CAN-BC

Version A1.13 EN

CAN bus converter

Manual

Bus converter CAN-BC/C:

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

en

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

TECHNISCHE ALTERNATIVE

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Safety requirements

All installation and wiring work on the controller must only be carried out in a zero-volts state.

The opening, connection and commissioning of the device may only be carried out by competent personnel. In so doing, all local security requirements must be adhered to.

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.

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 chlorethenes 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.

System requirements

Use of the CAN-BC incl. data logging with Winsol version ≥2.00 requires version 3.18 or higher on controller UVR1611 and the C.M.I. (or Bootloader with version >2.17).

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, a 12V-mains adapter 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

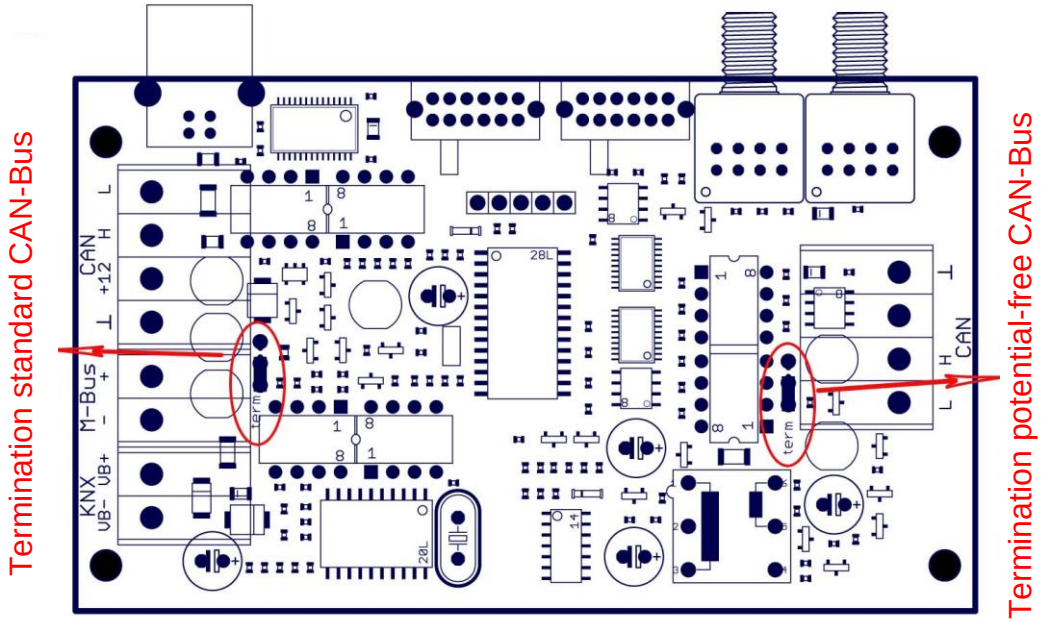
Bus converter CAN-BC/L

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

This operating manual applies for all types.

CAN cable selection and network topology

The basics of bus cabling are likewise described in detail in the UVR16** 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!



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 UVR16** controllers, CAN I/O modules, CAN monitors and C.M.I.. This bus and its properties are described in detail in the UVR16** manual.

Potential-free CAN bus with increased interference resistance (CAN-BC/C)

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 UVR16** controllers, C.M.I. 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-fibre optic transmission path (CAN-BC/L)

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, euromicron 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.

EIB/KNX (European installation bus (CAN-BC/E)

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) (analogue) are supported. It is possible to transmit 16 analogue and 16 digital values in each direction (KNX -> CAN and CAN -> KNX).
No application (product database) is available for the ETS software.

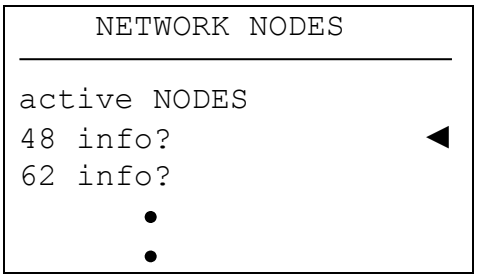
M-Bus (measurement bus)

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 heat meters (slaves) (no energy, water or gas metering possible).
There must only be one master in the M-bus system. Prior to use of new meters compatibility with the bus converter must be ensured as the protocols used by the slaves are not completely standardised.

