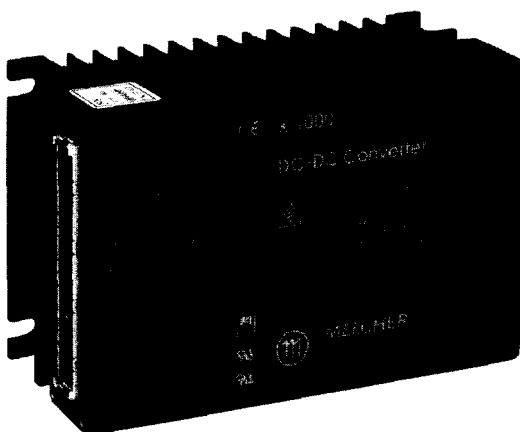




Input voltage ranges from 8...385 V DC  
1 or 2 outputs up to 48 V DC  
4 kV AC I/O electric strength test voltage



- Rugged electrical and mechanical design
- Fully isolated outputs
- Operating ambient temperature range  
-40...71 °C with convection cooling

## Selection chart

| Output 1               |                     | Output 2               |                     | Type                         | Options            |
|------------------------|---------------------|------------------------|---------------------|------------------------------|--------------------|
| $U_{o\ nom}$<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 |                    |
| 5.1                    | 20                  | -                      | -                   | AK 1001-7R                   | -9, D, V, P, T, B1 |
| 12                     | 10                  | -                      | -                   | AK 1301-7R                   | -9, D, P, T, B1    |
| 15                     | 8                   | -                      | -                   | AK 1501-7R                   | -9, D, P, T, B1    |
| 24                     | 5                   | -                      | -                   | AK 1601-7R                   | -9, D, P, T, B1    |
| 24                     | 5                   | -                      | -                   | AK 2320-7R                   | -9, D, P, T, B1    |
| 30                     | 4                   | -                      | -                   | AK 2540-7R                   | -9, D, P, T, B1    |
| 48                     | 2.5                 | -                      | -                   | AK 2660-7R                   | -9, D, P, T, B1    |
| 12                     | 5                   | 12                     | 5                   | AK 2320-7R                   | -9, D, P, T, B1    |
| 15                     | 4                   | 15                     | 4                   | AK 2540-7R                   | -9, D, P, T, B1    |
| 24                     | 2.5                 | 24                     | 2.5                 | AK 2660-7R                   | -9, D, P, T, B1    |

| Output 1               |                     | Output 2               |                     | 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] | Input voltage<br>14...70 V DC | Input voltage<br>20...100 V DC |                    |
| 5.1                    | 25                  | -                      | -                   | BK 1001-7R                    | FK 1001-7R                     | -9, D, V, P, T, B1 |
| 12                     | 12                  | -                      | -                   | BK 1301-7R                    | FK 1301-7R                     | -9, D, P, T, B1    |
| 15                     | 10                  | -                      | -                   | BK 1501-7R                    | FK 1501-7R                     | -9, D, P, T, B1    |
| 24                     | 6                   | -                      | -                   | BK 1601-7R                    | FK 1601-7R                     | -9, D, P, T, B1    |
| 24                     | 6                   | -                      | -                   | BK 2320-7R                    | FK 2320-7R                     | -9, D, P, T, B1    |
| 30                     | 5                   | -                      | -                   | BK 2540-7R                    | FK 2540-7R                     | -9, D, P, T, B1    |
| 48                     | 3                   | -                      | -                   | BK 2660-7R                    | FK 2660-7R                     | -9, D, P, T, B1    |
| 12                     | 6                   | 12                     | 6                   | BK 2320-7R                    | FK 2320-7R                     | -9, D, P, T, B1    |
| 15                     | 5                   | 15                     | 5                   | BK 2540-7R                    | FK 2540-7R                     | -9, D, P, T, B1    |
| 24                     | 3                   | 24                     | 3                   | BK 2660-7R                    | FK 2660-7R                     | -9, D, P, T, B1    |

| Output 1               |                     | Output 2               |                     | 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] | Input voltage<br>28...140 V DC | Input voltage<br>44...220 V DC | Input voltage<br>67...385 V DC |                       |
| 5.1                    | 25                  | -                      | -                   | CK 1001-7R                     | DK 1001-7R                     | -                              | -9, E, D, V, P, T, B1 |
| 12                     | 12                  | -                      | -                   | CK 1301-7R                     | DK 1301-7R                     | EK 1301-7R                     | -9, E, D, P, T, B1    |
| 15                     | 10                  | -                      | -                   | CK 1501-7R                     | DK 1501-7R                     | EK 1501-7R                     | -9, E, D, P, T, B1    |
| 24                     | 6                   | -                      | -                   | CK 1601-7R                     | DK 1601-7R                     | EK 1601-7R                     | -9, E, D, P, T, B1    |
| 24                     | 6                   | -                      | -                   | CK 2320-7R                     | DK 2320-7R                     | EK 2320-7R                     | -9, E, D, P, T, B1    |
| 30                     | 5                   | -                      | -                   | CK 2540-7R                     | DK 2540-7R                     | EK 2540-7R                     | -9, E, D, P, T, B1    |
| 48                     | 3                   | -                      | -                   | CK 2660-7R                     | DK 2660-7R                     | EK 2660-7R                     | -9, E, D, P, T, B1    |
| 12                     | 6                   | 12                     | 6                   | CK 2320-7R                     | DK 2320-7R                     | EK 2320-7R                     | -9, E, D, P, T, B1    |
| 15                     | 5                   | 15                     | 5                   | CK 2540-7R                     | DK 2540-7R                     | EK 2540-7R                     | -9, E, D, P, T, B1    |
| 24                     | 3                   | 24                     | 3                   | CK 2660-7R                     | DK 2660-7R                     | EK 2660-7R                     | -9, E, D, P, T, B1    |

