

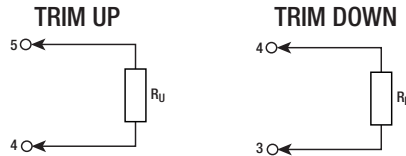
Specifications measured at $T_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted

External Output Trimming

Output Voltage Trimming

Single output Powerline Plus converters offer the feature of trimming the output voltage over a certain range around the nominal value by using external trim resistors. No general equation can be given for calculating the trim resistors, but the following trimtables give typical values for choosing these trimming resistors. If voltages between the given trim points are required, extrapolate between the two nearest given values to work out the resistor required or use a variable resistor to set the output voltage.

Output can be externally trimmed by using the method shown below.



RP20-xx3.3SFR

Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.63	Volts
R _U =	385.07	191.51	126.99	94.73	75.37	62.47	53.25	46.34	40.96	36.66	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	3.267	3.234	3.201	3.168	3.135	3.102	3.069	3.036	3.003	2.97	Volts
R _D =	116.72	54.78	34.13	23.81	17.62	13.49	10.54	8.33	6.60	5.23	KOhms

RP20-xx05SFR

Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	5.05	5.01	5.15	5.20	5.25	5.30	5.35	5.4	5.45	5.50	Volts
R _U =	253.45	125.70	83.18	61.83	49.05	40.53	34.45	29.89	26.34	23.50	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	4.95	4.90	4.85	4.80	4.75	4.70	4.65	4.60	4.55	4.50	Volts
R _D =	248.34	120.59	78.01	56.72	43.94	35.42	29.34	24.78	21.23	18.39	KOhms

RP20-xx12SFR

Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	12.12	12.24	12.36	12.48	12.60	12.72	12.84	12.96	13.08	13.20	Volts
R _U =	203.22	99.06	64.33	46.97	36.56	29.61	24.65	20.93	18.04	15.72	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	11.88	11.76	11.64	11.52	11.40	11.28	11.16	11.04	10.92	10.8	Volts
R _D =	776.56	380.72	248.78	182.81	143.22	116.83	97.99	83.84	72.85	64.06	KOhms

RP20-xx15SFR

Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	15.15	15.3	15.45	15.60	15.75	15.90	16.05	16.20	16.35	16.50	Volts
R _U =	161.56	78.22	50.45	36.56	28.22	22.67	18.70	15.72	13.41	11.56	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	14.85	14.70	14.55	14.40	14.25	14.10	13.95	13.80	13.65	13.50	Volts
R _D =	515.22	401.56	262.67	193.22	151.56	123.78	103.94	89.06	77.48	68.22	KOhms

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PROTECTIONS

Parameter	Condition	Value
Short Circuit Protection (SCP)		continuous, automatic recovery
Over Voltage Protection (OVP)	Zener Diode Clamp	3.3Vout
		5Vout
		12Vout
		15Vout
		3.7VDC - 5.4VDC 5.6VDC - 7.0VDC 13.5VDC - 19.6VDC 16.8VDC - 20.5VDC
Over Load Protection (OLP)	% Iout rated	150% typ.
Isolation Voltage	I/P to O/P	1.6kVDC/1minute
	I/P to O/P to case	1.6kVDC/1minute
Isolation Resistance	500 VDC	1GΩ min.
Isolation Capacitance		3000pF max.

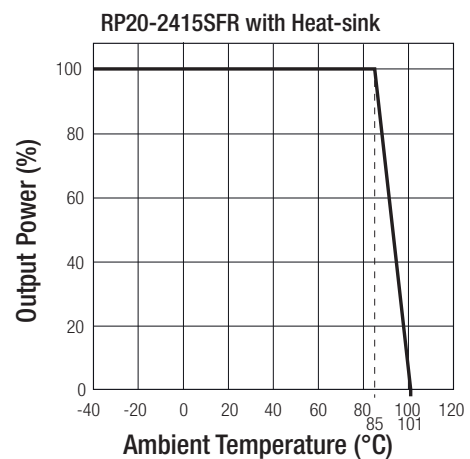
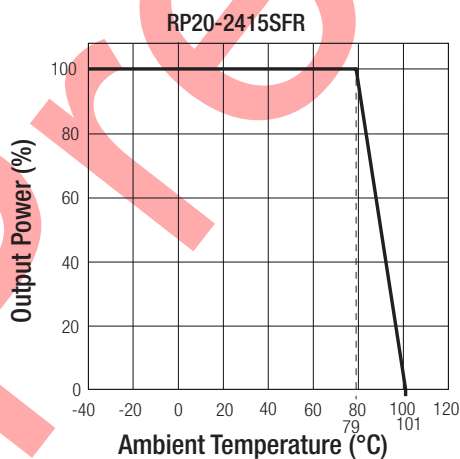
Notes:

Note6: This power module is not internally fused. An input line fuse must always be used.

