

# CAN-BC

Version A1.8-2 EN

## CAN bus converter



## Manual

### **Bus converter CAN-BC/C:**

- Second isolated CAN-bus interface
- M-Bus interface

### **Bus converter CAN-BC/E**

- EIB/KNX interface
- M-Bus interface

### **Bus converter CAN-BC/L**

- Second CAN bus interface with SC coupling for fibre optic cable
- M-Bus interface



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# System requirements for the UVR1611 Controller

So that the CAN bus converter can also be parameterised with the controller, the following is necessary:

- the UVR1611 controller has an operating system  $\geq$  A2.21 or
- the controller has a boot sector  $\geq$  B1.02 and a Bootloader BL232 or BL-NET to update the UVR1611 controller.

**Controllers with a boot sector < B1.02 must be returned to the factory for updating!**

Procedure for updating a UVR1611 controller to the latest version:

- 1) Download and install the program Memory Manager  $\geq$  V2.07 from the Technische Alternative home page ([www.ta.co.at](http://www.ta.co.at)).
- 2) From the TA home page download firmware  $\geq$  2.6 (BL232) or 1.28 (BL-NET) for the Bootloader and use to update the Bootloader.
- 3) Download the operating system (version  $\geq$  A2.21) from the TA home page and use to update the controller.

## Supply capacity

The UVR1611 controller makes the correct supply voltage available for most bus members - including the bus converter. No more than two devices (CAN monitor, CAN-I/O module etc.) can be supplied with each controller (UVR1611). With 3 or more devices in the CAN network, the CAN power pack is required.

## Types

There are 3 different types available; each with a standard CAN bus interface and the following additional interfaces:

### Bus converter CAN-BC/C:

- Second isolated CAN-bus interface
- M-Bus interface

### Bus converter CAN-BC/E

- EIB/KNX interface
- M-Bus interface

### Bus converter CAN-BC/L

- Second CAN bus interface with SC coupling for fibre optic cable (2 x 50/125  $\mu$ m).
- M-Bus interface

This operating manual applies for all types.

# Interface description

## Standard CAN- Bus

This is the connection to the surroundings within a controller network. For example, this could be all CAN bus members within a building, comprising UVR1611 controllers, CAN I/O modules, CAN monitors and Bootloaders. This bus and its properties are described in detail in the UVR1611 manual.

## Potential-free CAN bus with increased interference resistance

For remote connection within a controller network or network group. This could be several groups of standard CAN bus connections and/or further remote bus members such as UVR1611 controllers, Bootloaders or similar, for example in a heating system.

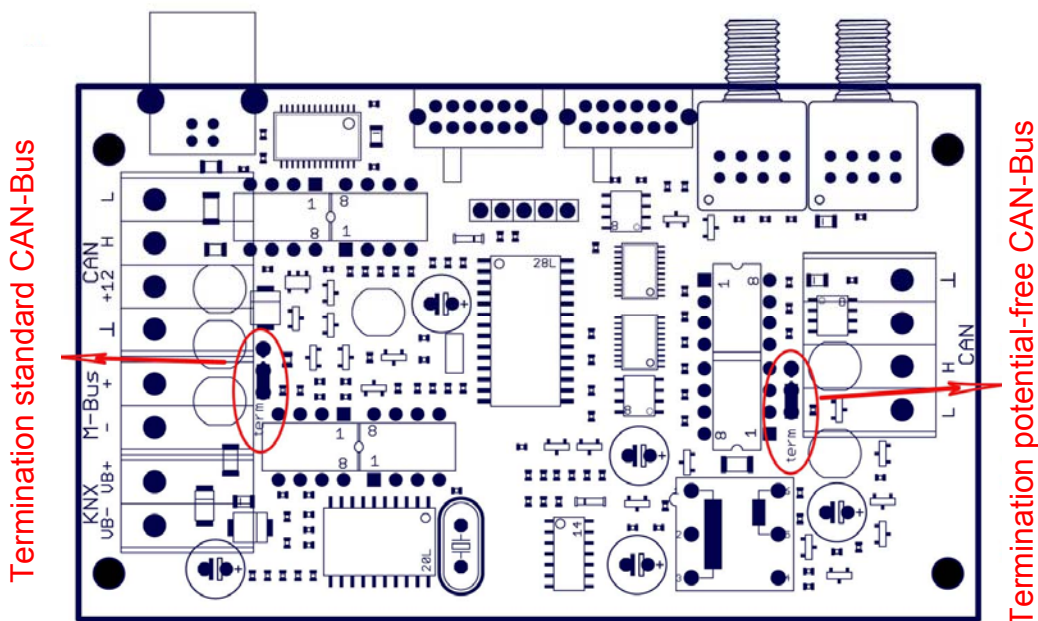
This interface is electrically isolated via an optical transmission path from the standard CAN bus.

