M Series Data Sheet
50-Watt AC-DC Cassette Converters



Features

- RoHS lead-solder-exempt compliant[1]
- Rugged electrical and mechanical design
- Outputs individually controlled with excellent dynamic properties
- Operating ambient temperature range of –40 to 71 °C with convection cooling

[1] The solder exemption refers to all the restricted materials except lead in solder.

Description

The M Series of AC-DC cassettes represents a broad and flexible range of power supplies for use in advanced industrial electronic systems. Features include high efficiency, reliability, low output voltage noise, and excellent dynamic response to load/line changes due to individual regulation of each output.

Model Selection

Output 1		Output 2		Output 3		Nom. Input Voltage	Model	Options
$V_{o\ nom}$ [VDC]	$I_{o\ nom}$ [A]	$V_{o\ nom}$ [VDC]	$I_{o\ nom}$ [A]	$V_{o\ nom}$ [VDC]	$I_{o\ nom}$ [A]	Vi [VAC]		
5.1	8	-	-	-	-	100 - 240	LM1001-7R	-9, E, P, D, V, A, F
12	4	-	-	-	-	100 - 240	LM1301-7R	-9, E, P, D, A, F
15	3.4	-	-	-	-	100 - 240	LM1501-7R	-9, E, P, D, A, F
24	2	-	-	-	-	100 - 240	LM1601-7R	-9, E, P, D, A, F
48	1	-	-	-	-	100 - 240	LM1901-7R	-9, E, P, D, A, F
12	2	12	2	-	-	100 - 240	LM2320-7	-9, E, P, D, A, F
15	1.7	15	1.7	-	-	100 - 240	LM2540-7	-9, E, P, D, A, F
5.1	5	12	0.7	12	0.7	100 - 240	LM3020-7	-9, E, P, D, V, A, F
5.1	5	15	0.6	15	0.6	100 - 240	LM3040-7	-9, E, P, D, V, A, F

Input

Nom. voltage and frequency	continuous range	100 - 240 VAC, 50 - 60, 440 Hz
Operating voltage and frequency	continuous range	85 - 264 VAC, 47 - 440 Hz
Inrush current limitation	by thermistor	

Output

Efficiency	$V_{i\ nom}$, $I_{o\ nom}$	up to 81%
Output voltage setting accuracy	$V_{i\ nom}$, $I_{o\ nom}$	better than ±1% $V_{o\ nom}$
Output voltage switching noise	IEC/EN 61204, total	typ. 50 mVpp
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 V/I characteristic	typ. 110% $I_{o\ nom}$
Current limitation aux. output(s)	rectangular V/I characteristic	typ. 120% $I_{o\ nom}$
Operation in parallel	by current limitation, only main outputs	
Hold-up time	Vi = 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% Vi min
Input overvoltage lockout		typ. 110% Vi 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% Vo nom
Overtemperature protection	switch-off with auto restart	TC typ. 100 °C

Control

Output voltage adjustment	single output types	0 - 110% Vo1 nom
Inhibit	TTL input, output(s) disabled if open circuit	
Status indication	3 LEDs: OK, inhibit, overload	

Safety

Approvals	EN 60950, UL 1950, CSAC22.2 No. 950	Class I equipment
Protection degree	units without options	IP 40
Electric strength test voltage	Input against (case + outputs)	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	Vi nom, Io nom, convection cooled	–25 to 71 °C
Operating case temperature TC	Vi nom, Io nom	–25 to 95 °C
Storage temperature	non operational	–40 to 100 °C
Damp heat	IEC/EN 60068-2-78, 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 to 500 Hz	4.9 $g_{n\ rms}$
MTBF	MIL-HDBK-217E, GB, 40 °C, single output models	320 000 h

