,6,8, BS EN/EN55035, light industry level, EAC TP TC 020								
	RAILWAY STANDARD		BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC ;BS EN/EN45545-2 for fire protection								
OTHERS	MTBF		2125.5K hrs min. Telcordia SR-332 (Bellcore) ; 218.2K hrs min. MIL-HDBK-217F (25℃)								
	DIMENSION		191*86*40mm (L*W*H)								
	PACKING		0.94Kg; 12pcs/12.3Kg/0.73CUFT								

NOTE

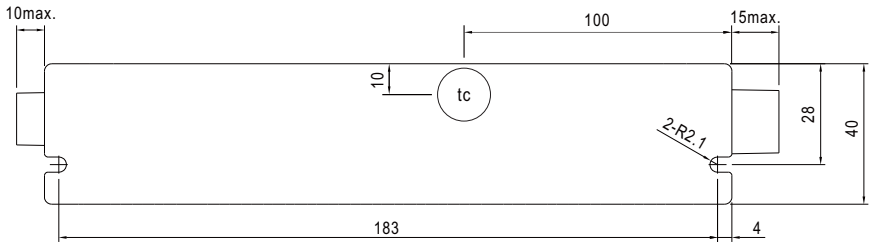
1. All parameters NOT specially mentioned are measured at 24,48,110VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
5. Strongly recommended that external output capacitance should not exceed 5000uF. (Only for: RSD-200-12)
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

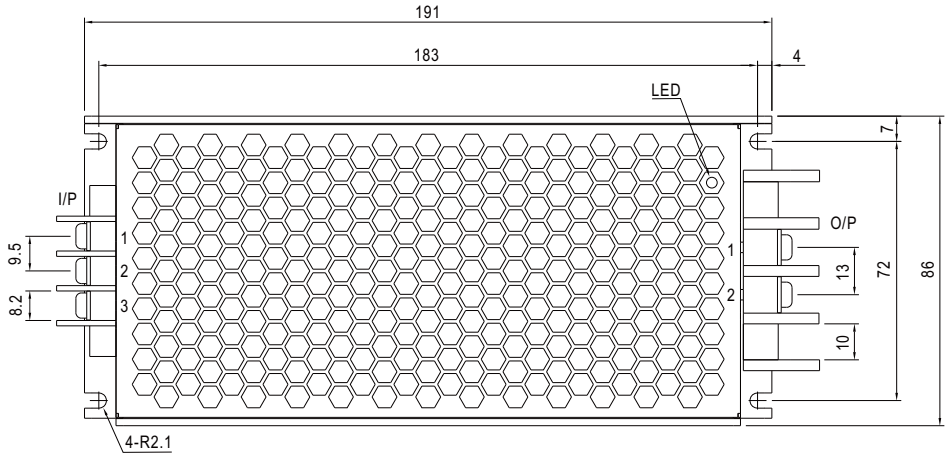
■ Mechanical Specification

(Unit: mm , tolerance ± 1mm)

Case No.203A



• ⓣⓒ : Max. Case Temperature



Input Terminal Pin No. Assignment :

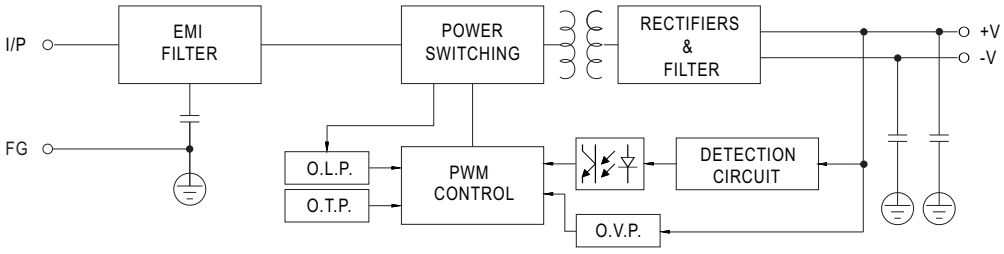
Pin No.	Assignment
1	DC INPUT V+
2	DC INPUT V-
3	FG ⏚

Output Terminal Pin No. Assignment :

Pin No.	Assignment
1	DC OUTPUT -V
2	DC OUTPUT +V

■ Block Diagram

fosc : 130KHz



■ Input Fuse

There are one or two fuses connected in series to the positive input line, which are used to protect against abnormal surge. Fuse specifications of each model are shown as below.

Type	Fuse Type	Reference and Rating
B	Time-Lag	2*Conquer UDA-A, 10A, 250V
C	Time-Lag	Conquer UDA-A, 10A, 250V
D	Time-Lag	Conquer UDA-A, 5A, 250V

■ Input Reverse Polarity Protection

There is a MOSFET connected in series to the negative input line. If the input polarity is connected reversely, the MOSFET opens and there will be no output to protect the unit.

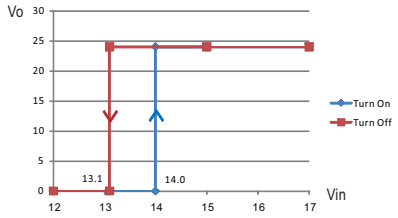
■ Input Range and Transient Ability

The series has a wide range input capability. Within ±30% of rated input voltage, it can be executed at full-load operation and operate properly; with ±40% of rated input voltage, it can withstand that for 1 second.

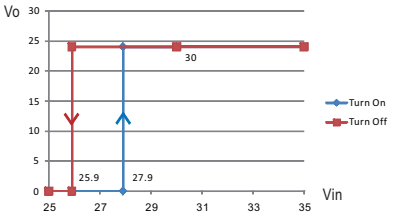
■ Input Under-Voltage Protection

If input voltage drops below Vimin, the internal control IC shuts down and there is no output voltage. It recovers automatically when input voltage reaches above Vimin, please refer to the cruve below.

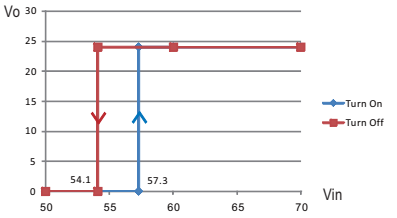
RSD-200B-24



RSD-200C-24



RSD-200D-24



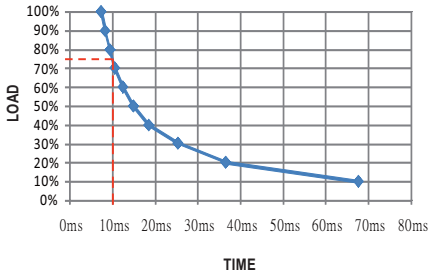
■ Inrush Current

Inrush current is suppressed by a resistor during the initial start-up, and then the resistor is bypassed by a MOSFET to reduce power consumption after accomplishing the start-up.

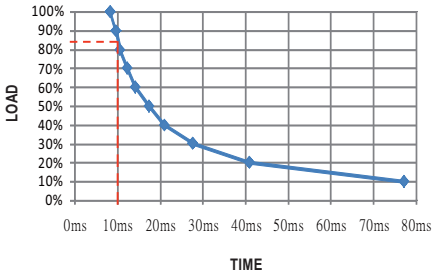
■ Hold-up Time

- EN50155: 2007 version - D type is in compliance with S2 level, while B and C types are in compliance with S1 level at full load output condition. To fulfil the requirements of S2 level, B and C types require de-rating their output load to 70%, please refer to the curve diagrams below.

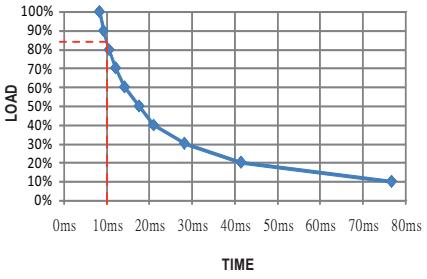
RSD-200B-12



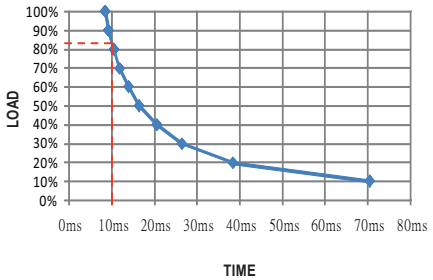
RSD-200B-24



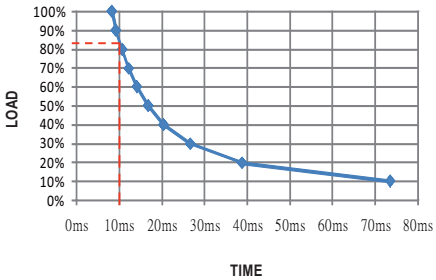
RSD-200B-48



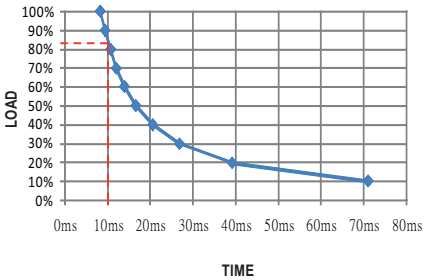
RSD-200C-12



RSD-200C-24



RSD-200C-48



- EN50155: 2017 version - Comply with S1 level

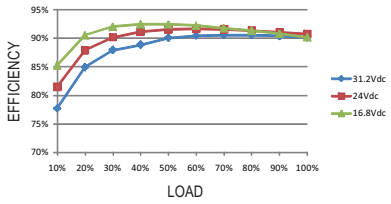
■ Output Voltage Adjustment

This function is optional, which the standard product does not have it. If you do need the function, please contact MW for details.

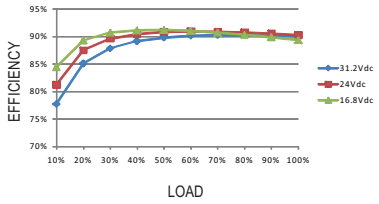
■ Efficiency vs Load & Vin Curve

The efficiency vs load & Vin curves of each model are shown as below.

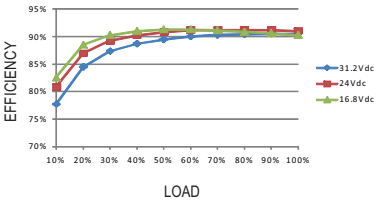
RSD-200B-12



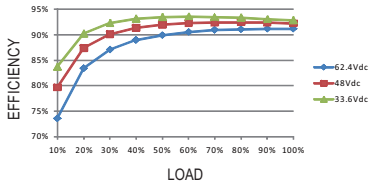
RSD-200B-24



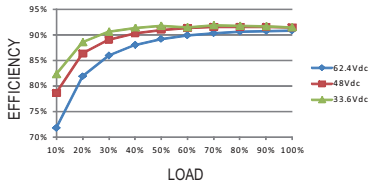
RSD-200B-48



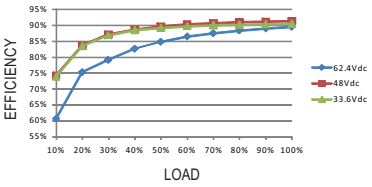
RSD-200C-12



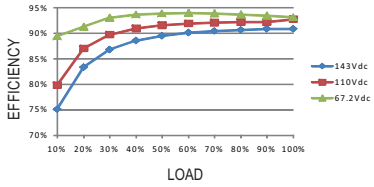
RSD-200C-24



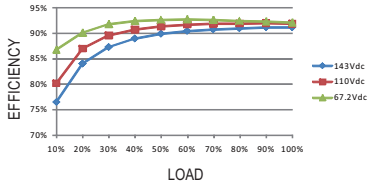
RSD-200C-48



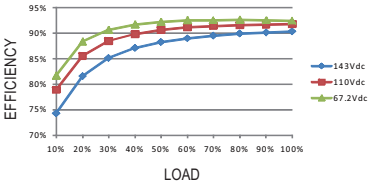
RSD-200D-12



RSD-200D-24



RSD-200D-48

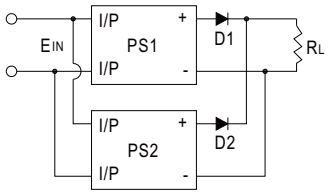


■ Parallel and Series Connection

A.Operation in Parallel

Since RSD-200 series don't have built-in parallel circuit, it can only use external circuits to achieve the redundant operation but not increase the current rating.

