

# DC/DC Ultra Wide Input Converter ECU 150 Watt Series



DC/DC converter module with input to output isolation of 1500 VDC • Pi-filter at input • Continuous short circuit proof • High efficiency • Low output ripple and noise • Low silhouette • External output voltage adjust • Inhibit on/off control • Half brick case

DC/DC Konverter-Modul mit galvanischer Trennung Eingang / Ausgang von 1500 VDC • Pi-Filter am Eingang • Dauerkurzschlussfest • Hoher Wirkungsgrad • Gute Werte von Rippel und Noise • Geringe Bauhöhe • Externer Ausgangsspannungsabgleich • Inhibit • Half brick Gehäuse

Module convertisseur DC/DC avec séparation galvanique entrée/sortie 1500 VDC • Filtre d'entrée • Protection contre courts-circuits permanents • Rendement élevé • Très faible ondulation résiduelle de sortie • Hauteur réduite • Ajustement externe de la tension de sortie • Fonction inhibiter • Boîtier au format "half brick"

| Product range |               |             | Typenübersicht                 |         |             | Sommaire des types |                       |                 |
|---------------|---------------|-------------|--------------------------------|---------|-------------|--------------------|-----------------------|-----------------|
| Model         | Input nominal | Input range | Input current max. @ full load | No Load | Output Uout | Output Iout max.   | Operating temperature | Efficiency typ. |
| ECU24-3V3150  | 24 VDC        | 9...36 VDC  | 4741 mA                        | 200 mA  | 3.3 VDC     | 30.00 A            | For all models:       | 87%             |
| ECU24-5V0150  | 24 VDC        | 9...36 VDC  | 7022 mA                        | 200 mA  | 5.0 VDC     | 30.00 A            | -40...+100°C          | 89%             |
| ECU24-12150   | 24 VDC        | 9...36 VDC  | 6944 mA                        | 100 mA  | 12.0 VDC    | 12.50 A            | case temperature      | 90%             |
| ECU24-15150   | 24 VDC        | 9...36 VDC  | 6944 mA                        | 100 mA  | 15.0 VDC    | 10.00 A            | see derating          | 90%             |
| ECU24-24150   | 24 VDC        | 9...36 VDC  | 7022 mA                        | 100 mA  | 24.0 VDC    | 6.50 A             | specification         | 89%             |
| ECU48-3V3150  | 48 VDC        | 18...72 VDC | 2371 mA                        | 100 mA  | 3.3 VDC     | 30.00 A            | on page 4             | 87%             |
| ECU48-5V0150  | 48 VDC        | 18...72 VDC | 3511 mA                        | 100 mA  | 5.0 VDC     | 30.00 A            |                       | 89%             |
| ECU48-12150   | 48 VDC        | 18...72 VDC | 3472 mA                        | 50 mA   | 12.0 VDC    | 12.50 A            |                       | 90%             |
| ECU48-15150   | 48 VDC        | 18...72 VDC | 3472 mA                        | 50 mA   | 15.0 VDC    | 10.00 A            |                       | 90%             |
| ECU48-24150   | 48 VDC        | 18...72 VDC | 3511 mA                        | 50 mA   | 24.0 VDC    | 6.50 A             |                       | 89%             |

**ECU 48 - 05 150 x**

Product Series

Nominal Input Voltage

Nominal Output Voltage  
(3V3 = 3.3V)