Parameterisation

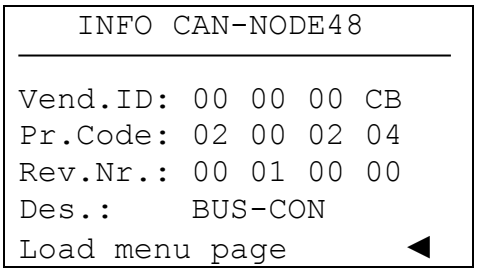
Parameterisation of the CAN bus converter takes place either via the UVR1611 controller, the CAN monitor, the C.M.I. or the software *F-Editor*(version ≥1.07). After incorporation of the CAN bus converter in the CAN bus network it appears with its node number (factory allocated: 48) in the Network menu as an "active node".

Access to the CAN bus converter using the UVR1611 or CAN monitor



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:



- selected node number

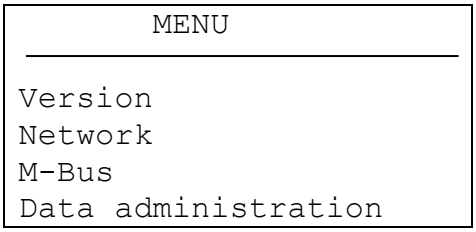
Access to the CAN-BC menu (only possible as "expert")

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.

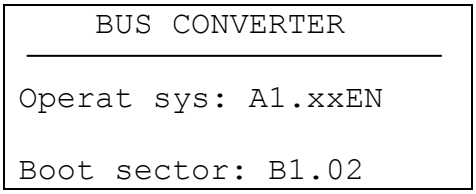
Load Menu (only by Expert level users): Access to the CAN bus converter menu level. The UVR1611 controller or CAN monitor now serve as a display for the CAN bus converter, Expert users can change all device-specific parameters and settings!

Main menu



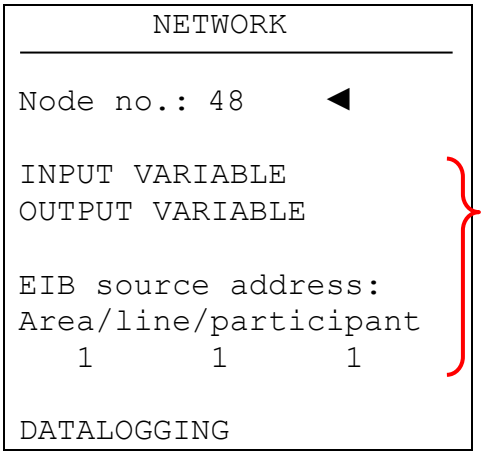
Version display
CAN network and EIB/KNX settings
M-bus settings
For data transfer to the Bootloader

MENU Version



Displays the version number and language of the bus converter

MENU Network



The device has network address 48 (factory setting).

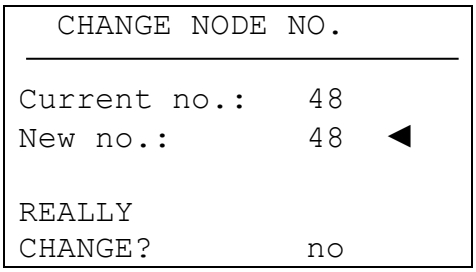
Only visible for type CAN-BC/E

Bus converter source address on the EIB

Specification of the master node number of the **data logger** and timeout

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

Changing the node number

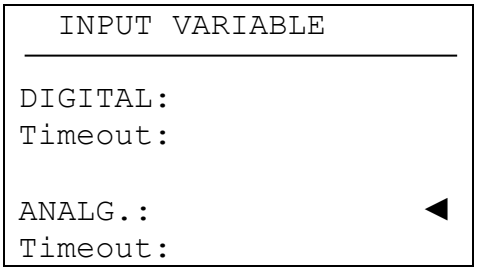


The device has network address 48 (factory setting).
The new node number is selected here.

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 (only CAN-BC/E)

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) (analogue) are supported. Each network input must be allocated to an EIB/KNX group address. In addition a weighting can also be specified for the analogue network inputs. There is an option for transmitting 16 digital and 16 analogue values from the CAN bus to the EIB/KNX.

