300W Railway Single Output DC-DC Converter

RSD-300 series

Features :

- Compliance to EN50155 railway certificate
- 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
- 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

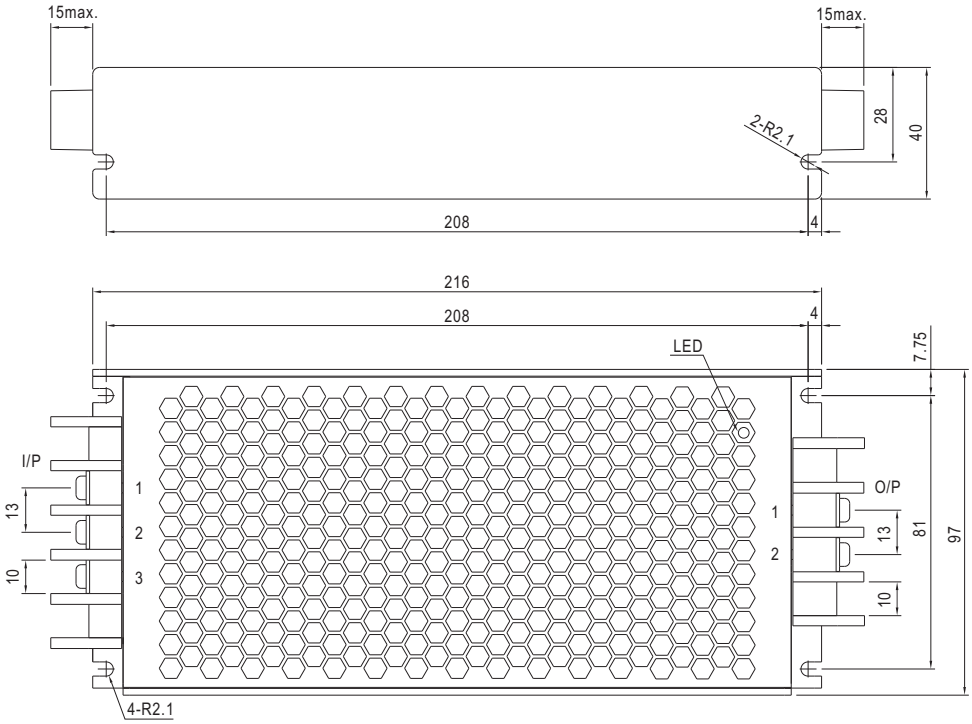
CE

SPECIFICATION

MODEL			RSD-300B-12	RSD-300B-24	RSD-300B-48	RSD-300C-12	RSD-300C-24	RSD-300C-48	RSD-300D-12	RSD-300D-24	RSD-300D-48
OUTPUT	DC VOLTAGE		12V	24V	48V	12V	24V	48V	12V	24V	48V
	RATED CURRENT		22.5A	11.3A	5.7A	25A	12.5A	6.3A	25A	12.5A	6.3A
	CURRENT RANGE		0 ~ 22.5A	0 ~ 11.3A	0 ~ 5.7A	0 ~ 25A	0 ~ 12.5A	0 ~ 6.3A	0 ~ 25A	0 ~ 12.5A	0 ~ 6.3A
	RATED POWER		270W	271.2W	273.6W	300W	300W	302.4W	300W	300W	302.4W
	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		±0.3%	±0.2%	±0.5%	±0.3%	±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.)		B/C- type comply with S1 level @ full load, comply with S2 level @ 70% load ; D-type comply with S2 level @ full load								
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%	91%	91%	91%	91%	91%	91%
	DC CURRENT (Typ.)		14.6A/24V	14.6A/24V	14.6A/24V	7.2A/48V	7.2A/48V	7.2A/48V	3.1A/110V	3.1A/110V	3.1A/110V
	INRUSH CURRENT (Typ.)		45A/24VDC			45A/48VDC			45A/110VDC		
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		B/C- type : 110℃±5℃(TSW1) detect on main power transformer ; D-type : 115℃±5℃(TSW1) detect on main power transformer								
			Protection type : 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		20 ~ 95% RH non-condensing								
	STORAGE TEMP., HUMIDITY		-40 ~ +85℃, 10 ~ 95% RH								
	TEMP. COEFFICIENT		±0.03%/℃ (0 ~ 55℃)								
	VIBRATION		10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373								
SAFETY & EMC (Note 4)	SAFETY STANDARDS		Meet IEC60950-1(LVD)								
	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 EN55022 (CISPR22) Conduction Emission: Class A, Radiation Emission: Class B ; EN50155(EN50121-3-2)								
	EMC IMMUNITY		Compliance to EN61000-4-2,3,4,5,6,8, light industry level, criteria A ; EN50121-3-2								
	RAILWAY STANDARD		Meet EN50155 / IEC60571 including IEC61373 for shock & vibration, EN50121-3-2 for EMC								
OTHERS	MTBF		130.7K hrs min. MIL-HDBK-217F (25℃)								
	DIMENSION		216*97*40mm (L*W*H)								
	PACKING		1.19Kg ; 12pcs/15.3Kg/1.12CUFT								
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 0.1uf & 47uf 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. The final equipment must be re-confirmed that it still meets EMC directives.										

