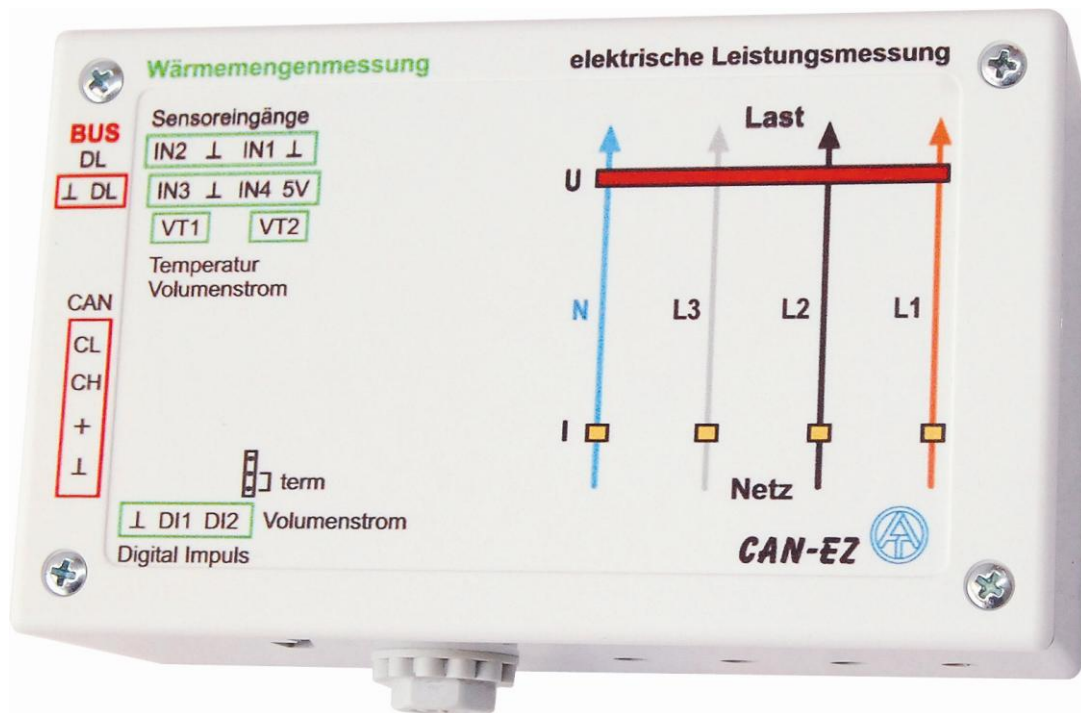


# CAN-EZ

Version A2.05 EN

Manual version 1

## CAN – Energy Meter



Operation

Installation instructions

en



TECHNISCHE  
ALTERNATIVE



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## Safety requirements



**All installation and wiring work on the energy meter 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. While doing so, all local safety requirements must be adhered to.**

The unit 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 conditions and rules 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 unit

- ◆ 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 unit and secure against unintentional use.

## Maintenance

If treated and used correctly, the unit will not require maintenance. To clean use only a cloth dampened with a gentle alcohol (e.g. ethyl alcohol). Do not use aggressive cleaning agents and solvents such as chlorethene or trike.

No components relevant to long-term accuracy are subject to loading if the device is used correctly. Consequently long-term drift is extremely low. Therefore the device cannot be adjusted. Thus any compensating is not possible.

During repair, the design features of the device must not be changed. Replacement parts must correspond to the original spare parts and must be used in accordance with the fabrication version.

## System requirements

For application of the CAN-EZ incl. data logging with Winsol version  $\geq 2.00$  at least version A3.18 is required for the controller UVR1611 and version 2.17 for the boot loader. One controller UVR1611 must be assigned node number 1 in the CAN network.

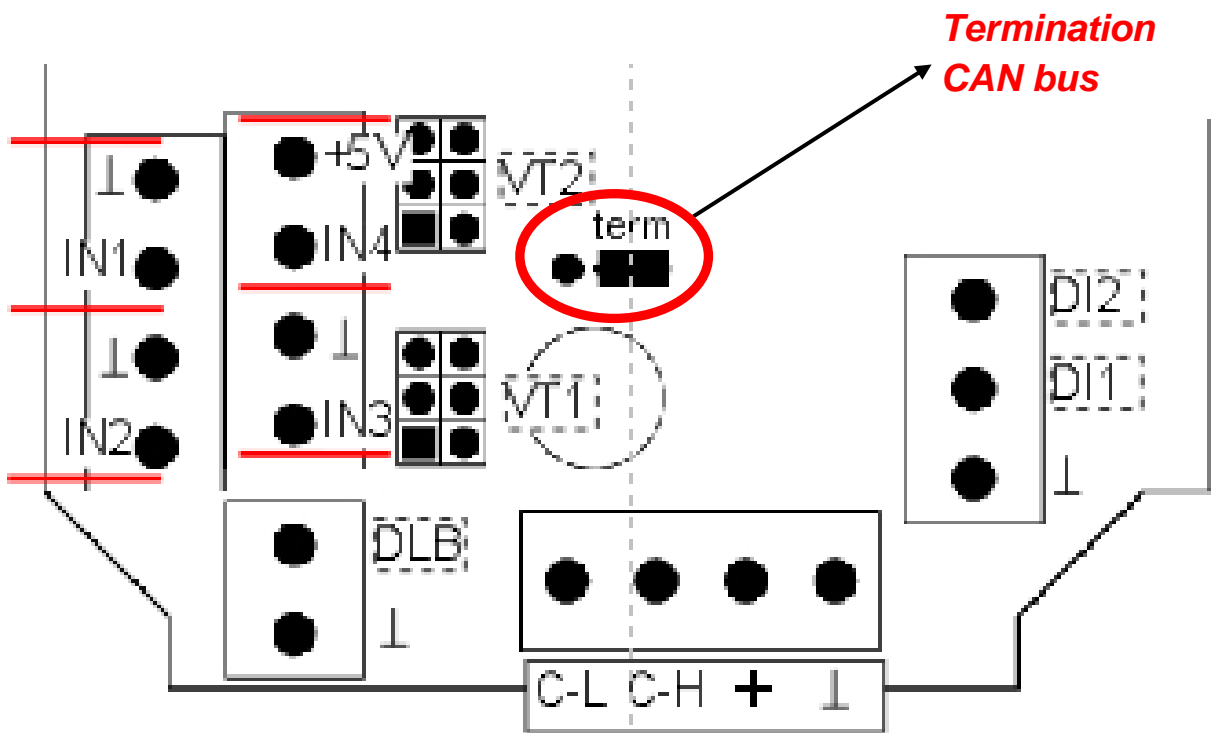
### Supply capacity

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.

## Cable selection and network topology

The basics of bus cabling are described in detail in the UVR1611 manual, so that it is not described in detail here with the exception of the termination.