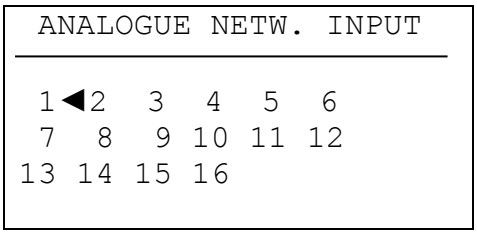


Digital network inputs
Digital network input timeouts

Analogue network inputs
Analogue network input timeouts

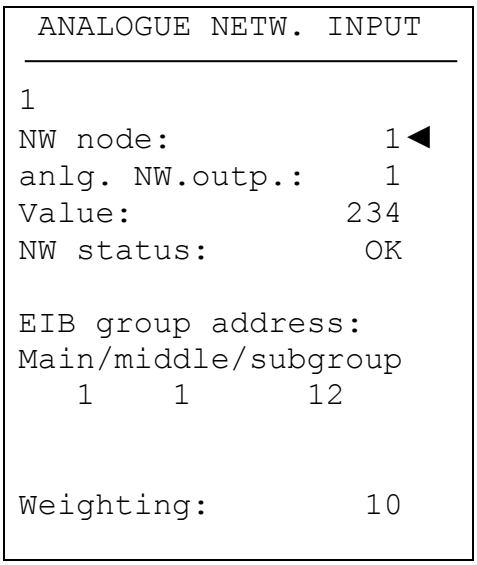
Entering network inputs

Example: analogue network input



Number selection

After selection of the input variable number:



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

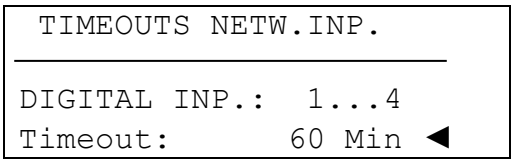
This value represents a **divisor** for the value, in this case the value "234" is forwarded as "23.4" over the EIB/KNX bus.

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

Timeouts (only CAN-BC/E)

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
- analogue network outputs 1-4, 5-8, 9-12, and 13-16



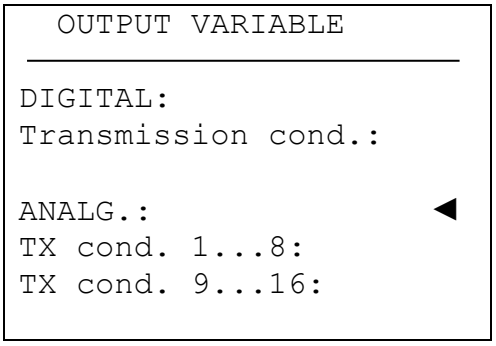
Setting of the timeout period

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 (only CAN-BC/E)

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) (analogue) are supported. Each network output must be allocated to an EIB/KNX group address! In addition, for the analogue network outputs a weighting and the measurement units can also be specified.

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

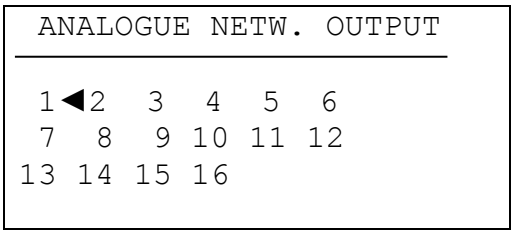


Digital network outputs
Transmission conditions for the digital network outputs

Analogue network outputs
Transmission conditions for analogue network outputs 1-8
Transmission conditions for analogue network outputs 9-16

Entering output variables

Example: analogue network output



Number selection

After selection of the output variable number:

```
 ANALOGUE 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 (only CAN-BC/E)

This menu determines the conditions for transmission of the output variables.
Digital network outputs:

```
 TRANSM. NETW.OUTPUT
 ──────────────────────
DIGITAL OUTP.: 1...16
with change:     yes◄
Block. time:    10 Sec
Interval time:   5 Min
```

Analogue network outputs:

```
 TRANSM. NETW.OUTPUT
 ──────────────────────
ANALG. OUTP.:    1...4
with change:   >  30◄
Block. time:    10 Sec
Interval time:   5 Min
         ...
         ...
```

The transmission conditions are divided into five groups:

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

Transmission conditions:

with change yes/no:	Transmission of a digital message if status is changed.
with change > 30:	If the last analogue value transmitted has been changed by more than 3.0 K, the date are transmitted again (= 30 because numbers are transmitted without a comma).
Block. time 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 time 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
Interval time 2.0 min	Time interval for reading of the M-bus meter values, adjustment range: 2 min. to 48 hr.
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 (flow and return temperatures, volume flow, outpur and heat amount) from up to three heat meters, which are connected via an M-bus interface In this respect, the bus converter acts as the master, the connected heat meters are the slaves. Any cable with a cross section of 0.75 mm² can be used for the M-bus (e.g. twin-strand) having a max. length of 30 m.

Data display

M - BUS DATA 1	
Tflow:	45.0 °C
Treturn:	38.0 °C
FLOW RATE:	0 l/h
OUTPUT:	0.0 kW
Heat amount:	
0 MWh	0.0 kWh

The M-Bus values are only available for the CAN data logging and as a display page on the bus converter.

MENU Data administration (only Bootloader BL-NET)

Note: When using the C.M.I. interface, data management is performed using drag and drop in the C.M.I. menu.

DATA ADMINISTRATION	
current func. data: TA FACTORY SETTINGS	Name of the latest function data
Last transfer: successful	Indicates whether the last function data transfer with the Bootloader was successful
Load factory setting	Loads the factory setting
DATA <=> BOOTLOADER:	Enters the sub-menu

Sub-menu Data <=> Bootloader

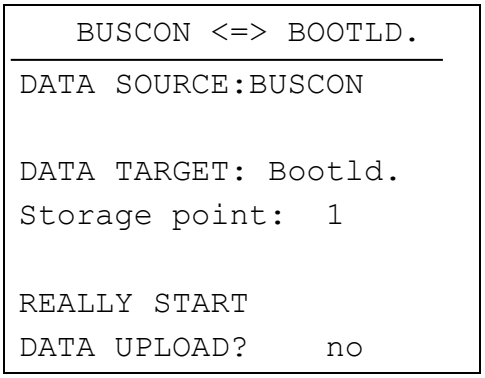
DATA <=> BOOTLOADER	
Upload data: BUSCON => BOOTLD.	Uploads function data into the Bootloader
Download data: BOOTLD. => BUSCON	Downloads function data from the Bootloader
OPER.SYSTEM<=BOOTLD.: Download oper.system: BOOTLD. => BUSCON	Downloads the current operating system from the Bootloader

