

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 _{pp} |
| 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

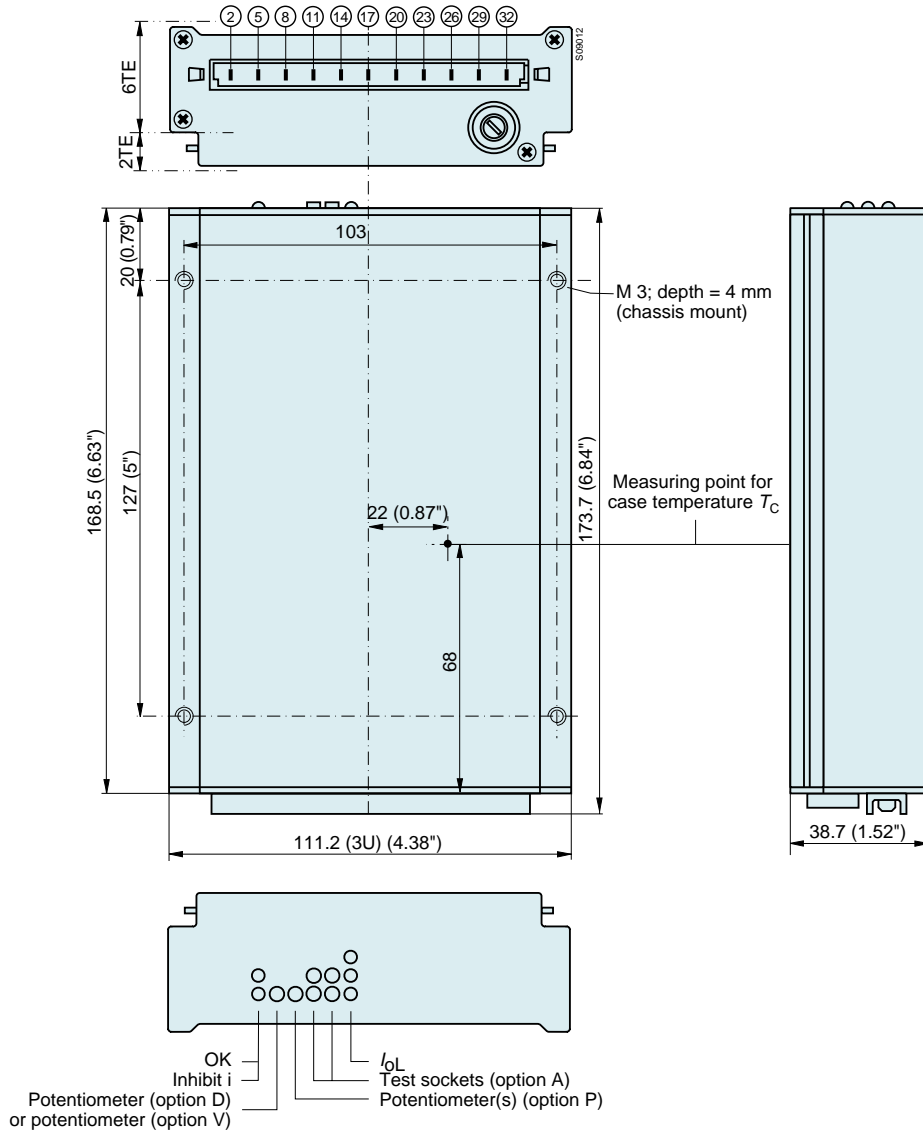
| Pin | Electrical determination | LM 1000 | LMZ 1000 | LM 2000 | LMZ 2000 | LM 3000 | LMZ 3000 |
|-----|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 2 | Inhibit control input | i | i | i | i | i | i |
| 5 | Data safe or ACFAIL | D 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 ± 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