



Wide input voltage from 8...372 V DC  
 1, 2 or 3 isolated outputs up to 48 V DC  
 4 kV AC I/O electric strength test voltage

LGA

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

## Selection chart

| Output 1               |                     | Output 2               |                     | Output 3               |                     | Type                         | Type                          | Type                           | Options              |
|------------------------|---------------------|------------------------|---------------------|------------------------|---------------------|------------------------------|-------------------------------|--------------------------------|----------------------|
| $U_{o\ nom}$<br>[V DC] | $I_{o\ nom}$<br>[A] | $U_{o\ nom}$<br>[V DC] | $I_{o\ nom}$<br>[A] | $U_{o\ nom}$<br>[V DC] | $I_{o\ nom}$<br>[A] | Input voltage<br>8...35 V DC | Input voltage<br>14...70 V DC | Input voltage<br>20...100 V DC |                      |
| 5.1                    | 8                   | -                      | -                   | -                      | -                   | AM 1001-7R                   | BM 1001-7R                    | FM 1001-7R                     | -9, P, D, V, A, H, F |
| 12                     | 4                   | -                      | -                   | -                      | -                   | AM 1301-7R                   | BM 1301-7R                    | FM 1301-7R                     | -9, P, D, A, H, F    |
| 15                     | 3.4                 | -                      | -                   | -                      | -                   | AM 1501-7R                   | BM 1501-7R                    | FM 1501-7R                     | -9, P, D, A, H, F    |
| 24                     | 2                   | -                      | -                   | -                      | -                   | AM 1601-7R                   | BM 1601-7R                    | FM 1601-7R                     | -9, P, D, A, H, F    |
| 48                     | 1                   | -                      | -                   | -                      | -                   | AM 1901-7R                   | BM 1901-7R                    | FM 1901-7R                     | -9, P, D, A, H, F    |
| 12                     | 2                   | 12                     | 2                   | -                      | -                   | AM 2320-7                    | BM 2320-7                     | FM 2320-7                      | -9, P, D, A, H, F    |
| 15                     | 1.7                 | 15                     | 1.7                 | -                      | -                   | AM 2540-7                    | BM 2540-7                     | FM 2540-7                      | -9, P, D, A, H, F    |
| 5.1                    | 5                   | 12                     | 0.7                 | 12                     | 0.7                 | AM 3020-7                    | BM 3020-7                     | FM 3020-7                      | -9, P, D, V, A, H, F |
| 5.1                    | 5                   | 15                     | 0.6                 | 15                     | 0.6                 | AM 3040-7                    | BM 3040-7                     | FM 3040-7                      | -9, P, D, V, A, H, F |