ENVIRONMENTAL

Parameter	Condition	Value
Operating Temperature Range	without derating	-40°C to +79°C
	with derating	-40°C to +101°C
Maximum Case Temperature		+105°C
Temperature Coefficient		±0.02%/°C max.
Thermal Impedance	Natural convection (20LFM) without Heat-sink	12°C/Watt
	Natural convection (20LFM) with Heat-sink	10°C/Watt
Operating Humidity		5% - 95% RH
Shock		EN61373, MIL-STD-810F
Thermal Shock		MIL-STD-810F
Vibration		EN61373, MIL-STD-810F
MTBF	MIL-HDBK-217F	1523 x 10 ³ hours

Derating Graph⁽⁷⁾



Notes:

Note7: Derating graphs are valid only for the shown part numbers. If you need detailed derating-information about a part-number not shown here please contact our technical support service at techsupportAT@recom-power.com

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SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
UL General Safety	E196683	UL60950-1, 2nd Edition
Canada General Safety	E196683	CSA C22.2 No. 601.1
Railway	15A100704E-C	EN50155
EMI Compliance		
EMI Standard ⁽⁹⁾	Condition	Standard / Criterion
ESD	Air ±8kV and Contact ±6kV	EN55011, EN55022, Class A or B
Radiated Immunity	10 V/m	EN61000-4-2, Criteria A
Fast Transient ⁽⁹⁾	±2kV	EN61000-4-3, Criteria A
Surge ⁽⁹⁾	±2kV	EN61000-4-4, Criteria A
Conducted Immunity	10 Vr.m.s	EN61000-4-5, Criteria A
Power frequency magnetic field	100A/m continuous; 1000A/m 1 sec	EN61000-4-6, Criteria A
		EN61000-4-8, Criteria A

Notes:

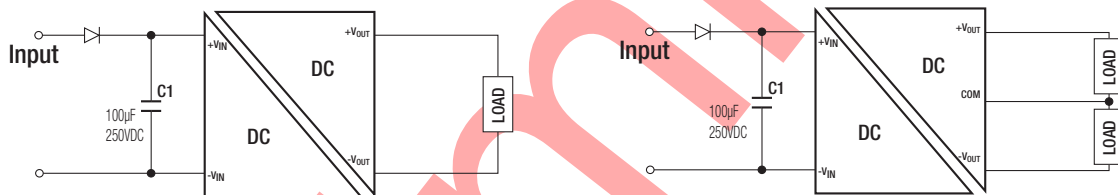
Note8: The 24VDC & 48VDC input standard modules meet EN55022 & EN55011 Class B without external components, 110VDC input meet EN55022 Class A without external components and meet Class B with external components.

Note9: An external input filter capacitor is required if the module has to meet EN61000-4-4, -5.

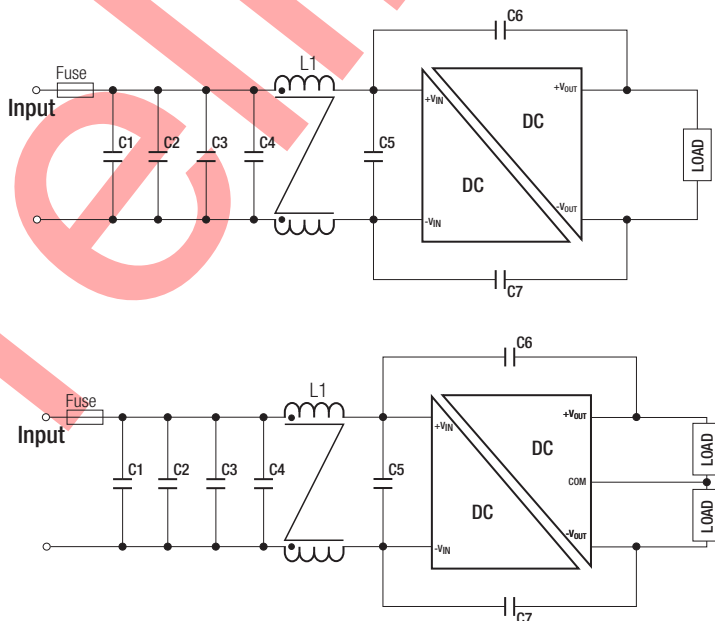
The filter Recom suggests: 24VDC and 48VDC input: Nippon chemi-con KY series, 220µF/100V.