It is also recommended that a bus converter is used with this connection on the opposite end of the cable, so that over the entire remote connection no critical electronic parts are directly connected to the bus. For such cases a sliding switch provides an option for selecting a lower data transfer rate than the usual 50 kBaud to increase the resistance to interference as well as the maximum distance.

**Notice:** Each CAN bus member is labelled with its own CAN-address (node number) from a total of 62 possible addresses. When planning the network, it should be borne in mind, that a bus converter does **not** decouple the network where data is concerned and thus the number of available node numbers is not doubled. Indeed, as a bus member, each individual converter requires its own node number, which further reduces the maximum number of active nodes. However its own number is the same on both CAN sides (standard and potential-free).

## CAN cable selection and network topology

The basics of bus cabling are likewise described in detail in the UVR1611 manual. Hence only bus terminations are considered here. Each CAN network must be provided with an 120 Ohm bus termination at the first and last network member (terminate using a jumper). Hence each CAN network always has two terminating resistances (each at the end). Spur lines or star-shaped CAN topologies are not permitted by the official specification!



## **CAN-fibre optic transmission path**

This technology represents the most interference-free remote connection. A 50/125µm multimode optical fibre with an SC connector system is used rather than copper cable. The operation of this technology is guaranteed up to a length of 300 m, has been tested in the field up to 500 m and all components are indeed designed to work to over 1000 m.

As there is an optical receiver for each optical transmitter, such transfer paths must have a bus converter on both ends. A fibre optic pair is also necessary to support bi-directional data transmission.

Fibre optic cable assembly:

The assembly of fibre optic cables can only be carried out by skilled personnel. Fibre optic cables are not easily shortened, as the cut surface must be perfectly perpendicular to the fibre axis and surface roughness on the cut surface must not exceed one micrometer. Although a single optical fibre has a diameter of just over 0.1 mm, the full assembly of a professional fibre optic cable has a diameter of some 10 mm. They are mainly supplied with two fibre pairs (second pair is redundant), have high mechanical resistance and are even rodent resistant.

The entire length is equal to the actual physical laid cable distance plus 2 m excess at each end. After laying and prior to connection, the excess length is coiled up (coil diameter no less than 200 mm) and secured using clips on a mounting plate which is secured to the wall alongside the converter. The cable can be ordered in lengths up to 100 m and can even be pulled through a cable protective tube. Above this length, skilled personnel are again needed for cable "blowing". Technische Alternative GmbH cooperates with its partner in this field, NBG Fiber - Optic GmbH, all over the globe. They manufacture the cables in the required length and to the required optical quality as well as terminating them with SC connectors. If necessary, they also provide the required skilled personnel and blowing apparatus.

## **M-Bus (measurement bus)**

The M-bus is a master-slave system with a transfer rate of 2.4 kBaud and was developed for reading data from utility meters (electricity, heat, water, gas). A single two-core cable is all that is needed for connection. The slave can draw its power from the bus. The bus converter (master) cyclically reads the values from the individual devices. As a master, this bus converter is suitable for the parallel connection of up to three energy meters.

## **EIB/KNX (European installation bus)**

The EIB/KNX connects sensors and actuators within a domestic installation. Here also, all that is needed is a twin-core wire with the slave power supply being provided by the bus. The cable has a slightly higher specification (twisted). A data rate of 9.6 kBaud is specified.

Data types EIS-type 1 (DPT 1) (digital) and EIS-type 5 (DPT 9) (analog) are supported. It is possible to transmit 16 analog and 16 digital values in each direction (KNX -> CAN and CAN -> KNX).

No application (product database) is available for the ETS software.

# Parameterisation

Parameterisation of the CAN bus converter takes place either via the BL-NET, the CAN monitor or the UVR1611 controller. After connecting the CAN bus converter to a UVR1611 or a CAN monitor via the CAN bus, the CAN bus converter appears with its node number (factory setting: 48) under the menu item "Network/network nodes" on the UVR1611 ("Network/active nodes" on the CAN monitor).

