



# 100BASE-T1 MEDIACONVERTER BCM

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## USER MANUAL

July 2020

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# 1 GENERAL INFORMATION

## 1.1 Functionality and Features of the 100BASE-T1 MediaConverter\_BCM



Figure 1-1: 100BASE-T1 MediaConverter\_BCM

The Technica Engineering 100BASE-T1 MediaConverter\_BCM transmits data frames directly from the physical layer BroadR-Reach (100BASE-T1) to Fast Ethernet (100BASE-TX) with constant delay time of 2.0 $\mu$ s.

### 1.1.1 Features

- 1 port BroadR-Reach (100BASE-T1) Ethernet with Broadcom BCM89810 Transceiver
- 1 port Fast Ethernet (100BASE-TX)
- Automotive Tyco MQS Connector for 100BASE-T1 and power supply
- Robust steel case
- DIP Switches for easy configuration

## 1.1.2 General Information

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Voltage requirement:	8 to 16 Volt DC (nominal 12 Volt DC)
Power consumption:	2 Watt
Size:	92 x 63 x 30 mm
Weight:	0,2 kg
International Protection:	IP 2 0
Operating temperature:	-40° to +80 °Celsius

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## 1.1.3 LINKS

The User can download the latest firmware and documentation for the 100BASE-T1 MediaConverter\_BCM here:

[https://technica-engineering.de/en/produkt/100base-t1-mediaconverter\\_bcm/](https://technica-engineering.de/en/produkt/100base-t1-mediaconverter_bcm/)

## 1.1.4 General operating and safety strategy of Technica Engineering's Products

Technica Engineering's products are designed for operation in automotive systems and for supply voltages of nominal 12 V or 24 V. The applicable limit values adhere to the standard norms for 12 V or 24 V automotive onboard power systems correspondingly and can be found in the mentioned norms.

Should Technica Engineering's products be operated in voltage ranges beyond those specified in the norms, which represents a breach of the conditions of operation, then this will void the product warranty and Technica Engineering will assume no liability whatsoever of the results and/or consequences thereof.

This is especially valid whenever the voltage level reaches or exceeds the limits of the low-voltage directive. In this case, damage to the devices cannot be excluded. Due to the manufacturing characteristics of the devices, there is no imminent fire hazard from the device itself, if the devices are being operated in an environment according to the conditions of use. A secondary fire hazard cannot be excluded, should those conditions not be met. A protection against overvoltage cannot be provided in such a breach of the conditions of use.




## 1.1.5 General design rules for the power supply of Technica Engineering's products





The power supply circuit of Technica Engineering's products are equipped with self-protection components. This automatic function protects the devices against excessive temperature and too high supply-voltage by switching the device off. This automatic switch-off function is independent of any software function.


The root-cause of excessive temperature in the power supply circuit can eventually be due to a too high environment temperature or due to an internal failure of the device. In both cases, the automatic switch-off function will switch-off the power supply from the device to avoid further damage.

The protection against too high supply-voltage protects the device even in case of an internal failure of the Technica Engineering device.

## 1.2 Warranty and Safety Information

	<p>Before operating the device, read this manual thoroughly and retain it for your reference.</p> <p>The latest documentation for the 100BASE-T1 Media Converter BCM can be downloaded here:  <a href="https://technica-engineering.de/en/produkt/100base-t1-mediaconverter-bcm/">https://technica-engineering.de/en/produkt/100base-t1-mediaconverter-bcm/</a></p>
	<p>Use the device only as described in this manual.</p> <p>Use only in dry conditions.</p> <p>Do not insert any foreign object in the slots/openings of the housing.</p> <p>Do not apply power to a damaged device.</p> <p>The device may only be used by specialists.</p>
	<p>Do not open the device. Otherwise warranty will be lost.</p>

	<p>This product is intended for use in automobiles or automotive-like environments. An automotive-like environment includes test setups or test benches in the office, laboratory and workshop areas. In the test setups the same environmental conditions apply as in vehicle electrical systems. Technica Engineering products are not intended to be used as standard IT equipment. The test systems and products from Technica Engineering are designed as customer and application-specific test modules that are only used by specialists for development and test facilities.</p> <p>When integrating the modules in a vehicle or test set-up, the user must ensure appropriate ventilation or air convection.</p> <p>Technica Engineering products must not be considered as a safety element out of context when using safety-critical systems and must be included in the safety assessment when used. The development class in a safety system must be taken into account with standard QM referred to ISO26262.</p>
	<p> The device can get hot.</p> <p>Do not cover the device due to fire danger.</p> <p>Do not place the device near to highly flammable materials due to fire danger.</p> <p>Do not use the device above the specified operating temperature.</p> <p>The operating temperature is the ambient temperature of the installation space.</p>
	<p>This symbol is only valid in the European Union. If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal. Technica Engineering GmbH is registered as manufacturer of the brand "Technica Engineering" and the device type "Small devices of Information- and Telecommunications- technology for exclusive use in non-private Households". WEEE reg. No. DE 20776859</p>