## Input

|                           |                           |                          |
|---------------------------|---------------------------|--------------------------|
| Input voltage             | 6 wide-input ranges (1:5) | refer to selection chart |
| Inrush current limitation | CK, DK, EK by thermistor  |                          |

## Output

|                                 |                                                                   |                           |
|---------------------------------|-------------------------------------------------------------------|---------------------------|
| Efficiency                      | $U_{i\ nom}, I_{o\ nom}$                                          | up to 87%                 |
| Output voltage setting accuracy | $U_{i\ nom}, I_{o\ nom}$                                          | $\pm 0.6\% U_{o\ nom}$    |
| Output voltage switching noise  | IEC/EN 61204, total                                               | typ. 100 mV <sub>pp</sub> |
| Line regulation                 | $U_{i\ min}...U_{i\ max}, I_{o\ nom}$                             | typ. $\pm 0.3\%$          |
| Load regulation                 | $U_{i\ nom}, 10...100\% I_{o\ nom}$ , symmetrical output load     | typ. 0.4%                 |
| Minimum load                    | not required                                                      | 0 A                       |
| Current limitation              | rectangular U/I characteristic                                    | typ. 110% $I_{o\ nom}$    |
| Operation in parallel           | by current limitation                                             |                           |
| Hold-up time                    | $U_{i\ nom}, I_{o\ nom}$ , C/D/E/FK with ext. diode in input line | 4...30 ms                 |
|                                 | $U_{i\ nom}, I_{o\ nom}$ , A/BK with ext. diode in input line     | typ. 1 ms                 |

## Control and protection

|                            |                                            |                        |
|----------------------------|--------------------------------------------|------------------------|
| Input reverse polarity     | built-in fuse, not user accessible         |                        |
| Input undervoltage lockout |                                            | typ. 80% $U_{i\ min}$  |
| Input overvoltage lockout  |                                            | typ. 108% $U_{i\ max}$ |
| Input transient protection | varistor or suppressor diode               |                        |
| Output                     | no-load, overload and short circuit proof  |                        |
| Output overvoltage         | suppressor diode in each output            | typ. 130% $U_{o\ nom}$ |
| Overtemperature            | switch-off with auto restart               | $T_C$ typ 100°C        |
| Output voltage adjustment  |                                            | 0...110% $U_{o\ nom}$  |
| Inhibit                    | TTL input, output(s) disabled if left open |                        |
| Status indication          | LEDs: OK, inhibit, overload                |                        |

## Safety

|                                |                                     |           |
|--------------------------------|-------------------------------------|-----------|
| Approvals                      | EN 60950, UL 1950, CSA 22.2 No. 950 |           |
| Protection degree              |                                     | IP 30     |
| Class of equipment             |                                     | class I   |
| Electric strength test voltage | I/case                              | 2 kV AC   |
|                                | I/O                                 | 4 kV AC   |
|                                | O/case                              | 1 kV AC   |
|                                | O/O                                 | 0.1 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 |
| Electr. fast transients/bursts | IEC/EN 61000-4-4, level 4 (2/4 kV)  | criterion A |
| Surge                          | IEC/EN 61000-4-5, level 3 (2 kV)    | criterion A |
| Conducted disturbances         | IEC/EN 61000-4-6, level 3 (10 V)    | criterion A |
| 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 $g_{n\text{ rms}}$ |
| MTBF                             | MIL-HDBK-217F, $G_B$ , 40 °C                             | 500'000 h              |