■ Mechanical Specification

Case No.205A Unit:mm



Input Terminal Pin No. Assignment :

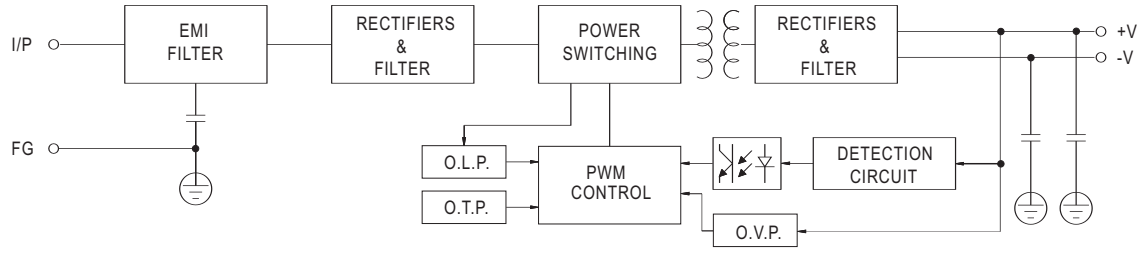
Pin No.	Assignment
1	DC INPUT V+
2	DC INPUT V-
3	FG ⏚

Output Terminal Pin No. Assignment :

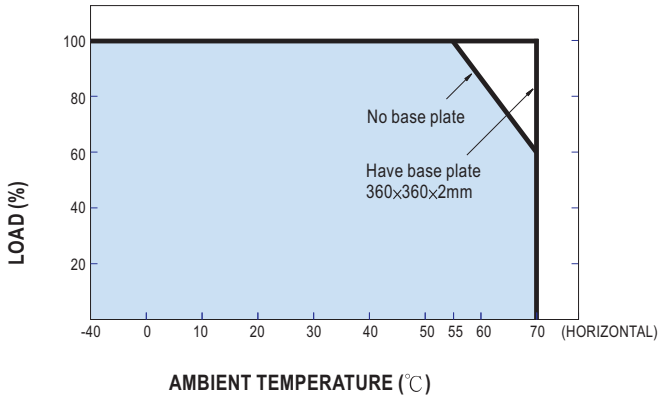
Pin No.	Assignment
1	DC OUTPUT -V
2	DC OUTPUT +V

■ Block Diagram

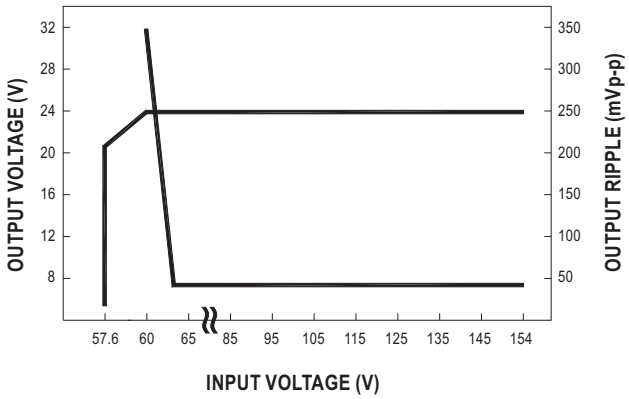
fosc : 130KHz



■ Derating Curve



■ Static Characteristics(RSD-300D-24)



■ Input Fuse

There is one fuse 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

■ 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.

