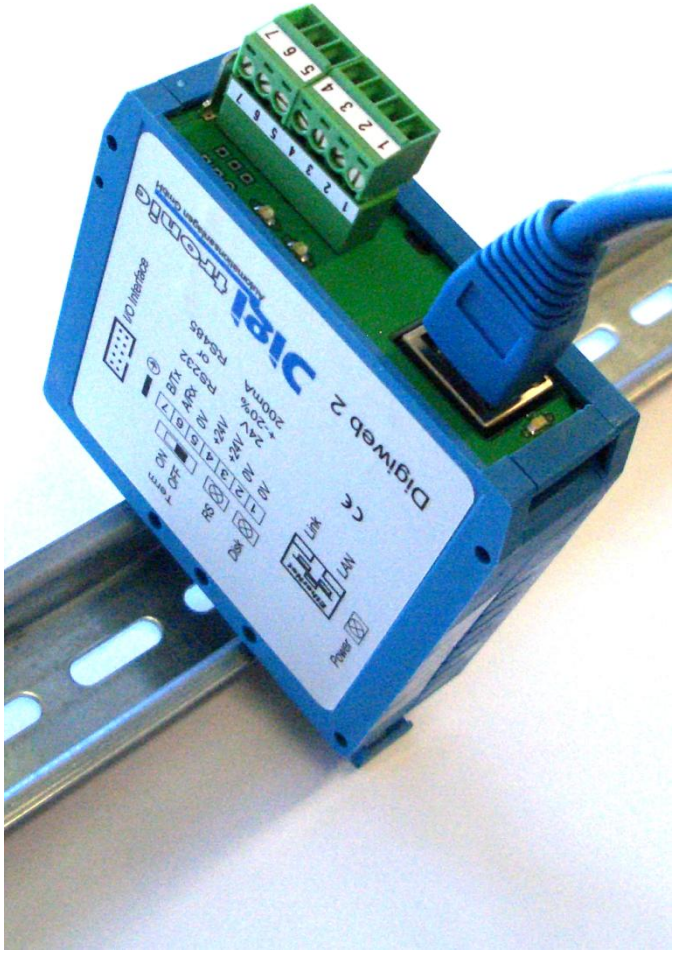
Modbus RTU Ethernet Gateway

Type: **DWZ MODBUS-GW**



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Notification

This handbook corresponds with the unit version of 5/2015. The company Digitronic Automationsanlagen GmbH reserves the right to implement changes that result in an improvement of the quality and the functions of the device at any time and without any announcements.
This instructions manual was created with a maximum of care, but mistakes are not out of the question. We are thankful for any comments, regarding possible mistakes in the instruction manual.

Update
You can also obtain this instruction manual on the Internet at http://www.digitronic.com in the latest version as PDF file.

Qualified personal only
Commissioning and operation of the device may only be carried out by qualified personal. Qualified personal are persons, authorized with commissioning, grounding and labeling devices, systems and electrical circuits according to the applicable standards of security

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Note: The products of Digitronic are so well constructed that they will not be effected by the millenium.

Note: This device fulfills the following norms according to electromagneticalcompatibility: EN 55011, EN 55022, EN 55024 Teil 2, EN 50082 Teil 2, ENV 50140, VDE 0843 Teil 2, VDE 0843 Teil 4, VDE 0871, VDE 0875 Teil 3 (and RoHS 2 (2011/65/EU).

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1 Introduction

The embedded WEB server of the series **DigiWEB** such as the heating control system **DigiENERGY** or the energy efficiency system, **bluebox** supports the Modbus TCP by default; however it is not possible to provide them with an RS485 Modbus RTU Slave interface.

To do so, another embedded WEB server of the type **DigiWEB 2** with a two-wire RS485 interface and advanced settings are needed. Order No: **DWZ MODBUS-GW**

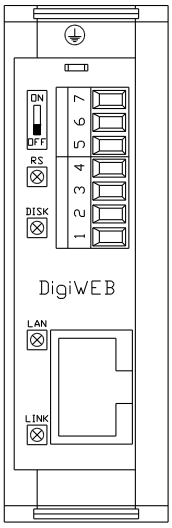
In the gateway a firmware is required from: V4.056x (26.2.2015) and the files or WEB sites: modbus.csv, modbus.htm, modbus_setup.htm and symbol.csv.