## Options

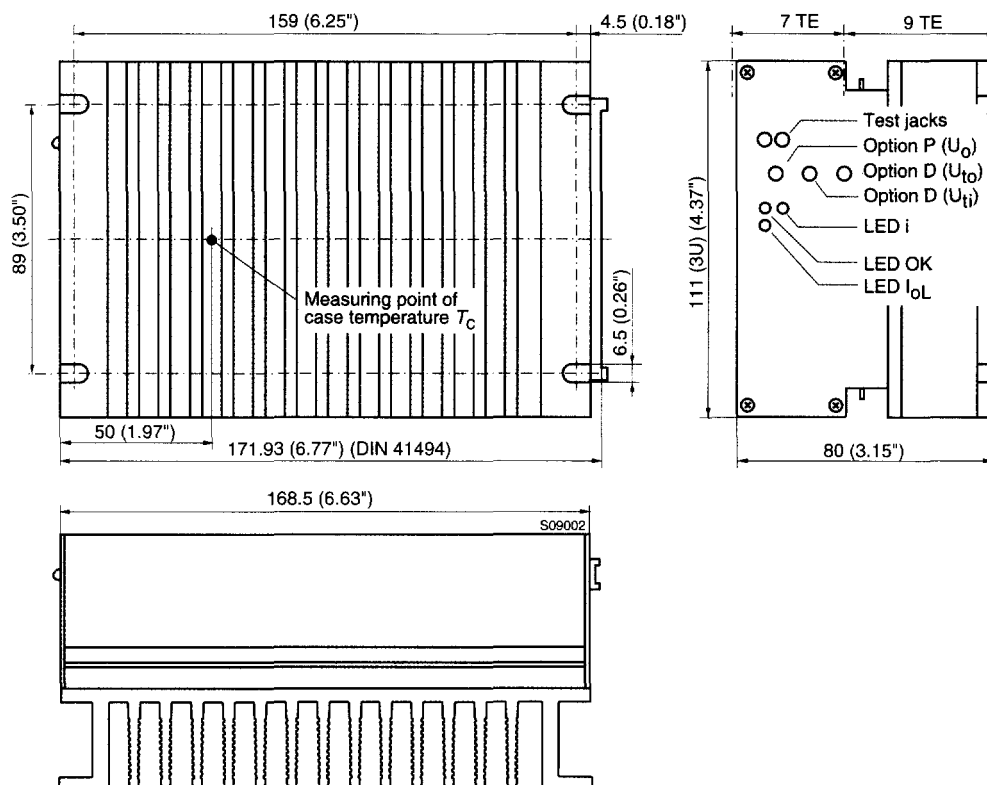
|                                                                      |                                                                  |            |
|----------------------------------------------------------------------|------------------------------------------------------------------|------------|
| Extended temperature range                                           | -40...71 °C, ambient, operating                                  | -9         |
| Electronic inrush current limitation                                 |                                                                  | E          |
| Output voltage adjustment                                            | 40...110% $U_{o\text{ nom}}$ , 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 P |                                                                  | V0, V2, V3 |
| Current sharing                                                      |                                                                  | T          |
| Cooling plate                                                        |                                                                  | B1         |

## Pin allocation

| Pin | AK 1000, BK...EK 1001 |                     | AK 2000 |                     | BK...EK 1301/1501/1601 |                     | BK...EK 2000 |                     |
|-----|-----------------------|---------------------|---------|---------------------|------------------------|---------------------|--------------|---------------------|
| 4   | Vo1+                  | Output 1            | Vo2+    | Output 2            | Vo1+                   | Output 1            | Vo2+         | Output 2            |
| 6   |                       |                     |         |                     | Vo1+                   |                     | Vo2+         |                     |
| 8   | Vo1-                  | Output 1            | Vo2-    | Output 2            | Vo1-                   | Output 1            | Vo2-         | Output 2            |
| 10  |                       |                     |         |                     | Vo1-                   |                     | Vo2-         |                     |
| 12  | S+                    | Sense               | Vo1+    | Output 1            | S+                     | Sense               | Vo1+         | Output 1            |
| 14  | S-                    | Sense               | Vo1-    | Output 1            | S-                     | Sense               | Vo1-         | Output 1            |
| 16  | R                     | Control of $U_{o1}$ | R       | Control of $U_{o1}$ | R                      | Control of $U_{o1}$ | R            | Control of $U_{o1}$ |
| 18  | i                     | Inhibit             | i       | Inhibit             | i                      | Inhibit             | i            | Inhibit             |
| 20  | D                     | Save data           | D       | Safe data           | D                      | Save data           | D            | Save data           |
|     | V                     | ACFAIL              |         |                     |                        |                     |              |                     |
| 22  | T                     | Current sharing     | T       | Current sharing     | T                      | Current sharing     | T            | Current sharing     |
| 24  | ⊕                     | Protective earth    | ⊕       | Protective earth    | ⊕                      | Protective earth    | ⊕            | Protective earth    |
| 26  | Vi+                   | Input               | Vi+     | Input               | Vi+                    | Input               | Vi+          | Input               |
| 28  |                       |                     |         |                     | Vi+                    |                     | Vi+          |                     |
| 30  | Vi-                   | Input               | Vi-     | Input               | Vi-                    | Input               | Vi-          | Input               |
| 32  |                       |                     |         |                     | Vi-                    |                     | Vi-          |                     |

## Mechanical data

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



## Accessories

Front panels 19" (Schroff/Intermas)

Mating H15/H15S4 connectors with screw, solder, fast-on or press-fit terminals

Connector retention facilities and code key system for connector coding

Chassis or wall mounting plates for frontal access

Universal mounting brackets for chassis or DIN-rail mounting

## Pin allocation