Output Power in Watts

blank = Positive logic inhibit on/off  
N = Negative logic inhibit on/off

## Specifications

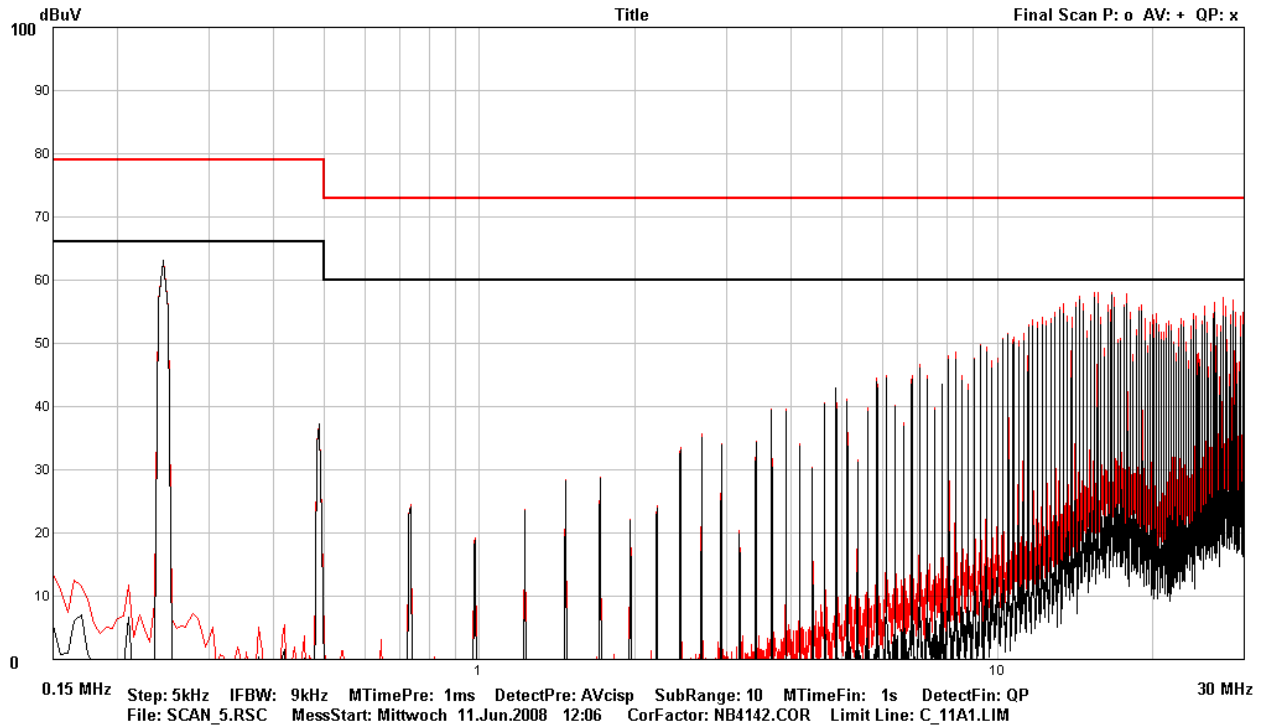
## Spezifikationen

## Spécifications

All values refer to an ambient temperature of 25°C and nominal rated values where nothing else is specified

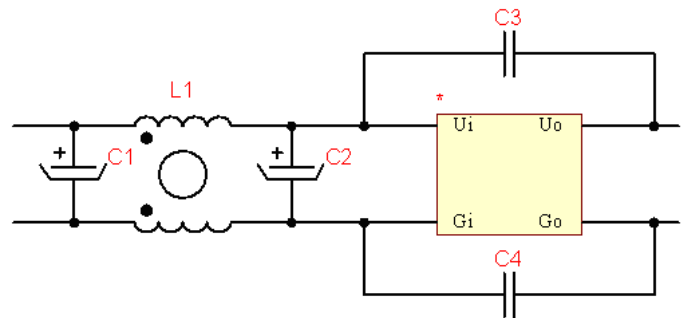
|  |   |  |  |
|--|---|--|--|
| Output voltage accuracy                      | Ausgangsspannungsgenauigkeit                  | Précision de la tension de sortie                    | ±1.5% of Uout nom.   |
| Ext. output voltage adjustment               | Ext. Ausgangsspannungsabgleich                | Ajustement ext. de la tension de sortie              | ±10%   |
| Transient Response                           | Sprungcharakteristik                          | Réponse en transitoires                              | 25% step load change < 500u sec.   |
| Residual output ripple and noise [BW 20 MHz] | Ausgangsspannungsrippel und Noise [BW 20 MHz] | Ondulation résiduelle et bruit de sortie [BW 20 MHz] | 3.3/5.0V 40mV RMS, max.<br>100mVpp, max.<br>12/15V 60mV RMS, max.<br>150mVpp, max.<br>24V 100mV RMS, max.<br>240mVpp, max. |
| Short circuit protection                     | Kurzschlussfestigkeit                         | Protection court-circuits                            | continuous   |
| Line regulation (Umax...Umin)                | Leitungsregulierung (Umax...Umin)             | Régulation ligne (Umax...Umin)                       | ±0.2% max. @ Iout nom.   |
| Load regulation (100...0%)                   | Lastregulierung (100...0%)                    | Régulation charge (100...0%)                         | ±0.2% max.   |
| Isolation voltage                            | Isolationsspannung                            | Tension d'isolement                                  | Input/Output 1500VDC<br>Input/Case 1500VDC<br>Output/Case 1500VDC  |
| Isolation resistance                         | Isolationswiderstand                          | Résistance d'isolement                               | > 10 MOhm  |
| Switching frequency                          | Schaltfrequenz                                | Fréquence de découpage                               | typ. 300 kHz   |
| MTBF (MIL-HB 217E at 25°C)                   | MTBF (MIL-HB 217E bei 25°C)                   | MTBF (MIL-HB 217E à 25°C)                            | >1'000'000 hrs.  |
| EMC<br>Conducted and radiated                | EMV<br>Leitungsgebunden und abgestrahlt       | EMC<br>Emis et conduit                               | EN55022/11 Class A<br>with external input capacitor  |
| Temperature coefficient                      | Temperaturkoeffizient                         | Coefficient de température                           | typ. ±0.03%/K  |
| Operating case temperature                   | Gehäusetemperatur bei Betrieb                 | Température du boîtier                               | -40...+100°C   |
| Storage temperature                          | Lagertemperatur                               | Température de stockage                              | -40...+105°C   |
| Thermal shutdown range                       | Thermische Abschaltung                        | Coupure thermique                                    | Tcase 110°C  |
| Current Limit                                | Strombegrenzung                               | Limitation du courant                                | 110...160% Nominal output  |
| Over voltage protection                      | Überspannungsschutz                           | Protection contre surtension                         | 115...140% Vo nom.   |
| Undervoltage lockout                         | Unterspannungsverhalten                       | Blocage de sous-tension                              | @ 24V up 8.8V; down 8.0V<br>@ 48V up 17V; down 16V   |
| Case material                                | Gehäusematerial                               | Matériaux du boîtier                                 | Plastic / Aluminium  |
| Soldering information                        | Lötinformationen                              | Prescriptions de soudage                             | 275°C for 10 sec.  |
| Weight                                       | Gewicht                                       | Poids  | approx. 100 g  |