 The CE mark, consisting of a large 'C' and a large 'E' in a bold, black, sans-serif font.	Please refer to <a href="#">CHAPTER 10</a> for the EU Declaration of Conformity in accordance with Directive 2014/30/EU.
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### 1.3 RoHS Certificate of Compliance

Technica Engineering's 100BASE-T1 MediaConverter BCM complies with RoHS (Restriction of Hazardous Substances Directive) Certificate of Compliance.

### 1.4 Scope of Delivery

The delivery includes:

- 1x 100BASE-T1 MediaConverter BCM
- 1x 1m Ethernet Cable
- 1x Black MQS Connector
- 1x 1m 100BASE-T1 Cable
- MQS crimp contacts

## 2 HARDWARE INTERFACES

### 2.1 Connectors

On the label on top of the device you can see an overview about all HW interfaces of the 100BASE-T1 MediaConverter\_BCM.

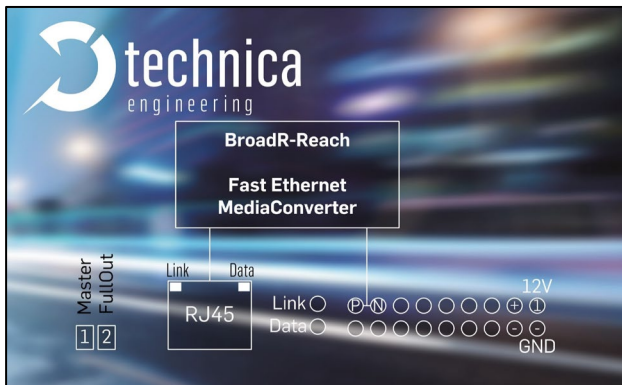


Figure 2-1: Label of 100BASE-T1 MediaConverter\_BCM

#### 2.1.1 Black MQS Connector

The pinning of the ECU connectors is listed on the label on top of the device as well. (See [FIGURE 2-1](#)).

The Connector color is black.

The power supply for the device is supplied by pin 1 (12 Volt) and pin 10 (Ground)



If you apply a voltage higher than 18 Volt, the device will be damaged!



The Tyco Electronics (TE) Micro Quad Lock System (MQS) is used.




Name	Picture	Part Number
Tyco, MQS Abdeckkappe 2x9 Pol, black Alternative		1-967416-1 1-1355350-1
Tyco, MQS Buchsengehäuse 2x9 Pol Alternative		965778-1 962108-2
Tyco crimp contact		928999-1

Table 1: Parts of black MQS connector

**i** You can use the official Tyco tool for these crimp contacts. A cheap variant is the crimp tool for “PSK” contacts.

Pin	Function	Pin	Function
1	Battery +12 Volt Input	10	Power Ground
2	reserved	11	reserved
3	n.c.	12	n.c.
4	n.c.	13	n.c.
5	n.c.	14	n.c.
6	n.c.	15	n.c.
7	n.c.	16	n.c.
8	100BASE-T1 port, negative	17	n.c.
9	100BASE-T1 port, positive	18	n.c.

Table 2: Pinning of black MQS connector

## 2.1.2 RJ45 Ethernet connectors

There is one RJ45 Standard Ethernet connector for Fast Ethernet (100BASE-TX).

## 2.2 Other Interfaces

### 2.2.1 DIP-Switches


The 100BASE-T1 MediaConverter\_BCM has two DIP switches for configuration (see [CHAPTER 3](#)).

### 2.2.2 Status LEDs

The 100BASE-T1MediaConverter\_BCM has two status LEDs at the frontside of the case for the 100BASE-T1 Port.

color	Description
<b>Green</b>	It is lit, when there is a linkup on the 100BASE-T1 port.
<b>Yellow</b>	It is toggling in alternation with the green LED when there is communication.

*Table 3: Status LEDs*



-  There is a bug in the used BroadR-Reach PHY. When the 100BASE-T1 Plus and Minus lines are swapped, and the 100BASE-T1 port is set to Slave then the Link LED is lit, but there is no data transmission possible. So please connect the 100BASE-T1 lines correctly.