After the CAN-BC has been prepared for the desired data transfer and the security prompt confirmed, the bus converter is ready for communication (the cursor flashes on the right edge of the display). To carry out the data transfer, the START button must now be pressed on the Bootloader.

WARNING: During the data transfer the UVR1611, CAN monitor and the BL-NET cannot access the CAN-BC.
As the CAN-BC module does not have its own display, the data transfer cannot be monitored. Whether the data transfer was successful or not can only be checked by next opening the menu Data Administration in the CAN-BC module and checking the status of the last data transfer.

Function data upload

The function data can be transferred via the CAN bus into the Bootloader to act as a data backup.



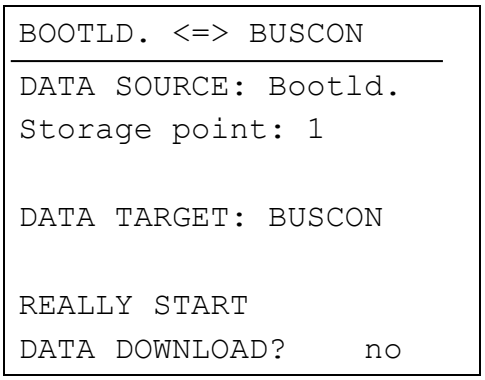
Storage location for the function data in the Bootloader

Selecting `yes` changes the CAN-BC to transfer mode

If the CAN-BC module is ready for data transfer, this is carried out by pressing the START button on the Bootloader.

Function data download

During a download, the function data stored in the Bootloader are transferred to the CAN-BC and in so doing the current configuration is overwritten.



Storage location for the function data in the Bootloader

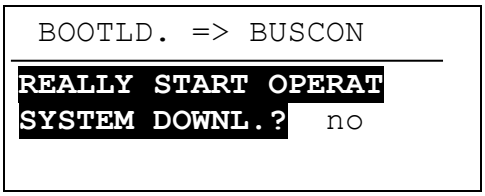
Selecting `yes` changes the CAN-BC to transfer mode

If the CAN-BC is ready for data transfer, this is carried out by pressing the START button on the Bootloader.

Operating system download

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 Bootloader.

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!



Selecting `yes` changes the CAN-BC to transfer mode

If the CAN-BC is ready for data transfer, this is carried out by pressing the START button on the Bootloader.

WARNING: As operating system transfer cannot be monitored, the version of the current operating system can be checked in the Version menu of the CAN-BC module after the update.

Data logging the M-bus values of the CAN-BC (C.M.I.)

Data logging with the C.M.I. interface is described in the instructions for ***Winsol*** (Version ≥ 2.02).

The logged values are presented in a data record:

Analogue 1	HMTR 1, flow temperature
Analogue 2	HMTR 1, return temperature
Analogue 3	HMTR 1, flow rate
Analogue 4	HMTR 2, flow temperature
Analogue 5	HMTR 2, return temperature
Analogue 6	HMTR 2, flow rate
Analogue 7	HMTR 3, flow temperature