Options

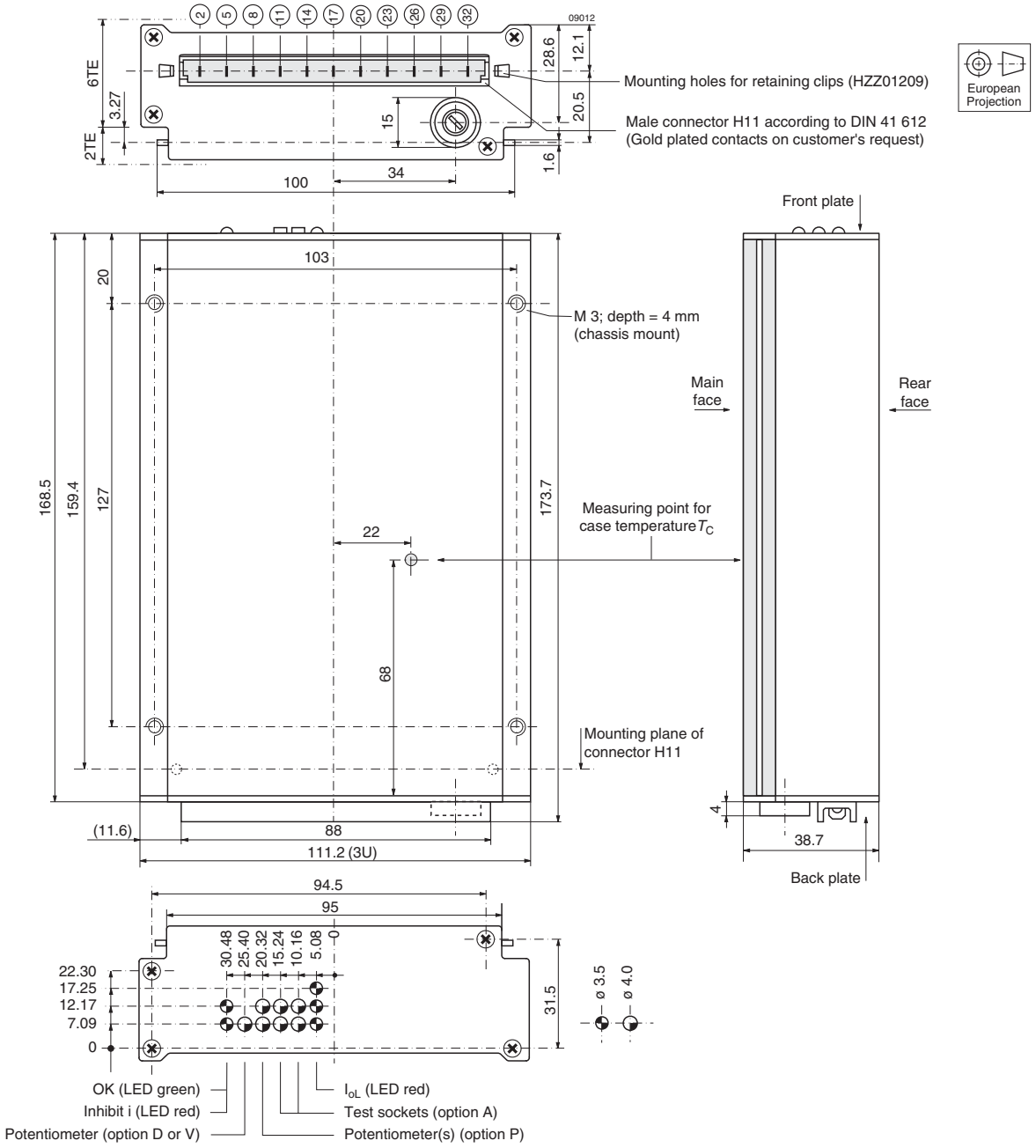
Extended temperature range	–40 to 71 °C, ambient, operating	-9
Electronic inrush current limitation		E
Output voltage adjustment	95 - 105% Vo nom, excludes feature R	P
Input and/or output undervoltage monitoring, excludes option V		D0 - D9
Input and/or output undervoltage monitoring (VME), excludes option D		V1 - V3
Test sockets for check of output voltage		A
Fuse not user-accessible		F

Pin Allocation

Pin	Electrical determination	LM1000	LM2000	LM3000
2	Inhibit control input	i	i	i
5	Data safe or ACFAIL	D or V	D or V	D or V
8	Output positive	Vo+		Vo3+
11	Output negative	Vo–		Vo3–
14	Control input +	R		
17	Control input –	G		
14	Output positive		Vo2+	Vo2+
17	Output negative		Vo2–	Vo2–
20	Output positive	Vo+	Vo1+	Vo1+
23	Output negative	Vo–	Vo1–	Vo1–
26	Protective earth PE	⏚	⏚	⏚
29	AC input neutral	N ≂	N ≂	N ≂
32	AC input phase	L ≂	L ≂	L ≂

Mechanical Data

Dimensions in mm. The power supplies are designed to be inserted into a 19" rack, 160 mm long, according to IEC 60297-3.



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

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