### 3 CONFIGURATION OF THE DEVICE

The 100BASE-T1 MediaConverter is configured by two **DIP switches** on the front of the device.

DIP-Switch	Status	Description
1	ON (up)	100BASE-T1 Port is set to Master
	OFF (down)	100BASE-T1 Port is set to Slave
2	ON (up)	100BASE-T1 Port is set to FullOut
	OFF (down)	100BASE-T1 Port is set to HalfOut

*Table 4: Configuration of DIP-Switches*

-  In a 100BASE-T1 Link one device must be set as Master, the other must be set as Slave.
-  The 100BASE-T1 MediaConverter\_BCM should always be set to FullOut. HalfOut was a former configuration for EMC optimization but it will cause an unstable link.

## 4 STANDARD USE CASE

Here you can see a standard use case of the 100BASE-T1 MediaConverter\_BCM:

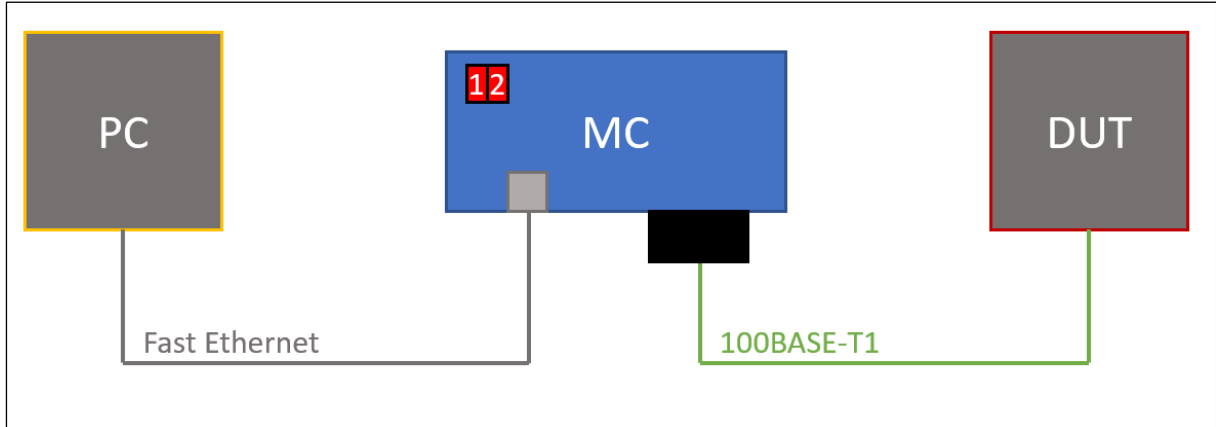


Figure 4-1: Example for use case

MC	MediaConverter
DUT	Device under Test.

**i** DIP switch 2 should be always ON, DIP switch 1 is dependent of the DUT. If DUT is Master, MC must be configured as Slave (DIP-switch 1: OFF) and vice versa.

## 5 100BASE-T1 FILTER

There are different BroadReach filters in different hardware versions of the 100BASE-T1 MediaConverter\_BCM:

The following 100BASE-T1 filter is used in the hardware version 3.0:

In Version 3.0 the Würth CMC 510010003 is used for L32.

In Version 3.0a the TDK CMC ACT45L - 2 01 - 2P is used for L32.

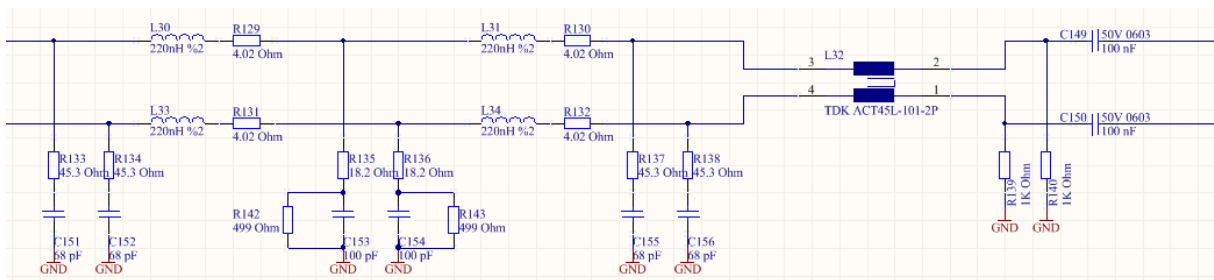


Figure 5-1: 100BASE-T1 filter for HW v3.0 and v3.0a

The following 100BASE-T1 filter is used in the hardware version 2.0:

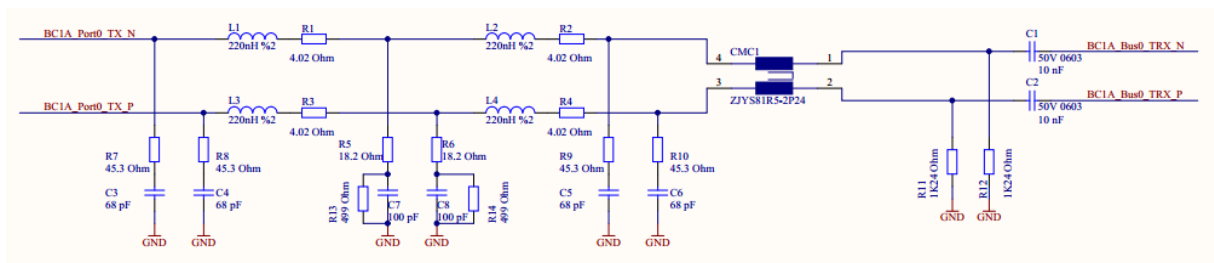


Figure 5-2: 100BASE-T1 filter for HW v2.0



All filter versions are compatible to each other and it is possible to set up a stable link. It is recommended to use the latest filter version.

## 6 ADDITIONAL INFORMATION

- The delay time is constant 2.0 $\mu$ s. The delay is independent from the ethernet packet frame size.
- The 100BASE-T1 MediaConverter\_BCM is optimized for automotive use. The maximum cable length for 100BASE-T1 segments is limited to 15 meters
- The 100BASE-T1 MediaConverter is a physical layer changer. It is independent from transmitted protocol sent on the 100BASE-T1.

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## 8 CHANGELOG

Version	Chapter	Description	Date
1.0	All	First release	
2.0	All	Second release	21.09.2018
2.1	All	Design and rework of content	25.02.2019
2.2	4	Chapter added	29.04.2019
2.3	1.4	Correction of PHY name	23.03.2020
2.3	1.2	Extension of warranty and safety	23.03.2020
2.3	All	Optical adaption	23.03.2020
2.4	All	Small corrections in spelling	May 2020
2.5	1.1.4	Added information on General Operating and Safety Strategy of Technica Engineering's Products	July 2020
	1.1.5	Added information on General Design Rules for the Power Supply of Technica Engineering's Products	
	1.2	Warranty and Safety Information updated	
	1.3	RoHS Certificate of Compliance added	
	10	Declaration of conformity added	



## 9 CONTACT

If you have any questions regarding this product, please feel free to contact us:

Technica Engineering GmbH  
Leopoldstr. 236  
80807 München  
Germany

Technical support:

[support@technica-engineering.de](mailto:support@technica-engineering.de)

General information:

[Info@technica-engineering.de](mailto:Info@technica-engineering.de)

Most current user manuals and product information:

<https://technica-engineering.de/>

## 10 DECLARATION OF CONFORMITY

### Български

С настоящото Technica Engineering GmbH декларира, че продуктът Модул за улавяне 100BASE-T1 MediaConverter BCM (TE-1000), е в съответствие с Директива 2014/30/ЕС. Цялостният текст на ЕС декларацията за съответствие може да се намери на следния интернет адрес:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

### Čeština

Tímto Technica Engineering GmbH prohlašuje, že produkt 100BASE-T1 MediaConverter BCM (TE-1000), je v souladu se směrnicí 2014/30/EU. Úplné znění EU prohlášení o shodě je k dispozici na této internetové adrese:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

### Dansk

Hermed erklærer Technica Engineering GmbH, at produktet 100BASE-T1 MediaConverter BCM (TE-1000), er i overensstemmelse med Direktiv 2014/30/EU. EU-overensstemmelseserklæringens fulde tekst kan findes på følgende internetadresse:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

### Deutsch

Hiermit erklärt Technica Engineering GmbH, dass das Produkt 100BASE-T1 MediaConverter BCM (TE-1000) die Richtlinie 2014/30/EU entspricht. Der vollständige Text der EU-Konformitätserklärung ist unter der folgenden Internetadresse verfügbar:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

### Eesti

Käesolevaga deklareerib Technica Engineering GmbH, et toode hõivamismoodul 100BASE-T1 MediaConverter BCM (TE-1000), vastab direktiivi 2014/30/EL nõuetele. ELi vastavusdeklaratsiooni tselik tekst on kttesaadav jrgmisel internetiaadressil:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

### English

Hereby, Technica Engineering GmbH declares that the product 100BASE-T1 MediaConverter BCM (TE-1000), is in compliance with Directive 2014/30/EU. The full text of the EU declaration of conformity is available at the following internet address:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