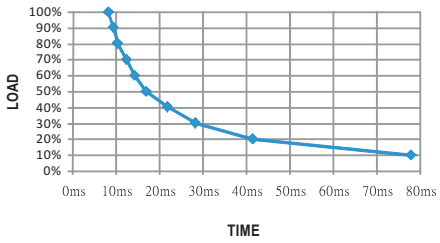
■ Input Under-voltage Protection

If input voltage drops to $V_{min.}$ -3V, the internal control IC shunts down and there is no output voltage.

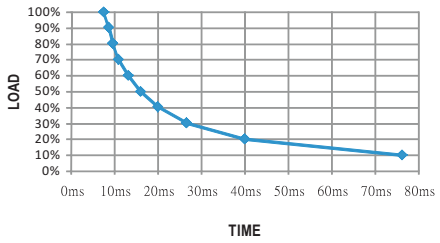
■ Hold-up Time

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.

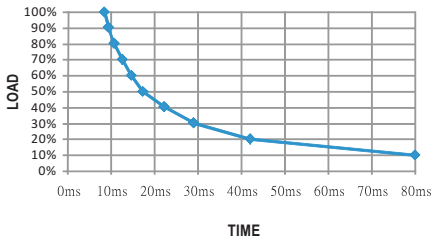
B-12



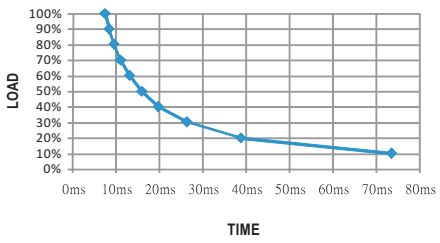
B-24



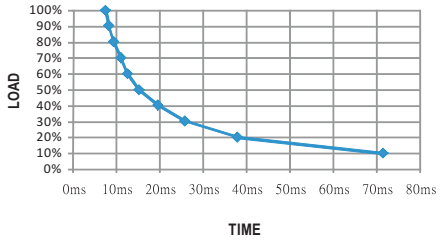
B-48



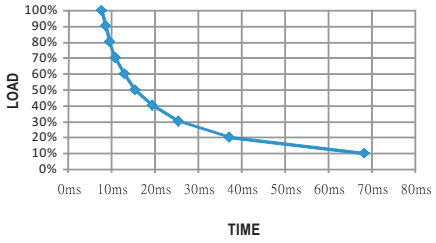
C-12



C-24

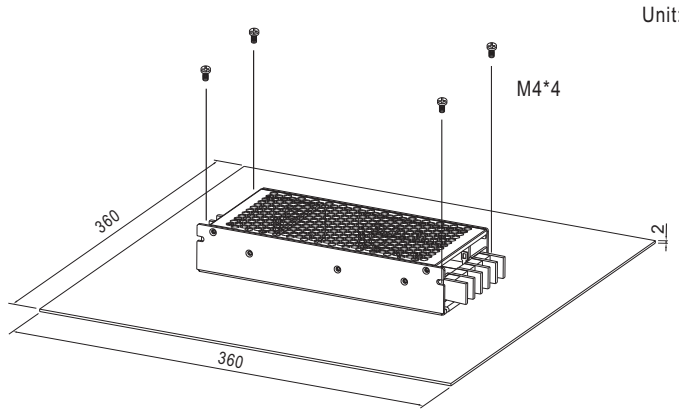


C-48



■ Size of Base Panel

Unit:mm



To fulfil the requirements of EN50155 TX level, RSD-300 series must be installed onto an iron plate on the bottom.

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, as shown in the diagram above.

■ 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