



FEATURES:

- Efficiency up to 90%
- Ultra-wide 4:1 Input range
- No-load consumption $\leq 0.15W$
- Operating Temperature: $-40^{\circ}C$ to $+85^{\circ}C$
- Input under voltage lockout
- On/Off Remote Control
- Over Voltage Protection
- I/Output Isolation 1500 & 3000VDC
- Over Current protection
- Continuous Short Circuit protection

Models
Single output



Model	Input Voltage (V)	Max Input current Full/No load (mA)	Output Voltage (V)	Output Current max (mA)	Isolation (VDC)	Max Capacitive Load(uF)	Efficiency (%)
AM20EW-2403S-NZ	9-36	818/45	3.3	5000	1500	10000	86
AM20EW-2405S-NZ	9-36	993/45	5	4000	1500	10000	90
AM20EW-2409S-NZ	9-36	941/10	9	2222	1500	4700	89
AM20EW-2412S-NZ	9-36	941/10	12	1667	1500	1600	89
AM20EW-2415S-NZ	9-36	941/10	15	1333	1500	1000	90
AM20EW-2424S-NZ	9-36	941/10	24	834	1500	500	90
AM20EW-4803S-NZ	18-75	409/25	3.3	5000	1500	10000	86
AM20EW-4805S-NZ	18-75	497/25	5	4000	1500	10000	90
AM20EW-4809S-NZ	18-75	485/9	9	2222	1500	4700	89
AM20EW-4812S-NZ	18-75	485/9	12	1667	1500	1600	89
AM20EW-4815S-NZ	18-75	485/9	15	1333	1500	1000	90
AM20EW-4824S-NZ	18-75	485/9	24	834	1500	500	90
AM20EW-11005S-NZ	40-160	212/20	5	4000	1500	4020	89
AM20EW-11012S-NZ	40-160	212/20	12	1667	1500	1600	88
AM20EW-11015S-NZ	40-160	212/20	15	1333	1500	1000	88
AM20EW-11024S-NZ	40-160	212/20	24	833	1500	470	88
AM20EW-2403SH30-NZ	9-36	818/45	3.3	5000	3000	10000	86
AM20EW-2405SH30-NZ	9-36	958/45	5	4000	3000	10000	89
AM20EW-2409SH30-NZ	9-36	967/12	9	2222	3000	4700	88
AM20EW-2412SH30-NZ	9-36	967/12	12	1667	3000	1600	88
AM20EW-2415SH30-NZ	9-36	967/12	15	1333	3000	1000	89
AM20EW-2424SH30-NZ	9-36	967/12	24	834	3000	500	89
AM20EW-4803SH30-NZ	18-75	409/25	3.3	5000	3000	10000	86
AM20EW-4805SH30-NZ	18-75	484/25	5	4000	3000	10000	88
AM20EW-4812SH30-NZ	18-75	484/8	12	1667	3000	1600	88
AM20EW-4815SH30-NZ	18-75	484/8	15	1333	3000	1000	89
AM20EW-4824SH30-NZ	18-75	484/8	24	834	3000	500	89

Models
Dual output

Model	Input Voltage (V)	Max Input current Full/No load (mA)	Output Voltage (V)	Output Current max (mA)	Isolation (VDC)	Max Capacitive Load(uF)	Efficiency (%)
AM20EW-2405D-NZ	9-36	993/45	± 5	± 2000	1500	± 4800	86
AM20EW-2409D-NZ	9-36	941/10	± 9	± 1111	1500	± 1000	88
AM20EW-2412D-NZ	9-36	941/10	± 12	± 834	1500	± 800	88
AM20EW-2415D-NZ	9-36	941/10	± 15	± 667	1500	± 625	88
AM20EW-4805D-NZ	18-75	497/25	± 5	± 2000	1500	± 4800	86
AM20EW-4812D-NZ	18-75	485/9	± 12	± 834	1500	± 800	88
AM20EW-4815D-NZ	18-75	485/9	± 15	± 667	1500	± 625	89

Add suffix “-K” for optional heat sink for metal cased 1500VDC isolated models only.

NOTE: All specifications in this datasheet are measured at an ambient temperature of $25^{\circ}C$, humidity $< 75\%$, nominal input voltage and at rated output load unless otherwise specified.