Each CAN network is to 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!



## Function description

The CAN energy meter, CAN-EZ, enables metering of both electrical energy and heat amounts.

Either 3 phase or single phase electrical energy can be metered. **The measurement limits which are specified in the technical data must be adhered to.**

Up to 3 heat meters can be implemented. For this purpose there are in total 4 analogue inputs for temperature sensors (KTY or PT1000), 2 impulse inputs for volume flow encoders VSG, 2 inputs for volume flow sensors FTS and one data link input for DL sensors.

Values from inputs, as well as the results from the metering can be transferred to the CAN bus as network output variables, as can the input values, which are not used for metering (as for a CAN I/O module). The UVR1611 or UVR16x2 controller accepts the values as a network input variable so that the variable can be further processed by the controller or logged using the Winsol program.

**The CAN-EZ may not be used for charging/billing purposes.**

## Installation and connection of the device

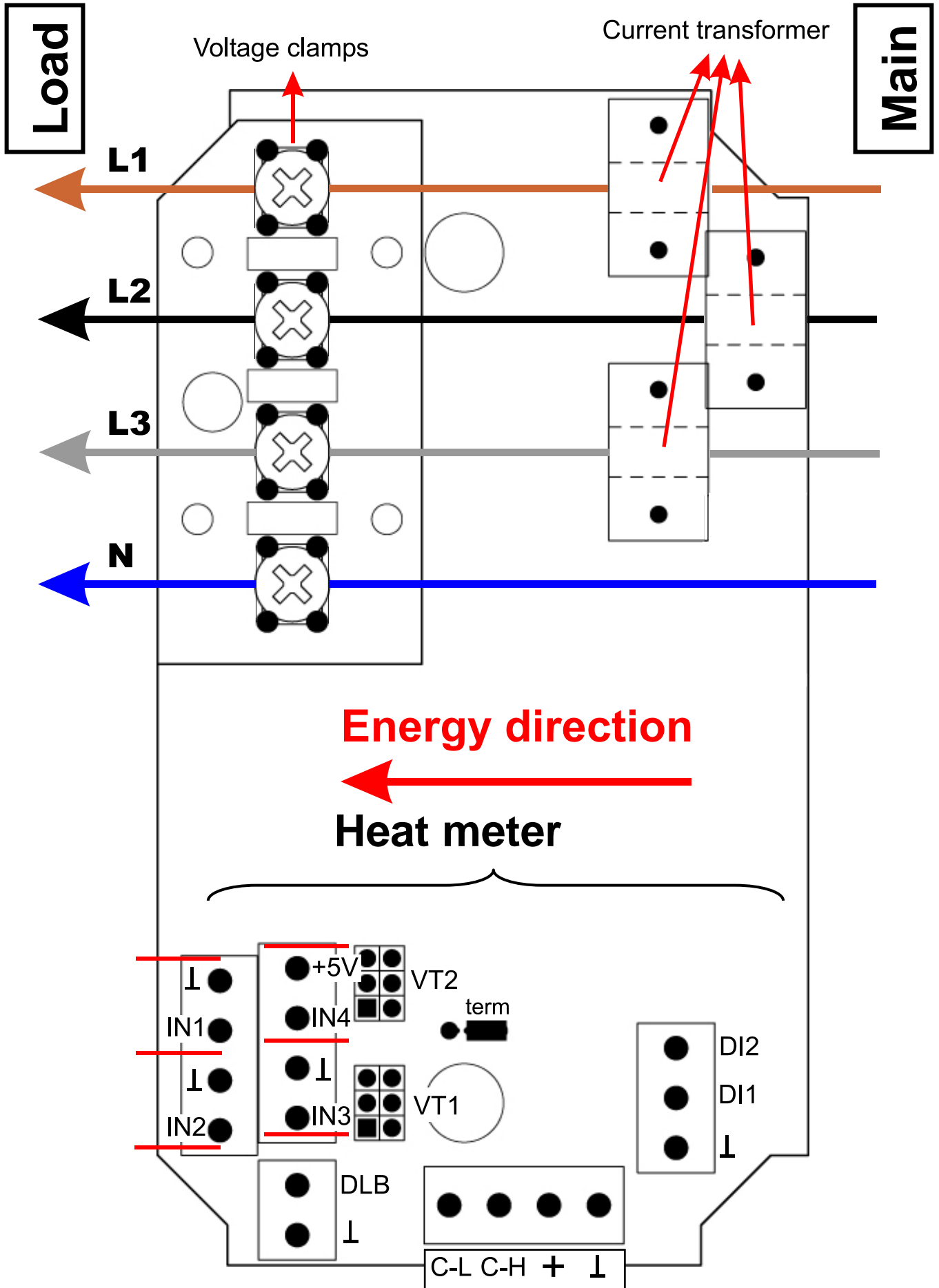
The CAN-EZ is intended for installation in a distribution box according to the site regulations. The energy meter can be snapped onto a DIN rail (DIN rail TS35 in accordance with EN 50022). Moreover the casing tray has 2 holes for screw fastening in the distributor.

The wires of the electrical energy meter are pulled through the current transformer and the voltage clamps according to the energy direction. The supply cable must be installed free from tension, so that the current transformer is not exposed to any mechanical pressure. Next, the screws for the voltage clamps must be sufficiently tightened, to ensure that the tips of the mating plate press through the insulation and that they make contact with the conductor.

