



## DCR60 RAILWAY DC/DC CONVERTER

### SERIES DCR60

The DCR60 series consists of PWM DC-DC converters, with a galvanic isolation between input and output. The converters operate at a fixed switching frequency and use push-pull converter topology.

Voltage feedback is performed by transferring the error signal from the output to the primary side through an optocoupler, where the PWM circuit changes the pulse width as required to keep the voltage output stable.

For maximum regulation, the remote sensing terminals can be connected to the load. This will allow a power cable voltage drop of up to 0.3 V on each cable to be offset.

The device is protected against overload and short-circuit by means of a current limiting circuit.

The device is also protected against reverse polarity input voltage, and the input fuse blows if an improper connection is made.

When a converter input undervoltage condition occurs, the converter is disabled, thus preventing the battery from becoming totally discharged.



High frequency technology



Light weight, compact size



Full electronic protection



Extended temperature range



Convection Cooling (no Fan)

### APPLICATIONS

- Railway Applications
- Transportation
- Mining
- Oil Rigs
- Military Applications
- Marine / Automotive / RV
- Electric Utilities and Substations
- Telecom Power Plants
- Manufacturing Locations
- Steel Mills
- Industrial Controls
- OEM Applications

### FEATURES

- Designed according to EN50155
- Fire and smoke: EN45545-2 approved
- Switching frequency: 140KHz
- High input-output isolation
- Adjustable output voltage
- Remote sensing
- Output voltage presence LED
- Protection against overloads and short-circuits
- Protection against input undervoltage

## SPECIFICATIONS

|        | 24Vin<br>14,4V ... 30V<br>16,8V ... 30V <sup>(1)</sup> | 36Vin<br>21,6V ... 47V<br>25,2V ... 47V <sup>(1)</sup> | 48Vin<br>28,8V ... 60V<br>33,6V ... 60V <sup>(1)</sup> | 72Vin<br>43,2V ... 90V<br>50,4V ... 90V <sup>(1)</sup> | 110Vin<br>66V ... 144V<br>77V ... 144V <sup>(1)</sup> |
|--------|--|--|--|--|---|
| 5Vout  | <b>DCR60-24-5</b><br>50W 78%                           | <b>DCR60-36-5</b><br>50W 78%                           | <b>DCR60-48-5</b><br>50W 79%                           | <b>DCR60-72-5</b><br>50W 79%                           | <b>DCR60-110-5</b><br>50W 80%                         |
| 12Vout | <b>DCR60-24-12</b><br>60W 83%                          | <b>DCR60-36-12</b><br>60W 83%                          | <b>DCR60-48-12</b><br>60W 84%                          | <b>DCR60-72-12</b><br>60W 84%                          | <b>DCR60-110-12</b><br>60W 85%                        |
| 16Vout | <b>DCR60-24-16</b><br>60W 83%                          | -  | -  | -  | <b>DCR60-110-16</b><br>60W 85%                        |
| 24Vout | <b>DCR60-24-24</b><br>60W 84%                          | <b>DCR60-36-24</b><br>60W 84%                          | <b>DCR60-48-24</b><br>60W 85%                          | <b>DCR60-72-24</b><br>60W 85%                          | <b>DCR60-110-24</b><br>60W 85%                        |
| 48Vout | <b>DCR60-24-48</b><br>60W 85%                          | <b>DCR60-36-48</b><br>60W 85%                          | <b>DCR60-48-48</b><br>60W 85%                          | <b>DCR60-72-48</b><br>60W 85%                          | <b>DCR60-110-48</b><br>60W 85%                        |

| Input  |   |
|--|---|
| Input voltage range                                      | See table                                       |
| Maximum input ripple                                     | 15% Vin nom (EN50155)                           |
| Output   |   |
| Output voltage range                                     |   |
| V <sub>imin</sub> >60% V <sub>i</sub> nom                | -10% ... +0% V <sub>o</sub> nom                 |
| V <sub>imin</sub> >70% V <sub>i</sub> nom <sup>(1)</sup> | -10% ... +15% V <sub>o</sub> nom <sup>(1)</sup> |
| Line regulation (I <sub>o</sub> = nom)                   | <0.2%   |
| Load regulation (V <sub>in</sub> = nom)                  | <0.2%   |
| Ripple   | < 50 mVpp                                       |
| Noise (BW = 20MHz)                                       | < 100 mVpp                                      |
| Maximum remote sensing                                   | 0,3V / pole                                     |
| Environmental  |   |
| Storage temperature                                      | -40°C ... 85°C                                  |
| Operating temperature full load                          | -25°C ... 60°C<br>(-40°C ... 60°C, see note-1)  |
| Operating temperature 75% load                           | -25°C ... 70°C<br>(-40°C ... 70°C, see note-1)  |
| Maximum Relative humidity                                | 95% without condensation                        |
| Shock and vibration                                      | EN61373 Category 1 class B body mounted         |
| MTBF   | 650.000h @ 40°C according to IEC61709           |

| EMC                                  |                           |
|--------------------------------------|---------------------------|
| Immunity according to                | EN61000-6-2 / EN50121-3-2 |
| Emissions according to               | EN61000-6-3 / EN50121-3-2 |
| Safety                               |                           |
| Safety according to                  | EN60950, EN50155          |
| Dielectric strength: Input / output  | 3000Vac, 4200Vdc 1min.    |
| Dielectric strength: Output / ground | 1500Vac, 2100Vdc 1min.    |
| Dielectric strength: Input / ground  | 1500Vac, 2100Vdc 1min.    |
| Fire and smoke                       | EN45545-2:2013 + A1:2015  |
| Mechanical                           |                           |
| Weight                               | 500 g                     |
| Dimensions                           | 127 x 84.5 x 40mm         |
| Protections                          |                           |
| Against overloads and short-circuits | Current limiting          |
| Against reverse input voltage        | Input fuse                |
| Against input under-voltage          | Under-voltage lock-out    |
| Against Input over-currents          | Input fuse                |

Note-1: The unit can start up and work at an ambient temperature of -40°C with the following restrictions:

- 1) Do not handle the connection terminals below -25°C.
- 2) The output ripple can rise up to 150mVpp at -40°C