Input Specifications

Parameters	Nominal	Typical	Maximum	Units
Voltage range	24 48 110	9-36 18-75 40-160		VDC
Filter	π(Pi) Network			
Startup time		10		ms
Absolute Maximum Rating	24 48 110		-0.7-50 -0.7-100 -0.7-200	VDC
Peak Input Voltage time	24 & 48Vin 110Vin		1000 100	ms
On/Off control	ON – open or 3.5-12VDC ; OFF – short to –Vin or 0-1.2VDC, Idle current: 110Vin models - 1mA; 24 & 48Vin models – 4-7mA			
Input under voltage lockout	24 48		5.5-6.5 14-15.5	VDC
Input reflected current		30		mA

Isolation Specifications

Parameters	Conditions	Typical	Maximum	Units
Tested I/O voltage	60 sec, 1mA	1500 & 3000		VDC
Resistance	500VDC Isolation	>1000		MOhm
Capacitance	1500VDC models 100KHz/0.1V 3000VDC models 100KHz/0.1V	2000 500		pF

Output Specifications

Parameters	Conditions	Typical	Maximum	Units
Voltage accuracy		±1	±3	%
Balanced load		±0.5	±1.5	%
Over voltage protection	Zener Diode Clamp	110	160	%
Over current protection		110	190	% of Io
Short Circuit protection	Continuous, hiccup			
Short circuit restart	Auto-Recovery			
Line voltage regulation (single)	Full load, LL-HL	±0.2	±0.5	% of Vin
Line voltage regulation (dual)	Full load, LL-HL	±0.5	±1	% of Vin
Load voltage regulation (single)	5% to 100% load for 1500VDC models & 0% to 100% load for 3000VDC models	±0.5	±1	%
Load voltage regulation (dual)	5% to 100% load	±0.5	±1.5	%
Cross regulation	50% 1 st load, 10-100% 2 nd load		±5	%
Temperature coefficient			±0.03	%/°C
Ripple & Noise	20MHz Bandwidth, 5% to 100% load		100	mV p-p
Voltage adjustment range			±10	%
Minimum Load Current		5		% of Max
Transient recovery time	25% load step change		800	µS
Transient recovery deviation	25% load step change: 3.3, 5, ±5Vout 25% load step change: others	±5 ±3	±8 ±5	%

General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	100% load, 24 & 48 Vin 100% load, 110Vin	270 300		KHz
Operating temperature	See derating curve	-40 to +85		°C
Storage temperature		-55 to +125		°C
Maximum case temperature			105	°C
Cooling	Free air convection			
Humidity			95	% RH
Case material	1500VDC models 3000VDC models	Aluminum Alloy Plastic (UL94-V0)		

General Specifications (continued)

Parameters	Conditions	Typical	Maximum	Units
Weight	24 & 48Vin 1500VDC model 110Vin models 3000VDC models	26 without heat sink/ 34 with heat sink 28 without heat sink/ 36 with heat sink 24		g
Dimensions (L x W x H)	Aluminium case Plastic case	2 x 1 x 0.47 inches 2.03 x 1.04 x 0.47 inches	50.8 x 25.4 x 11.8 mm 51.5 x 26.5 x 12 mm	
MTBF	>1,000,000 hours (MIL-HDBK -217F, Ground Benign, t=+25°C)			
Maximum soldering temperature	1.5mm from case for 10 sec		300	°C

Environment Specification

Test	Parameters	Conditions
Vibration	Test mode	10-55Hz
	Acceleration	10g, 30min, every axis tested