Display example on the UVR 1611:

```
NETWORK NODES
-----
Active NODES
48 Info?
62 Info?
  •
  •
```

◀ All nodes are listed!

All devices in the network are listed here with their node number. Once a node is selected, the following display appears:

```
INFO CAN-NODE48
-----
Vend.ID: 00 00 00 CB
Pr.Code: 02 00 02 04
Rev.Nr.: 00 01 00 00
Des.:    BUS-CON
Load Menu
```

- selected node number

- Vend.ID:** Manufacturer identification number (CB for Technische Alternative GmbH)
- Pr.Code:** Product code of the selected node (here for a bus converter)
- Rev.Nr.:** Revision number
- Des.:** Node product description

These data are fixed values specified by Technische Alternative and cannot be changed.

**Load Menu** (only by Expert level users): Access to the CAN bus converter menu level. The UVR1611 controller or CAN monitor now serve as a display for the CAN bus converter, Expert users can change all device-specific parameters and settings!

## Main menu

```
MENU
-----
Version
Network
M-Bus
Data Administration
```

Version display  
CAN network and EIB/KNX settings  
M-bus settings  
For data transfer to the Bootloader

## MENU Version

```
BUS CONVERTER
-----
Operat.Syst: A1.08EN
```

Displays the version number and language of the bus converter

## MENU Network

```
NETWORK
-----
Node No.: 48 ◀
INPUT VARIABLE
OUTPUT VARIABLE
EIB source address:
Area/line/participant
  1      1      1
```

The device has network address 48 (factory setting).

Bus converter source address on the EIB

**Node No.:** Every device in the network must have its own address (node number 1-62)!

### Changing the node number:

```
CHANGE NODE NO.
-----
Current no.: 48
New no.: 48 ◀
REALLY
CHANGE?      no
```

The device has network address 48 (factory setting).

The new node number is selected here.

As the UVR1611 controller or CAN monitor (client) has a fixed connection to the bus converter (server) via the set node number, changing the node number leads to this communication connection being cancelled. I.e. after the change command, the client displays the "Node number is changed". Then the client jumps back to the start page. The new node number can then be used to make a new connection to the bus converter.

**Input variable:**

Messages from the CAN bus are read in here, converted and output to the EIB/KNX. Data types EIS-type 1 (DPT 1) (digital) and EIS-type 5 (DPT 9) (analog) are supported. Each network input must be allocated to an EIB/KNX group address. In addition a weighting can also be specified for the analog network inputs. There is an option for transmitting 16 digital and 16 analogue values from the CAN bus to the EIB/KNX.

```
INPUT VARIABLE
-----
DIGITAL:
Timeout:

ANALOG:
Timeout:
```

Digital network inputs  
Digital network input timeouts  
Analog network inputs  
Analog network input timeouts

**Entering network inputs**

Example: analog network input

```
INPUT VARIABLE ANA.
-----
1 2 3 4 5 6
7 8 9 10 11 12
13 14 15 16
```

Number selection

After selection of the input variable number:

```
ANA. NETW. INPUT 1
-----
NW.Node:          1
anal. NW.Outp.:  1
Value:            234
NW Status:        OK

EIB group address:
Main/middle/subgroup
 1      1      12

Weighting:        10
```

Selection of the network node  
Selection of the network output for the selected node  
Analogue value display (without unit and decimal place)  
The value is transmitted trouble-free over the CAN bus  
  
Entering the EIB/KNX address  
  
This value represents a **divisor** for the value, in this case the value "234" is forwarded as "23.4" over the EIB/KNX bus.

The entry of digital network inputs is similar, instead of the value, the status (ON/OFF) is displayed.

**Timeouts:**

Are monitoring functions that can cause reactions in the control strategy if bus messages are missing (e.g. as a result of a device failure). The timeouts are sub-divided for 8 groups of network inputs:

- ◆ digital network inputs 1-4, 5-8, 9-12 and 13-16
- ◆ analog network outputs 1-4, 5-8, 9-12, and 13-16

```

TIMEOUTS NETW.INP.
-----
DIGITAL INPUT:  1...4
Timeout:        60 Min ◀

```

Setting of the timeout period

As long as the information is being read from the CAN bus, the network status is OK. If the value has not been updated since the set timeout, the network status changes from OK to **Timeout**.

**Output variables:**

Messages from the EIB/KNX bus are read in here, converted and output to the CAN bus. Data types EIS-type 1 (DPT 1) (digital) and EIS-type 5 (DPT 9) (analog) are supported. Each network output must be allocated to an EIB/KNX group address! In addition, for the analog network outputs a weighting and the measurement units can also be specified.