2 Installation

The device is being snapped on an "EN - mounting rail" in the switch cabinet. The ground terminal has to be applied on the shortest way on a block earth terminal arranged beside the device. Thanks to the earthed mounting plate and its electrical connection to the EN – a mounting rail with an optimum discharge of the interferences on the shielding is being achieved. Connect all cables in a voltage-free state! Make sure to use a category 5 patch cable (Cat5) for the Ethernet interface.

3 Electrical connections

3.1 Voltage supply



Clamp 1: 0V Voltage supply
Clamp 2: 0V Voltage supply
Clamp 3: +24V +/- 20% Voltage supply
Clamp 4: +24V +/- 20% Voltage supply

Note: 0V clamps 1 and 2 are connected to one another.
+24VDC clamps 3 and 4 are connected to one another.

3.2 RS485 interface

Connect your Modbus RTU Master here.

Clamp 5: 0V Signal ground
Clamp 6: A (+)
Clamp 7: B (-)

Please note: On the RS485 interface, the ends of the data line needs to be connected to a terminating resistor. Please find further information in the following chapter.

3.3 Terminating resistor of the serial RS485 interface

On the RS485 interface, the ends of the data line need to be connected to a terminating resistor. It can be connected or disconnected by using the DIP switch at the front. If the DIP switch is closed the RS485 line is connected with a resistance of 150 Ohm (ON).

4 Commissioning

Before switching the **DigiWEB** 2 on for the first time please check the wiring of the device. Please refer to chapter "Electrical connections".

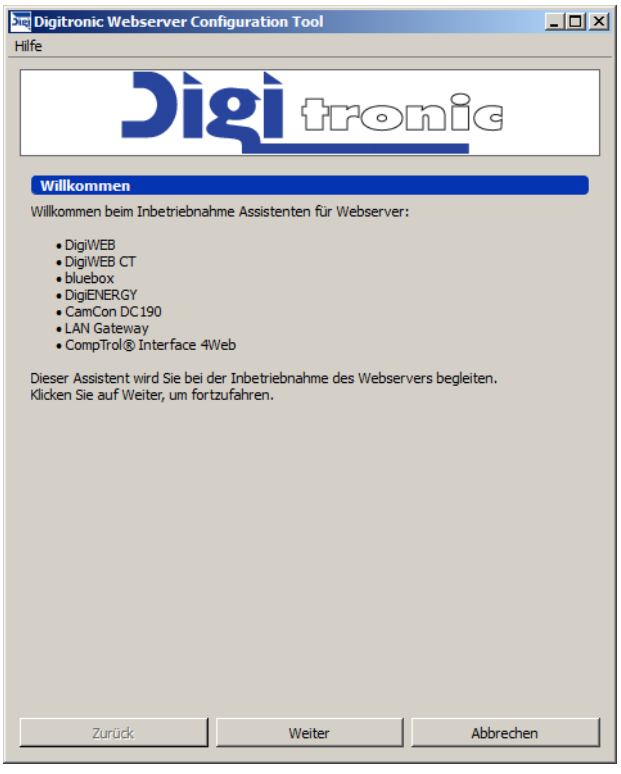
Ensure that there is an Ethernet network connection to your PC when commissioning the device.

This can be done by connecting the **DigiWEB** by means of a category 5 cable (Cat5) to a 10 or 10/100 Megabit Switch (please do not use a HUB) to your LAN (**L**okal **A**rea **N**etwork).

If you would like to operate the **DigiWEB**at a single workstation without LAN connection , then your PC should have a 10 or 10/100 Megabit network card with a TCPIP protocol with a defined IP address installed and the **DigiWEB** needs to be connected using a twisted Cat5 (Cross-Over-Cable).

The "Webserver - Configuration - Tool" or "Webserver - Setup - Tool" is required to set the IP address.

You can download it from http://www.digitronic.com or find it on the CD-ROM attached to the **DigiWEB** devices.



After having started the software please follow the instructions of the program in order to set the IP address and the network parameters.