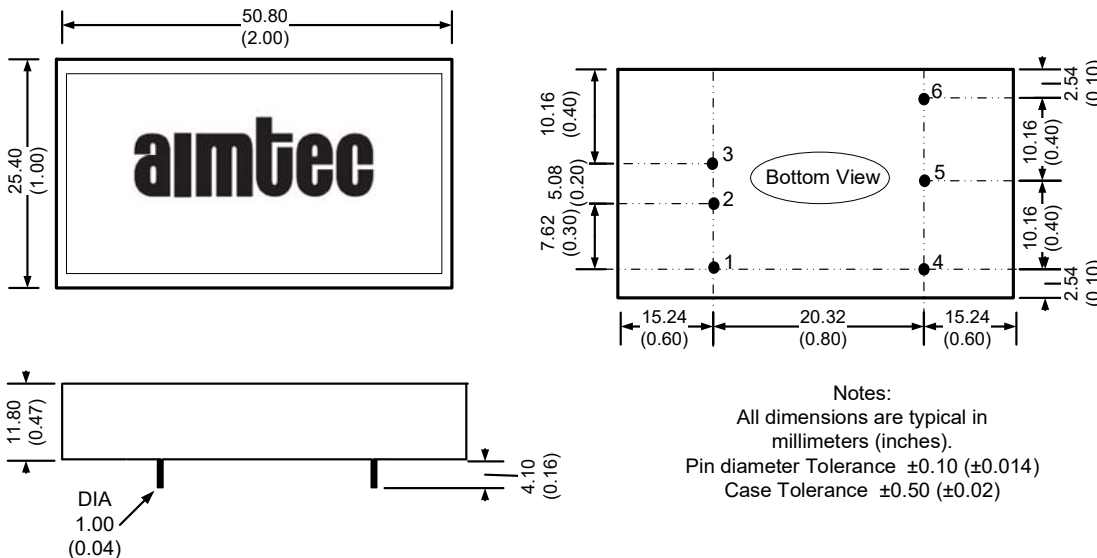
Safety Specifications

Parameters	
Approval	UL, CE (40-160 Vin models only)
Standards	IEC/UL 60950-1 EN 55022, Class B, with external filter & EN 55024: 2010 IEC 61000-4-2, Contact ±4KV, Criteria B IEC 61000-4-3, 10V/m, Criteria A IEC 61000-4-4, ±2KV, Criteria B, with external filter IEC 61000-4-5, ±2KV, Criteria B, with external filter IEC 61000-4-6, 3Vrms, Criteria A IEC 61000-4-29, 0-70%, Criteria B

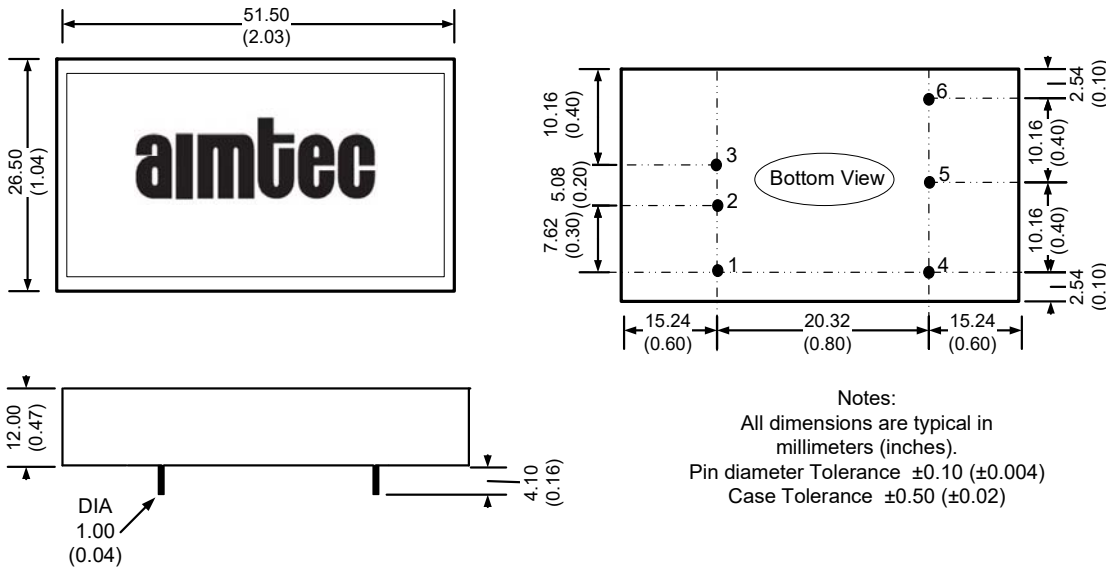
Pin Out Specifications

Pin	Single	Dual
1	On/Off Control	On/Off Control
2	-Vin	-Vin
3	+Vin	+Vin
4	-Vout	-Vout
5	Trim	Common
6	+Vout	+Vout