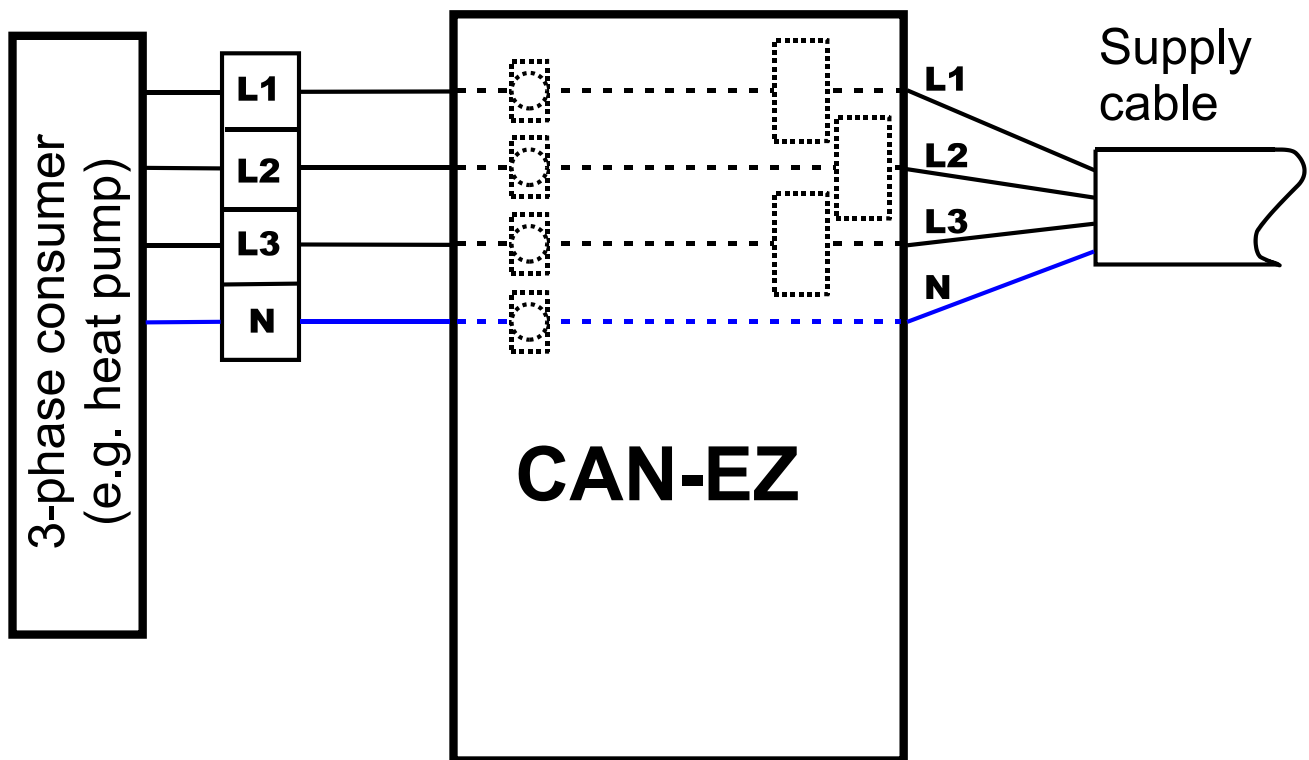
**Warning! The screws of the voltage connections could possibly take-on the voltage of the penetrated conductor.**

The connection of the sensors, the CAN and DL buses is carried out with the supplied connectors. Take care to ensure that the individual connections of the bus links are not interchanged.

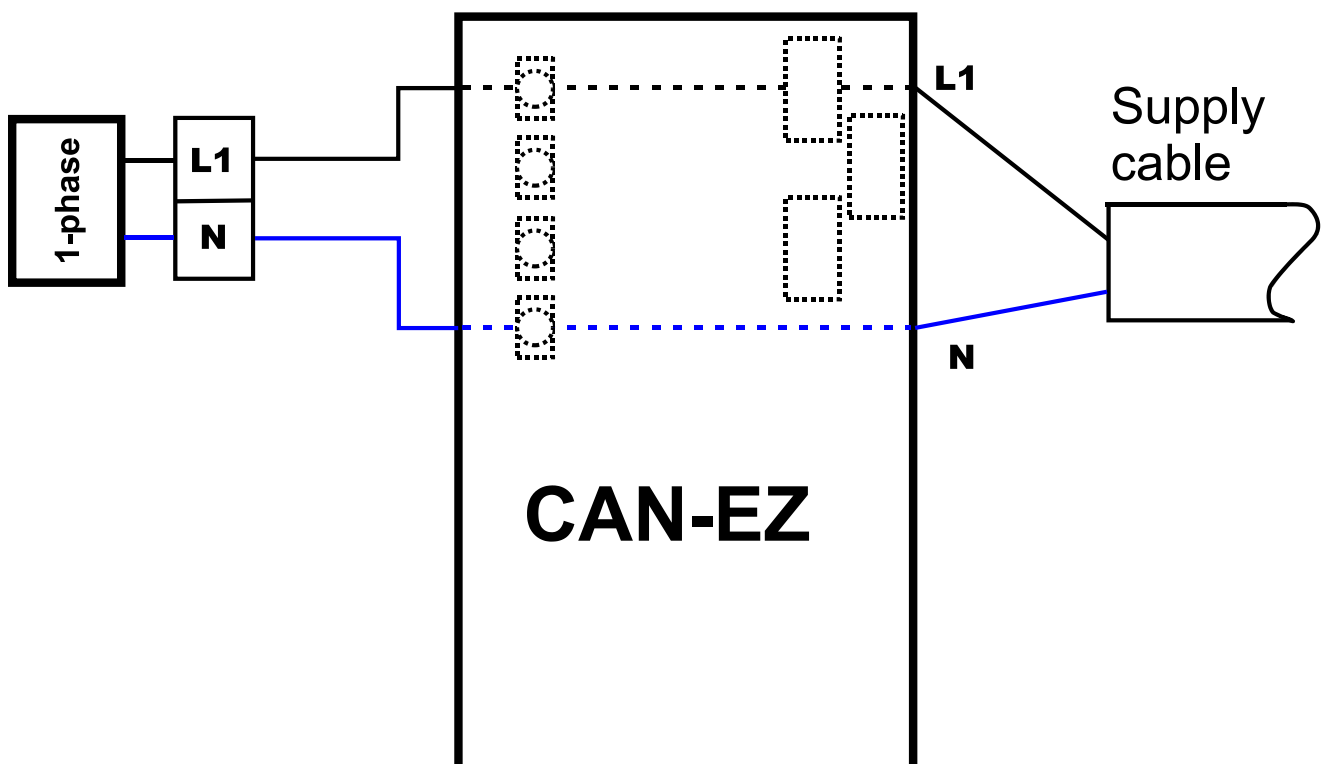
**Wiring diagram**



## Wiring diagram for three-phase energy metering



## Connection diagram for single-phase energy metering





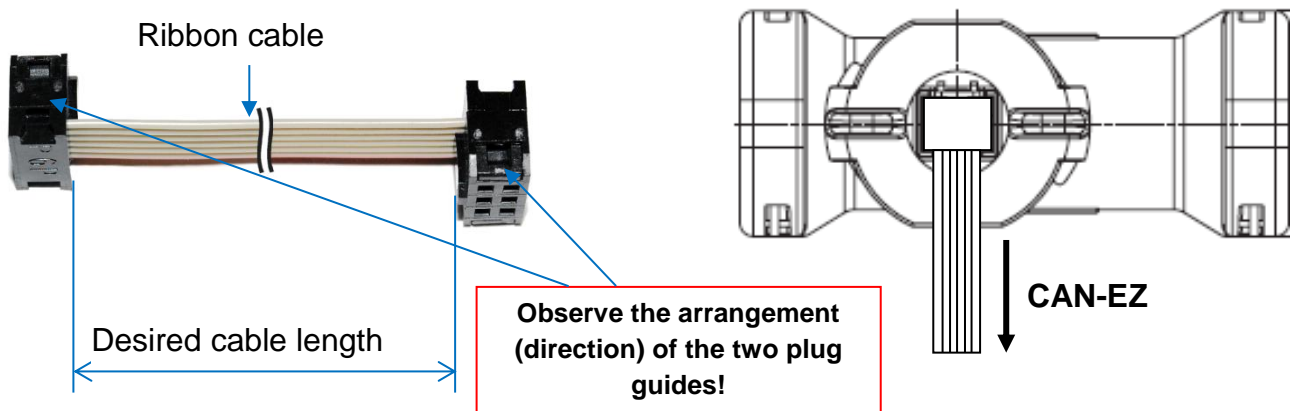
# Connection of sensors, DL-bus and CAN bus