110VDC input: Rubycon BXF series, 100µF/250V

EMC Railway Class A



EMC Filtering Class B



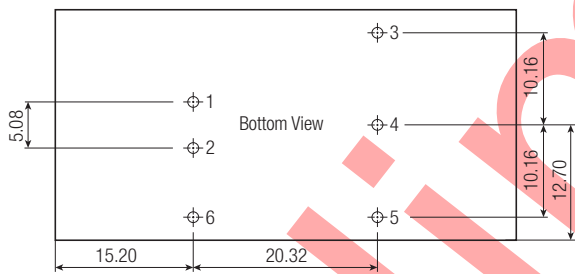
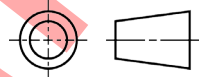
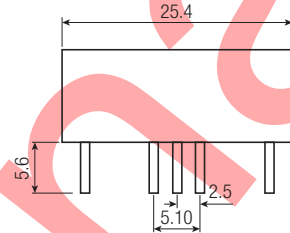
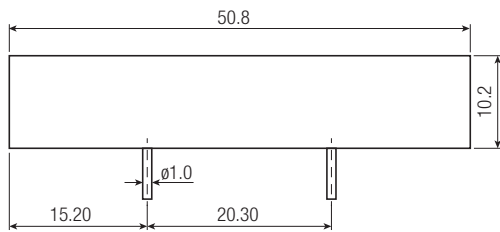
MODEL	C1	C2/C3/C4	C7	L1
RP20-110xxSFR	39µF/250V Al Cap. (lie down) Rubycon BX	0.47µF/250V 1812 MLCC	1000pF/3kV 1808 MLCC	CMC: 470µH ref.: WE-SL5 744272471

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DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case Base Potting	Nickel coated copper FR4 PCB Silicone (UL94V-0)
Packaging Dimension (LxWxH)		50.8 x 25.4 x 10.2mm
Packaging Weight	without Heat-sink with Heat-sink	30g 40.89g

Dimension Drawing (mm)

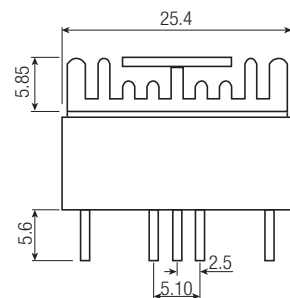
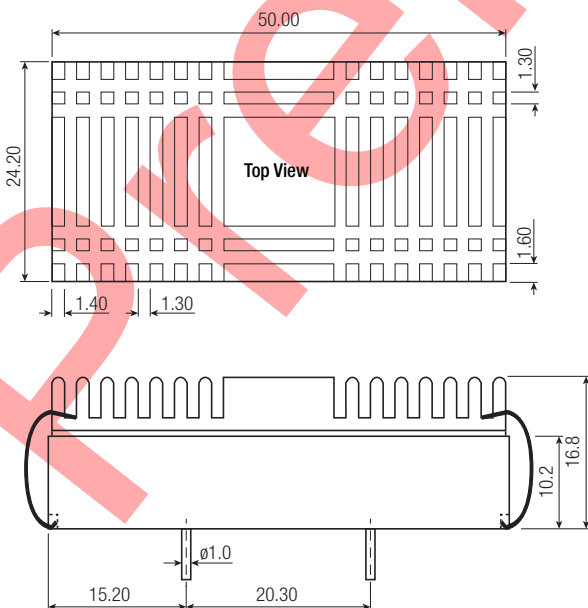


Pin Connections

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Com
5	-Vout	-Vout
6	CTRL	CTRL

Pin Pitch Tolerance ±0.25mm
Pin dimension tolerance ±0.1mm
XX.X ± 0.5mm
XX.XX ± 0.25mm

Dimension Drawing (mm) with Heat-sink



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PACKAGING INFORMATION		
Parameter	Type	Value
Packaging Dimension (LxWxH)	Tube	255 x 54 x 22mm
	Tray	302.5 x 222 x 28mm
Packaging Quantity	without Heat-Sink	9pcs.
	with Heat-Sink	20pcs.
Storage Temperature Range		-55°C to $+125^\circ\text{C}$
Storage Humidity		5% - 95% RH
Tube Dimension Drawing (mm)		
<p>The drawing shows a cross-section of a tube with a complex profile. The overall length is 52±0.6 mm. The top edge has a thickness of 2.0±0.8 mm. The total height of the profile is 19.5±1 mm. The bottom edge has a thickness of 1±0.2 mm. The profile features several steps and a central cutout. Key dimensions for the cutout and steps are: 11.5±0.3 mm, 18.5±0.3 mm, 21.5±0.3 mm, and 26±0.3 mm. The right side of the tube has a height of 13±0.5 mm and a top edge thickness of 2.0±0.8 mm. A fillet with a radius of R1.5 is shown at the bottom right corner.</p>		