The option also exists for transmitting 16 digital and 16 analog values from the EIB/KNX to the CAN bus.

```

OUTPUT VARIABLE
-----
DIGITAL:
Transm.Conditions:

ANALOG: ◀
TX cond. 1...8:
TX cond. 9...16:

```

Digital network outputs  
Transmit conditions for the digital network outputs

Analog network outputs  
Transmit conditions for the analog network outputs  
Transmit conditions for the analog network outputs

**Entering output variables:**

Example: analog network output

```

OUTPUT VARIABLE ANA.
-----
1 ◀ 2  3  4  5  6
7  8  9 10 11 12
13 14 15 16

```

Number selection

After selection of the output variable number:

```
ANAL. NETW. OUTPUT 1
-----
EIB group address:
Main/middle/subgroup
 1◀ 1 35
Unit: °C
Weighting: 10
Value: 234
```

Entering the EIB/KNX address

Unit selection

This value represents a **divisor** for the value, in this case the value "234" is forwarded as "23.4" over the CAN bus.  
Analogue value display (without unit and decimal place)

The entry of digital network outputs is similar, instead of the unit, the weighting and the value, the status (ON/OFF) is displayed.

### Transmission conditions:

This menu determines the conditions for transmission of the output variables.

Digital network outputs:

```
TRANSM. NETW.OUTPUT
-----
DIGITAL OUTP.: 1...16
On Change: yes◀
Blocked: 10 Sec
Interval: 5 Min
```

Analog network outputs:

```
TRANSM. NETW.OUTPUT
-----
ANALOG OUTP.: 1...4
On Change: > 30◀
Blocked: 10 Sec
Interval: 5 Min
...
...
```

The transmission conditions are divided into five groups:

- ◆ digital network outputs 1-16
- ◆ analog network outputs 1-4, 5-8, 9-12, and 13-16

### Transmission conditions:

- On Change yes/no:** Transmission of a digital message if status is changed.
- On Change > 30:** If the last analog value transmitted has been changed by more than 3.0 K, the data are transmitted again (= 30 because numbers are transmitted without a comma).
- Blocked 10 sec:** If the value is changed within 10 seconds of the last transmission by more than 30, the value is not transmitted anew for another 10 seconds.
- Interval 5 min.:** The value is transmitted every five minutes even if it has not changed by more than 30 (3.0K) since the last transmission.

## MENU M-Bus

The following entries are listed in this menu:

M - BUS		
ENABLE:	ON	Enables the M-bus interface
SLAVE ADDRESSES:		
Address 1:	1 ◀ Data:	Selects slave address (1), displays the data
Address 2:	4 Data:	Selects slave address (4), displays the data
Address 3:	5 Data:	Selects slave address (5), displays the data

This interface is used to read out the data (pre-run and return temperatures, volume flow, power and heat capacity) from up to three heat quantity counters, which are connected via an M-bus interface. In this respect, the bus converter acts as the master, the connected heat quantity counters are the slaves. Any cable with a cross section of 0.75 mm<sup>2</sup> can be used for the M-bus (e.g. twin-strand) having a max. length of 30 m.

### Data display:

M - BUS DATA 1	
T.Pre-run:	45.0 □
T.Return:	38.0 °C
FLOW:	0 l/h
POWER:	0.0 kW
Heat volume:	
0 MWh	0.0 kWh

**Currently the M-bus values are only visible as a display page on the bus converter and are not available for CAN-bus data logging.**

## MENU Data administration

```
DATA ADMINISTRATION
-----
Current Funct. Data:
TA FACTORY SETTINGS
Last transfer:
successful
Load Factory Setting
DATA <=> BOOTLOADER:
```

Name of the latest function data

Indicates whether the last function data transfer with the Bootloader was successful

Loads the factory setting

Enters the sub-menu

### **Sub-menu Data <=> Bootloader:**

```
DATA <=> BOOTLOADER
-----
Upload Data:
BUSCON => BOOTLD.
Download Data:
BOOTLD. => BUSCON

OPER.SYSTEM<=BOOTLD.:
Download Oper.System:
BOOTLD. => BUSCON
```

Uploads function data into the Bootloader

Downloads function data from the Bootloader

Downloads the current operating system from the Bootloader

After selection of the Bootloader storage location, confirmation of the security question and the subsequent confirmation of the start button on the Bootloader, data transfer starts.