## Overview terminal designations

IN1.... IN4	Sensor inputs 1 – 4, Parameterization in the inputs menu, Connection of the sensors between IN1 (2, 3, 4) and sensor earth $\perp$ <b>N.B.:</b> Inputs 3 and 4 have a common earth terminal.
+5V	Power supply for vortex sensors
VT1...VT2	Special connection for FTS volume flow sensors.... (without DL) Parameterization: Menu inputs / inputs 3 – 4 for temperature (PT1000 Sensor), inputs 5 – 6 for flow and sensor selection (DN) Make-up of the connection wire is according to the following description
DLB	DL-bus input for volume flow sensors FTS....DL (with intermediate card) and other DL sensors ( <b>except</b> RCV-DL), Parameterization: Menu network / analog input variable, source DL Connection between DLB and earth $\perp$
DI1...DI2	Inputs 5 – 6, for pulse generator VSG, Parameterization: Menu inputs / inputs 5 – 6, Connections between DI... and sensor earth $\perp$
C-L, C-H +	CAN-Bus LOW, CAN-Bus HIGH, +12V, The basics of bus cabling are described in detail in the UVR1611/UVR16x2 manual and must be observed.
$\perp$	Sensor earths

### Sensor connection FTS... to VT1 or VT2

The volume flow sensors are directly connected, without intermediate card, to the CAN-EZ. The supplied ribbon cable is pre-made to the required length in that the 2nd plug is pressed on to the cable according to the following drawing.



## Parameterisation of the FTS sensors... (without DL) at the VT1 or VT2 connections

INPUT 5	
TYPE:	ANALG.
MEAS.VAR:	Flow rate
SENSOR:	FTS4-50 DN15
AVERAGE:	1,0 Sec

The volume flow of the **sensors at VT1** is measured at input 5. Input 5 must therefore be parameterized as follows (example: sensor FTS4-50):  
No other volume flow encoder (VSG pulse generator) may be directly connected to input 5.

INPUT 3	
TYPE:	ANALG.
MEAS.VAR:	Temp.
SENSOR:	Pt 1000
SENSOR CORR:	0.0 K
AVERAGE:	1.0 Sec

The internally measured temperature of the sensor is measured at input 3. This input must be parameterized as follows:  
No other volume flow encoder may be directly connected to input 3.

In the same way, the volume flow of the **sensor at VT2** is measured at input 6. Therefore no other volume flow encoder can be connected at this input.

The internally measured temperature of the sensor is measured at input 4. Therefore no other temperature sensor may be directly connected to this input.

### Bus load DL bus

The CAN-EZ delivers the maximum bus load 100%.

For example, the electronic sensor FTS4-50DL has a bus load of 39%, therefore up to a max. 2 FTS4-50DL can be connected to the DL bus. The bus loads of the electronic sensors are listed in the technical data of the respective sensors.

# Parameterisation

Parameterisation of the CAN-EZ takes place via the UVR1611 controller, the CAN monitor, the interface C.M.I. the BL-NET boot loader or the software *F-Editor* (version  $\geq 1.08$ ). After incorporation of the energy meter in the CAN bus network it appears with its node number (factory allocated: 40) in the Network menu as an "active node".

## Access to the CAN energy meter using the UVR1611 or CAN monitor

```
MENU
-----
Version
User
:
Network ◀
```

Main menu of the UVR1611 or service menu of the CAN monitor

Load the "Network" menu

```
NETWORK
-----
Node No.:      1
ENABLE:        EIN
Autooperat.:  yes
:
NETWORK NODES: ◀
```

Load the "Network nodes" sub-menu

```
NETWORK NODES
-----
active NODES:
:
40 info? ◀
```

List of all nodes active in the network

Select the node of the CAN-EZ

```
INFO CAN-NODE 40
-----
Vend.ID: 00 00 00 CB
Pr.Code: 02 00 02 04
Rev.Nr.: 00 01 00 00
Des:     CAN-EZ
Load menu page ◀
```

- selected node number

Access to the CAN-EZ 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 CAN-EZ)

**Rev.No.:** Revision number

**Des:** Node product description

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

**Load menu page** - access the CAN-EZ menu level. The UVR1611 (or the CAN monitor) now serves as a display for the CAN-EZ; an expert level user can change all device specific parameters and settings!

**WARNING:** Two devices cannot have the same node number (address) in a network! Consequently, if several CAN-EZ meters, which have the same node number (40), are linked together in a network, the devices must be connected **sequentially**. After the first CAN energy meter has been connected to the CAN bus, it must be allocated a node number which does not equal 40 (see "Network" menu). **Only then can the next energy meter be incorporated in the network.**

## Main menu

MENU
Version
Date/time
Measurement overview
Individual power
Connection test
Inputs
Functions
Network
Data administration

Information about device software  
 Control display date/time (cannot be changed here)  
 Display of all measurement values (including network inputs)  
 Display of individual electric metering outputs  
 Testing option for the network connections  
 Input parameterisation  
 Parameterization of the functions (Perf.factor, HT MTR1-3, E MTR4)  
 CAN network settings  
 Data transfer using boot loader

## MENU Version

CAN - EZ
Operat. sys: A2.xxEN
Boot sector: B2.xx

Device software version number and language  
 Version number of the boot range

**Operating system:** Device software version number and language. The latest software (higher version number) is available for download at <http://www.ta.co.at>. Using an additional device – the interface C.M.I. or the Bootloader BL-NET - you can transfer the software to the CAN-EZ.

**Boot Sector:** Version number of the boot area. So that the device processor can program itself with the operating system, it requires a basic program in a protected memory area - the boot sector.

## MENU Measured values overview

In this menu, all entries of the measured values are listed in a table:

CAN - EZ	
INPUTS:	
1: 60,3 °C	27,6 °C
3: 49,2 °C	88,4 °C
5: 543 l/h	644 l/h
7: 4,2 kW	
-----	
	next ◀
NETWORK INPUTS:	
1: OFF	ON
17: 25,4 °C	10,6 °C

Forward to the next display page

In the example the temperature at sensor 1 is 60.3°C, the one at sensor 2 is 27.6°C, etc.

If there is a network connection to other devices, the digital conditions and analog values of the defined network inputs are subsequently displayed too.

In the example, network input 1 (=digital input 1) is in the "OFF" state, network input 2 is in the "ON" state, network input 17 (= analog input 1) is equal to 25.4°C and network input 18 is equal to 10.6°C.

