M Series Data Sheet
50 Watt AC-DC Converters

Input voltage range 85 to 264 V AC
1, 2 or 3 isolated outputs up to 48 V DC
Class I equipment

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

Model Selection

Output 1 $V_{o\ nom}$ [V DC]	Output 1 $I_{o\ nom}$ [A]	Output 2 $V_{o\ nom}$ [V DC]	Output 2 $I_{o\ nom}$ [A]	Output 3 $V_{o\ nom}$ [V DC]	Output 3 $I_{o\ nom}$ [A]	Input voltage V_i [V AC]	Type	Options
5.1	8	-	-	-	-	85 - 264	LM 1001-7R	-9, E, P, D, V, A, H, F
12	4	-	-	-	-	85 - 264	LM 1301-7R	-9, E, P, D, A, H, F
15	3.4	-	-	-	-	85 - 264	LM 1501-7R	-9, E, P, D, A, H, F
24	2	-	-	-	-	85 - 264	LM 1601-7R	-9, E, P, D, A, H, F
48	1	-	-	-	-	85 - 264	LM 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
15	1.7	15	1.7	-	-	85 - 264	LM 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	15	0.6	15	0.6	85 - 264	LM 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	$V_{i\ nom}$, $I_{o\ nom}$	up to 81%
Output voltage setting accuracy	$V_{i\ nom}$, $I_{o\ nom}$	±0.6% $V_{o\ nom}$
Output voltage switching noise	IEC/EN 61204, total	typ. 50 mV_{pp}
Line regulation	$V_{i\ min}$ - $V_{i\ max}$, $I_{o\ nom}$, each output regulated	typ. ±0.2% $V_{o\ nom}$
Load regulation	$V_{i\ nom}$, 0 - $I_{o\ nom}$, each output regulated	typ. 0.15% $V_{o\ nom}$
Minimum load	not required	0 A
Current limitation main output	rectangular U/I characteristic	typ. 110% $I_{o\ nom}$
Current limitation aux. output(s)	rectangular U/I characteristic	typ. 120% $I_{o\ nom}$
Operation in parallel	by current limitation, only main outputs	
Hold-up time	V_i = 230 V AC, $I_{o\ nom}$	typ. 90 ms

Protection

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

Control

Output voltage adjustment	single output types	0 - 110% $V_{o1\ nom}$
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
Protection degree	units without options	IP 40
Electric strength test voltage	I/case	2 kV AC
	I/O	4 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	$V_{i\ nom}$, $I_{o\ nom}$, convection cooled	–25 to 71°C
Operating case temperature T_C	$V_{i\ nom}$, $I_{o\ nom}$	–25 to 95°C
Storage temperature	non operational	–40 to 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% $V_{o\ nom}$, 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

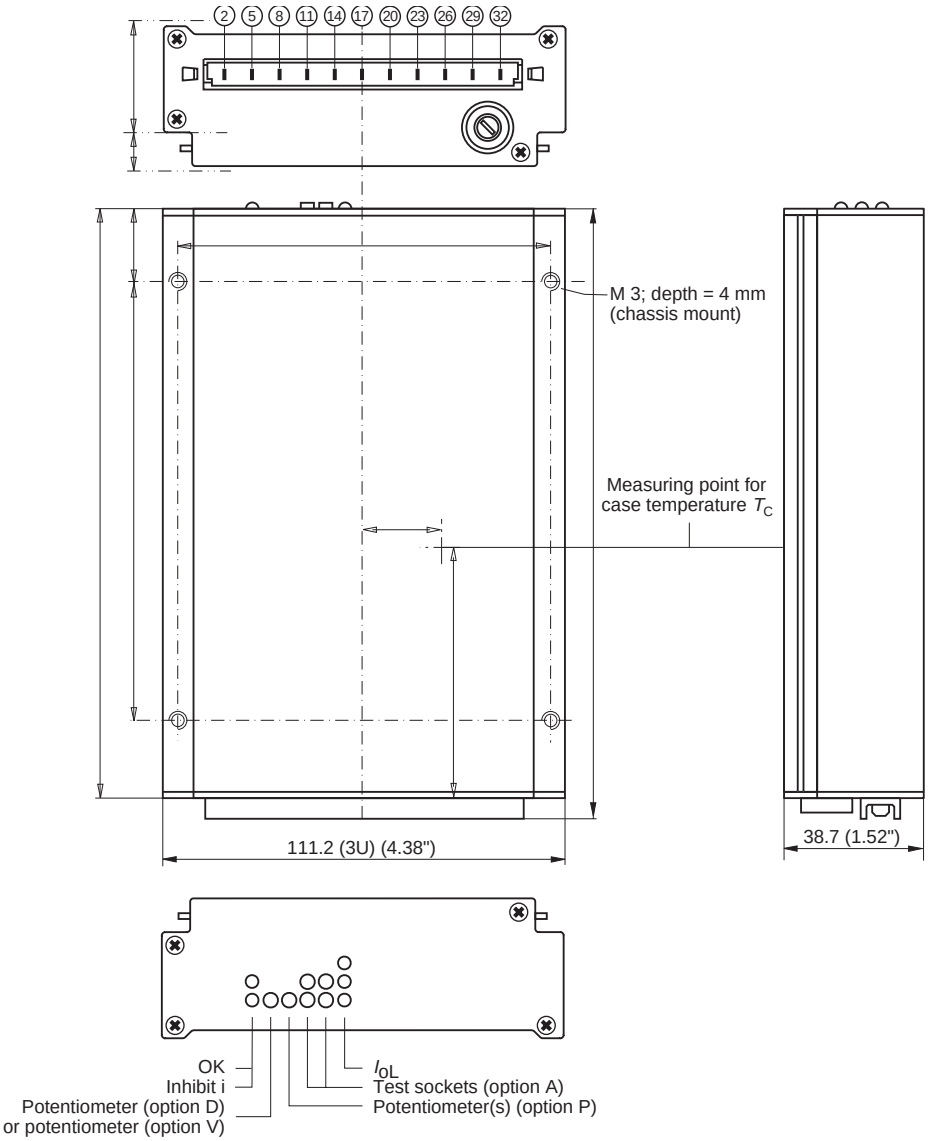
Pin allocation

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

Mechanical data

Tolerances ±0.3 mm (0.012") unless otherwise indicated.

European Projection



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