

22. APPLICATION NOTES

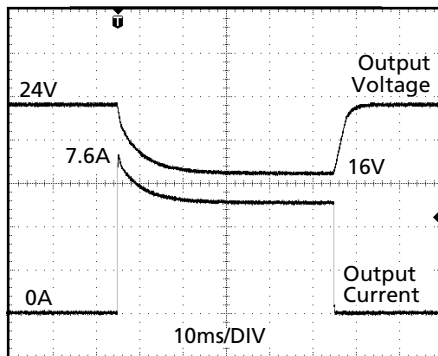
22.1. PEAK CURRENT CAPABILITY

Solenoids, contactors and pneumatic modules often have a steady state coil and a pick-up coil. The inrush current demand of the pick-up coil is several times higher than the steady-state current and usually exceeds the nominal output current (including the PowerBoost). The same situation applies, when starting a capacitive load.

Branch circuits are often protected with circuit breakers or fuses. In case of a short or an overload in the branch circuit, the fuse needs a certain amount of over-current to trip or to blow. The peak current capability ensures the safe operation of subsequent circuit breakers.

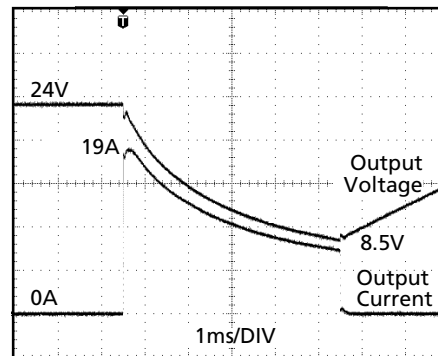
Assuming the input voltage is turned on before such an event, the built-in large sized output capacitors inside the DC/DC converter can deliver extra current. Discharging this capacitor causes a voltage dip on the output. The following two examples show typical voltage dips:

Fig. 22-1 Peak loading with 2x the nominal current for 50ms, typ.



Peak load 7.6A (resistive load) for 50ms
Output voltage dips from 24V to 16V.

Fig. 22-2 Peak loading with 5x the nominal current for 5ms, typ.



Peak load 19A (resistive load) for 5ms
Output voltage dips from 24V to 8.5V.

22.2. BACK-FEEDING LOADS

Loads such as decelerating motors and inductors can feed voltage back to the DC/DC converter. This feature is also called return voltage immunity or resistance against Back- E.M.F. (Electro Magnetic Force).

This DC/DC converter is resistant and does not show malfunctioning when a load feeds back voltage to the DC/DC converter. It does not matter, whether the DC/DC converter is on or off.

The maximum allowed feed-back-voltage is 30Vdc. The absorbing energy can be calculated according to the built-in large sized output capacitance which is specified in chapter 5.

22.3. INDUCTIVE AND CAPACITIVE LOADS

The unit is designed to supply any kind of loads, including unlimited capacitive and inductive loads.

22.4. EXTERNAL INPUT PROTECTION

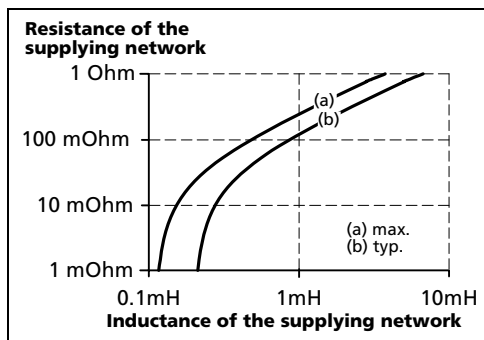
The unit is tested and approved for branch circuits up to 50A. An external protection is only required, if the supplying branch has an ampacity greater than this. Check also local codes and local requirements. In some countries local regulations might apply.

If an external fuse is necessary or utilized, minimum requirements need to be considered to avoid nuisance tripping of the circuit breaker. A minimum value of 10A B- or 8A C-Characteristic breaker should be used.

22.5. REQUIREMENTS FOR THE SUPPLYING SOURCE

In certain circumstances, the input filter of the DC/DC converter can show a resonant effect which is caused by the supplying network. Especially when additional external input filters are utilized, a superimposed AC voltage can be generated on the input terminals of the DC/DC converter which might cause a malfunction of the unit. Therefore, additional input filters are not recommended. To avoid the resonant effects, the minimal resistance of the supplying network which depends on the inductance of the input network, shall be above the boundary curve in Fig. 22-3.

Fig. 22-3 External input filter requirements to avoid filter instabilities



22.6. PARALLEL USE TO INCREASE OUTPUT POWER

This DC/DC-converter is designed to meet the NEC Class 2 requirements. Do not use in parallel to increase the output current. This would increase the output current and violates the NEC Class 2 limitations. Use CD5.241 or CD5.241-S1.