1.Add a diode at the positive-output of each power supply (as shown as below), the current rating of the diode should be larger than the maximum output current rating and attached to a suitable heat sink. This is only for redundant use (increase the reliability of the system) and users have to check suitability of the circuit by themselves.

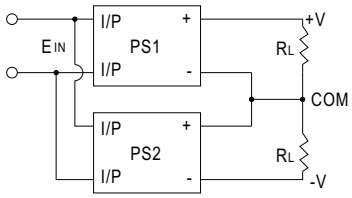


2.When using S.P.S. in parallel connection, the leakage current will increase at the same time. This could pose as a shock hazard for the user. So please contact the supplier if you have this kind of application.

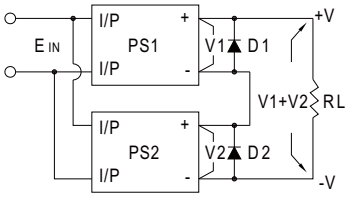
B.Operation in Series

RSD-200 can be operated in series. Here are the methods of doing it:

1.Positive and negative terminals are connected as shown as below. According to the connection, you can get the positive and negative output voltages for your loads.

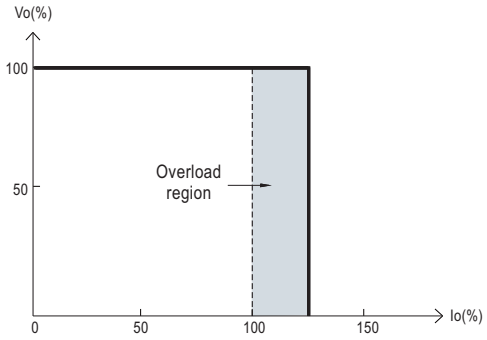


2.Increase the output voltage (current does not change). Because RSD-200 series have no reverse blocking diode in the unit, you should add an external blocking diode to prevent the damage of every unit while starting up. The voltage rating of the external diode should be larger than V1+V2 (as shown as below).



■ Overload Protection

If the output draw up to 105~135% of its output power rating, the converter will go into overload protection which is constant current mode. After the faulty condition is removed, it will recover automatically. Please refer to the diagram below for the detail operation characteristic. Please note that it's not suitable to operate within the overload region continuously, or it may cause to over temperature and reduce the life of the power supply unit or even damage it.



■ Over Voltage Protection

The converter shuts off to protect itself when the output voltage drawn exceeds 115~135% of its output rating. It must be repowered on to recover.

■ Over Temperature Protection

The converter shuts off to protect itself when the built-in temperature sensor mounted on the main power transformer senses a high temperature. The output recovers automatically if the temperature drops below the limit.

■ LED Indicator

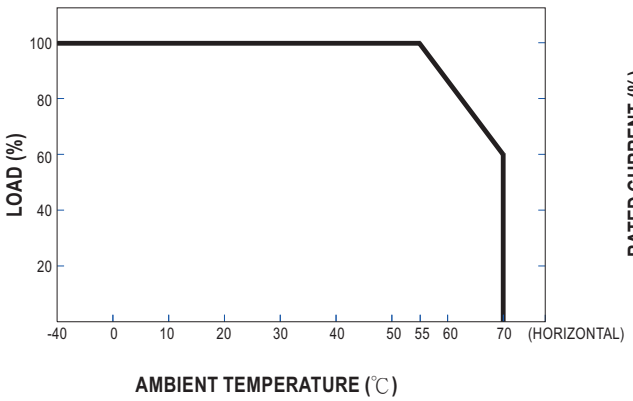
Equipped with a built-in LED indicator, the converter provides an easy way for users to check its condition through the LED indicator.

Green : normal operation; No signal: no power or failure.

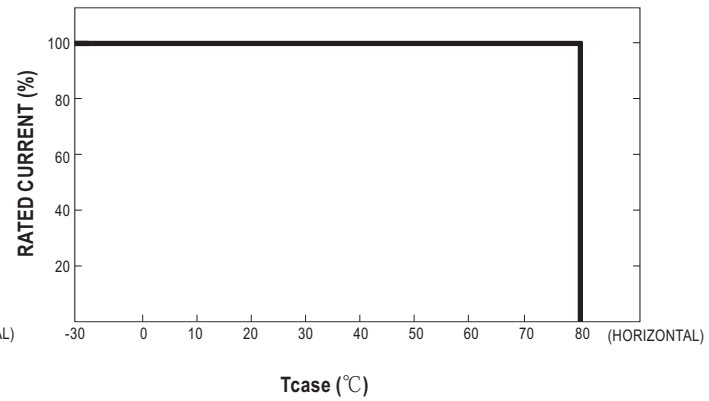
■ Derating Curve

a.Single unit operation

If the unit has no iron plate mounted on its bottom, the maximum ambient temperature for the unit will be 55℃ as operating under full load condition. It requires de-rating output current when ambient temperature is between 55-70℃, please refer to the de-rating curve as below.

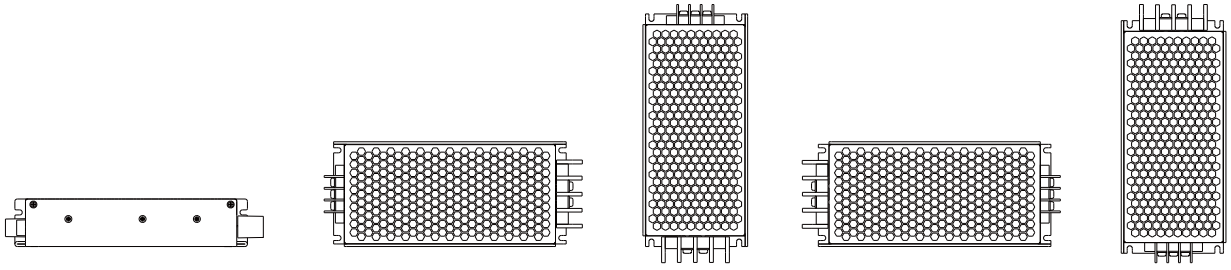


AMBIENT TEMPERATURE (℃)



Tcase (℃)

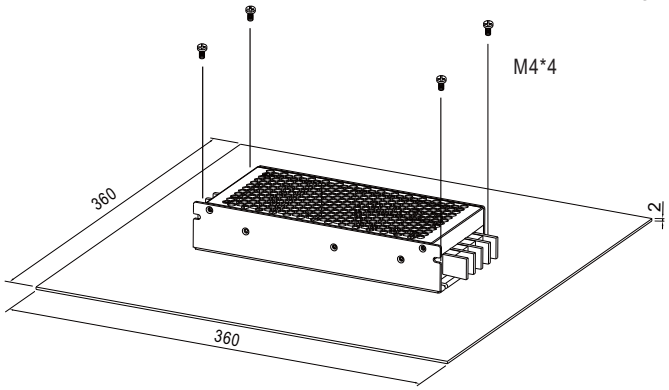
Suitable installation methods are shown as below. Since RSD-200 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



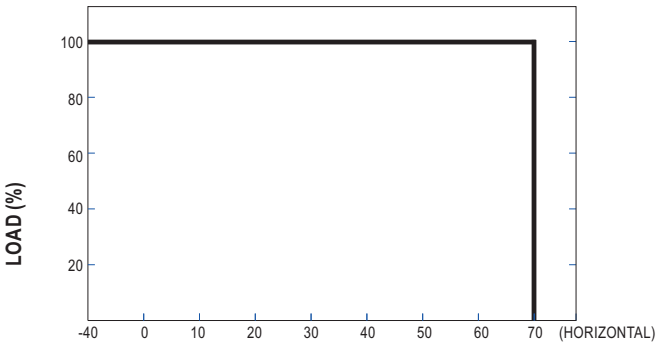
b.Operate with additional iron plate

If it is necessary to fulfil the requirements of EN50155 TX level that operate the unit fully-loaded at 70℃, RSD-200 series must be installed onto an iron plate on the bottom. The size of the suggested iron plate is shown as below. In order for optimal thermal performance, the iron plate must have an even & smooth surface and RSD-200 series must be firmly mounted at the center of the iron plate.

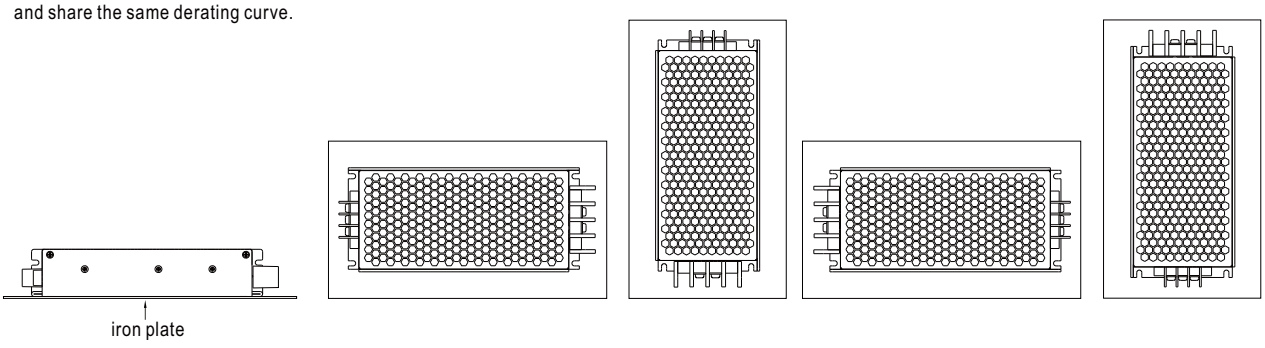
Unit:mm



The load vs ambient temperature curve is shown as below.



Suitable installation methods are shown as below. Since RSD-200 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



■ Immunity to Environmental Conditions

Test method	Standard	Test conditions	Status
Cooling Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 2 hrs/cycle	No damage
Dry Heat Test	EN 50155 section 12.2.4 (Column 2, Class TX) EN 50155 section 12.2.4 (Column 3, Class TX & Column 4, Class TX) EN 60068-2-2	Temperature: 70℃ / 85℃ Duration: 6 hrs / 10min	PASS
Damp Heat Test, Cyclic	EN 50155 section 12.2.5 EN 60068-2-30	Temperature: 25℃~55℃ Humidity: 90%~100% RH Duration: 48 hrs	PASS
Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 10 mins	PASS
Increased Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 5 hrs	PASS
Shock Test	EN 50155 section 12.2.11 EN 61373	Temperature: 21± 3℃ Humidity: 65 ± 5% Duration: 30ms*18	PASS
Low Temperature Storage Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 16 hrs	PASS
Salt Mist Test	EN 50155 section 12.2.10 (Class ST4)	Temperature: 35℃ ±2℃ Duration: 96 hrs	PASS

■ EN45545-2 Fire Test Conditions

Test Items			Hazard Level		
Items		Standard	HL1	HL2	HL3
R22	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
	Smoke density test	EN 45545-2:2013 EN ISO 5659-2:2006	PASS	PASS	PASS
	Smoke toxicity test	EN 45545-2:2013 NF X70-100:2006	PASS	PASS	PASS
R24	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
R25	Glow-wire test	EN 45545-2:2013 EN 60695-2-11:2000	PASS	PASS	PASS
R26	Vertical flame test	EN 45545-2:2013 EN 60695-11:2003	PASS	PASS	PASS

300W Railway Single Output DC-DC Converter

RSD-300 series

Features :

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- 2:1 wide input range
- Protections: Short circuit / Overload / Over voltage / Over temperature / Input reverse polarity
- 4000VDC I/O isolation
- Cooling by free air convection
- Half encapsulated
- Built-in constant current limiting circuit
- 1U low profile 40mm
- All using 105℃ long life electrolytic capacitors
- LED indicator for power on
- 100% full load burn-in test
- 3 years warranty

