

## M Series

## 50 Watt AC-DC Converters



Input voltage range 85...264 V AC  
1, 2 or 3 isolated outputs up to 48 V DC  
4 kV AC I/O electric strength test voltage



- Rugged electrical and mechanical design
- Outputs individually controlled with excellent dynamic properties
- Operating ambient temperature range -40...71°C with convection cooling

### Selection chart

Output 1		Output 2		Output 3		Input voltage $U_i$ [V AC]	Type	Options
$U_o$ nom [V DC]	$I_o$ nom [A]	$U_o$ nom [V DC]	$I_o$ nom [A]	$U_o$ nom [V DC]	$I_o$ nom [A]			
5.1	8	-	-	-	-	85...264	LM 1001-7R	-9, E, P, D, V, A, H, F
5.1	8	-	-	-	-	85...264	LMZ 1001-7R □	-9, E, P, D, V, A, H, F
12	4	-	-	-	-	85...264	LM 1301-7R	-9, E, P, D, A, H, F
12	4	-	-	-	-	85...264	LMZ 1301-7R □	-9, E, P, D, A, H, F
15	3.4	-	-	-	-	85...264	LM 1501-7R	-9, E, P, D, A, H, F
15	3.4	-	-	-	-	85...264	LMZ 1501-7R □	-9, E, P, D, A, H, F
24	2	-	-	-	-	85...264	LM 1601-7R	-9, E, P, D, A, H, F
24	2	-	-	-	-	85...264	LMZ 1601-7R □	-9, E, P, D, A, H, F
48	1	-	-	-	-	85...264	LM 1901-7R	-9, E, P, D, A, H, F
48	1	-	-	-	-	85...264	LMZ 1901-7R □	-9, E, P, D, A, H, F
12	2	12	2	-	-	85...264	LM 2320-7	-9, E, P, D, A, H, F
12	2	12	2	-	-	85...264	LMZ 2320-7 □	-9, E, P, D, A, H, F
15	1.7	15	1.7	-	-	85...264	LM 2540-7	-9, E, P, D, A, H, F
15	1.7	15	1.7	-	-	85...264	LMZ 2540-7 □	-9, E, P, D, A, H, F
5.1	5	12	0.7	12	0.7	85...264	LM 3020-7	-9, E, P, D, V, A, H, F
5.1	5	12	0.7	12	0.7	85...264	LMZ 3020-7 □	-9, E, P, D, V, A, H, F
5.1	5	15	0.6	15	0.6	85...264	LM 3040-7	-9, E, P, D, V, A, H, F
5.1	5	15	0.6	15	0.6	85...264	LMZ 3040-7 □	-9, E, P, D, V, A, H, F

**Input**

Input voltage	continuous range	85...264 V AC
Input frequency		47...65(440) Hz
Inrush current limitation	by thermistor	

**Output**

Efficiency	$U_{i \text{ nom}}, I_{o \text{ nom}}$	up to 81%
Output voltage setting accuracy	$U_{i \text{ nom}}, I_{o \text{ nom}}$	$\pm 0.6\% U_{o \text{ nom}}$
Output voltage switching noise	IEC/EN 61204, total	typ. 50 mV <sub>pp</sub>
Line regulation	$U_{i \text{ min}} \dots U_{i \text{ max}}, I_{o \text{ nom}}$ , each output regulated	typ. $\pm 0.2\% U_{o \text{ nom}}$
Load regulation	$U_{i \text{ nom}}, 0 \dots I_{o \text{ nom}}$ , each output regulated	typ. 0.15% $U_{o \text{ nom}}$
Minimum load	not required	0 A
Current limitation main output	rectangular U/I characteristic	typ. 110% $I_{o \text{ nom}}$
Current limitation aux. output(s)	rectangular U/I characteristic	typ. 120% $I_{o \text{ nom}}$
Operation in parallel	by current limitation, only main outputs	
Hold-up time	$U_i = 230 \text{ V AC}, I_{o \text{ nom}}$	typ. 90 ms