## MENÜ Individual power

Individual power	
3 phase pow.	
	4,2 kW
p1:	1,3 kW
p2:	1,3 kW
p3:	1,6 kW

This menu displays 1 or 3-phase power (which can be selected in the menu Inputs / Input 7) and partial outputs for individual phase conductors.

## MENU Connection test

CONNECTION TEST	
U1: ✓	I1: ✓
U2: ✓	I2: ✓
U3: ✓	I3: ✓
	IN: ✓
Rot. f.: right	

In this menu, the successful connection (by pressing the contact pins through the conductor insulation), the functioning of the current transformer (current  $I > 0$ ) and the rotating field can be checked.

# MENU Inputs

This menu is used for parameterisation of the CAN energy meter's inputs.

INPUTS		
1:	52,7 °C	PAR? ◀
2:	23,4 °C	PAR?
3:	68,5 °C	PAR?
4:	54,3 °C	PAR?
5:	543 l/h	PAR?
6:	644 l/h	PAR?
7:	3-phase pow. 4,2 kW	

Parameterization of the inputs takes place as for the UVR1611 controller and is described in the controller manual.

3 phase or single phase power  
Setting of whether a single or 3-phase consumer is measured.

## Input properties

Type / Measured variable / Process variable	Input 1	Input 2	Input 3	Input 4	Input 5	Input 6
<b>Digital</b>	X	X	X	X		
<b>Analogue</b> Measured variable: Temperature (KTY, Pt1000, RAS, thermocouple THEL), RASPT	X	X	X	X		
<b>Analogue</b> Measured variable: Solar radiation (GBS), humidity (RFS), rain (RES)	X	X	X	X		
<b>Analogue</b> Measured variable: Voltage 0-5 V Process variables: dimensionless, temperature, solar radiation, voltage, current, resistance, flow rate, pressure	X	X	X	X		
<b>Analogue</b> Measured variable: Flow rate (Sensor: DN... = FTS...)					X (VT1)	X (VT2)
<b>Impulse</b> Measured variable: Flow rate(sensor: VSG...)					X (DI1)	X (DI2)

If a FTS sensor is connected to VT1 (volume flow at input 5), no further sensor can be connected to input 3, as the sensor temperature of the FTS is taken from this input. The same is true for VT2 or inputs 6 and 4.

All input types and measured variables can always be selected at all inputs. However if properties are selected, which the input does not allow, then the last set selection remains.

## Examples for parameterizing of inputs

INPUT 1	
TYPE:	ANALG.
MEAS.VAR:	Temp..
SENSOR:	Pt 1000
SENSOR CORR:	0.0 K
AVERAGE:	1.0 Sec

Temperature sensor Pt1000

INPUT 5	
TYPE:	IMPULSE
MEAS VAR:	Flow rate
QUOTIENT:	0,5 l/Imp
AVERAGE:	1,0 Sec

Volume flow sensor VSG

INPUT 5	
TYPE:	ANALG.
MEAS.VAR:	Flow rate
SENSOR:	FTS4-50 DN15
AVERAGE:	1,0 Sec

Volume flow sensor FTS  
(without DL)

## MENU Functions

FUNCTIONS	
Perf.factor	◀
Meter	
1 2 3 4	

Selection of the desired functions (meter)

1- 3 = heat meter HT MTR

4 = electrical energy meter EM

## Definitions

### COP value (COP= Coefficient of Performance)

Ratio of the output heat power (kW) to the consumed electrical operating power incl. auxiliary energy **under test conditions** (defined temperature conditions, defined time points).

$$\text{cop} = Q_{\text{HP}} / P_{\text{el}}$$

The COP value also includes the power of auxiliary units (thawing energy, fraction of pump capacity for heating, brine or groundwater heat pumps).

Consequently the COP value is a good criterion for heat pumps.

Test institutes determine this value according to a defined measuring method (DIN EN 255).

However performance number and COP value do not allow any energy-based evaluation of the overall system. They are only a snapshot of certain heat pump (HP) type under favourable operating conditions (e.g. at 35°C flow temperature). The (yearly) performance factor is much more meaningful for a **system**.

### Performance factor $\beta$

The performance factor is the actual COP during operation.

It is the ratio of the heat energy yield (kWh) to the consumed operating and auxiliary power (kWh) over a given time period:

$$\beta = W_{\text{Useful}} / W_{\text{el}}$$

**The more important performance factor for the efficiency of a system is therefore the (annual) performance factor  $\beta$ .**

This is the result of **measurements** at the electricity meter for the supplied electrical energy (compressor, heat source pump) and at the heat meter (output thermal energy of the heat pump) over a given time interval. If the interval is one year, then the annual performance factor or annual COP is referred to.

## Performance factor

PERF.FACTOR	
INPUT VARIABLE:	
SERVICE MENU:	
DAILY VALUES:	
MONTHLY VALUES:	
ANNUAL VALUES:	
THERMAL OUTPUT:	
1:	12.20 kW
2:	8,64 kW
3:	6,73 kW
	27,57 kW
ELECTRICAL OUTPUT:	
	3.10 kW
curr. PF:	3.93

Selection of the participating meters  
 Reset of the history (=deletion of all values)  
 List of daily values  
 List on monthly valves  
 List of yearly values (annual performance factors)

} Actual values

## Input variables

INPUT VARIABLE	
ENABLE PERF.FACTOR:	
Source:	User
Status:	ON
THERMAL OUTPUT:	
Source 1:	HT MTR 1
Source 2:	HT MTR 2
Source 3:	HT MTR 3
ELECTRICAL OUTPUT:	
Source:	E MTR 4

Selection: User, input 1-4 (parameterization: digital), network digital 1-16

Selection: HT MTR 1 – 3, these values are added to calculate the performance factor

Selection: E MTR 4

## Service menu

SERVICE MENU	
RESET	
HISTORY:	no

Switching to "yes" causes resetting of the values

## Displaying the values

In the controller UVR1611 only the last values can be displayed. If "TOTAL LIST" is selected, no other values are displayed.

When displaying on the PC via boot loader BL-NET or in the CAN monitor, if "TOTAL LIST" is selected all stored values since the last history reset are displayed.

The daily, monthly or annual values are respectively saved at the changeover of the day, month or year. **Daily values example:**

DAILY VALUES	
15.02.2012:	3.93
16.02.2012:	3.15
.....	