| Output 1               |                     | Output 2               |                     | Output 3               |                     | Type                           | Type                           | Type                           | Options                 |
|------------------------|---------------------|------------------------|---------------------|------------------------|---------------------|--------------------------------|--------------------------------|--------------------------------|-------------------------|
| $U_{o\ nom}$<br>[V DC] | $I_{o\ nom}$<br>[A] | $U_{o\ nom}$<br>[V DC] | $I_{o\ nom}$<br>[A] | $U_{o\ nom}$<br>[V DC] | $I_{o\ nom}$<br>[A] | Input voltage<br>28...140 V DC | Input voltage<br>44...220 V DC | Input voltage<br>88...372 V DC |                         |
| 5.1                    | 8                   | -                      | -                   | -                      | -                   | CM 1001-7R                     | DM 1001-7R                     | LM 1001-7R                     | -9, E, P, D, V, A, H, F |
| 12                     | 4                   | -                      | -                   | -                      | -                   | CM 1301-7R                     | DM 1301-7R                     | LM 1301-7R                     | -9, E, P, D, A, H, F    |
| 15                     | 3.4                 | -                      | -                   | -                      | -                   | CM 1501-7R                     | DM 1501-7R                     | LM 1501-7R                     | -9, E, P, D, A, H, F    |
| 24                     | 2                   | -                      | -                   | -                      | -                   | CM 1601-7R                     | DM 1601-7R                     | LM 1601-7R                     | -9, E, P, D, A, H, F    |
| 48                     | 1                   | -                      | -                   | -                      | -                   | CM 1901-7R                     | DM 1901-7R                     | LM 1901-7R                     | -9, E, P, D, A, H, F    |
| 12                     | 2                   | 12                     | 2                   | -                      | -                   | CM 2320-7                      | DM 2320-7                      | LM 2320-7                      | -9, E, P, D, A, H, F    |
| 15                     | 1.7                 | 15                     | 1.7                 | -                      | -                   | CM 2540-7                      | DM 2540-7                      | LM 2540-7                      | -9, E, P, D, A, H, F    |
| 5.1                    | 5                   | 12                     | 0.7                 | 12                     | 0.7                 | CM 3020-7                      | DM 3020-7                      | LM 3020-7                      | -9, E, P, D, V, A, H, F |
| 5.1                    | 5                   | 15                     | 0.6                 | 15                     | 0.6                 | CM 3040-7                      | DM 3040-7                      | LM 3040-7                      | -9, E, P, D, V, A, H, F |

CM, DM and LM types available as CMZ, DMZ and LMZ class II equipment

**Input**

|                           |                           |                          |
|---------------------------|---------------------------|--------------------------|
| Input voltage             | 6 wide-input ranges (1:5) | refer to selection chart |
| Inrush current limitation | CM, DM, LM by thermistor  |                          |

**Output**

|                                   |   |                                   |
|-----------------------------------|---|-----------------------------------|
| Efficiency                        | $U_{i\text{ nom}}, I_{o\text{ nom}}$  | up to 83%                         |
| 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. $\pm 0.3\% U_{o\text{ nom}}$ |
| 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                      | $U_{i\text{ nom}}, I_{o\text{ nom}}$ , LM   | typ. 100 ms                       |
|                                   | $U_{i\text{ nom}}, I_{o\text{ nom}}$ , A/B/C/D/FM with ext. diode in input line     | up to 7 ms                        |

**Protection**

|                            |   |                                |
|----------------------------|---|--------------------------------|
| Input reverse polarity     | built-in fuse                             |                                |
| 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. $100^\circ\text{C}$ |

**Control**

|                           |   |                                  |
|---------------------------|---|----------------------------------|
| Output voltage adjustment | single output types                           | $0 \dots 110\% U_{o\text{ nom}}$ |
| 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             | AM, BM, CM, DM, FM, LM                | class I   |
|                                | CMZ, DMZ, LMZ                         | class II  |
| Protection degree              | units without options                 | IP 40     |
| Electric strength test voltage | class I, I/O                          | 2 kV AC   |
|                                | class I, I/O                          | 4 kV AC   |
|                                | class II, CMZ/DMZ/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 B   |
| 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, conducted                | class B       |

## Environmental

|                                  |  |                 |
|----------------------------------|--|-----------------|
| Operating ambient temperature    | $U_{i\text{ nom}}, I_{o\text{ nom}}$ , convection cooled | -25...71 °C     |
| Operating case temperature $T_C$ | $U_{i\text{ nom}}, I_{o\text{ nom}}$                     | -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