User's Manual

UL62368-1 AS/NZS62368-1 TPTC004 IEC62368-1

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

SPECIFICATION

MODEL			RSD-300B-5	RSD-300B-12	RSD-300B-24	RSD-300B-48	RSD-300C-5	RSD-300C-12	RSD-300C-24	RSD-300C-48
OUTPUT	DC VOLTAGE		5V	12V	24V	48V	5V	12V	24V	48V
	RATED CURRENT		42A	22.5A	11.3A	5.7A	42A	25A	12.5A	6.3A
	CURRENT RANGE		0 ~ 42A	0 ~ 22.5A	0 ~ 11.3A	0 ~ 5.7A	0 ~ 42A	0 ~ 25A	0 ~ 12.5A	0 ~ 6.3A
	RATED POWER		210W	270W	271.2W	273.6W	210W	300W	300W	302.4W
	RIPPLE & NOISE (max.) Note.2		100mVp-p	120mVp-p	150mVp-p	180mVp-p	100mVp-p	120mVp-p	150mVp-p	180mVp-p
	VOLTAGE TOLERANCE Note.3		±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION		±0.5%	±0.3%	±0.2%	±0.5%	±0.5%	±0.3%	±0.2%	±0.5%
	LOAD REGULATION		±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME		800ms, 50ms at full load							
	HOLD UP TIME (Typ.)		Please refer to page 5,6 Hold up Time(Load de-rating curve)							
INPUT	VOLTAGE RANGE	CONTINUOUS	16.8 ~ 31.2VDC				33.6 ~ 62.4VDC			
		1 SEC.	14.4 ~ 33.6VDC				28.8 ~ 67.2VDC			
	EFFICIENCY (Typ.)		89%	89.5%	90%	91.5%	90.5%	91%	91.5%	92%
	DC CURRENT (Typ.)		9.7A/24V	14.6A/24V	14.6A/24V	14.6A/24V	4.8A/48V	7.2A/48V	7.2A/48V	7.2A/48V
	INRUSH CURRENT (Typ.)		45A/24VDC				45A/48VDC			
	INTERRUPTION OF VOLTAGE SUPPLY		EN50155:2007-B/C- type comply with S1 level @ full load, comply with S2 level @ 70% load							
			EN50155:2017-Comply with S1 level							
PROTECTION	OVERLOAD		105 ~ 135% rated output power							
			Protection type : Constant current limiting, recovers automatically after fault condition is removed							
	OVER VOLTAGE		5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V
			Protection type : Shut down o/p voltage, re-power on to recover							
	OVER TEMPERATURE		Shut down o/p voltage, recovers automatically after temperature goes down							
ENVIRONMENT	WORKING TEMP.		-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ no derating with external base plate, TX class compliance							
	WORKING HUMIDITY		5 ~ 95% RH non-condensing							
	STORAGE TEMP.		-40 ~ +85℃							
	TEMP. COEFFICIENT		±0.03%/℃ (0 ~ 55℃)							
	VIBRATION		10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373							
	OPERATING ALTITUDE		5000 meters							
SAFETY & EMC (Note 5)	SAFETY STANDARDS		IEC 62368-1, UL 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1							
	WITHSTAND VOLTAGE		I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC							
	ISOLATION RESISTANCE		I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH							
	EMC EMISSION		Compliance to BS EN/EN55032 (CISPR32) Conduction Emission: Class A, Radiation Emission: Class B, EAC TP TC 020							
	EMC IMMUNITY		Compliance to BS EN/EN61000-4-2,3,4,5,6,8, BS EN/EN55035, light industry level, EAC TP TC 020							
	RAILWAY STANDARD		BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration,BS EN/EN50121-3-2 for EMC;BS EN/EN45545-2 for fire protection							
OTHERS	MTBF		1850.1K hrs min. Telcordia SR-332 (Bellcore) ; 130.8K hrs min. MIL-HDBK-217F (25℃)							
	DIMENSION		216*96.5*40mm (L*W*H)							
	PACKING		1.19Kg ; 12pcs/15.3Kg/0.97CUFT							

NOTE

1. All parameters NOT specially mentioned are measured at 24,48VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Strongly recommended that external output capacitance should not exceed 5000uF. (Only for: RSD-300-5 / -12)
5. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

300W Railway Single Output DC-DC Converter RSD-300 series

Features :

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- 2:1 wide input range
- Protections: Short circuit / Overload / Over voltage / Over temperature / Input reverse polarity
- 4000VDC I/O isolation
- Cooling by free air convection
- Half encapsulated
- Built-in constant current limiting circuit
- 1U low profile 40mm
- All using 105℃ long life electrolytic capacitors
- LED indicator for power on
- 100% full load burn-in test
- 3 years warranty

User's Manual

UL62368-1 AS/NZS62368-1 TPTC004 IEC62368-1

GTIN CODE

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SPECIFICATION

MODEL			RSD-300D-5	RSD-300D-12	RSD-300D-24	RSD-300D-48	RSD-300E-5	RSD-300E-12	RSD-300E-24	RSD-300E-48
OUTPUT	DC VOLTAGE		5V	12V	24V	48V	5V	12V	24V	48V
	RATED CURRENT		42A	25A	12.5A	6.3A	42A	25A	12.5A	6.3A
	CURRENT RANGE		0 ~ 42A	0 ~ 25A	0 ~ 12.5A	0 ~ 6.3A	0 ~ 42A	0 ~ 25A	0 ~ 12.5A	0 ~ 6.3A
	RATED POWER		210W	300W	300W	302.4W	210W	300W	300W	302.4W
	RIPPLE & NOISE (max.) Note.2		100mVp-p	120mVp-p	150mVp-p	180mVp-p	100mVp-p	120mVp-p	150mVp-p	180mVp-p
	VOLTAGE TOLERANCE Note.3		±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION		±0.5%	±0.2%	±0.2%	±0.5%	±0.5%	±0.3%	±0.2%	±0.5%
	LOAD REGULATION		±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME		800ms, 50ms at full load							
	HOLD UP TIME (Typ.)		Please refer to page 5,6 Hold up Time(Load de-rating curve)							
INPUT	VOLTAGE RANGE	CONTINUOUS	67.2 ~ 143VDC				25.2 ~ 46.8VDC			
		1 SEC.	57.6 ~ 154VDC				21.6 ~ 50.4VDC			
	EFFICIENCY (Typ.)		90%	91.5%	91.5%	91.5%	88%	90%	91%	91%
	DC CURRENT (Typ.)		2.1A/110V	3.1A/110V	3.1A/110V	3.1A/110V	6.5A/36V	9.2A/36V	9.2A/36V	9.2A/36V
	INRUSH CURRENT (Typ.)		45A/110VDC				45A/36VDC			
	INTERRUPTION OF VOLTAGE SUPPLY		EN50155:2007-D-type and E-5 comply with S2 level @ full load; other E- type comply with S1 level @ full load, comply with S2 level @ 70% load							
			EN50155:2017-Comply with S1 level							
PROTECTION	OVERLOAD		105 ~ 135% rated output power							
			Protection type : Constant current limiting, recovers automatically after fault condition is removed							
	OVER VOLTAGE		5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V	5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V
			Protection type : Shut down o/p voltage, re-power on to recover							
	OVER TEMPERATURE		Shut down o/p voltage, recovers automatically after temperature goes down							
ENVIRONMENT	WORKING TEMP.		-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ no derating with external base plate, TX class compliance							
	WORKING HUMIDITY		5 ~ 95% RH non-condensing							
	STORAGE TEMP.		-40 ~ +85℃							
	TEMP. COEFFICIENT		±0.03%/℃ (0 ~ 55℃)							
	VIBRATION		10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373							
	OPERATING ALTITUDE		5000 meters							
SAFETY & EMC (Note 5)	SAFETY STANDARDS		IEC 62368-1, UL 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1							
	WITHSTAND VOLTAGE		I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC							
	ISOLATION RESISTANCE		I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH							
	EMC EMISSION		Compliance to BS EN/EN55032 (CISPR32) Conduction Emission: Class A, Radiation Emission: Class B, EAC TP TC 020							
	EMC IMMUNITY		Compliance to BS EN/EN61000-4-2,3,4,5,6,8, BS EN/EN55035, light industry level, EAC TP TC 020							
	RAILWAY STANDARD		BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC ; BS EN/EN45545-2 for fire protection							
OTHERS	MTBF		1850.1K hrs min. Telcordia SR-332 (Bellcore) ; 130.8K hrs min. MIL-HDBK-217F (25℃)							
	DIMENSION		216*96.5*40mm (L*W*H)							
	PACKING		1.19Kg ; 12pcs/15.3Kg/0.97CUFT							

NOTE

1. All parameters NOT specially mentioned are measured at 36,110VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Strongly recommended that external output capacitance should not exceed 5000uF. (Only for: RSD-300-5 / -12)
5. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

300W Railway Single Output DC-DC Converter

RSD-300 series

Features :

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- 2:1 wide input range
- Protections: Short circuit / Overload / Over voltage / Over temperature / Input reverse polarity
- 4000VDC I/O isolation
- Cooling by free air convection
- Half encapsulated
- Built-in constant current limiting circuit
- 1U low profile 40mm
- All using 105℃ long life electrolytic capacitors
- LED indicator for power on
- 100% full load burn-in test
- 3 years warranty

User's Manual

UL62368-1 AS/NZS62368-1 TPTC004 IEC62368-1

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

SPECIFICATION

MODEL			RSD-300F-5	RSD-300F-12	RSD-300F-24	RSD-300F-48
OUTPUT	DC VOLTAGE		5V	12V	24V	48V
	RATED CURRENT		42A	25A	12.5A	6.3A
	CURRENT RANGE		0 ~ 42A	0 ~ 25A	0 ~ 12.5A	0 ~ 6.3A
	RATED POWER		210W	300W	300W	302.4W
	RIPPLE & NOISE (max.) Note.2		100mVp-p	120mVp-p	150mVp-p	180mVp-p
	VOLTAGE TOLERANCE Note.3		±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION		±0.5%	±0.3%	±0.2%	±0.5%
	LOAD REGULATION		±1.0%	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME		800ms, 50ms at full load			
	HOLD UP TIME (Typ.)		Please refer to page 5,6 Hold up Time(Load de-rating curve)			
INPUT	VOLTAGE RANGE	CONTINUOUS	50.4 ~ 93.6VDC			
		1 SEC.	43.2 ~ 100.8VDC			
	EFFICIENCY (Typ.)		89%	91%	91%	91.5%
	DC CURRENT (Typ.)		3.25A/72V	4.6A/72V	4.6A/72V	4.6A/72V
	INRUSH CURRENT (Typ.)		45A/72VDC			
	INTERRUPTION OF VOLTAGE SUPPLY		EN50155:2007-F-type comply with S2 level @ full load			
			EN50155:2017-Comply with S1 level			
PROTECTION	OVERLOAD		105 ~ 135% rated output power			
			Protection type : Constant current limiting, recovers automatically after fault condition is removed			
	OVER VOLTAGE		5.75 ~ 7V	13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V
			Protection type : Shut down o/p voltage, re-power on to recover			
	OVER TEMPERATURE		Shut down o/p voltage, recovers automatically after temperature goes down			
ENVIRONMENT	WORKING TEMP.		-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ no derating with external base plate, TX class compliance			
	WORKING HUMIDITY		5 ~ 95% RH non-condensing			
	STORAGE TEMP.		-40 ~ +85℃			
	TEMP. COEFFICIENT		±0.03%/℃ (0 ~ 55℃)			
	VIBRATION		10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373			
	OPERATING ALTITUDE		5000 meters			
SAFETY & EMC (Note 5)	SAFETY STANDARDS		IEC 62368-1, UL 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1			
	WITHSTAND VOLTAGE		I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC			
	ISOLATION RESISTANCE		I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH			
	EMC EMISSION		Compliance to BS EN/EN55032 (CISPR32) Conduction Emission: Class A, Radiation Emission: Class B, EAC TP TC 020			
	EMC IMMUNITY		Compliance to BS EN/EN61000-4-2,3,4,5,6,8, BS EN/EN55035, light industry level, EAC TP TC 020			
	RAILWAY STANDARD		BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC ; BS EN/EN45545-2 for fire protection			
OTHERS	MTBF		1850.1K hrs min. Telcordia SR-332 (Bellcore) ; 130.8K hrs min. MIL-HDBK-217F (25℃)			
	DIMENSION		216*96.5*40mm (L*W*H)			
	PACKING		1.19Kg ; 12pcs/15.3Kg/0.97CUFT			