22.7. PARALLEL USE FOR REDUNDANCY

This DC/DC-converter is designed to meet the NEC Class 2 requirements. Do not use in parallel for redundancy. This would increase the output current and violates the NEC Class 2 limitations. Use CD5.241 or CD5.241-S1.

22.8. SERIES OPERATION

This DC/DC-converter is designed to meet the NEC Class 2 requirements. Do not use in series to increase the output voltage. This would increase the output power for the NEC Class 2 circuit and violates the NEC Class 2 limitations. Use CD5.241 or CD5.241-S1.

22.9. CHARGING OF BATTERIES

This DC/DC converter can not be used to charge batteries. The output voltage is not adjustable.

22.10. USE IN A TIGHTLY SEALED ENCLOSURE

When the DC/DC converter is installed in a tightly sealed enclosure, the temperature inside the enclosure will be higher than outside. In such situations, the inside temperature defines the ambient temperature for the DC/DC converter.

The following measurement results can be used as a reference to estimate the temperature rise inside the enclosure.

The DC/DC converter is placed in the middle of the box, no other heat producing items are inside the box

Enclosure:	Rittal Typ IP66 Box PK 9516 100, plastic, 110x180x165mm
Load:	24V, 3A; (=80%) load is placed outside the box
Input:	24Vdc
Temperature inside enclosure:	37.7°C (in the middle of the right side of the DC/DC converter with a distance of 2cm)
Temperature outside enclosure:	22.2°C
Temperature rise:	15.5K

22.11. MOUNTING ORIENTATIONS

Mounting orientations other than input terminals on the bottom and output on the top require a reduction in continuous output power or a limitation in the max. allowed ambient temperature. The amount of reduction influences the lifetime expectancy of the DC/DC converter. Therefore, two different derating curves for continuous operation can be found below:

Curve A1 Recommended output current.

Curve A2 Max allowed output current (results in approximately half the lifetime expectancy of A1).

Fig. 22-4
Mounting Orientation A
(Standard orientation)

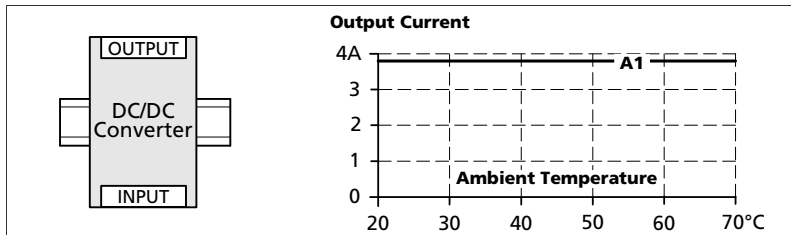


Fig. 22-5
Mounting Orientation B
(Upside down)

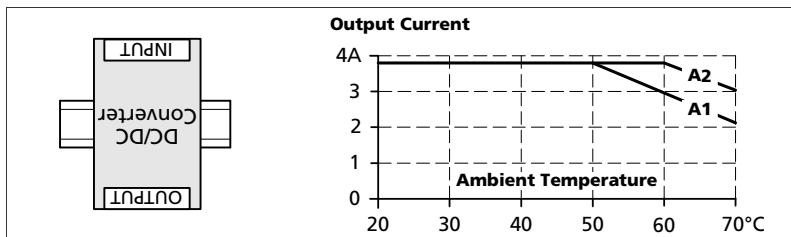


Fig. 22-6
Mounting Orientation C
(Table-top mounting)

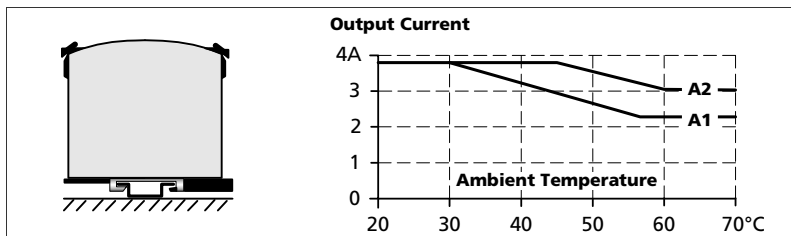


Fig. 22-7
Mounting Orientation D
(Horizontal cw)

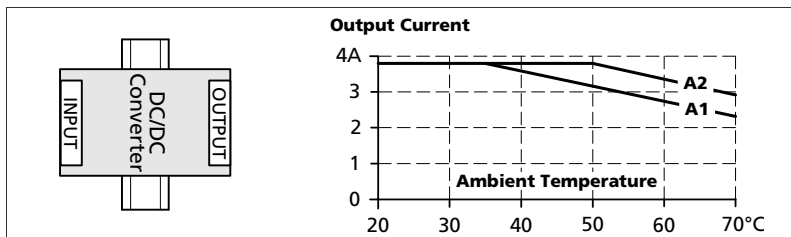


Fig. 22-8
Mounting Orientation E
(Horizontal ccw)