## Heat meters HT MTR 1 – 3

```

HEAT METER 1
-----
INPUT VARIABLE:
SERVICE MENU:

Status: UNCALIBRATED

FROST PROT:      0 %
Tflow:           68,2 °C
Treturn:         56,3 °C
DIFF:            11,9 K
FLOW RATE:       468 l/h
OUTPUT:          12,20 kW
HEAT AMOUNT:
                0    118,2 kWh
    
```

Parameterisation of HT MTR 1

Meter resetting, calibration

Antifreeze fraction in %

Actual values

### Input variables

```

INPUT VAR. HQC 1
-----
ENABLE HM 1:
Source: User
Status: ON

FLOW TEMPERATURE:
Source: Input 1

RETURN TEMPERATURE:
Source: Input 2

next page:
-----
FLOW RATE:
Source: Input 5

METER RESET:
Source: User
        unused
    
```

Selection: User, input 1-4 (parameterization: digital), network digital 1-16

Selection: Input 1-4, Network analog 1-16

Selection: Input 1-4, Network analog 1-16

Selection: Input 5-6, Network analog 1-16

Selection: User, input 1-4 (parameterization: digital), network digital 1-16

For a more precise measurement of the flow and return temperatures, we recommend the use of Class A ultra-fast sensors (type: MSP60).

## Service menu

SERVICE MENU	
Log meter	yes
RESET	
METER:	no
HEAT AMOUNT:	
0	118,2 kWh
CALIBRATION	
START:	no
Status:	UNCALIBRATED
DIFFEREN.:	0.00 K

Query whether the meter values should be logged in the **Win-so!** program

Reset of the meter to zero

Actual heat amount

Start command for calibration

The heat meter is not yet calibrated

Display of the difference measured during the calibration process

## Calibration

By simultaneously measuring the same temperature with both sensors, the computer can ascertain the deviation of the sensors from each other and include it as a correction factor when calculating the heat amount in the future.

**As a result measuring accuracy can be considerably increased.**

### Calibration process:

1. Immerse the sensors in the water bath (-> both sensors at the same temperature). The water bath should be at approximately 40°C. Ensure that both sensors are completely immersed and are not touching the cool bath edge.
2. Start the calibration process by selecting "**START: yes**".
3. After successful calibration, the status "CALIBRATED" appears. The measured difference value is displayed.

If a calibration had already been carried out, then the calibration cannot be reversed (i.e. the prior calibration is lost).

If a calibration is carried out inadvertently or falsely executed, the calibration must be repeated under the specified conditions (both sensors at the same temperature).

## Energy meter E MTR 4

```
ENERGY METER 4
-----
INPUT VARIABLE:
SERVICE MENU:

OUTPUT:      4,20 kW
ENERGY:
      0      40,5 kWh
```

Parameterisation of E MTR 4  
meter reset

} Actual values

### Input variables

```
INPUT VAR. EM4
-----
ENABLE EM 4:
Source:  User
Status:  ON

OUTPUT:
Source:  Input 7

next page:
-----
METER RESET:
Source:  User
      unused
```

Selection: User, input 1-4, network digital 1-16

Selection: Input 7, Network analog 1-16

Selection: User, input 1-4 (parameterization; digital), network digital 1-16

**Important note:** In the menu "**Inputs**" for input 7 a setting must be made to indicated whether the connected consumer is single or 3-phase.

### Service menu

```
SERVICE MENU
-----
Log meter   yes

RESET
METER:      no
ENERGY:
      0      40,5 kWh
```

Query whether the meter values should be logged

Reset of the meter to zero

Current meter level

Although the meter value is written every 90 minutes to the internal storage, it is lost when new function data is loaded (load factory settings, data transfer from C.M.I.)! Therefore for this reason, should a power failure occur, up to 90 minutes meter data can be lost.

## MENU Network

NETWORK	
Node no.:	40
Node status	
INPUT VARIABLE:	
OUTPUT VARIABLE:	
DATA LOGGING:	

the device has network address 40 (factory setting)

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

**Node No.:** Each network device must be allocated a different address (node number 1- -62)!

**Node status:** Shows an overview of the current states of the inputs and network inputs of the CAN-EZ module, comparable with the measured values overview. This page is fixed and cannot be changed.

### Changing the device node number

If the node number is selected in the network menu, the following sub-menu appears for changing the device address:

CHANGE NODE NO.	
Current no.:	40
New no.:	42 ◀
REALLY	
CHANGE ?	no

Instantaneous node number of the device

Select new node number (example: 42)

Adopt new node number

As the UVR1611, UVR16x2 controller or CAN monitor (client) has a fixed connection to the CAN-EZ (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 make a new connection to the CAN-EZ.

## Input variable

The CAN-EZ can accept values from other CAN network members or from the DL bus (data link). These input variables are specified here. There are 16 digital and 16 analog network inputs available.

INPUT VARIABLE
DIGITAL:
Timeout:
ANALG.:
Timeout:

Selection of variables and specification of the timeouts

## Digital network inputs

DIGITAL NETW. INPUT
1 ◀ 2 3 4 5 6
7 8 9 10 11 12
13 14 15 16

### Example: Digital network input 1

DIGITAL NETW. INPUT 1
NW node: 1
dig.NW.outp.: 1
Source: CAN
Status: ON
NW status: OK

Transmit node

Output of the node

Source: CAN or DL

Current status

Network status (display "Timeout" if the signal has not been received for longer than the set time)

If the node number is set to 0, the input is classed as unused.

Parameterisation of the **analog network inputs** takes place in the same way, rather than the "status", the actual value is displayed without the comma.

## Timeout

TIMEOUTS NETW.INP.
DIGITAL INP.: 1...4
Timeout 60 Min
DIGITAL INP.: 5...8
Timeout 60 Min
...

Adjustable timeout time (5 – 240 min)

If the value of a network input variable is not received for longer than the set time, a timeout display is generated.

## Output variable

<pre> OUPUT VARIABLE ----- DIGITAL: Transmission cond.:  ANALG.: Transm. cond. 1...8: Transm. cond. 9..16: </pre>
---

Selection of variables and specification of the transmit conditions

### Digital network outputs

<pre> DIGITAL NETW. OUTPUT ----- 1 ◀ 2   3   4   5   6 7   8   9  10  11  12 13 14  15  16 </pre>
---

#### Example: Digital network output 1

<pre> DIGITAL NETW. OUTPUT 1 ----- Source: Input 1 </pre>
---

Selection of the source  
 Selection: User (unused), input 1-4, network digital 1-16, connection test U1-U3, I1-I3

### Analog network outputs

Once the output number is selected, the following menu appears:

<pre> ANALOGUE NETW. OUTPUT ----- Source: Input 1 </pre>
--

Selection of the source: User (unused), input 1-8, network analog 1-16, HT MTR-3, E MTR4, performance factor, individual outputs P1-P3 (rounded to 1 decimal place, rounding examples: +1.15 kW ⇒ 1.1 kW, -1.15 kW ⇒ -1.2 kW)  
 If a HT MTR or E MTR is selected all input variables, the output and meter values are available.