NOTE

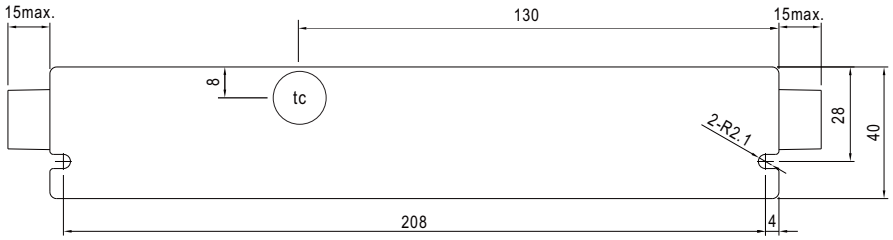
1. All parameters NOT specially mentioned are measured at 72VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μF & 47 μF parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Strongly recommended that external output capacitance should not exceed 5000uF. (Only for: RSD-300-5 / -12)
5. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

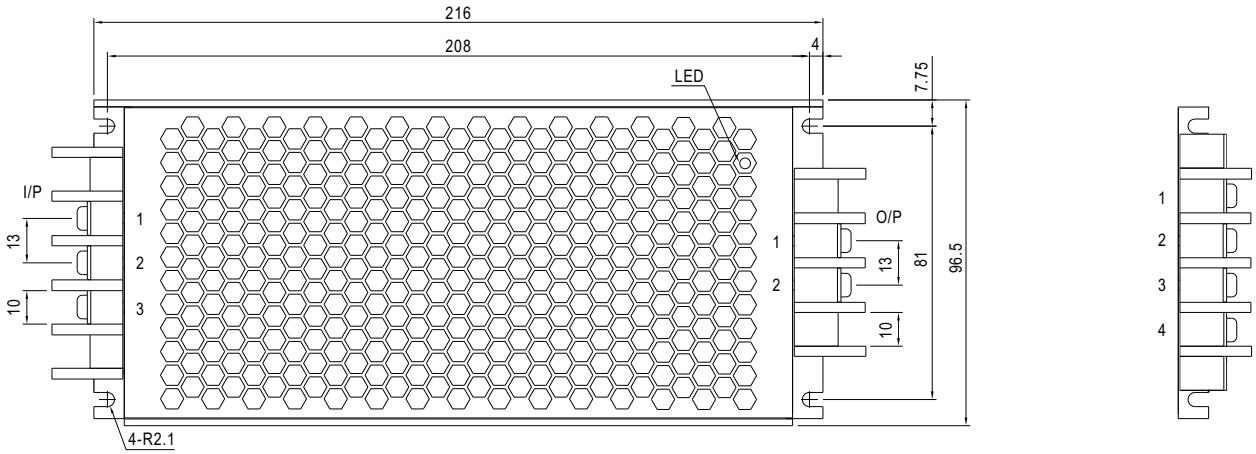
■ Mechanical Specification

(Unit: mm , tolerance ± 1mm)

Case No.205



• ⓣⓒ : Max. Case Temperature



Input Terminal Pin No. Assignment :

Pin No.	Assignment
1	DC INPUT V+
2	DC INPUT V-
3	FG ⏚

Output Terminal Pin No. Assignment :

(For 12V, 24V, 48V)

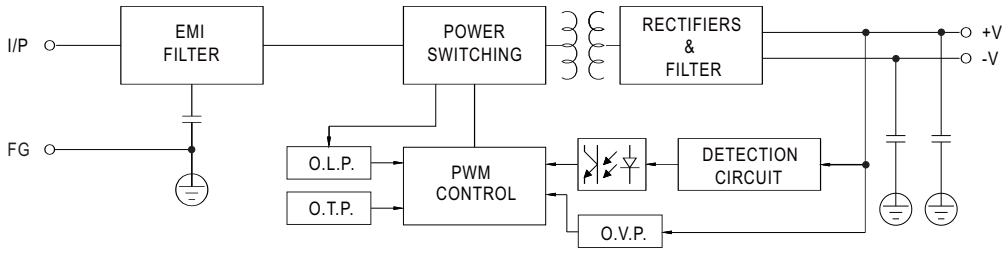
Pin No.	Assignment
1	DC OUTPUT -V
2	DC OUTPUT +V

(For 5V)

Pin No.	Assignment
1,2	DC OUTPUT -V
3,4	DC OUTPUT +V

■ Block Diagram

fosc : 130KHz



■ Input Fuse

There are one or two fuses connected in series to the positive input line, which are used to protect against abnormal surge. Fuse specifications of each model are shown as below.

Type	Fuse Type	Reference and Rating
B	Fast	Littelfuse 257, 30A, 32V
C	Time-Lag	Conquer UDA-A, 16A, 250V
D	Time-Lag	Conquer UDA-A, 8A, 250V
E	Time-Lag	Conquer UDA-A, 20A, 250V
F	Time-Lag	Conquer UDA-A, 10A, 250V

Input Reverse Polarity Protection

There is a MOSFET connected in series to the negative input line. If the input polarity is connected reversely, the MOSFET opens and there will be no output to protect the unit.

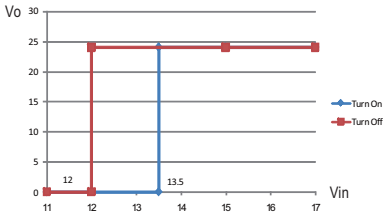
Input Range and Transient Ability

The series has a wide range input capability. Within ±30% of rated input voltage, it can be executed at full-load operation and operate properly; with ±40% of rated input voltage, it can withstand that for 1 second.

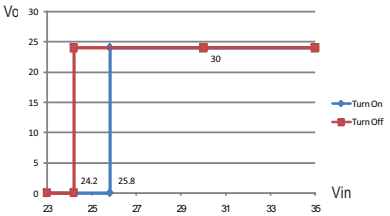
Input Under-Voltage Protection

If input voltage drops below Vimin, the internal control IC shuts down and there is no output voltage. It recovers automatically when input voltage reaches above Vimin, please refer to the cruve below.

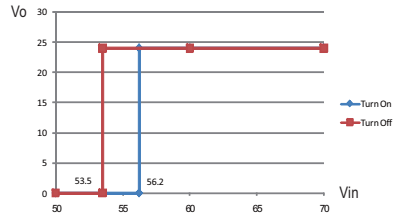
RSD-300B-24



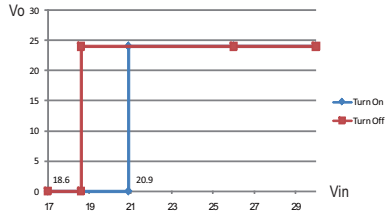
RSD-300C-24



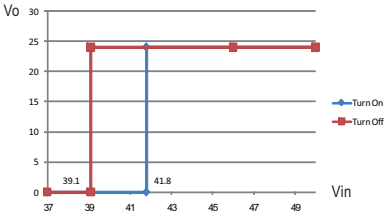
RSD-300D-24



RSD-300E-24



RSD-300F-24



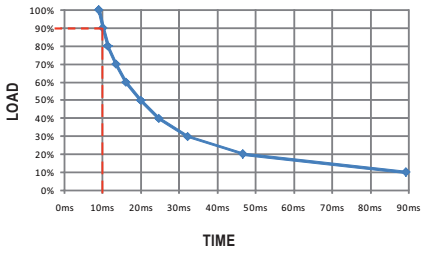
Inrush Current

Inrush current is suppressed by a resistor during the initial start-up, and then the resistor is bypassed by a MOSFET to reduce power consumption after accomplishing the start-up.

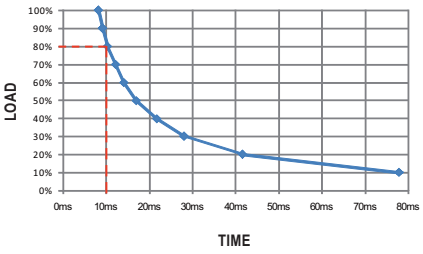
Hold-up Time

- EN50155: 2007 version - D and F and E-5 types are in compliance with S2 level, while B and C and E types are in compliance with S1 level at full load output condition. To fulfil the requirements of S2 level, B and C and E types require de-rating their output load to 70%, please refer to the curve diagrams below.

RSD-300B-5



RSD-300B-12



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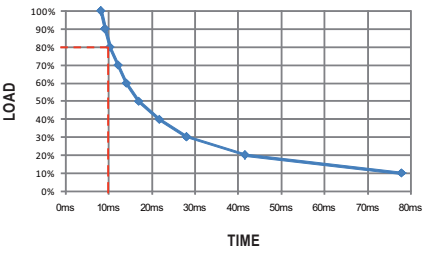
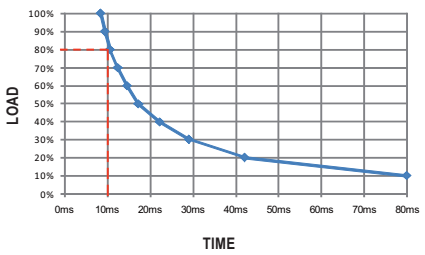


RSD-300B-48



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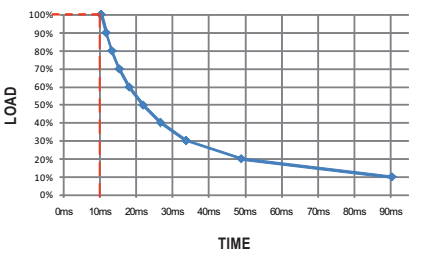

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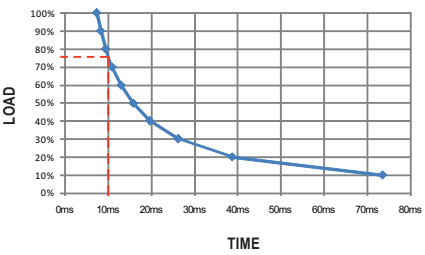

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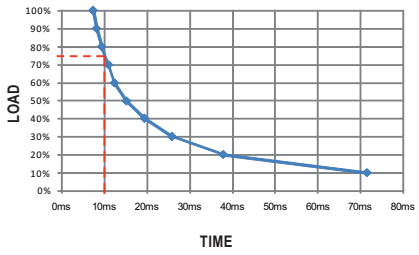

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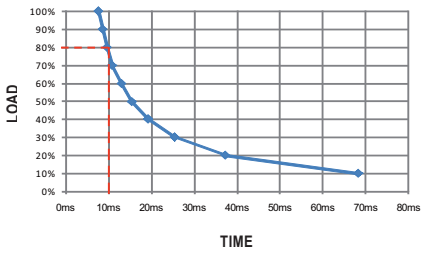
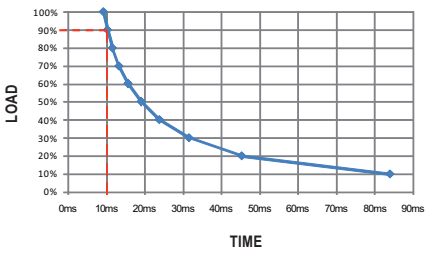


RSD-300E-12



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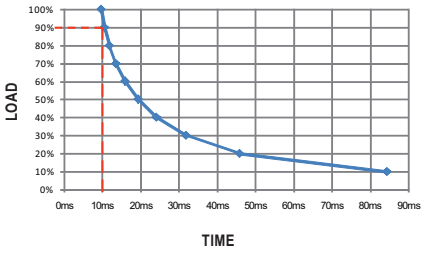

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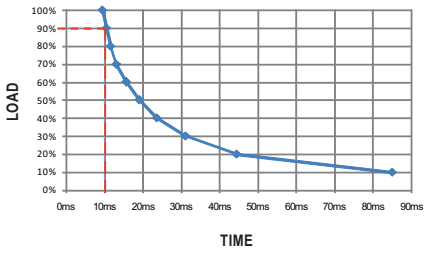


- EN50155: 2017 version - Comply with S1 level

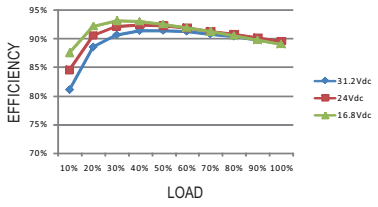
■ Output Voltage Adjustment

This function is optional, which the standard product does not have it. If you do need the function, please contact MW for details.