Analogue 8	HMTR 3, return temperature
Analogue 9	HMTR 3, flow rate

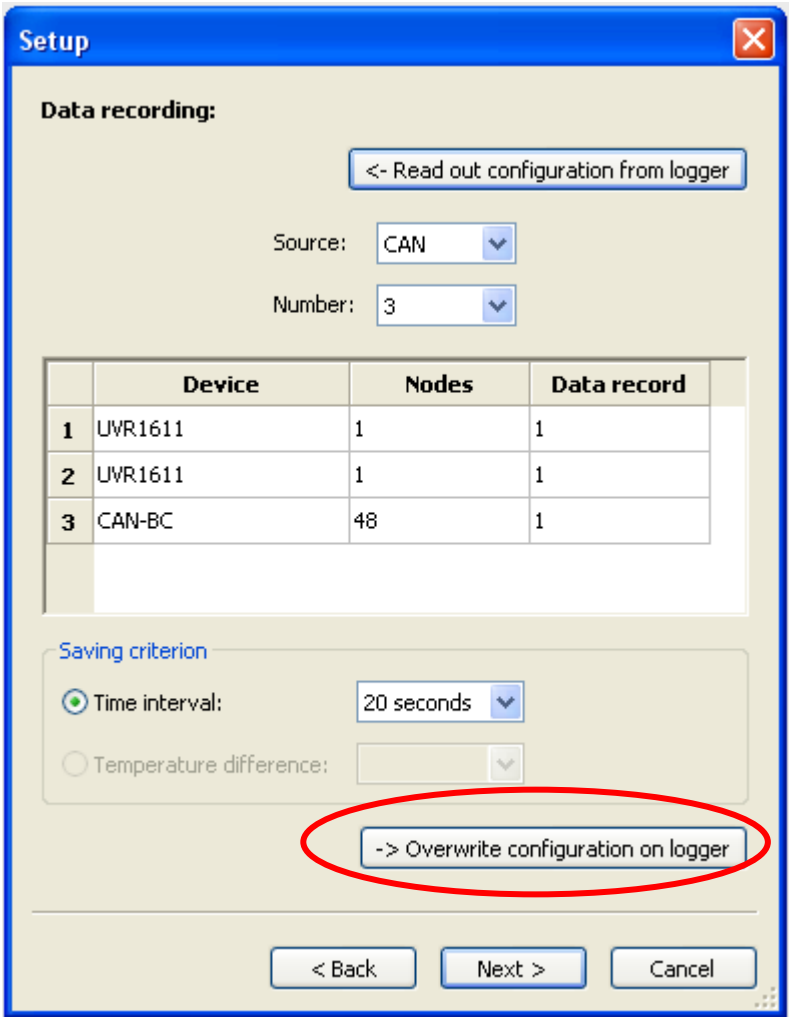
Data logging the M-bus values of the CAN-BC (BL-NET)

For data logging of the M-bus values the Bootloader BL-NET (from version **2.17**) is required. The program ***Winsol*** (from version 2.00) makes possible the capture and evaluation of the CAN-BC measured values recorded by the Bootloader. A precise description of the ***Winsol*** program is contained in the manual of the BL-NET Bootloader. In the following, only the specific ***Winsol*** settings for the CAN-BC are described.

Data logging of the values of the CAN-BC takes place in mode "**CAN Datalogging**". The values of the CAN-BC are output in a pre-specified data record. The data records for recording in the Bootloader are specified in **Setup dialogue** under "**Data recording**".

Configuration

Example: (CAN network with a controller UVR1611 and a CAN-BC):



Reading out of the configuration stored in the logger

Specification of the **Source** and number of data records

Double clicking in the respective fields allows selection of the desired settings.

Selection of the saving criterion

Overwriting of the configuration in the logger

The changed settings are only saved and transferred as a configuration to the logger if this button is clicked.

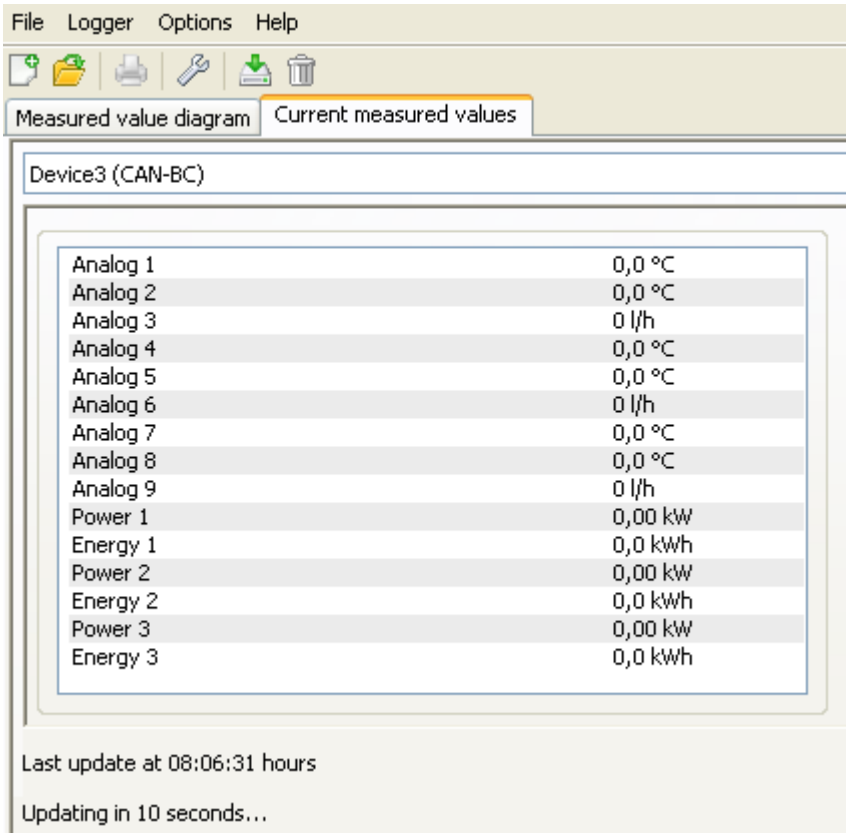
Nodes: Specification of the device node number, the data of which are to be logged.
Data record: Each controller and each energy meter CAN-EZ can output a maximum 2 data records and each CAN-BC 1 data record.
Device: Selection of the device (UVR1611, CAN-EZ or CAN-BC).

Important instructions concerning CAN data logging: One controller UVR16** must be assigned **node number 1** in the CAN network, so that the time stamp of this controller can be accepted from the Bootloader. This controller UVR1611 must be loaded with at least version A3.18.

General information about ***Winsol*** can be found in the instructions for ***Winsol*** (Version ≥ 2.02).
Special information about the tab **"Current measured values"** for the CAN-BC:

Current measured values

The values of the M-Bus heat meters are given in the following data record:



The analog values are divided as follows across the heat meters (HMTR):

Analogue 1	HMTR 1, flow temperature