## EMC information EN55022/11 Class A



## Filter

| Used Parts: |  |
|-------------|--|
| C1          | 220 $\mu$ F / 50V Rubycon 50ZL220M10X16    |
| C2          | 220 $\mu$ F / 50V Rubycon 50ZL220M10X16    |
| C3          | 680 pF / 2kV Vishay 228271214616           |
| C4          | 680 pF / 2kV Vishay 228271214616           |
| L1          | B64290-L45-X830 with 2 x 9 windings 1.1 mm |



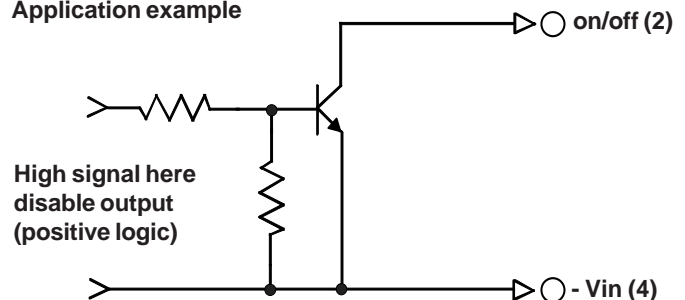
## Inhibit on/off control

The ECU 150 allows the user to switch the module on and off electronically by inhibit on/off feature. The converters are available in "positive logic" or "negative logic" (option) versions for inhibit on/off.

## Logic table

| Logic state (Pin 2) | Negative logic* | Positive logic |
|---------------------|-----------------|----------------|
| Logic low           | Module on       | Module off     |
| Logic high          | Module off      | Module on      |