**Protection**

Input fuse	built-in	T 2.5 A, 250 V AC
Input undervoltage lockout		typ. 80% $U_{i \text{ min}}$
Input overvoltage lockout		typ. 110% $U_{i \text{ max}}$
Input transient protection	varistor or suppressor diode	
Output	no-load, overload and short circuit proof	
Output overvoltage	suppressor diode in each output	typ. 150% $U_{o \text{ nom}}$
Overtemperature	switch-off with auto restart	$T_C$ typ. 100°C

**Control**

Output voltage adjustment	single output types	0...110% $U_{o1 \text{ nom}}$
Inhibit	TTL input, output(s) disabled if open circuit	
Status indication	LEDs: OK, inhibit, overload	

**Safety**

Approvals	EN 60950, UL 1950, CSA C22.2 No. 950	
Class of equipment	LM	class I
	LMZ	class II
Protection degree	units without options	IP 40
Electric strength test voltage	class I, I/case	2 kV AC
	class I, I/O	4 kV AC
	class II (LMZ), I/O and I/case	4 kV AC
	O/case	1 kV AC
	O/O	0.2 kV AC

## EMC

Electrostatic discharge	IEC/EN 61000-4-2, level 4 (8/15 kV)	criterion A
Electromagnetic field	IEC/EN 61000-4-3, level x (20 V/m)	criterion A/B
Electr. fast transients/bursts	IEC/EN 61000-4-4, input, level 3/4 (2/4 kV)	criterion A/B
Surge	IEC/EN 61000-4-5, input, level 3/4 (2/4 kV)	criterion A
Conducted disturbances	IEC/EN 61000-4-6, level 3 (10 V)	criterion B
Electromagnetic emissions	CISPR 22/EN 55022, class I, conducted	class B

## Environmental

Operating ambient temperature	$U_{nom}$ , $I_{o nom}$ , convection cooled	-25...71 °C
Operating case temperature $T_C$	$U_{nom}$ , $I_{o nom}$	-25...95 °C
Storage temperature	non operational	-40...100 °C
Damp heat	IEC/EN 60068-2-3, 93%, 40 °C	56 days
Vibration, sinusoidal	IEC/EN 60068-2-6, 10...60/60...2000 Hz	0.35 mm/5 $g_n$
Shock	IEC/EN 60068-2-27, 6 ms	100 $g_n$
Bump	IEC/EN 60068-2-29, 6 ms	40 $g_n$
Random vibration	IEC/EN 60068-2-64, 20...500 Hz	4.9 $g_{n,rms}$
MTBF	MIL-HDBK-217E, $G_B$ , 40 °C, single output types	320'000 h

## Options

Extended temperature range	-40...71 °C, ambient, operating	-9
Electronic inrush current limitation		E
Output voltage adjustment	95...105% $U_{o nom}$ , excludes feature R and vice versa	P
Input and/or output undervoltage monitoring, excludes option V		D0...D9
Input and/or output undervoltage monitoring (VME), excludes option D		V1...V3
Test sockets for check of output voltage		A
Enhanced electric strength test 2 kV AC		H
Fuse not user accessible		F