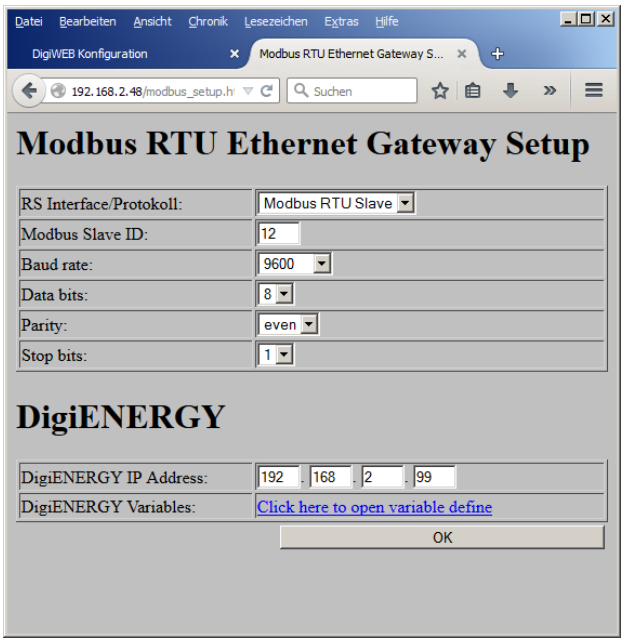
Note: Default User = **ftp** Password = **ftp**

4.1 Modbus RTU settings

To set the Modbus RTU interface please open the following WEB site:

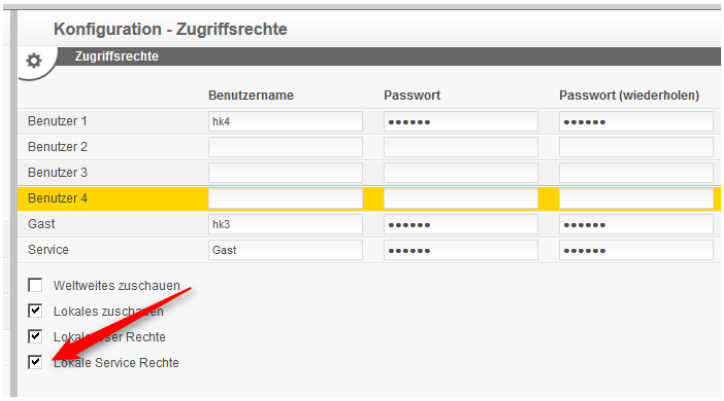
http://your.ip.address.please/modbus_setup.htm

After having entered the login data the following site opens:



Please set the parameters of your Modbus - Masters and the IP/network address of the **DigiWEB** device, this case, the heating control system **DigiENERGY**.

Please note:
In order that the gateway can access all parameters of the **DigiENERGY** the checkbox "Local service rights" in the menu "Configuration -> Access rights" needs to be activated in the corresponding **DigiENERGY**.



Attention: Through this method, all network devices and PC`s of the LAN service or admin obtain their rights. It may be avoided if only the IP address of the gateway is released in the advanced configuration.

4.2 Modbus register assignment

The structure of the Modbus protocol is determined with a 16 Bit data word and a maximum number of 65536 registers.

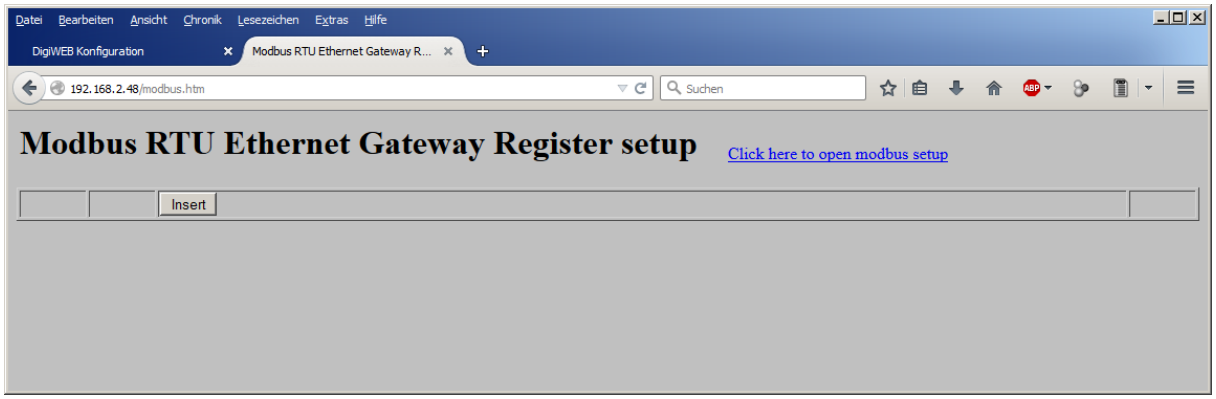
The high number of variables of the embedded WEB server of the **DigiWEB** series and the default 32 Bit width of this variable require an assignment or translation table.