## Application example

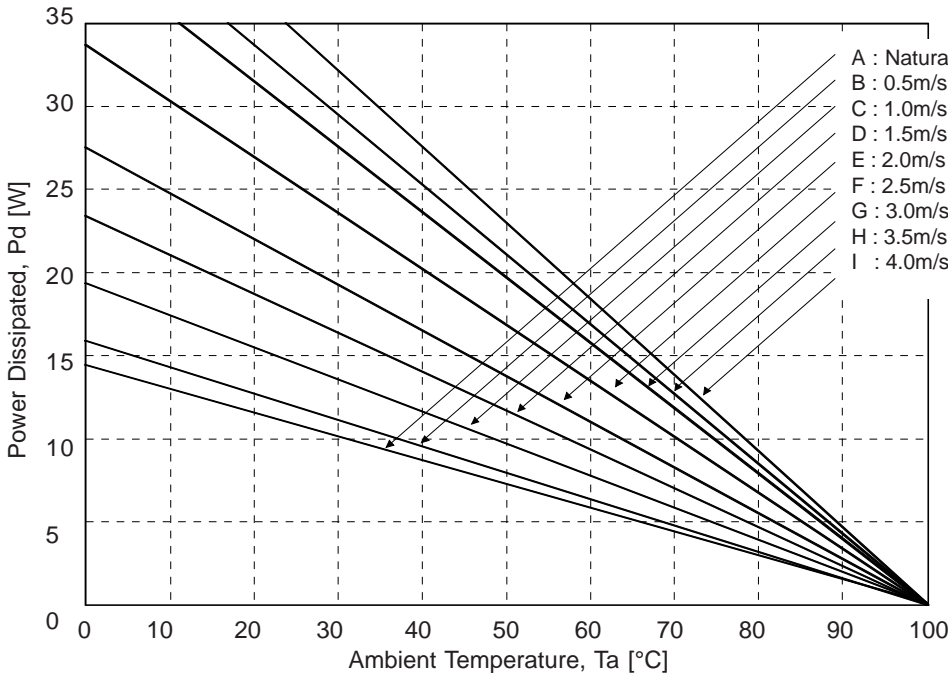


\* Suffix "N" to the model number with active low inhibit on /off

# Derating ECU 150 Watt Series

The operating case temperature range of ECU 150 series is -40°C to +100°C. When operating the ECU 150 series, proper derating or cooling is needed. The following curves are the derating curves of ECU 150 without and with heat sink. Please note that these are relative values in a test environment. Ambient temperature can not be exactly defined in an application, only the case temperature.

## Without Heat Sink: Power Dissipated vs Ambient Temperature and Air Flow



### Remark:

Fabrimex recommends a free space of at least half the converter length above the converter at natural air flow. For the ECW 150 Watt this equals to:

Free space = 30.5mm min.

Where:

The Power Dissipation (Pd):  

$$Pd = Pi - Po = Po * (1 - \eta) / \eta$$

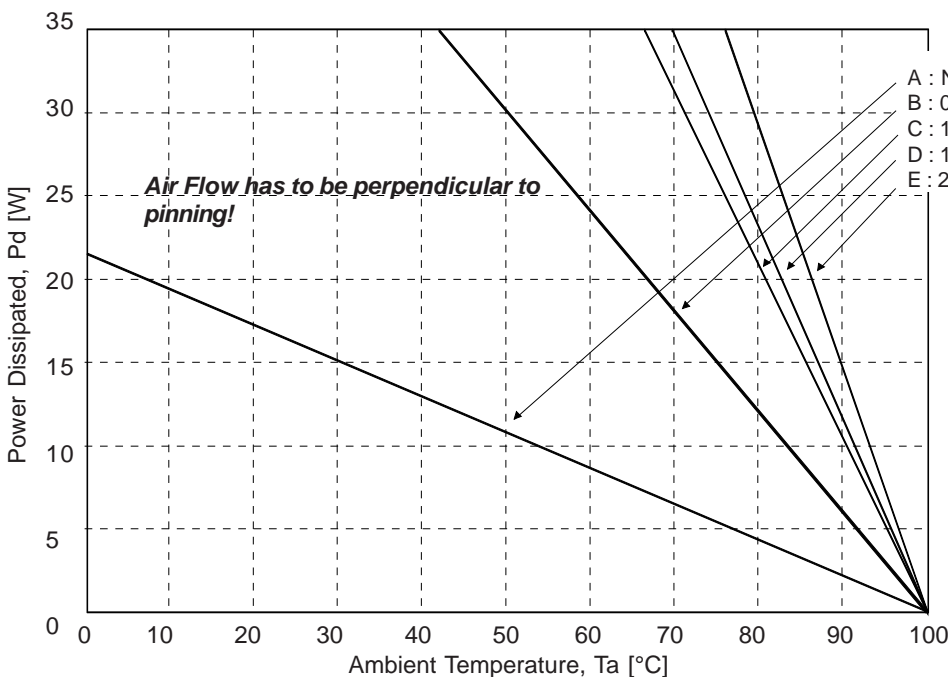
The temperature rise (delta T):  

$$\Delta T = Pd * Rca$$

The thermal resistances with out heat sink are listed below:

| air flow rate             | typical Rca |
|---------------------------|-------------|
| natural convection 0.1m/s | 7.12 K/W    |
| 0.5m/s                    | 6.21 K/W    |
| 1.0m/s                    | 5.17 K/W    |
| 1.5m/s                    | 4.29 K/W    |
| 2.0m/s                    | 3.64 K/W    |
| 2.5m/s                    | 2.96 K/W    |
| 3.0m/s                    | 2.53 K/W    |
| 3.5m/s                    | 2.37 K/W    |
| 4.0m/s                    | 2.19 K/W    |