Dimensions metal case



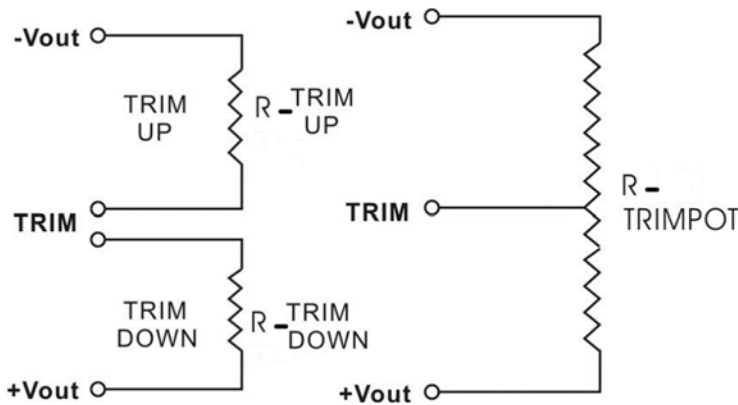
Dimensions plastic case



Trimming

Output voltage can be externally trimmed by utilizing the methods as shown below

Fixed Resistor Variable Potentiometer



Leave open if not used.

AM20EW-xx03S-NZ, xx=24 or 48

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	3.27	3.23	3.2	3.17	3.14	3.1	3.07	3.04	3	2.97
Rt down (KΩ)	124.138	73.217	53.983	41.497	32.737	24.449	19.839	16.148	12.236	9.856
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	3.33	3.37	3.4	3.43	3.47	3.5	3.53	3.56	3.6	3.63
Rt up (KΩ)	-556.59	194.738	89.364	55.050	34.131	25.350	19.357	15.006	10.773	8.367

AM20EW-xx05S-NZ, xx=24 or 48

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	4.95	4.9	4.85	4.8	4.75	4.7	4.65	4.6	4.55	4.5
Rt down (KΩ)	105.180	52.153	31.996	21.377	14.822	10.372	7.154	4.719	2.811	1.276
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	5.05	5.1	5.15	5.2	5.25	5.3	5.35	5.4	5.45	5.5
Rt up (KΩ)	176.356	71.279	41.973	28.200	20.197	14.967	11.281	8.543	6.430	4.749

AM20EW-11005S-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	4.95	4.9	4.85	4.8	4.75	4.7	4.65	4.6	4.55	4.5
Rt down (KΩ)	96.08	49.349	30.67	20.616	14.333	10.034	6.909	4.533	2.667	1.162
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	5.05	5.1	5.15	5.2	5.25	5.3	5.35	5.4	5.45	5.5
Rt up (KΩ)	205.698	76.406	44.023	29.296	20.879	15.431	11.617	8.798	6.63	4.91

AM20EW-xx09S-NZ, xx=24 or 48

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	8.91	8.82	8.73	8.64	8.55	8.46	8.37	8.28	8.19	8.1
Rt down (KΩ)	375.532	207.429	139.156	102.145	78.924	62.996	51.392	42.562	35.616	30.011
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	9.09	9.18	9.27	9.36	9.45	9.54	9.63	9.72	9.81	9.9
Rt up (KΩ)	314.531	112.638	64.147	42.357	29.974	21.989	16.412	12.296	9.134	6.628

AM20EW-xx12S-NZ, xx=24 or 48

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	11.88	11.76	11.64	11.52	11.4	11.28	11.16	11.04	10.92	10.8
Rt down (KΩ)	496.091	301.451	212.527	161.585	128.573	105.441	88.332	75.163	64.715	56.223
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	12.12	12.24	12.36	12.48	12.6	12.72	12.84	12.96	13.08	13.2
Rt up (KΩ)	706.435	158.920	83.878	54.074	38.076	28.095	21.274	16.316	12.551	9.594

AM20EW-11012S-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	11.88	11.76	11.64	11.52	11.4	11.28	11.16	11.04	10.92	10.8
Rt down (KΩ)	505.529	303.041	211.851	159.978	126.504	103.114	85.849	72.581	62.066	53.527
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	12.12	12.24	12.36	12.48	12.6	12.72	12.84	12.96	13.08	13.2
Rt up (KΩ)	614.769	150.097	78.994	50.198	34.607	24.832	18.13	13.249	9.536	6.616

AM20EW-xx15S-NZ, xx=24 or 48

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	14.85	14.7	14.55	14.4	14.25	14.1	13.95	13.8	13.65	13.5
Rt down (KΩ)	634.883	400.637	288.513	222.758	179.536	148.959	126.187	108.568	94.532	83.086
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	15.15	15.3	15.45	15.6	15.75	15.9	16.05	16.2	16.35	16.5
Rt up (KΩ)	1460.098	192.573	96.641	61.354	43.016	31.781	24.191	18.720	14.590	11.361