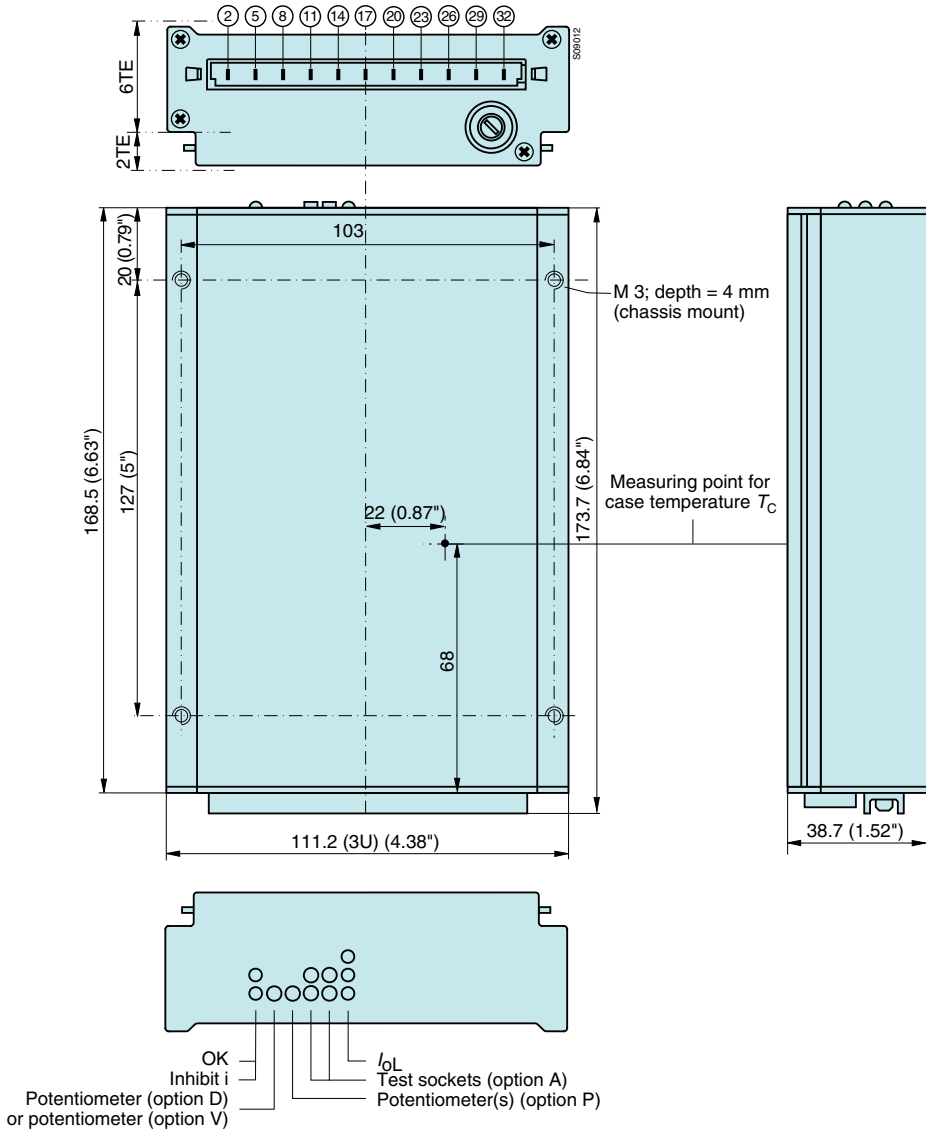
|  |  |            |
|--|--|------------|
| Extended temperature range   | -40...71 °C, ambient, operating                                  | -9         |
| Electronic inrush current limitation                                 |  | E          |
| Output voltage adjustment  | 95...105% $U_{o\text{ nom}}$ , 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 |  | V0, V2, 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  | AM...LM<br>1000 | CMZ...LMZ<br>1000 | AM...LM<br>2000 | CMZ...LMZ<br>2000 | AM...LM<br>3000 | CMZ...LMZ<br>3000 |
|-----|---------------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| 2   | Inhibit control input     | i               | i                 | i               | i                 | i               | i                 |
| 5   | Safe data 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  | DC input voltage          | Vi+             | Vi+               | Vi+             | Vi+               | Vi+             | Vi+               |
| 32  | DC input voltage          | Vi-             | Vi-               | Vi-             | Vi-               | Vi-             | Vi-               |

## 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