Through its flash technology, the device is able to replace its own operating system (device software) with a more current version (obtain from the download area under the address <http://www.ta.co.at>) using the boot loader.

Importing a new operating system is only advisable, if it contains new, required functions. Updating the operating system always represents a risk (comparable with flashing the PC Bios) and requires an examination of all function data for compatibility problems, as these are to be expected due to new function components!

## Electrical connection (type dependent)

The electrical connection should only be made by a professional electrician in accordance with the relevant local guidelines.

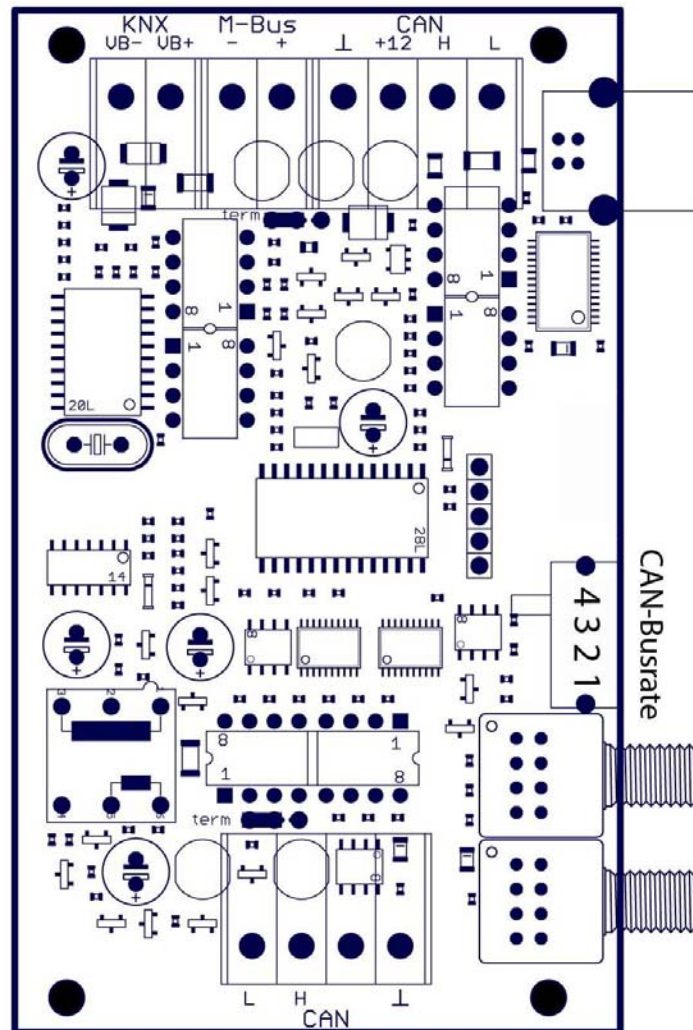
**Warning:** Only work on the inside of the device when it is not connected to power. If you assemble the device with the power connected, it may be damaged.

Connect all bus cables to the PCB according to the labelling.

The first CAN-bus interface is designed for a bus rate of 50 kBaud. Consequently communication with the UVR1611, CAN-Monitor, I/O-module and BL-NET devices is possible. The second CAN-bus interface has a sliding switch for switching between the following **bus rates: Maximum permitted bus length according to the specification:**

- |            |         |
|------------|---------|
| 1) 50kBaud | 1,000m  |
| 2) 20kBaud | 2,500m  |
| 3) 10kBaud | 5,000m  |
| 4) 5kBaud  | 10,000m |

EIB/KNX, M-Bus and CAN-Bus connections with a fixed baud rate of 50 kBaud  
**Observe polarity** (see PCB printed labels)



Bus rate selection for the second CAN bus

Transmit connection fibre optic cable

Receive connection fibre optic cable

Second CAN bus connection (electrically isolated), select bus rate with sliding switch!

## Technical data

M-Bus	for up to 3 slaves
Power consumption	max. 4 W
Dimensions (W/H/D)	127 / 76 / 45 mm
Protection	IP40

## Installing the device

Screw the casing tray to the wall using the supplied fastenings fitted through the two holes provided.

Create the network connection, as described in the chapter "Cable selection and network topology", then reinsert the cover in the casing tray.

## Maintenance

If treated and used correctly, the device will not require maintenance. To clean use only a cloth dampened with a gentle alcohol (e.g. ethyl alcohol). Harsh solvents such as chloroethenes or trichloroethylene are not admissible.