AM20EW-11015S-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	14.85	14.7	14.55	14.4	14.25	14.1	13.95	13.8	13.65	13.5
Rt down (KΩ)	570.165	371.335	271.179	210.846	170.524	141.673	120.008	103.142	89.638	78.584
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	15.15	15.3	15.45	15.6	15.75	15.9	16.05	16.2	16.35	16.5
Rt up (KΩ)	3208.668	231.297	104.85	63.553	43.061	30.815	22.672	16.865	12.516	9.136

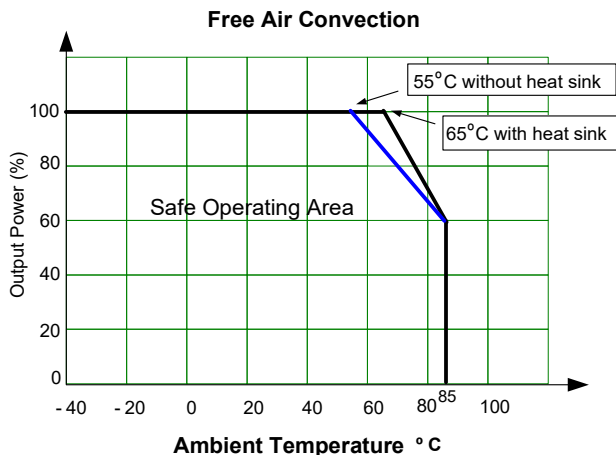
AM20EW-xx24S-NZ, xx=24 or 48

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	23.76	23.52	23.28	23.04	22.8	22.56	22.32	22.08	21.84	21.6
Rt down (KΩ)	1038.047	638.015	455.256	350.553	282.702	235.158	199.992	172.928	151.453	134
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	24.24	24.48	24.72	24.96	25.2	25.44	25.68	25.92	26.16	26.4
Rt up (KΩ)	816.889	179.913	94.338	60.463	42.306	30.987	23.256	17.640	13.375	10.027

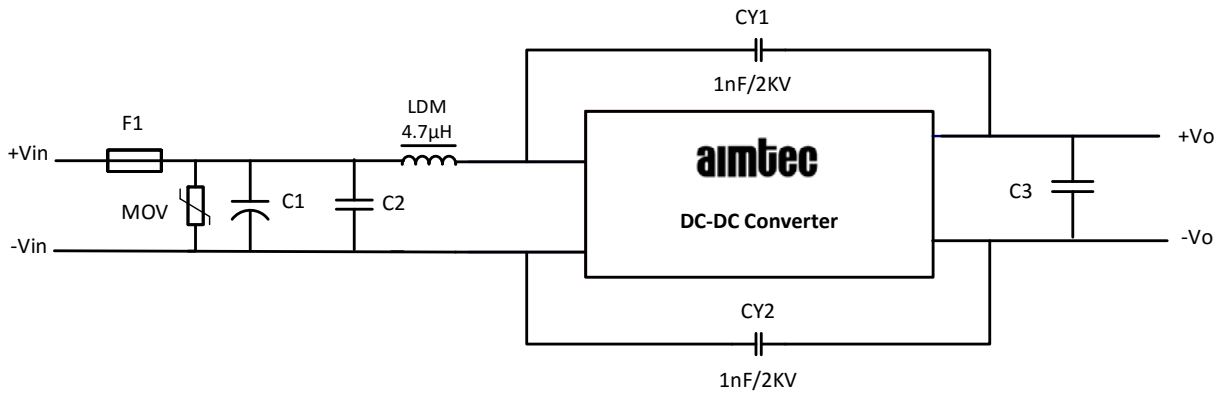
AM20EW-11024S-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	23.76	23.52	23.28	23.04	22.8	22.56	22.32	22.08	21.84	21.6
Rt down (KΩ)	1135.537	730.699	532.922	415.701	338.146	283.038	241.862	209.929	184.441	163.624
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	24.24	24.48	24.72	24.96	25.2	25.44	25.68	25.92	26.16	26.4
Rt up (KΩ)	2871.219	219.961	106.182	66.054	45.551	33.104	24.745	18.744	14.226	10.703