Analogue 2	HMTR 1, return temperature
Analogue 3	HMTR 1, flow rate
Analogue 4	HMTR 2, flow temperature
Analogue 5	HMTR 2, return temperature
Analogue 6	HMTR 2, flow rate
Analogue 7	HMTR 3, flow temperature
Analogue 8	HMTR 3, return temperature
Analogue 9	HMTR 3, flow rate

Electrical connection (type dependent)

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

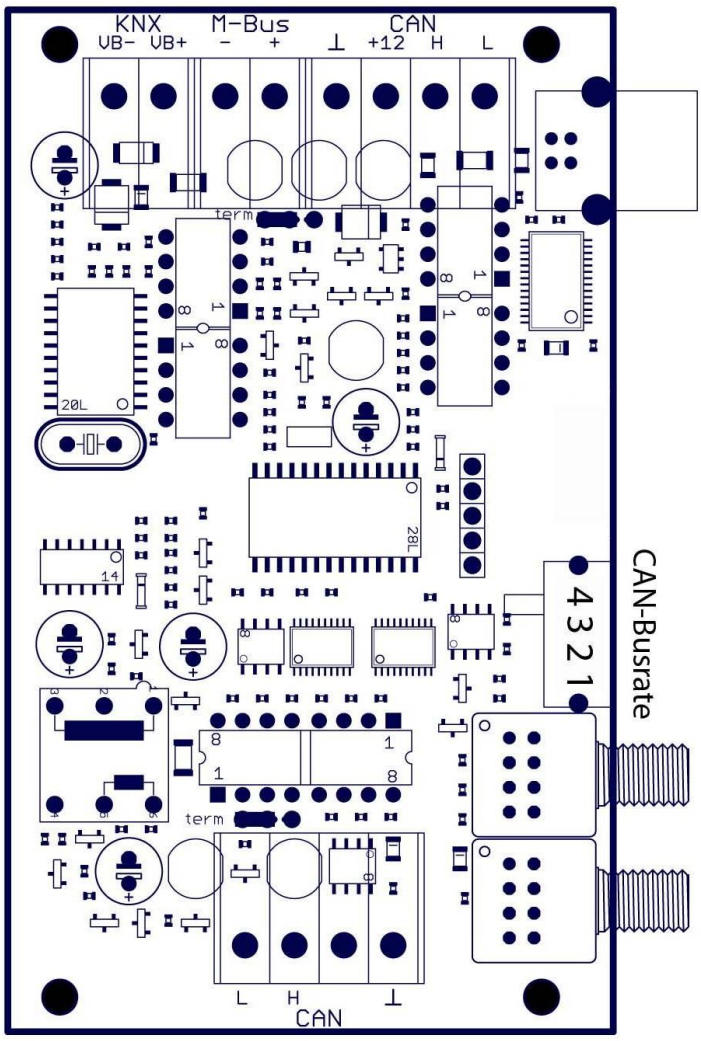
Warning: Only work on the inside of the device when it is not connected to power. If you assemble the device with the power connected, it may be damaged.

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 C.M.I. 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
Max. ambient temperature	0°C to 45°C

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.

We reserve the right to make technical changes. © 2017

EU Declaration of conformity

Document- Nr. / Date:	TA17012 / 02/02/2017
Company / Manufacturer:	Technische Alternative RT GmbH
Address:	A- 3872 Amaliendorf, Langestraße 124

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product name:	CAN-BC/C, CAN-BC/E, CAN-BC/L
Product brand:	Technische Alternative RT GmbH
Product description:	CAN bus converter

The object of the declaration described above is in conformity with Directives:

2014/35/EU	Low voltage standard
2014/30/EU	Electromagnetic compatibility
2011/65/EU	RoHS Restriction of the use of certain hazardous substances

Employed standards:

EN 60730-1: 2011	Automatic electrical controls for household and similar use – Part 1: General requirements
EN 61000-6-3: 2007 +A1: 2011 + AC2012	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2: 2005 + AC2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 50581: 2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Position of CE - label: On packaging, manual and type label

CE

Issuer:	Technische Alternative RT GmbH A- 3872 Amaliendorf, Langestraße 124

This declaration is submitted by

Dipl.-Ing. Andreas Schneider, General manager,
02/02/2017

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.

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 RT GmbH 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. Processing is accelerated if an RMA number is applied for via our home page www.ta.co.at. 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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