As the components relevant to accuracy are not subjected to loads if used properly, long-term deviation is very low. Therefore the device cannot be adjusted. Hence, no calibration is possible.

During repair, the constructive characteristics of the device must not be changed. Spare parts must correspond to the original parts and be used as intended.

## Safety requirements

The device corresponds to the latest state of the art and fulfils all necessary safety conditions. It may only be used or deployed in accordance with the technical data and the safety requirements and regulations listed below. When using the device, the legal and safety regulations apposite to the particular use are also to be observed.

Safe operation is not possible if the device

....has visible signs of damage,

....is not functioning,

....has been stored for a long period under unfavourable storage conditions.

If this is the case, deactivate the device and secure against unintentional use.

We reserve the right to make technical changes.

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# TECHNISCHE ALTERNATIVE

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## EC- DECLARATION OF CONFORMITY

*Document- Nr.: / Date* TA10012 / 03.09.2010  
*Company / Manufacturer:* Technische Alternative  
elektronische SteuerungsgerätegesmbH.  
*Address:* A- 3872 Amaliendorf, Langestraße 124  
*Product:* CAN-BC/C, CAN-BC/E, CAN-BC/L  
*The stated above product complies with the following essential requirements:*  
*EU requirements:* 2006/95/EG Low voltage standard  
2004/108/EG Electromagnetic compatibility

*Employed standards:*

EN 60730-1:2009 08 01 Automatic electrical controls for household and similar use -  
Part 1: General requirements  
EN 61000-6-3:2007 11 01 Electromagnetic compatibility (EMC) - Part 6-3: Generic  
standards - Emission standard for residential, commercial  
and light-industrial environments  
EN 61000-6-2:2006 05 01 Electromagnetic compatibility (EMC) - Part 6-2: Generic  
standards - Immunity for industrial environments  
*Position of CE - label:* On packaging, manual and type label



*Issuer:* Technische Alternative  
elektronische SteuerungsgerätegesmbH.  
A- 3872 Amaliendorf, Langestraße 124

*This declaration is submitted by:*

*General management*

This declaration certifies the agreement with the named standards, contains however  
no warranty of characteristics.  
The security advices of included product documents are to be considered.

UIDNr.: ATU 17986204, Firmenbuch-Nr.: FN37578m, DVR-Nr.:1011553, ARA-Lizenz-Nr.:1996

Telefon ++43(0)2862/53635 Fax ++43(0)2862/53635-7 E-mail: mail@ta.co.at <http://www.ta.co.at>

## **Guarantee conditions**

**Note:** The following guarantee conditions do not in any way limit the legal right to a guarantee, rather expand your rights as a consumer.

1. The company Technische Alternative elektronische Steuerungsgerätegesellschaft m. b. H. provides a two-year guarantee from the date of purchase by the end consumer for all the devices and parts which it sells. Defects must be reported immediately upon detection and within the guarantee period. Technical support knows the correct solution for nearly all problems. In this respect, contacting us immediately will help to avoid unnecessary expense or effort in troubleshooting.
2. The guarantee includes the free of charge repair (but not the cost of on site fault-finding, removal, refitting and shipping) of operational and material defects which impair operation. In the event that a repair is not, for reasons of cost, worthwhile according to the assessment of Technische Alternative, the goods will be replaced.
3. Not included is damage resulting from the effects of overvoltage or abnormal ambient conditions. Likewise, no guarantee liability can be accepted if the device defect is due to: transport damage for which we are not responsible, incorrect installation and assembly, incorrect use, non-observance of operating and installation instructions or incorrect maintenance.
4. The guarantee claim will expire if repairs or actions are carried out by persons who are not authorised to do so or have not been so authorised by us or if our devices are operated with spare, supplementary or accessory parts which are not considered to be original parts.
5. The defective parts must be sent to our factory with an enclosed copy of the proof of purchase and a precise description of the defect. A filled in "service advice note", which can be downloaded from our homepage [www.ta.co.at](http://www.ta.co.at), will accelerate processing. A prior clarification of the defect with our technical support is necessary.
6. Services provided under guarantee result neither in an extension of the guarantee period nor in a resetting of the guarantee period. The guarantee period for fitted parts ends with the guarantee period of the whole device.
7. Extended or other claims, especially those for compensation for damage other than to the device itself are, insofar as a liability is not legally required, excluded.

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