It will be stored in the **DigiWEB** Modbus gateway in the database or CSV file with the name "modbus.csv". Please also refer to chapter 5.1.

In order to edit this file please open the following WEB site:

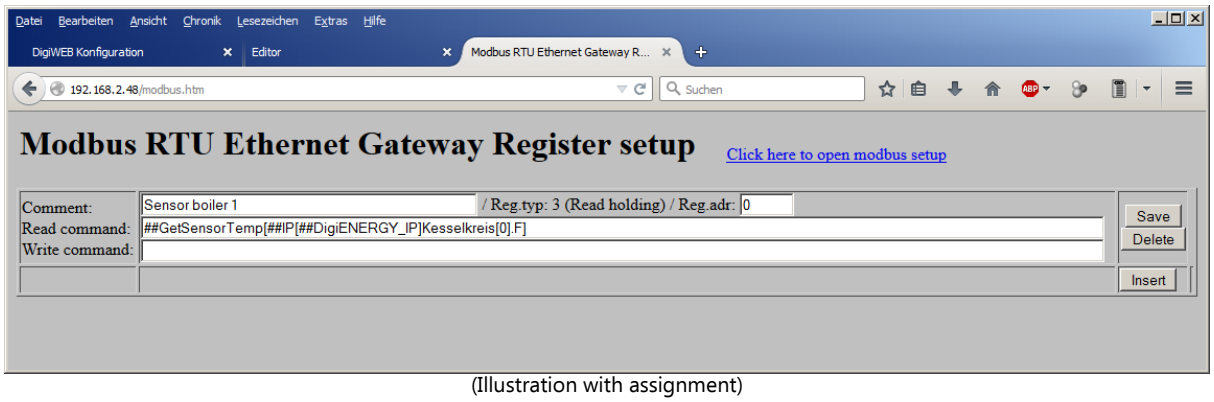
http://ihre.ip.adresse.bitte/modbus.htm

After having entered the login data the following site opens:



(Illustration without assignment)

or if assignments are already available



(Illustration with assignment)

You have four edit boxes for each Modbus: a comment box, the Modbus register address 0-65535, the **DigiWEB** reading expression and the **DigiWEB** writing expression (only required if the **DigiWEB/DigiENERGY** variable can be written and needs to be modified).

It is only possible to read the Modbus type 3 register (Read holding register) or writing is only possible for the Modbus type 6 register (Write Single Register).

By clicking on the buttons Save, Delete and Insert, it would be possible to edit the assignment or translation table "modbus.csv".

Note: Of course, it is also possible to edit the "modbus.csv" file by using a spreadsheet program such as e.g. Excel and subsequently upload the data on the gateway. Please also refer to chapter 5.1.

4.2.1 The edit boxes of the site "modbus.htm"

*** Comment:**

You can enter a free comment to describe the variable here.

*** Register address:**

Please enter the desired Modbus - Register - Address which shall be defined. Possible values are 0 to 65535.

Attention: Please make sure that you do not assign or define double addresses.

Note: In order to be able to perform a Modbus RTU reading cycle at an optimum level, you should not leave any gaps in the register addressing.

*** Read command:**

In this data field in the **DigiWEB** Syntax the reading expression or the variable name of the **DigiENERGY**, the IP address and possibly a symbol variable of the gateway are being entered.

The IP/network address of the **DigiENERGY** is saved in the gateway in the symbol ##DigiENERGY_IP (refer to Modbus_setup.htm) and used as an index for a **DigiWEB** - IP/network communication expression.

The complete reading expression has the following structure:

##IP[##DigiENERGY_IP]Variable

##IP	Is the preamble for the **DigiWEB** network communication
[##DigiENERGY_IP]	The indexed **DigiWEB** - IP/network address
Variable	The variable to be read of the desired device or of the **DigiENERGY**.

A few examples on the following page should give you a better understanding of the command.