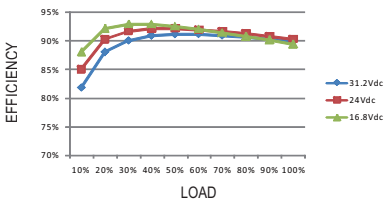
■ Efficiency vs Load & Vin Curve

The efficiency vs load & Vin curves of each model are shown as below.

RSD-300B-5



RSD-300B-12



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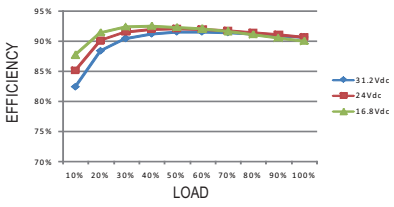
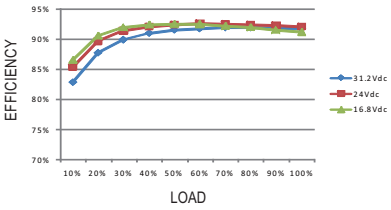
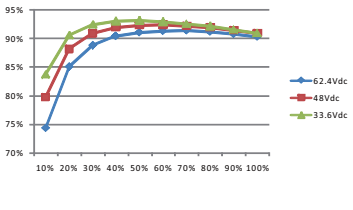


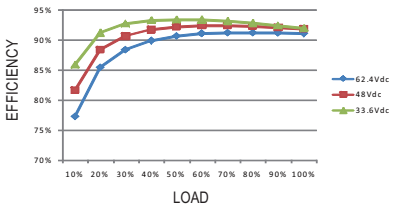
RSD-300B-48



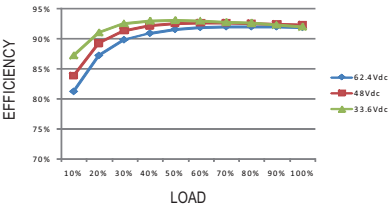
RSD-300C-5



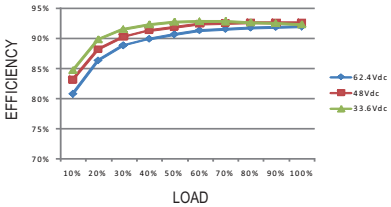
RSD-300C-12



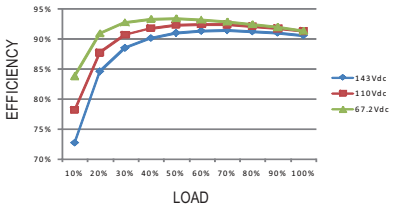
RSD-300C-24



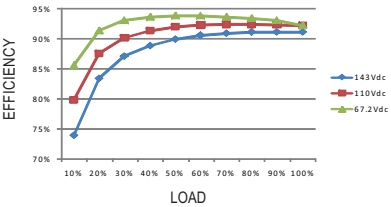
RSD-300C-48



RSD-300D-5



RSD-300D-12



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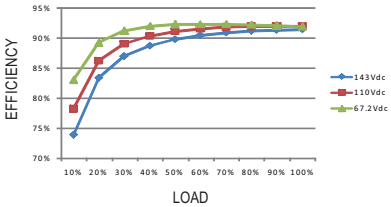

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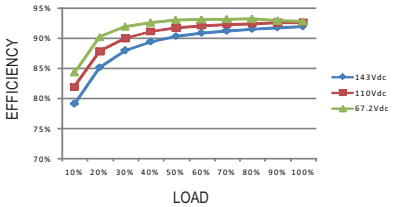

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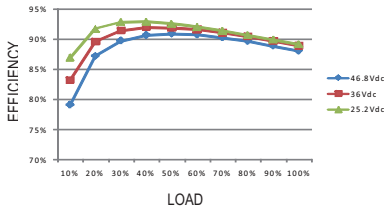

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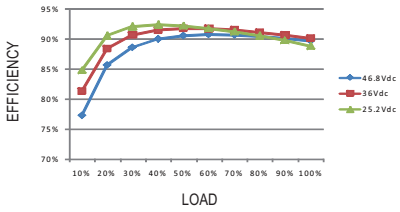

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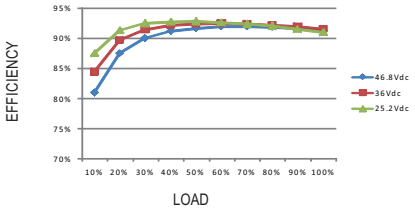

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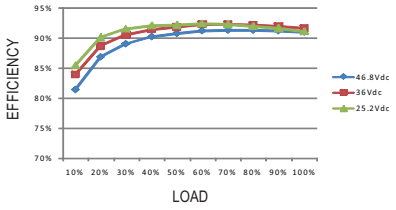

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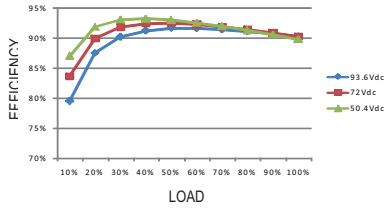

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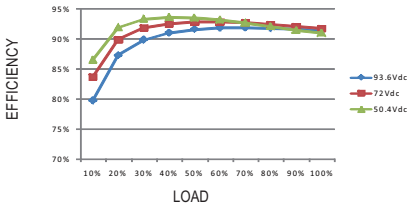

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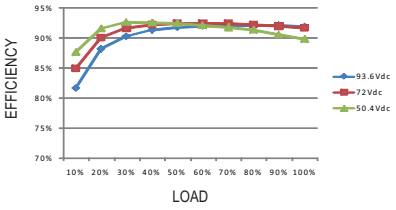
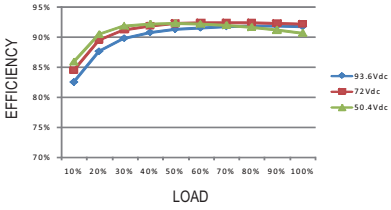


RSD-300F-48

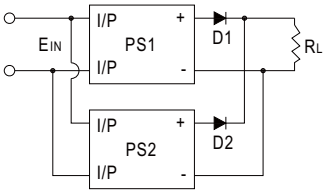


■ Parallel and Series Connection

A.Operation in Parallel

Since RSD-300 series don't have built-in parallel circuit, it can only use external circuits to achieve the redundant operation but not increase the current rating.

1.Add a diode at the positive-output of each power supply (as shown as below), the current rating of the diode should be larger than the maximum output current rating and attached to a suitable heat sink. This is only for redundant use (increase the reliability of the system) and users have to check suitability of the circuit by themselves.

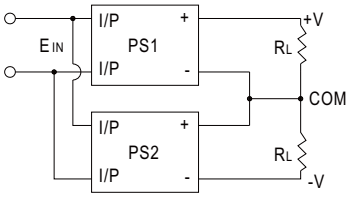


2.When using S.P.S. in parallel connection, the leakage current will increase at the same time. This could pose as a shock hazard for the user. So please contact the supplier if you have this kind of application.

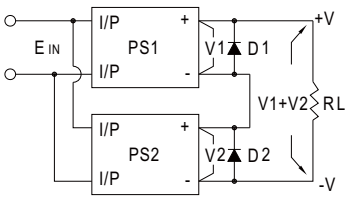
B.Operation in Series

RSD-300 can be operated in series. Here are the methods of doing it:

1.Positive and negative terminals are connected as shown as below. According to the connection, you can get the positive and negative output voltages for your loads.

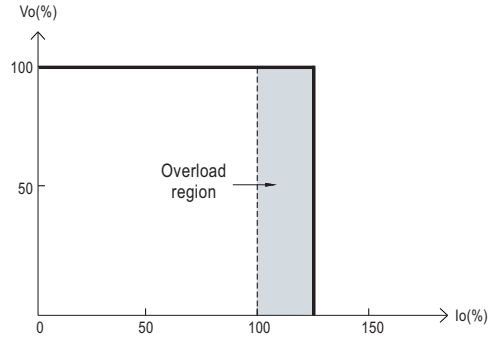


2.Increase the output voltage (current does not change). Because RSD-300 series have no reverse blocking diode in the unit, you should add an external blocking diode to prevent the damage of every unit while starting up. The voltage rating of the external diode should be larger than V1+V2 (as shown as below).



■ Overload Protection

If the output draw up to 105~135% of its output power rating, the converter will go into overload protection which is constant current mode. After the faulty condition is removed, it will recover automatically. Please refer to the diagram below for the detail operation characteristic. Please note that it's not suitable to operate within the overload region continuously, or it may cause to over temperature and reduce the life of the power supply unit or even damage it.



■ Over Voltage Protection

The converter shuts off to protect itself when the output voltage drawn exceeds 115~140% of its output rating. It must be repowered on to recover.

■ Over Temperature Protection

The converter shuts off to protect itself when the built-in temperature sensor mounted on the main power transformer senses a high temperature. The output recovers automatically if the temperature drops below the limit.

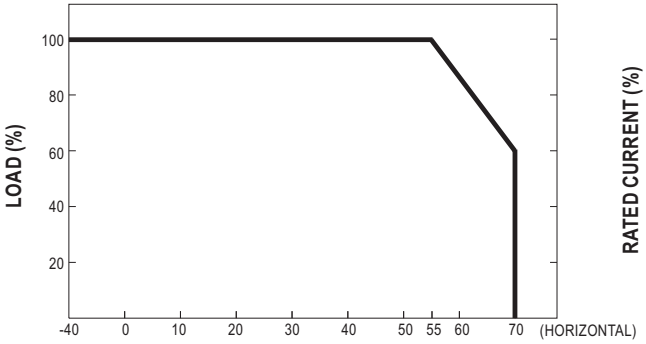
■ LED Indicator

Equipped with a built-in LED indicator, the converter provides an easy way for users to check its condition through the LED indicator.
Green : normal operation; No signal: no power or failure.

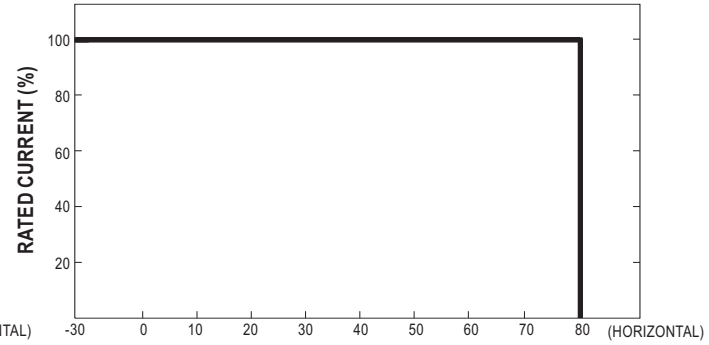
■ Derating Curve

a.Single unit operation

If the unit has no iron plate mounted on its bottom, the maximum ambient temperature for the unit will be 55℃ as operating under full load condition. It requires de-rating output current when ambient temperature is between 55-70℃, please refer to the de-rating curve as below.