## With Heat Sink FH-6158-13: Power Dissipated vs Ambient Temperature; Height: 12.7mm

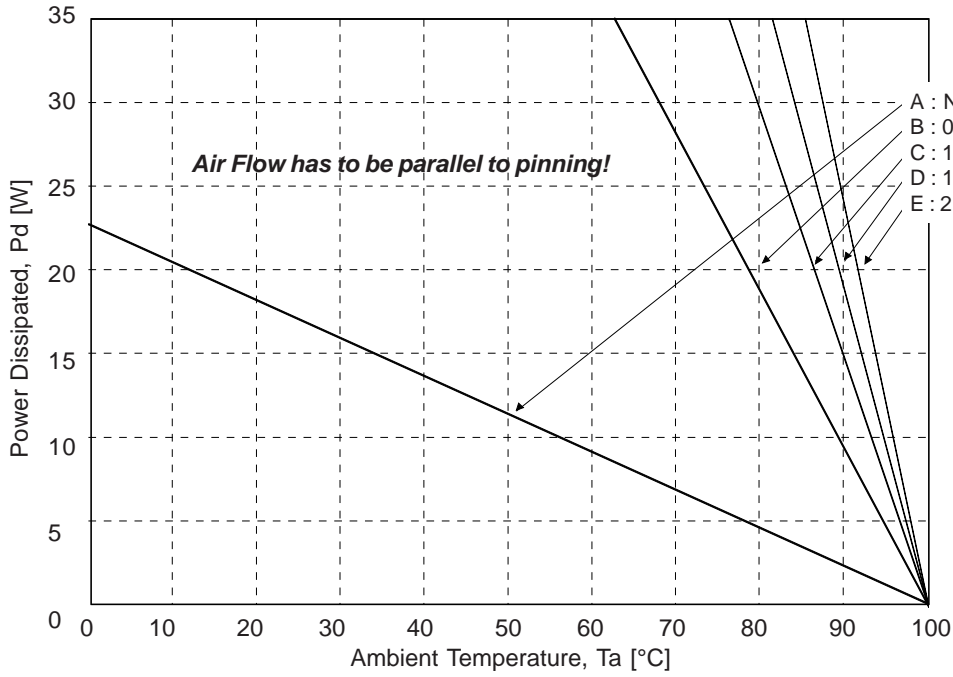


### Remark:

Fabrimex recommends a free space of at least half the heat sink height above the heat sink at natural air flow. For the FH-6158-13 this equals to:

Free space = 6.5mm min.

**With Heat Sink FH-5861-21: Power Dissipated vs Ambient Temperature; Height: 21mm**

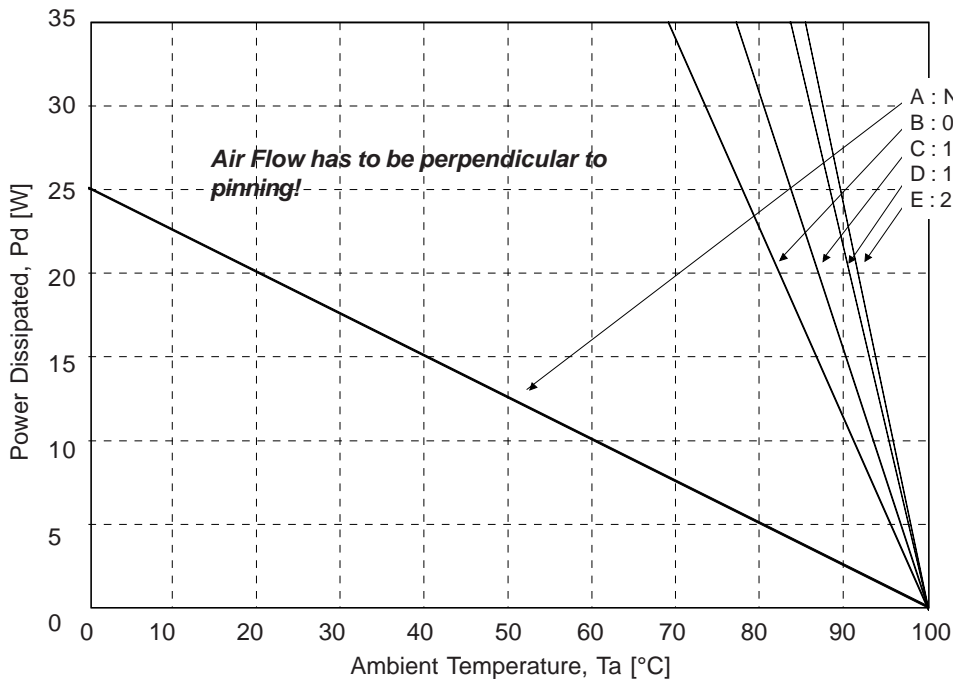


**Remark:**

Fabrimex recommends a free space of at least half the heat sink height above the heat sink at natural air flow. For the FH-5861-21 this equals to:

Free space = 10.5mm min.

**With Heat Sink FH-6158-25: Power Dissipated vs Ambient Temperature; Height: 25.4mm**

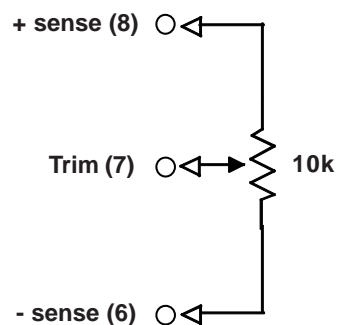
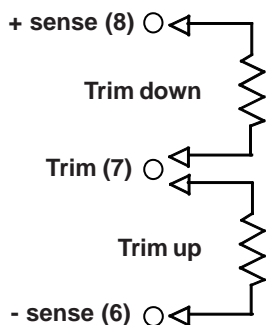


**Remark:**

Fabrimex recommends a free space of at least half the heat sink height above the heat sink at natural air flow. For the FH-6158-25 this equals to:

Free space = 12.5mm min.

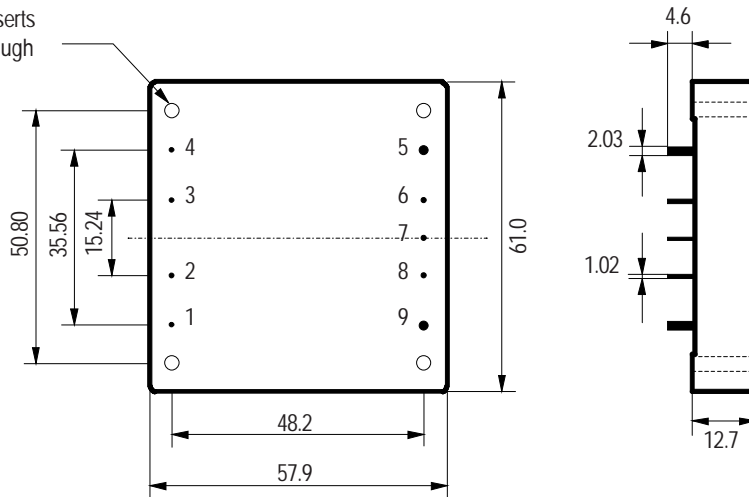
**External output trim**



View from bottom; Normal tolerance 1/10 ±0.5 mm, 1/100 ±0.25 mm; Pin tolerance ±0.5 mm diameter

### HALF BRICK CASE

Mounting Inserts  
M3 x 0,5 trough



Bottom view

| Pin | Function |
|-----|----------|
| 1   | + Vin    |
| 2   | on/off   |
| 3   | case     |
| 4   | - Vin    |
| 5   | - Vout   |
| 6   | - sense  |
| 7   | trim     |
| 8   | + sense  |
| 9   | + Vout   |

### Cleaning

The modules are cleanable with the today's known and in the electronics industry usually used products.

Due to the different cleaning processes and new available products, we highly recommend to do a compatibility test when using the converters the first time.

### Waschen

Die Module sind waschbar mit den heute bekannten und in der Elektronikindustrie üblichen Reinigungsmitteln.

Bedingt durch die verschiedenen Reinigungsprozesse und neu auf den Markt kommende Mittel, raten wir dringend beim Ersteinsatz der Konverter eine Verträglichkeitsprüfung vorzunehmen.

### Lavage

Les modules sont généralement lavables avec les solvants couramment utilisés dans l'industrie électronique.

En fonction de la diversité des processus de lavage disponibles sur le marché, il est recommandé de faire, avant la première utilisation, un test de compatibilité.

**Notice:** All statements, technical information, and recommendations related to FABRIMEX's products are based on information believed to be reliable, but the accuracy or completeness thereof is not guaranteed. Before utilizing the product, the user should determine the suitability of the product for its intended use.

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