Derating

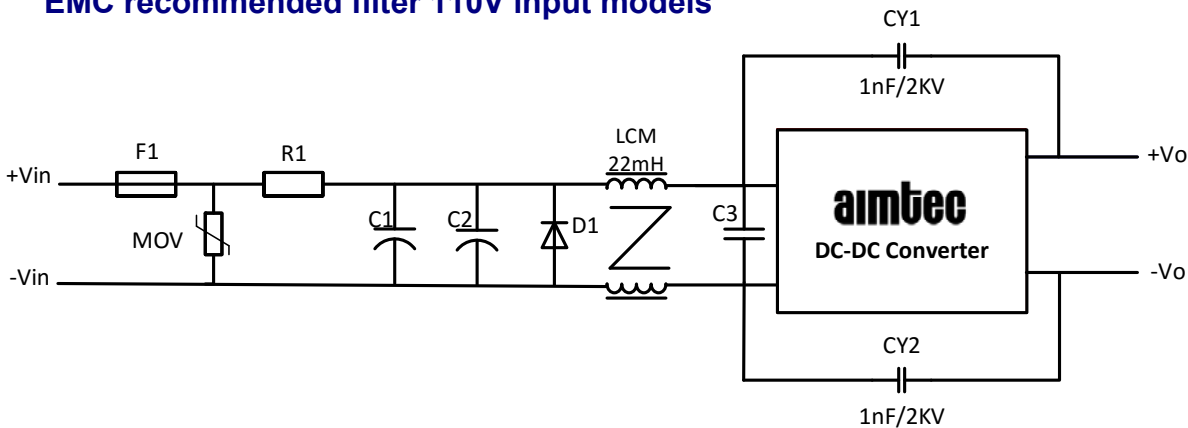


EMC recommended filter 24 & 48V input 1500VDC models



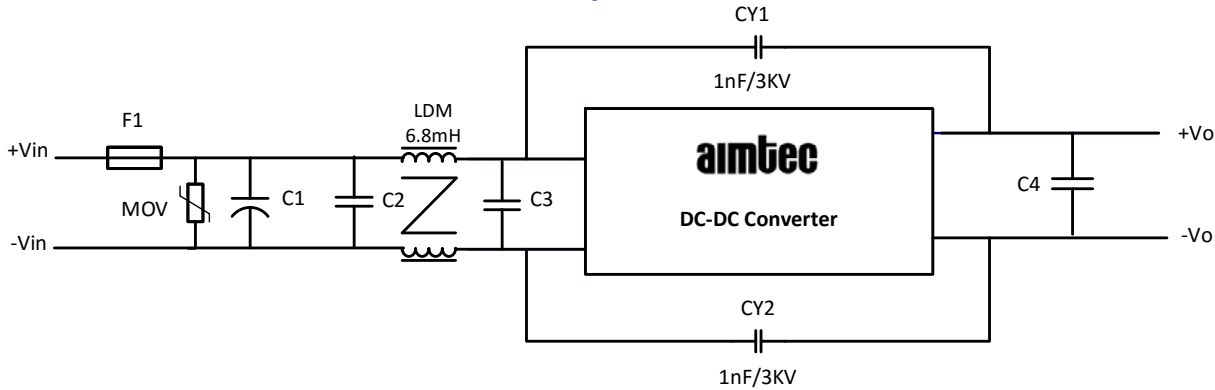
Model	MOV	C1	C2	C3
24 Vin	S14K35	330 µF / 50V	1 µF / 50V	470µF for 3.3 & 5V output 220µF for 9/12/15 & ±5 V output
48 Vin	S14K60	330 µF / 100V	1 µF / 100V	100 µF for 24 & ±9/±12/±15 V output 220µF for ±5Voutput

EMC recommended filter 110V input models



MOV	C1 & C2	R1	C3	D1
S20K130	1 µF / 200V	1 Ω	100 µF / 200V	ER304

EMC recommended filter 24 & 48V input 3000VDC models



Model	MOV	C1	C2 & C3	C4
24 Vin	S14K35	330 μ F / 50V	1 μ F / 50V	470 μ F for 3.3 & 5V output 220 μ F for 9/12/15V output 100 μ F for 24V output
48 Vin	S14K60	330 μ F / 100V	1 μ F / 100V	

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