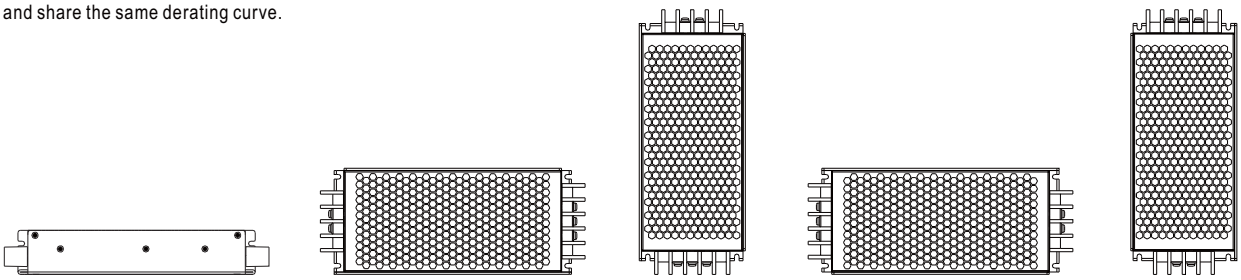


AMBIENT TEMPERATURE (℃)



Tcase (℃)

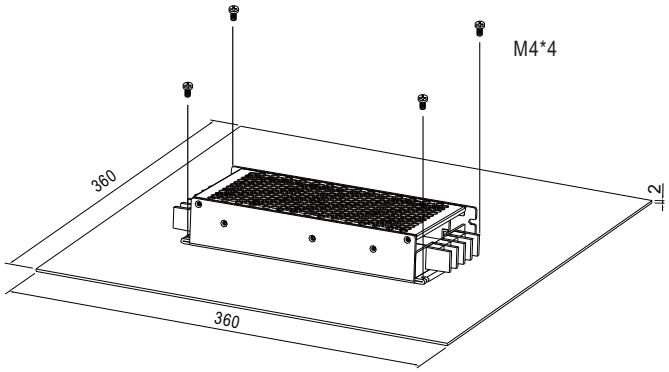
Suitable installation methods are shown as below. Since RSD-300 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



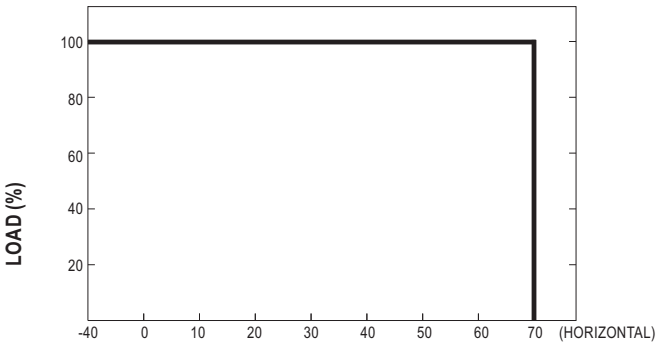
b.Operate with additional iron plate

If it is necessary to fulfil the requirements of EN50155 TX level that operate the unit fully-loaded at 70℃, RSD-300 series must be installed onto an iron plate on the bottom. The size of the suggested iron plate is shown as below. In order for optimal thermal performance, the iron plate must have an even & smooth surface and RSD-300 series must be firmly mounted at the center of the iron plate.

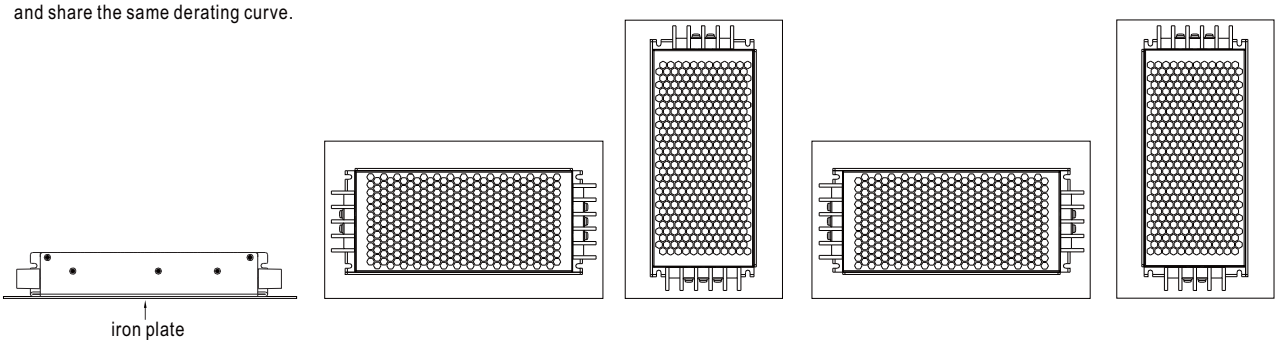
Unit:mm



The load vs ambient temperature curve is shown as below.



Suitable installation methods are shown as below. Since RSD-300 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



■ Immunity to Environmental Conditions

Test method	Standard	Test conditions	Status
Cooling Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 2 hrs/cycle	No damage
Dry Heat Test	EN 50155 section 12.2.4 (Column 2, Class TX) EN 50155 section 12.2.4 (Column 3, Class TX & Column 4, Class TX) EN 60068-2-2	Temperature: 70℃ / 85℃ Duration: 6 hrs / 10min	PASS
Damp Heat Test, Cyclic	EN 50155 section 12.2.5 EN 60068-2-30	Temperature: 25℃~55℃ Humidity: 90%~100% RH Duration: 48 hrs	PASS
Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 10 mins	PASS
Increased Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 5 hrs	PASS
Shock Test	EN 50155 section 12.2.11 EN 61373	Temperature: 21± 3℃ Humidity: 65 ± 5% Duration: 30ms*18	PASS
Low Temperature Storage Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 16 hrs	PASS
Salt Mist Test	EN 50155 section 12.2.10 (Class ST4)	Temperature: 35℃ ±2℃ Duration: 96 hrs	PASS

■ EN45545-2 Fire Test Conditions

Test Items			Hazard Level		
Items		Standard	HL1	HL2	HL3
R22	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
	Smoke density test	EN 45545-2:2013 EN ISO 5659-2:2006	PASS	PASS	PASS
	Smoke toxicity test	EN 45545-2:2013 NF X70-100:2006	PASS	PASS	PASS
R24	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
R25	Glow-wire test	EN 45545-2:2013 EN 60695-2-11:2000	PASS	PASS	PASS
R26	Vertical flame test	EN 45545-2:2013 EN 60695-11:2003	PASS	PASS	PASS

500W Enclosed Type Reliable Railway DC-DC Converter RSD-500 series

User's Manual

IEC62368-1 UL62368-1 AS/NZS62368-1 TPTC004

Railway Automate Industrial Security Network Telecom

Features

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- 1U low profile 41mm
- 2:1 wide input range
- **Fanless design**, half encapsulated , cooling by free air convection
- -40~+80℃ wide operating temperature
- DC output adjustable
- Protections: Short circuit / Overload / Over voltage / Over temperature / Input reverse polarity/ Input under voltage protection
- 4KVdc I/O isolation(Reinforced isolation)
- Operating additude up to 5000 meters(Note.5)
- LED indicator for power on
- 3 years warranty

Applications

- Bus,tram,metro or railway system
- Industrial control system
- Semi-conductor fabrication equipment
- Factory automation
- Electro-mechanical
- Wireless network
- Telecom or datacom system
- Highly vibrating, highly dusty, extremely low or high temperature harsh environment

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

Description

RSD-500 series is a 500W enclosed type reliable railway DC-DC converter. This series is compliant with BS EN/EN50155/BS EN/EN45545-2 railway standard, constituting three types of models with 2:1 wide but different input ranges 16.8~33.6V/33.6~67.2V/67.2~154V, suitable for railway and all kinds of transportation systems exploiting the frequently used standard input voltages such as 24V, 36V, 48V, 72V, 96V and 110V.Various output voltages, 12V, 24V and 48V are available for selection.

This series has the capability of working under -40~+80℃, low ripple and noise, supreme EMC characteristics, 4KVdc I/O isolation, low enclosure profile 41mm and an interior with semi-potted silicone. It does not only well fits the in-car systems or the facilities by rails for railway, trams and buses but also can be used in the harsh environment with high vibration, high dust, extremely low or high temperature, etc.

Model Encoding

RSD - 500 B - 24

- 24 — Output voltage(12/24/48Vdc)
- B — Input voltage (B:16.8~33.6Vdc, C:33.6~67.2Vdc, D:67.2~154Vdc)
- 500 — Rated wattage
- RSD — Series name

500W Enclosed Type Reliable Railway DC-DC Converter RSD-500 series

SPECIFICATION

MODEL		RSD-500B-12	RSD-500B-24	RSD-500B-48	RSD-500C-12	RSD-500C-24	RSD-500C-48	RSD-500D-12	RSD-500D-24	RSD-500D-48
OUTPUT	DC VOLTAGE	12V	24V	48V	12V	24V	48V	12V	24V	48V
	RATED CURRENT	35A	17.5A	8.8A	35A	19.2A	9.6A	35A	20.8A	10.4A
	CURRENT RANGE	0 ~ 35A	0 ~ 17.5A	0 ~ 8.8A	0 ~ 35A	0 ~ 19.2A	0 ~ 9.6A	0 ~ 35A	0 ~ 20.8A	0 ~ 10.4A
	RATED POWER	420W	420W	422.4W	420W	460.8W	460.8W	420W	499.2W	499.2W
	RIPPLE & NOISE (max.) Note.2	100mVp-p	120mVp-p	150mVp-p	100mVp-p	120mVp-p	150mVp-p	100mVp-p	120mVp-p	150mVp-p
	VOLTAGE ADJ. RANGE	12 ~ 14V	24 ~ 28V	48~ 56V	12 ~ 14V	24 ~ 28V	48~ 56V	12 ~ 14V	24 ~ 28V	48~ 56V
	VOLTAGE TOLERANCE Note.3	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME	500ms, 60ms								
	HOLD UP TIME (Typ.)	Please refer to page 4 hold up time (Load de-rating curve)								
INPUT	VOLTAGE RANGE Note.4 CONTINUOUS	16.8 ~ 33.6Vdc			33.6 ~ 67.2Vdc			67.2 ~ 154Vdc		
	VOLTAGE RANGE Note.4 1s	14.4 ~ 16.8Vdc			28.8 ~ 33.6Vdc			57.6 ~ 67.2Vdc		
	EFFICIENCY (Typ.)	92%	92%	92%	93%	93%	93%	93%	93%	93%
	DC CURRENT (Typ.)	21.5A @24Vdc			11A @48Vdc			5A @110Vdc		
	INRUSH CURRENT (Typ.)	30A								
	INTERRUPTION OF VOLTAGE SUPPLY	EN50155:2017-B/C/D type comply with S1 level (3ms)@ full load; B/C type comply with S2 level (10ms)@ 70% load, D- type comply with S2 level (10ms) @ full load								
PROTECTION	OVERLOAD	Constant current limiting 105~135% rated output power with auto-recovery								
	OVER VOLTAGE	14.4 ~ 17.5V	28.8 ~ 35V	57.6 ~ 65V	14.4 ~ 17.5V	28.8 ~ 35V	57.6 ~ 65V	14.4 ~ 17.5V	28.8 ~ 35V	57.6 ~ 65V
		Protection type : Shut down o/p voltage, re-power on to recover								
	OVER TEMPERATURE	Shut down o/p voltage, re-power on to recover								
	REVERSE POLARITY	By internal, MOSFET, no damage, recovers automatically after fault condition is removed								
	UNDER VOLTAGE LOCKOUT	24Vin :Power ON≥16.8V , OFF≤16.5V			48Vin :Power ON≥33.6V , OFF≤33V			110Vin :Power ON≥67.2V , OFF≤65V		
ENVIRONMENT	WORKING TEMP.	-40 ~ +80℃ (Refer to "Derating Curve")								
	WORKING HUMIDITY	5 ~ 95% RH non-condensing								
	STORAGE TEMP., HUMIDITY	-40 ~ +85, 5 ~ 95% RH non-condensing								
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 55℃)								
	VIBRATION	Component:10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes; Mounting: Compliance to IEC61373								
	OPERATING ALTITUDE Note.5	5000 meters / OVC II								
SAFETY & EMC (Note 6)	SAFETY STANDARDS	UL62368-1, IEC 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1								
	WITHSTAND VOLTAGE	I/P-O/P:4KVdc I/P-FG:2.5KVdc O/P-FG:2.5KVdc								
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:>100M Ohms / 500Vdc / 25℃/ 70% RH								
	EMC EMISSION	**Parameter**			**Standard**			**Test Level / Note**		
		Conducted			BS EN/EN55032 (CISRP32)			Class A		
		Radiated			BS EN/EN55032 (CISRP32)			Class B		
		Voltage Flicker			BS EN/EN61000-3-3			-----		
		Harmonic Current			-----			-----		
	EMC IMMUNITY	BS EN/EN55035								
		Parameter			**Standard**			**Test Level / Note**		
		ESD			BS EN/EN61000-4-2			Level 3, 8KV air ; Level 3, 6KV contact; criteria A		
		Radiated			BS EN/EN61000-4-3			Level 3, 10V/m ; criteria A		
		EFT / Burst			BS EN/EN61000-4-4			Level 3, 2KV ; criteria A		
		Surge			BS EN/EN61000-4-5			Level 3, 1KV/Line-Line ;Level 3, 2KV/Line-Line-FG ;criteria A		
		Conducted			BS EN/EN61000-4-6			Level 3, 10V ; criteria A		
		Magnetic Field			BS EN/EN61000-4-8			Level 4, 30A/m ; criteria A		
	RAILWAY STANDARD	Compliance to BS EN/EN45545-2 for fire protection ; BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC								
OTHERS	MTBF	834.7K hrs min. Telcordia SR-332 (Bellcore) ; 99.1K hrs min. MIL-HDBK-217F (25℃)								
	DIMENSION	237*100*41mm (L*W*H)								
	PACKING	1.45Kg;10pcs/15.5Kg/0.8CUFT								

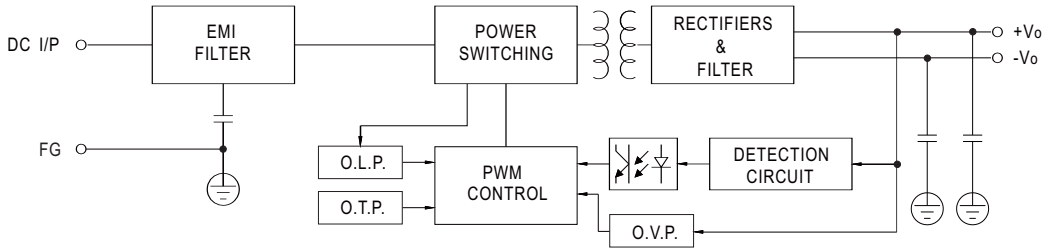
NOTE

1. All parameters NOT specially mentioned are measured at normal input (B:24Vdc , C:48Vdc , D:110Vdc) , rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1μf & 47μf parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Derating may be needed under low input voltage. Please check the derating curve for more details.
5. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than2000m(6500ft).
6. The power supply is considered as an independent unit, but the final equipment still need to re-confirm that the whole system complies with the EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)

※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

■ Block Diagram

fosc : 67KHz



■ Input Fuse

There are two or three fuses connected in series to the positive input line, which are used to protect against abnormal surge. Fuse specifications of each model are shown as below.