### Español

Por la presente, Technica Engineering GmbH declara que el producto 100BASE-T1 MediaConverter BCM (TE-1000), es conforme con la Directiva 2014/30/UE. El texto completo de la declaración UE de conformidad está disponible en la página web siguiente:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

### Ελληνικά

Με την παρούσα ο/η Technica Engineering GmbH, ότι το προϊόν 100BASE-T1 MediaConverter BCM (TE-1000), πληροί την οδηγία 2014/30/ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρφωσης ΕΕ διατίθεται στην ακόλουθη ιστοσελίδα στο διαδίκτυο:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Français

Le soussigné, Technica Engineering GmbH, déclare que le produit 100BASE-T1 MediaConverter BCM (TE-1000), est conforme la directive 2014/30/UE. Le texte complet de la déclaration UE de conformité est disponible l'adresse internet suivante:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Hrvatski

Technica Engineering GmbH ovime izjavljuje da je proizvod 100BASE-T1 MediaConverter BCM (TE-1000) u skladu s Direktivom 2014/30/EU. Cjeloviti tekst EU izjave o sukladnosti dostupan je na sljedećoj internetskoj adresi:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Italiano

Il fabbricante, Technica Engineering GmbH, dichiara che il prodotto 100BASE-T1 MediaConverter BCM (TE-1000), conforme alla direttiva 2014/30/UE. Il testo completo della dichiarazione di conformità UE disponibile al seguente indirizzo Internet:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Latviešu

Ar šo Technica Engineering GmbH deklarē, ka produkts 100BASE-T1 MediaConverter BCM (TE-1000), atbilst Direktīvai 2014/30/ES. Pilns ES atbilstības deklarācijas teksts ir pieejams šādā interneta vietnē:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Lietuvių

Aš, Technica Engineering GmbH, patvirtinu, kad produktas sugavimo modulis 100BASE-T1 MediaConverter BCM (TE-1000), atitinka Direktyvą 2014/30/ES. Visas ES atitikties deklaracijos tekstas prieinamas šiuo internet adresu:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Magyar

Technica Engineering GmbH igazolja, hogy a termék 100BASE-T1 MediaConverter BCM (TE-1000) a 2014/30/EU irányelvnek. Az EU-megfelelőségi nyilatkozat teljes szövege elérhető a következő internetes címen:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Malti

B'dan, Technica Engineering GmbH, niddikjara li l-prodott 100BASE-T1 MediaConverter BCM (TE-1000), huwa konformi madDirettiva 2014/30/UE. It-test kollu tad-dikjarazzjoni ta' konformit ta-UE huwa disponibbli f'dan l-indirizz talInternet li ġej:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Nederlands

Hierbij verklaar ik, Technica Engineering GmbH, dat het 100BASE-T1 MediaConverter BCM (TE-1000) product voldoet aan richtlijn 2014/30/EU. De volledige tekst van de EU-conformiteitsverklaring kan worden geraadpleegd op het volgende internetadres:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Polski

Technica Engineering GmbH niniejszym oświadcza, że produkt 100BASE-T1 MediaConverter BCM (TE-1000), jest zgodny z dyrektywą 2014/30/UE. Pełny tekst deklaracji zgodności I UE jest dostępny pod następującym adresem internetowym:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Português

O(a) abaixo assinado(a) Technica Engineering GmbH declara que o produto 100BASE-T1 MediaConverter BCM (TE-1000), está em conformidade com a Diretiva 2014/30/UE. O texto integral da declaração de conformidade está disponível no seguinte endereço de Internet:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Română

Prin prezenta Technica Engineering GmbH declară ca produsul 100BASE-T1 MediaConverter BCM (TE-1000), este în conformitate cu Directiva 2014/30/UE. Textul integral al declarației UE de conformitate este disponibil la următoarea adresă internet:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Slovensko

Technica Engineering GmbH potrjuje, da je izdelek 100BASE-T1 MediaConverter BCM (TE-1000), skladen z irektivo 2014/30/EU. Celotno besedilo izjave EU o skladnosti je na voljo na naslednjem spletnem naslovu:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>

## Slovensky

Technica Engineering GmbH týmto vyhlasuje, že produkt 100BASE-T1 MediaConverter BCM (TE-1000) , je v slade so smernicou 2014/30/EÚ. Úplné EÚ vyhlásenie o zhode je k dispozícii na tejto internetovej adrese:

<https://technica-engineering.de/wp-content/uploads/2018/06/100base-t1-mediaconverter-bcm-1000-eu-declaration-of-conformity.pdf>