Example 1: Reading the required temperature of the 1st. heating circuit

##IP[##DigiENERGY_IP]Raum[0].Einzel[4].Soll

Example 2: Reading the required temperature of the 2nd. heating circuit

##IP[##DigiENERGY_IP]Raum[1].Einzel[4].Soll

Example 3: Reading the oil temperature of a VW CHP unit connected via Can-BUS

##IP[##DigiENERGY_IP]BHKW_VW[0].VPSSensor1_OilTemp

To read a temperature probe directly connected to the **DigiENERGY** please first observe the following:

These values are stored in a 32Bit variable and included in the upper Bit of an error message if, for example, a probe is not connected or if there is a cable break.

Since only a 16Bit value can be transferred via Modbus, this error Bit has to be entered to the 16Bit register at another place. The symbol of the gateway ##GetSensorTemp[] serves to do so.

This icon/function will return a value of 32768 or 0x8000 in case of a probe error or a cable break. Please also refer to chapter 5.2.

Example 4: Reading the temperature of the 1st. boiler
##GetSensorTemp[##IP[##DigiENERGY_IP]Kesselkreis[0].F]

Example 5: Reading the temperature of the return probe of the 1st. boiler
##GetSensorTemp[##IP[##DigiENERGY_IP]Kesselkreis[0].F_Ruecklauf]

Example 6: Reading the temperature of the flow sensor of the 1st. heating circuit
##GetSensorTemp[##IP[##DigiENERGY_IP]Heizkreis[0].F]

*** Write command:**

If it is necessary to change the variables of the **DigiENERGY** such as the required temperatures the writing expression has to be entered in this data field in the **DigiWEB** Syntax.

Only the Modbus type 6 register (Write Single Register) can be written

The complete writing expression has the same structure as the reading expression:

##IP[##DigiENERGY_IP]Variable

##IP	Is the preamble for the **DigiWEB** network communication
[##DigiENERGY_IP]	The indexed **DigiWEB** - IP/network address
Variable	The variable to be written of the desired device or **DigiENERGY**.

Example 1: Writing the required temperature of the 1st. heating circuit

##IP[##DigiENERGY_IP]Raum[0].Einzel[4].Soll

Example 2: Writing the required temperature of the 2nd. heating circuit

##IP[##DigiENERGY_IP]Raum[1].Einzel[4].Soll

5 Annex

5.1 Structure or data fields of the "modbus.csv" file

The file "modbus.csv" is a database file separated by semicolons. You currently need 6 data fields:

Field name		Function
Id	=	Serial data record ID
Type	=	Modbus register type / currently only type 3 is possible (Read holding register)
Adr	=	Modbus register address or number / 0 .. 65535
Read	=	Command to read the register
Write	=	Command to write the register
Comment	=	Comment field

Example:

Id	Type	Adr	Read	Write	Comment
0	3	0	##IP[##DigiENERGY_IP]V1	##IP[##DigiENERGY_IP]V1	Text 1
1	3	1	##IP[##DigiENERGY_IP]V2	##IP[##DigiENERGY_IP]V2	Text 2
2	3	2	##IP[##DigiENERGY_IP]V3	##IP[##DigiENERGY_IP]V3	Text 3
3	3	3	##IP[##DigiENERGY_IP]V4	##IP[##DigiENERGY_IP]V4	Text 4

5.2 Necessary icons in the "symbol.csv" file

Two variables or functions need to be defined in the **DigiWEB** icon management for the Modbus RTU gateway functions as described in this manual.

In most cases, they are already included in the package "**DWZ MODBUS-GW**" in the file "symbol.csv".

This again is a database file separated by semicolons.

Id	Symbol	Read	Write	Com-ment	Para-meter	Cat-gory
0	##DigiENERGY_IP	##000256				all
1	##GetSensorTemp	(##A<-892?0x8000:##A)			[##A]	all

5.3 List of the DigiENERGY icons or variables

In this chapter and in the following chapters you will find an excerpt of the most important **DigiENERGY** icons or variables which can be read or written by the Modbus RTU gateway.

Most of the variables can be indexed and identified by square brackets [ ] in the variable name. The variable index is indicated in the brackets e.g. for several heating circuits, boiler circuits or CHP units.

Note: You will receive the complete list as csv file upon request.