Type	Fuse Type	Reference and Rating
B	Time-Lag	WALTER WN 20, 20A, 500V *2
C	Time-Lag	Conquer MST, 10A, 250V *3
D	Time-Lag	Conquer MST, 10A, 250V *2

■ Input Reverse Polarity Protection

There is a MOSFET connected in series to the negative input line. If the input polarity is connected reversely, the MOSFET opens and there will be no output to protect the unit.

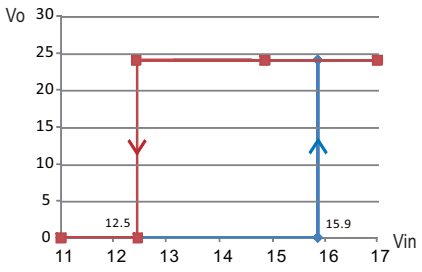
■ Input Range and Transient Ability

The series has a wide range input capability. Within ±30% of rated input voltage, it can be executed at full-load operation and operate properly; with ±40% of rated input voltage, it can withstand that for 1 second.

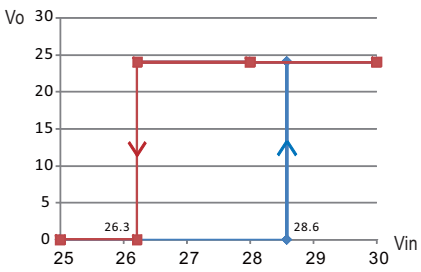
■ Input Under-Voltage Protection

If input voltage drops below Vimin, the internal control IC shuts down and there is no output voltage. It recovers automatically when input voltage reaches above Vimin, please refer to the cruve below.

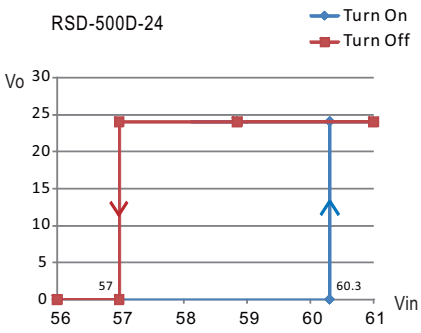
RSD-500B-24



RSD-500C-24



RSD-500D-24



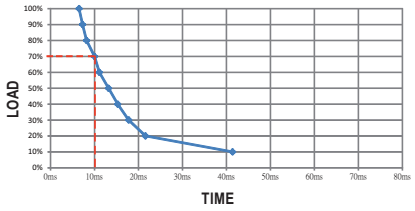
■ Inrush Current

Inrush current is suppressed by a resistor during the initial start-up, and then the resistor is bypassed by a Relay to reduce power consumption after accomplishing the start-up.

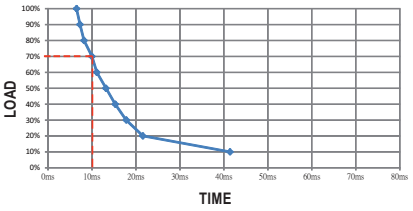
Hold-up Time

- EN50155:2017 version- D type is in compliance with S2 level (10ms), while B and C types are in compliance with S1 level (3ms) at full load output condition.
  To fulfil the requirements of S2 level (10ms), B and C types require de-rating their output load to 70%, please refer to the curve diagrams below.

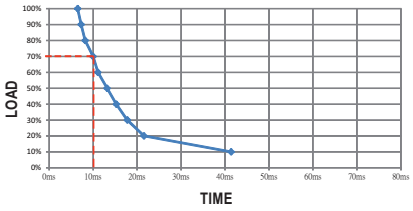
RSD-500B-12



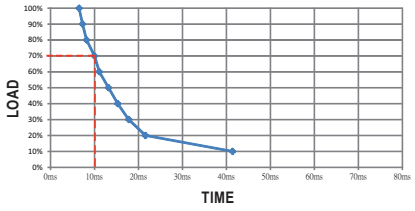
RSD-500B-24



RSD-500B-48



RSD-500C-12



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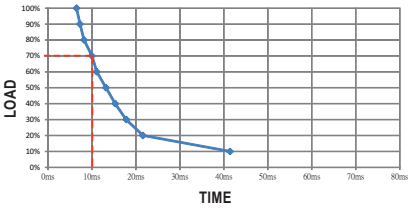
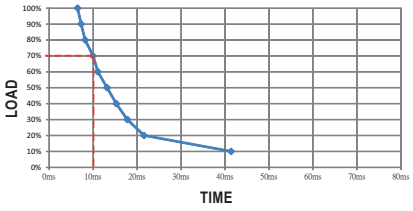
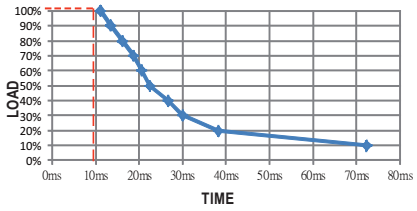


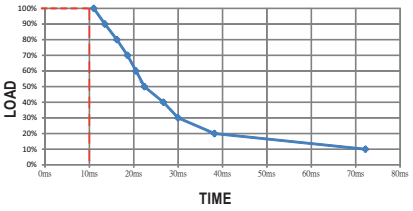
RSD-500C-48



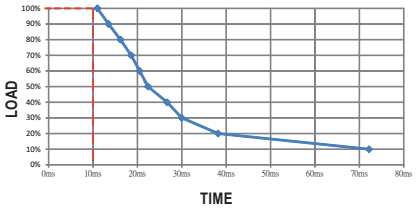
RSD-500D-12



RSD-500D-24



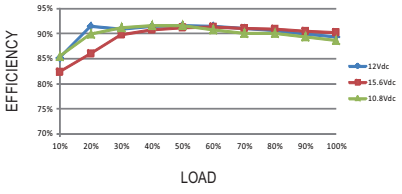
RSD-500D-48



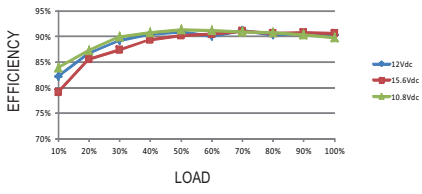
Efficiency vs Load & Vin Curve

The efficiency vs load & Vin curves of each model are shown as below.

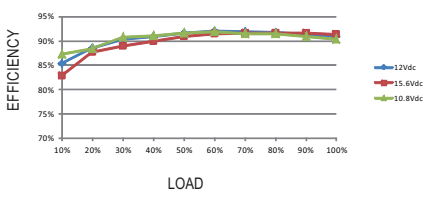
RSD-500B-12



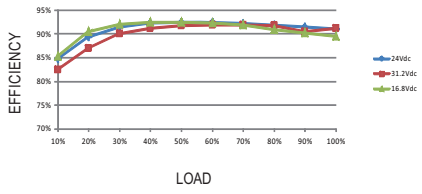
RSD-500B-24



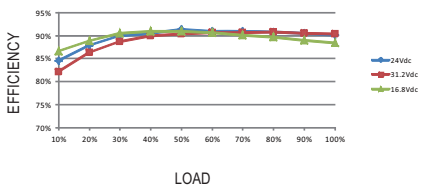
RSD-500B-48



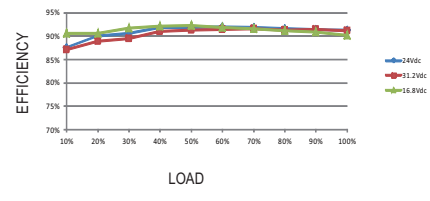
RSD-500C-12



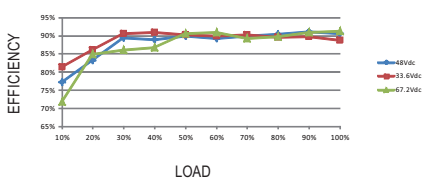
RSD-500C-24



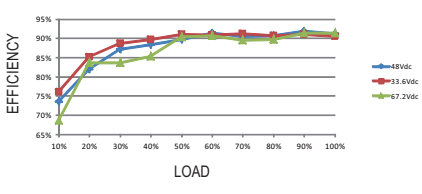
RSD-500C-48



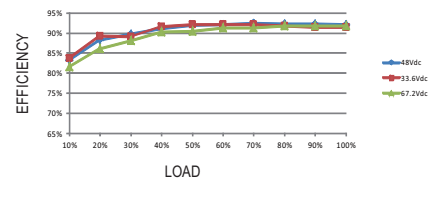
RSD-500D-12



RSD-500D-24

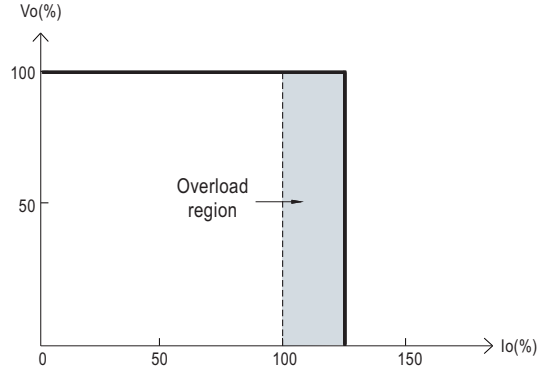


RSD-500D-48



■ Overload Protection

If the output draw up to 105~135% of its output power rating, the converter will go into overload protection which is constant current mode. After the faulty condition is removed, it will recover automatically. Please refer to the diagram below for the detail operation characteristic. Please note that it's not suitable to operate within the overload region continuously, or it may cause to over temperature and reduce the life of the power supply unit or even damage it.



■ Over Voltage Protection

The converter shuts off to protect itself when the output voltage drawn exceeds 115~140% of its output rating.It must be repowered on to recover.

■ Over Temperature Protection

The converter shuts off to protect itself when the built-in temperature sensor mounted on the main power transformer senses a high temperature.

It must be repowered on to recover.

■ LED Indicator

Equipped with a built-in LED indicator, the converter provides an easy way for users to check its condition through the LED indicator.