## Transmission conditions

- with change yes/no:** Only for **digital** network inputs: Transmission of a message if a status change occurs
- with change > 30:** Only for **analog** network inputs: If the current value changes relative to the last transmitted value by more than 3.0K, a new transmission is made (= 30, as numerical values are transmitted without the decimal point).
- Block. time 10 sec:** If the value changes within 10 seconds of the last transmission by more than 30, the value is nevertheless only transmitted again after 10 seconds.
- Interval time 5 min:** The value is transmitted every 5 minutes even if it has not changed by more than 30 since the last transmission.

## 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 current function data in the CAN-EZ
Last transfer:	
successful	Status of the last data transfer
DATA <=> BOOTLD.: ◀	Sub-menu for the data transfer

DATA <=> BOOTLOADER	
Upload data:	
CAN - EZ => BOOTLD.	Function data upload
Download data:	
BOOTLD. => CAN - EZ	Function data download
OPER.SYSTEM<=BOOTLD.:	
Download oper.system:	
BOOTLD. => CAN - EZ	Operating system update

After the CAN-EZ has been prepared for the desired data transfer and the security prompt confirmed, the energy meter 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 boot loader.

However data transfer can also be carried out from the PC using browser/boot loader (see the boot loader BL-NET operating manual).

**WARNING:** During data transfer, the UVR1611, CAN monitor and BL--NET cannot access the CAN-EZ.

As the CAN-EZ does not have its own display, the data transfer can therefore not be monitored. Whether the data transfer was successful or not can only be checked by next opening the menu Data Administration in the CAN-EZ and checking the status of the last data transfer.

## Function data upload

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

```
CAN - EZ => BOOTLD.  
-----  
DATA SOURCE: CAN - EZ  
DATA TARGET: Bootld.  
Storage point: 1  
  
REALLY START  
DATA UPLOAD?    no
```

Storage location for the function data in the boot loader

Selecting "yes" changes the CAN-EZ to transfer mode

If the CAN-EZ is ready for data transfer, this is carried out by pressing the START button on the boot loader.

## Function data download

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

```
BOOTLD. => CAN - EZ  
-----  
DATA SOURCE: Bootld.  
Storage point: 1  
  
DATA TARGET: CAN - EZ  
  
REALLY START  
DATA DOWNLOAD?  no
```

Storage location for the function data in the boot loader

Selecting "yes" changes the CAN-EZ to transfer mode

If the CAN-EZ is ready for data transfer, this is carried out by pressing the START button on the boot loader.



## Operating System Download

Through its flash technology, the device provides the option of replacing its own operating system (device software) with a more up-to-date version (link to the download area of the Internet address <http://www.ta.co.at>) with the aid of the boot loader.

To transfer the operating system from the PC to the boot loader at least version 2.08 of the **Memory Manager** is required.

The importing of a new operating system is only advisable, if it contains new, required functions. Updating the operating system always has an associated risk (comparable with flashing a PC BIOS) and in all cases requires checking of all function data, as compatibility problems are to be expected due to new function components!

```
BOOTLD. => CAN-EZ
-----
REALLY START OPERAT
SYSTEM DOWNL. ?   no
```

Selecting "yes" changes the CAN-EZ to transfer mode

If the CAN-EZ is ready for data transfer, this is carried out by pressing the START button on the boot loader.

**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-EZ after the update.

## Data logging of CAN-EZ values (C.M.I.)

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

The logged values are divided into 2 data records:

	Analogue 1-6	Analogue 7-8	Analogue 9-12	Digital 1-16	Meter 1 - 3
<b>Data record 1</b>	Inputs 1-6	Unused	Analogue net- work inputs 1-4	Unused	Thermal heat meter HT MTR1 to 3
<b>Data record 2</b>	Analogue network inputs 5-10	Analogue network inputs 11-12	Analogue net- work inputs 13-16	Digital net- work outputs 1-16	Energy meter E MTR 4

## Data logging values of the CAN-EZ (BL-NET)

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

Data logging of the values of the CAN-EZ takes place in mode "**CAN Datalogging**". The values of the CAN-EZ are output in 2 specified data records. The data records for recording in the boot loader are specified in **Setup dialogue** under "**Data recording**".

## Configuration

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

	Device	Nodes	Data record
1	UVR1611	1	1
2	UVR1611	1	2
3	CAN-EZ	40	1
4	CAN-EZ	40	2

**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.

**Important instructions re CAN data logging:** One controller UVR1611 must be assigned **node number 1** in the CAN network, so that the time stamp of this controller can be accepted from the boot loader. This controller must be at least version A3.18. The following units are output as the temperature: l/pulse, V, mA, pulse, kOhm, km/h, bar, % room humidity. Dimensionless values (e.g. meter states) cannot be logged.

General information about *Winsol* can be found in the BL-NET manual.

Special information about the tab “**Current measured values**” for the CAN-EZ:

## Current measured values

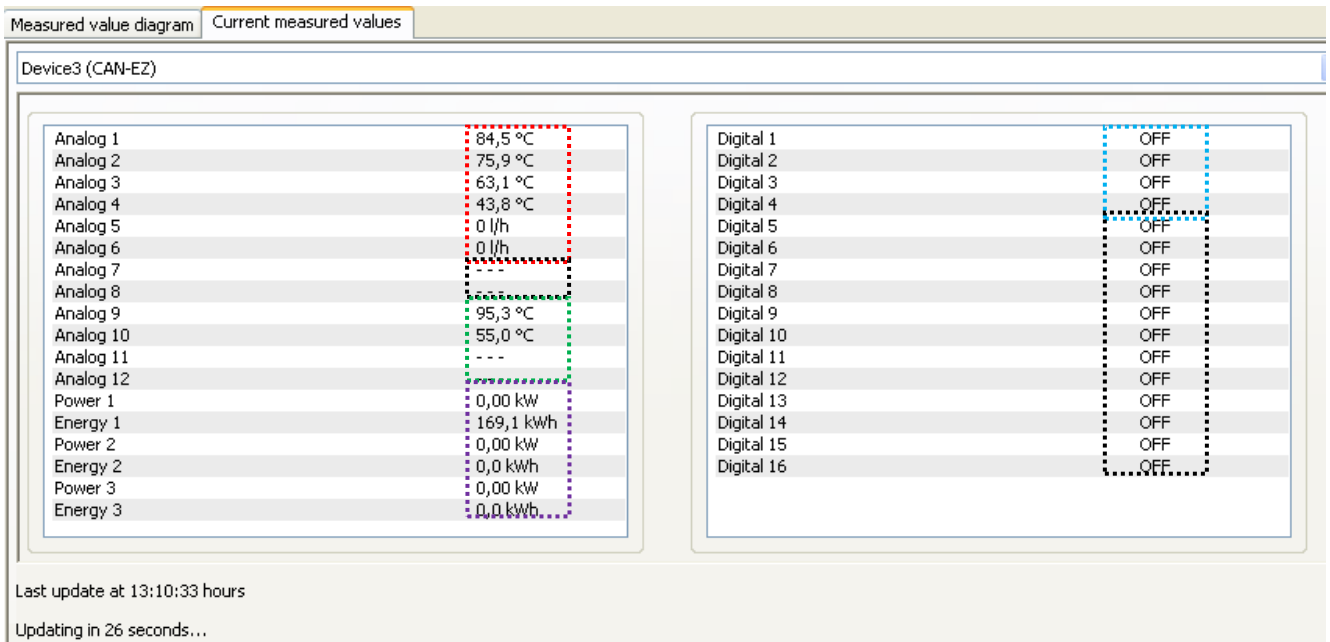
The values of the CAN-EZ are output in 2 specified data records.