5.3.1 System variables

##Anwesend[..]	Present / absent control with Bit map for rooms
##F_HeizkreisZulauf	Heating circuit supply temperature in 0.1°C
##VL_Soll	Total flow required in 0.1°C
##nVL_Soll[..]	Total flow required in 0.1°C
##F_ExAnf[..]	External requirements in 0.1°C
##EP.Prozent	Energy potential release in percent
##EP.W	Current electrical total output (+ = reference | - = delivery)
##Reset	Trigger reset or restart of the device

5.3.2 Variables for outdoor temperature

##Aussen.F	Outdoor temperature Temperature in 0.1°C
##Aussen.F_Filterzeit_h	Outdoor temperature Filter time in h
##Aussen.F_Gefiltert	Calculated sensor outdoor temperature low pass
##Aussen.nF[..]	Outdoor temperature from the database (Temperature in 0.1°C)
##Aussen.nFG[..]	Outdoor temperature filtered from the database (Temperature in 0.1°C)
##Aussen.Test_F_Aktiv	Test outdoor temperature sensor activated
##Aussen.Test_F	Test outdoor temperature sensor in 0.1°C
##Aussen.F_Ext	Outdoor temperature from external module

5.3.3 Variables for the room temperature adjustment

##Raum[..].F	Sensor room temperature in 0.1°C
##Raum[..].nF[..]	Sensor room temperature in 0.1°C from the database
##Raum[..].Einzel[..].F	Single room adjustment: Sensor room temperature in 0.1°C
##Raum[..].Einzel[..].VIst	Valve status
##Raum[..].Einzel[..].VSoll	Valve required status
##Raum[..].Einzel[..].Test_V	Valve test
##Raum[..].Einzel[..].ModeHeizen	Comfort mode key
##Raum[..].Einzel[..].ModeSparen	Saving mode key
##Raum[..].Einzel[..].Soll	Short term desired required value (0 = back to automatic mode)
##Raum[..].Einzel[..].SollSzene[..]	Single room adjustment
##Raum[..].Einzel[..].nSoll[..]	Room required temperature calculated in 0.1°C from the database
##Raum[..].Einzel[..].nF[..]	Sensor room temperature in 0.1°C from the database
##Raum[..].Einzel[..].Manuell_Timer	Manual timer in seconds until then the manual required value is applicable
##Raum[..].Einzel[..].Manuell_Soll	Required value in 0.1°C for manual operation
##Raum[..].Einzel[..].Allowed	Does the room exist and is it in the permitted area
##Raum[..].IsLow.dT	Maximum applicable temperature short-fall in 0.1K
##Raum[..].IsLow.Time	Maximum admissible temperature short-fall time in s