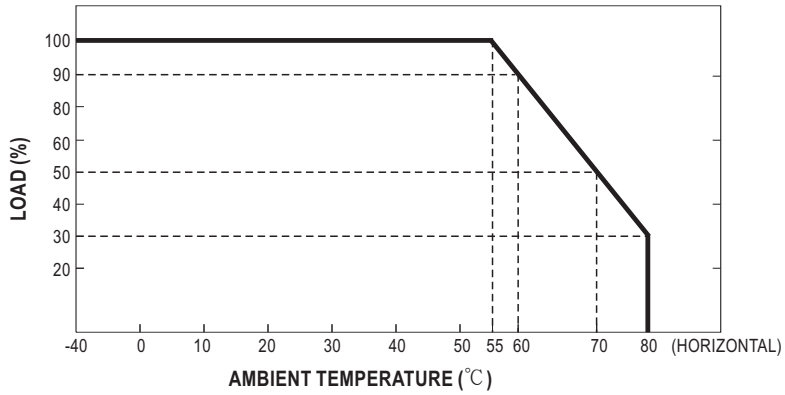
Green : normal operation;

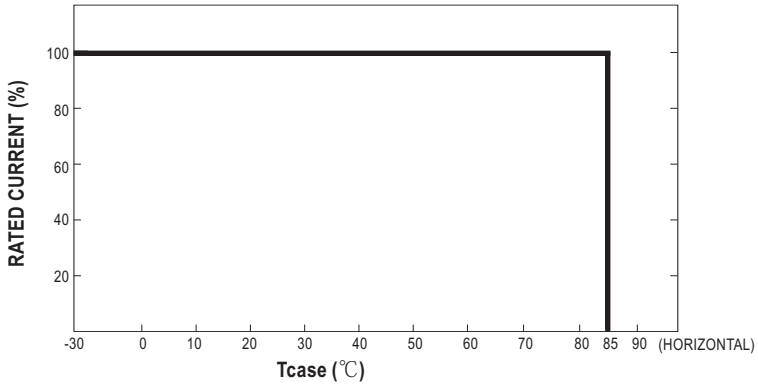
No signal: no power or failure.

■ Derating Curve

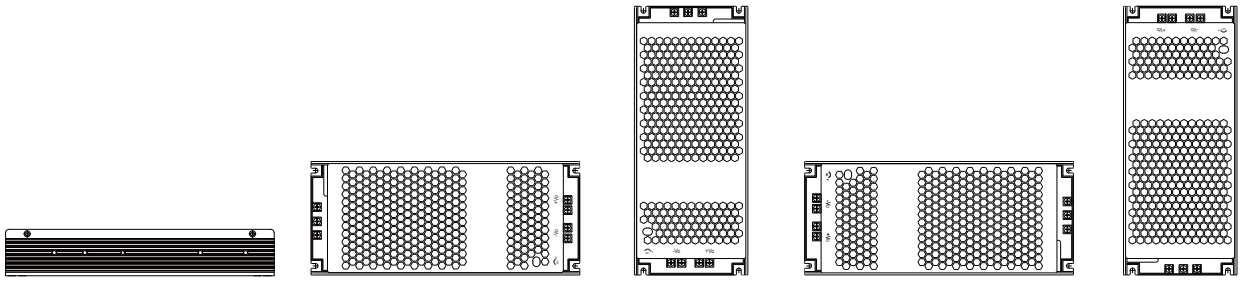
a.Single unit operation

If the unit has no iron plate mounted on its bottom, the maximum ambient temperature for the unit will be 55℃ as operating under full load condition. It requires de-rating output current when ambient temperature is between 55 ~ 80℃, please refer to the de-rating curve as below.



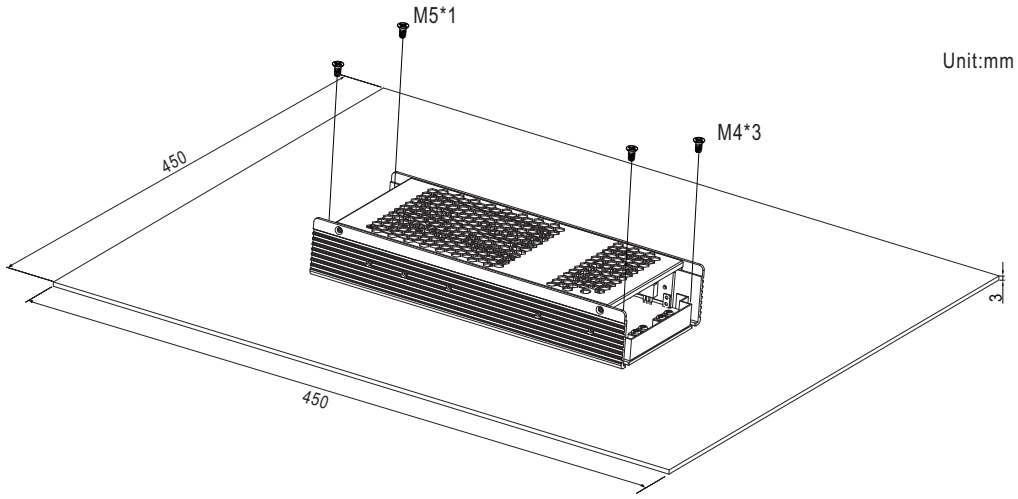


Suitable installation methods are shown as below. Since RSD-500 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.

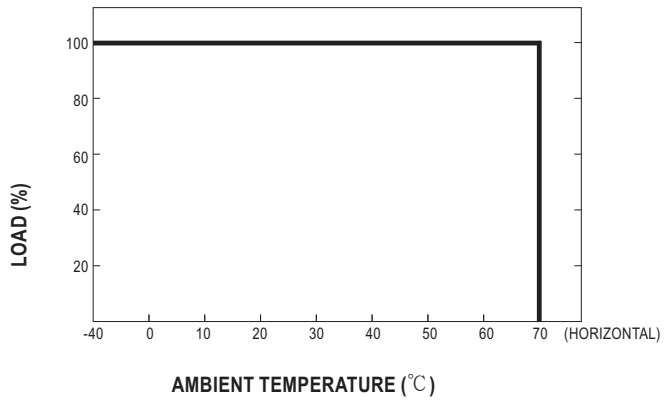


b.Operate with additional iron plate

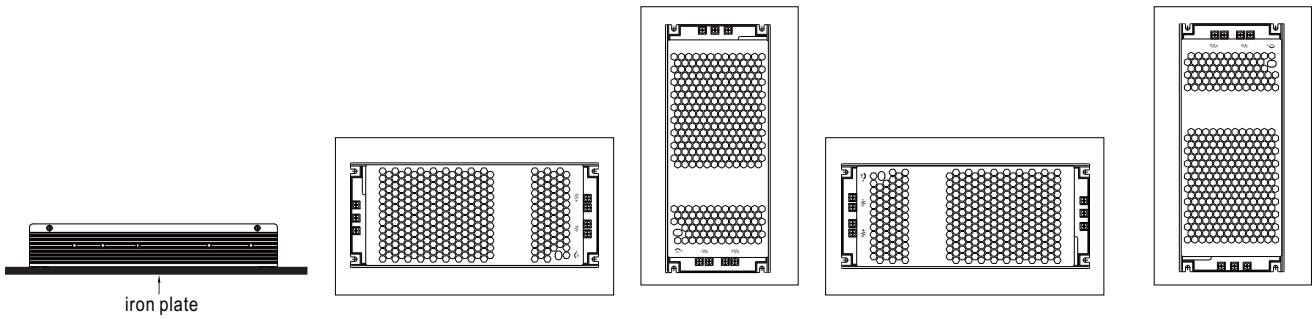
If it is necessary to fulfil the requirements of EN50155 TX level that operate the unit fully-loaded at 70℃, RSD-500 series must be installed onto an iron plate on the bottom. The size of the suggested iron plate is shown as below. In order for optimal thermal performance, the iron plate must have an even & smooth surface and RSD-500 series must be firmly mounted at the center of the iron plate.



The load vs ambient temperature curve is shown as below.



Suitable installation methods are shown as below. Since RSD-500 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



■ Immunity to Environmental Conditions

Test method	Standard	Test conditions	Status
Cooling Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 2 hrs/cycle	No damage
Dry Heat Test	EN 50155 section 12.2.4 (Column 2, Class TX) EN 50155 section 12.2.4 (Column 3, Class TX & Column 4, Class TX) EN 60068-2-2	Temperature: 70℃ / 85℃ Duration: 6 hrs / 10min	PASS
Damp Heat Test, Cyclic	EN 50155 section 12.2.5 EN 60068-2-30	Temperature: 25℃~55℃ Humidity: 90%~100% RH Duration: 48 hrs	PASS
Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 10 mins	PASS
Increased Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 5 hrs	PASS
Shock Test	EN 50155 section 12.2.11 EN 61373	Temperature: 21± 3℃ Humidity: 65 ± 5% Duration: 30ms*18	PASS
Low Temperature Storage Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 16 hrs	PASS
Salt Mist Test	EN 50155 section 12.2.10 (Class ST4)	Temperature: 35℃ ±2℃ Duration: 48 hrs	PASS

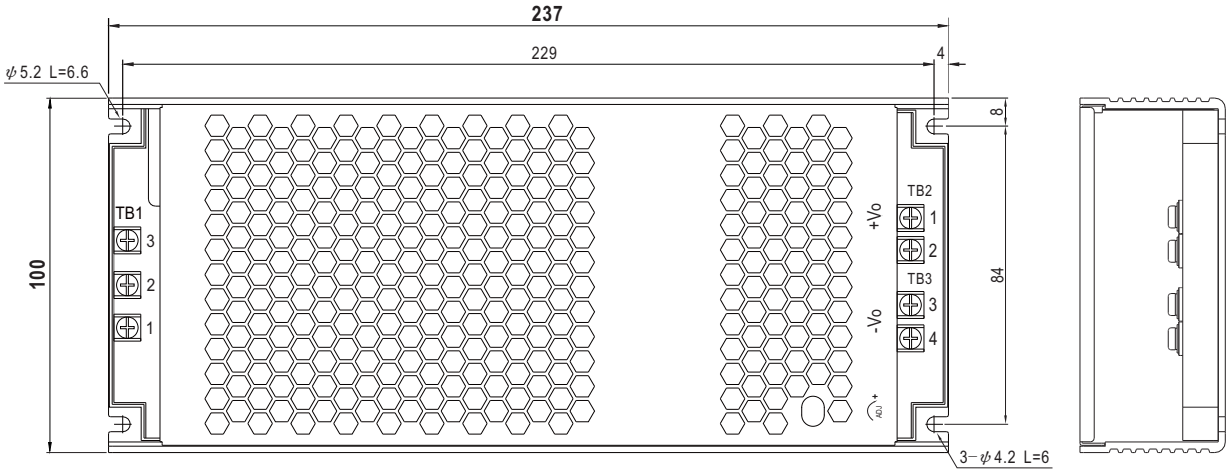
■ EN45545-2 Fire Test Conditions

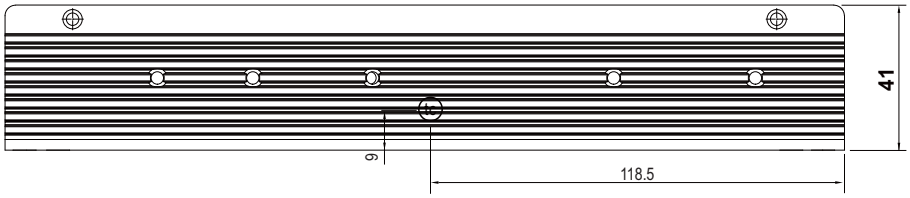
Test Items			Hazard Level		
Items		Standard	HL1	HL2	HL3
R22	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
	Smoke density test	EN 45545-2:2013 EN ISO 5659-2:2006	PASS	PASS	PASS
	Smoke toxicity test	EN 45545-2:2013 NF X70-100:2006	PASS	PASS	PASS
R24	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
R25	Glow-wire test	EN 45545-2:2013 EN 60695-2-11:2000	PASS	PASS	PASS
R26	Vertical flame test	EN 45545-2:2013 EN 60695-11:2003	PASS	PASS	PASS

■ Mechanical Specification

(Unit: mm , tolerance ± 1mm)

Case No.270C





• ⓣc : Max. Case Temperature

Input Terminal Pin No. Assignment (TB1)

Pin No.	Assignment
1	DC input +Vin
2	DC input -Vin
3	FG ⏚

Output Terminal Pin No. Assignment (TB2,TB3)

Pin No.	Assignment
1	DC output +Vo
2	DC output +Vo
3	DC output -Vo
4	DC output -Vo

■ Installation Manual

Please refer to : http://www.meanwell.com/manual.html