Distribution of the display values over the two data records:

	Analogue 1-6	Analogue 7-8	Analogue 9-12	Digital 1-16	Meter 1 - 3
<b>Data record 1</b>	Inputs 1-6	Unused	Analogue network inputs 1-4	Unused	Thermal heat meter HT MTR 1 -3
<b>Data record 2</b>	Analogue network inputs 5-10	Analogue network inputs 11-12	Analogue network inputs 13-16	Digital network outputs 1-16	Energy meter E MTR 4

In the example the display of the values of the CAN-EZ was set as “devices” 3 and 4. This results in the following view in the tab “**Current measured values**”:

**Data record 1 of the CAN-EZ (in the example: device 3):**



The following values are displayed:

Analog 1 - 6 : analogue Inputs 1 - 6

Analog 7 - 8 : unused

Analog 9 - 12 : Analogue network inputs 1 - 4

Digital 1 – 4 : Digital inputs 1 - 4

Digital 5 - 16 : unused (always set to "OFF")

Meter 1 - 3 : Thermal heat meter

So that a heat meter is logged, the query must be set to "yes" in the service menu of the heat meter.

## Data record 2 of the CAN-EZ (in the example: device 4):

Measured value diagram		Current measured values	
Device4 (CAN-EZ)			
Analog 1	54,8 °C	Digital 1	ON
Analog 2	5,0 °C	Digital 2	ON
Analog 3	---	Digital 3	OFF
Analog 4	---	Digital 4	OFF
Analog 5	---	Digital 5	OFF
Analog 6	---	Digital 6	OFF
Analog 7	---	Digital 7	OFF
Analog 8	---	Digital 8	OFF
Analog 9	---	Digital 9	OFF
Analog 10	---	Digital 10	OFF
Analog 11	---	Digital 11	OFF
Analog 12	---	Digital 12	OFF
Power 1	0,00 kW	Digital 13	OFF
Energy 1	75,1 kWh	Digital 14	OFF
Power 2	---	Digital 15	OFF
Energy 2	---	Digital 16	OFF
Power 3	---		
Energy 3	---		

Last update at 13:14:25 hours  
Updating in 28 seconds...

The following values are displayed:

Analog 1 - 12: Analogue network inputs 5 - 16

Digital 1 - 16: Digital network inputs 1 - 16

Meter 1: Energy meter

Meter 2 - 3: unused

So that the electrical energy meter is logged, the query must be set to "yes" in the service menu of the meter.

## Notes on accuracy

The accuracy of all measured energies and energy flow depends on many factors and is to be subject to closer consideration here.

- PT1000 **class B** temperature sensors have an accuracy of +/- 0.55K (at 50°C). For class A sensors (e.g. ultra-fast MSP60 sensor), the accuracy is +/- 0.25K (at 50°C).
- The uncertainty of the CAN-EZ temperature measurement is +/- 0.4K per channel.

For an assumed spread of 10K, these two measuring errors between the flow and return give a **maximum** measuring error of +/- 1.90K = **+/- 19.0%** for class B and +/-13.0% for class A.

- At lower heat injections, the measurement error increases.
- The accuracy of the volume flow sensor FTS 4-50DL equals approximately **+/- 1.5%**
- The measurement error of the electrical energy measurement equals **+/- 3%** (for  $\cos \phi = 0.6$ )

The maximum overall measurement error for the performance coefficient therefore equals, in the most **unfavourable** case:

$$1.19 \times 1.015 \times 1.03 = 1.244$$

This means a performance factor accuracy in **the most unfavourable** case of **+/- 24.4%** (at 10K injection, **without calibration** of the temperature sensors), whereby all the measurement errors must act to falsify the measurement result in the same direction.

From experience such a case (worst case) never actually occurs and in the worst case half this value can be assured. However even 12.2% is not justifiable.

After calibration of the temperature sensors (see chapter "Heat meter" WMZ1-3/ Service menu") the measurement error of the overall temperature measurement reduces to a maximum 0.3K. Relative to the above assumed injection of 10K this equals a measurement error of 3 %.

The maximum overall measurement error for the performance coefficient therefore equals:

$$1.03 \times 1.015 \times 1.03 = 1.077$$

With 10K injection and **calibration** of the temperature sensors the accuracy of the performance factor measurement in the **worst** case improves to **+/- 7.7 %**.

## Technical data

**Important information** about the measuring limits of the electrical energy meter:

1. If the effective power value is available as kW only, then cos phi must be observed.
2. The consumer load must lie within the specified power limits.
3. As the power consumption of heat pumps **with frequency converters (inverters)** is not sinusoidal, there is a risk of over control of the measuring movement resulting in a measurement error. The actual peak value of the current must never exceed 17A. This reduces the maximum output by about 30% compared with the specified limits.

Rated voltage consumer	3 x 400/230V 50 Hz
Power range with single phase connected consumer	0.3 kVA to 3.3 kVA / 230V
Power range with 3-phase connected consumer	0.8 kVA to 10.0 kVA / 3x400V
Cos phi range of the electrical consumer	0.6 to 1.0 inductive
Cross section range for energy meter	2.5 mm <sup>2</sup> to 4 mm <sup>2</sup>
Sensor inputs 1-4,	Digital inputs, standard sensors of type PT1000 and KTY- sensor (2 kΩ), thermocouple, radiation, humidity, rain and room sensor, voltage inputs (0-5 V DC) e.g. for electronic vortex sensors
Sensor inputs 5, 6	Inputs for analog flow sensors (type FTS) or pulse (type VSG)
DL-bus input	For electronic sensors via DL-bus
DL-bus load	100%
Ribbon cable length for FTS...	2m
CAN- Bus	Data rate 50 KB/sec
Max. ambient temperature	0°C to 40°C
Protection class	IP40
Dimensions	W x H x D = 127 x 76 x 46 mm

We reserve the right to make technical changes

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# EU Declaration of conformity

Document- Nr. / Date: TA17005 / 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-EZ  
Product brand: Technische Alternative RT GmbH  
Product description: CAN – Energy Meter

***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
2009/125/EC	Eco-design directive

***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 envi- ronments
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



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

***This declaration is submitted by***

A handwritten signature in black ink, appearing to read 'Schneider Andreas'. The signature is written in a cursive, flowing style.

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 anyway 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 overvoltages 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](http://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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