5.3.4 Variables of the boiler circuits

##Kesselkreis[..].FW.Mischer.Laufzeit	Mixer running time from 0-100% in s
##Kesselkreis[..].FW.Mischer.Totzeit100	Time between mixer flow and sensor flow at 100% circulation in s
##Kesselkreis[..].FW.Mischer.Soll	Calculated flow required in 0.1°C
##Kesselkreis[..].FW.Mischer.nSoll[..]	Calculated flow required in 0.1°C from the database
##Kesselkreis[..].FW.Mischer.O_Auf	Mixer on output
##Kesselkreis[..].FW.Mischer.O_Zu	Mixer to output
##Kesselkreis[..].FW.Mischer.Test	Test mixer 0=Auto, 1=Opened, 2=Closed, -1=Off
##Kesselkreis[..].FW.Mischer.Is	Is there a mixer? Or heating circuit at all?
##Kesselkreis[..].FW.Mischer.F	Mixer outdoor temperature (for boiler return increase)
##Kesselkreis[..].FW.Mischer.Test_F	Test Mixer outdoor temperature(for boiler return increase)
##Kesselkreis[..].FW.Mischer.Test_F_Aktiv	Test Mixer outdoor temperature(for boiler return increase)
##Kesselkreis[..].FW.F	Sensor district heating supply in 0.1°C
##Kesselkreis[..].FW.Is	District heating connection with return adjustment?
##Kesselkreis[..].FW.nF[..]	Sensor value for a certain NTP value -> daily diagram
##Kesselkreis[..].KK_RL_P_Is	Is there a boiler circuit return increase pump?
##Kesselkreis[..].KK_RL_P	Status of the boiler circuit return increase pump
##Kesselkreis[..].Test_KK_RL_P	Test boiler circuit return increase pump
##Kesselkreis[..].ErbStatus	Is the Master being found?
##Kesselkreis[..].IsSlave	Slave
##Kesselkreis[..].Pumpe_t_min	Circuit pump min. time for switching on in ms
##Kesselkreis[..].PumpeCal0[..]	Calibration pump 0% (in 0.0005V or 0.001mA)
##Kesselkreis[..].PumpeCal100[..]	Calibration pump 100% (in 0.0005V or 0.001mA)
##Kesselkreis[..].Count	Circuit pump switch on
##Kesselkreis[..].Time	Circuit pump running time in sec
##Kesselkreis[..].Durchfluss	in cm/min
##Kesselkreis[..].Durchfluss_Prozent	Boiler circuit flow in %
##Kesselkreis[..].Durchfluss_Prozent_Min	Min. circuit flow in %
##Kesselkreis[..].Min	Min. temperature in 0.1°C (from 10.0°C-60.0°C)
##Kesselkreis[..].Max	Maximum temperature in 0.1°C (from xxx_min - 90,0°C)
##Kesselkreis[..].Diff_Ein	Switching on hysteresis point for circuit pump in 0.1°K (e.g. 5.0°K)
##Kesselkreis[..].Diff_Aus	Switching off hysteresis point for circuit pump in 0.1°K (e.g. 3.0°K)
##Kesselkreis[..].Diff	Circuit difference between temperature and memory in 0.1°C
##Kesselkreis[..].Ziel	Target temperature in 0.1°C
##Kesselkreis[..].Totzeit100	Time between flow and return at 100% circulation in s
##Kesselkreis[..].ZuHeissMode	Collector circuit to extremely hot cooling??
##Kesselkreis[..].MaxToleranz	Allowed temperature excess in 0.1°K
##Kesselkreis[..].MaxToleranzMin	Allowed temperature excess time adjustment range: 1 - 20 minutes
##Kesselkreis[..].Fk_Ruecklauf	Selected return to determine the difference
##Kesselkreis[..].Is_I_Volumen	Is there a volume counter contact
##Kesselkreis[..].I_Volumen	Volume counter contact
##Kesselkreis[..].Test_Aktiv	Test heat circuit pump activated(1) / Auto(0)
##Kesselkreis[..].Test	Test heat circuit pump percent in %
##Kesselkreis[..].Test_F_Aktiv	Test flow temperature sensor activated
##Kesselkreis[..].Test_F_Ruecklauf_Aktiv	Test return temperature sensor activated
##Kesselkreis[..].Test_F	Test flow temperature sensor in 0.1°C