## Pin allocation

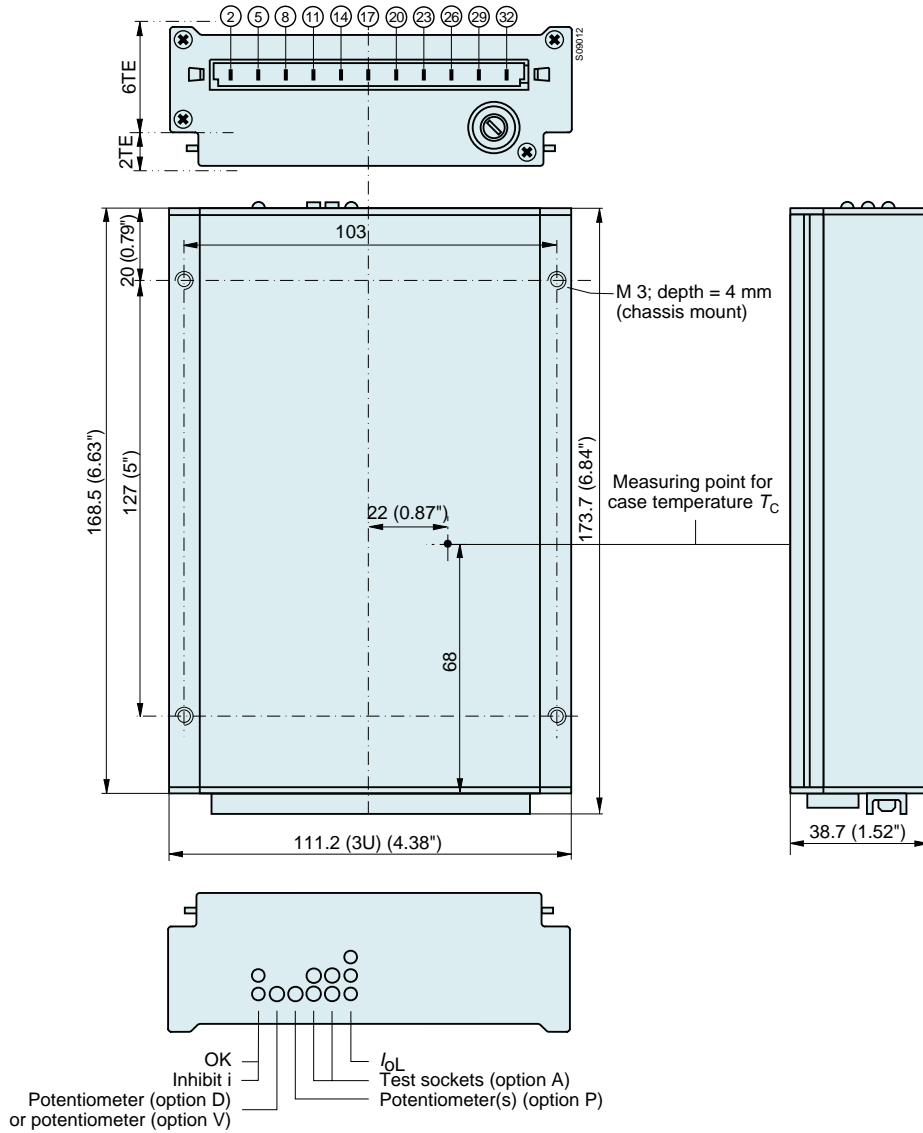
Pin	Electrical determination	LM 1000	LMZ 1000	LM 2000	LMZ 2000	LM 3000	LMZ 3000
2	Inhibit control input	i	i	i	i	i	i
5	Data safe or ACFAIL	D or V	D or V	D or V	D or V	D or V	D or V
8	Output voltage (positive)	Vo1+	Vo1+			Vo3+	Vo3+
11	Output voltage (negative)	Vo1-	Vo1-			Vo3-	Vo3-
14	Control input +	R	R				
17	Control input -	G	G				
14	Output voltage (positive)			Vo2+	Vo2+	Vo2+	Vo2+
17	Output voltage (negative)			Vo2-	Vo2-	Vo2-	Vo2-
20	Output voltage (positive)	Vo1+	Vo1+	Vo1+	Vo1+	Vo1+	Vo1+
23	Output voltage (negative)	Vo1-	Vo1-	Vo1-	Vo1-	Vo1-	Vo1-
26	Protective earth	⊕		⊕		⊕	
29	AC input voltage	N $\approx$	N $\approx$	N $\approx$	N $\approx$	N $\approx$	N $\approx$
32	AC input voltage	P $\approx$	P $\approx$	P $\approx$	P $\approx$	P $\approx$	P $\approx$

# Cassette Style

# M Series

## Mechanical data

Tolerances  $\pm 0.3$  mm (0.012") unless otherwise indicated.



## Accessories

- Front panels 19" (Schroff/Intermas)
- Mating H11 connectors with screw, solder, fast-on or press-fit terminals
- Connector retention facilities and code key system for connector coding
- Flexible PCB for connecting the converter via an H11 connector, if mounted on a PCB
- Chassis or wall mounting plates for frontal access
- Universal mounting brackets for chassis or DIN-rail mounting