##Kesselkreis[..].Test FRuecklauf	Test return temperature sensor in 0.1°C
##Kesselkreis[..].Is_Pumpe	Is there a pump in the circuit?
##Kesselkreis[..].Is	Is there a circuit at all?
##Kesselkreis[..].F	Sensor flow temperature in 0.1°C
##Kesselkreis[..].nF[..]	Sensor flow temperature in 0.1°C from the database
##Kesselkreis[..].F_Ruecklauf	Sensor return temperature in 0.1°C
##Kesselkreis[..].nFRL[..]	Sensor return temperature in 0.1°C from the database
##Kesselkreis[..].Energy.nZaehlerSpeed[..]	Energy counting
##Kesselkreis[..].Energy.Typ	Basic type of the energy purchase counter
##Kesselkreis[..].Energy.I	Status of the input at the clamp
##Kesselkreis[..].Energy.Is	Gas counter
##Kesselkreis[..].Energy.Is_HZ	Is it a main meter?
##Kesselkreis[..].Energy.Speed	Uncalculated counter speed
##Kesselkreis[..].Energy.ZaehlerSpeed	in W
##Kesselkreis[..].Energy.ZaehlerStand	the display displayed on the external counter
##Kesselkreis[..].Energy.Zaehler	internal counter
##Kesselkreis[..].Energy.MengeProImpuls	in 0.001 l/impulse or in Ws/impulse
##Kesselkreis[..].Energy.MengeMax	Maximum gas output in W (50 kWh) or max. flow, etc...
##Kesselkreis[..].Energy.Prellzeit	Debouncing in ms
##Kesselkreis[..].Energy.Konstante	mostly in 0.000001 kWh/sqm
##Kesselkreis[..].Energy.Offset	in l
##Kesselkreis[..].Energy.AbStart	Billing start in 0.001 kWh
##Kesselkreis[..].Energy.AbEnd	Billing end in 0.001 kWh
##Kesselkreis[..].Energy.Preis	in 0.001 ct/kWh
##Kesselkreis[..].Energy.Betrag	in 0.01 Euros
##Kesselkreis[..].Energy.Counter.Typ	Counter type 1=standard, 3=250ms Eltaco
##Kesselkreis[..].Energy.K0	specific heat constant of the volume (!) at 0° (Water = 4216)
##Kesselkreis[..].Energy.dK	Change of the specific heat constant of the volume
##Kesselkreis[..].Energy.Start	in Wh
##Kesselkreis[..].Energy.Menge	Direct access also internal counter
##Kesselkreis[..].Wasser[..].nZaehlerSpeed[..]	Consumption counting for volume cold and hot water:
##Kesselkreis[..].Wasser[..].Typ	Basic type of the energy purchase counter
##Kesselkreis[..].Wasser[..].I	Status of the input at the clamp
##Kesselkreis[..].Wasser[..].Is	Gas counter
##Kesselkreis[..].Wasser[..].Is_HZ	Is it a main meter
##Kesselkreis[..].Wasser[..].Speed	Uncalculated counter speed
##Kesselkreis[..].Wasser[..].ZaehlerSpeed	in W
##Kesselkreis[..].Wasser[..].ZaehlerStand	the display displayed on the external counter
##Kesselkreis[..].Wasser[..].Zaehler	internal counter
##Kesselkreis[..].Wasser[..].MengeProImpuls	in 0.001 l/ impulse or in Ws / impulse
##Kesselkreis[..].Wasser[..].MengeMax	Maximum gas output in W (50 kWh) or max. flow, etc...
##Kesselkreis[..].Wasser[..].Prellzeit	Debouncing in ms
##Kesselkreis[..].Wasser[..].Konstante	mostly in 0.000001 kWh/cm
##Kesselkreis[..].Wasser[..].Offset	in l
##Kesselkreis[..].Wasser[..].AbStart	Billing start in 0.001 kWh
##Kesselkreis[..].Wasser[..].AbEnd	Billing end in 0.001 kWh
##Kesselkreis[..].Wasser[..].Preis	in 0.001 ct/kWh

##Kesselkreis[..].Wasser[..].Betrag	in 0.01 Euros
##Kesselkreis[..].Wasser[..].Counter.Typ	Counter type 1=standard, 3=250ms Eltaco
##Kesselkreis[..].Wasser[..].K0	specific heat constant of the volume (!) at 0° (Water = 4216)
##Kesselkreis[..].Wasser[..].dK	Change of the specific heat constant of the volume
##Kesselkreis[..].Wasser[..].Start	in Wh
##Kesselkreis[..].Wasser[..].Menge	Direct access also with an internal counter
##Kesselkreis[..].Energy TyProzent1000	Percentage share of Tyfocor in 0.001%
##Kesselkreis[..].F_ExAnf[..]	External requirements in 0.1°C
##Kesselkreis[..].Max_Rl	Maximum temperature in 0.1°C (from 10,0°C-60,0°C) for heat circuit return
##Kesselkreis[..].EB.nZaehlerSpeed[..]	Boiler circuit energy purchase:
##Kesselkreis[..].EB.Typ	Basic type of the energy purchase counter
##Kesselkreis[..].EB.I	Status of the input at the clamp
##Kesselkreis[..].EB.Is	Gas counter
##Kesselkreis[..].EB.Is HZ	Is it a main meter?
##Kesselkreis[..].EB.Speed	Uncalculated counter speed
##Kesselkreis[..].EB.ZaehlerSpeed	in W
##Kesselkreis[..].EB.ZaehlerStand	the display displayed on the external counter
##Kesselkreis[..].EB.Zaehler	internal counter
##Kesselkreis[..].EB.MengeProImpuls	in 0.001 l/ impulse or in Ws / impulse
##Kesselkreis[..].EB.MengeMax	Maximum gas output in W (50 kWh) or max. flow, etc...
##Kesselkreis[..].EB.Prellzeit	Debouncing in ms
##Kesselkreis[..].EB.Konstante	mostly in 0.000001 kWh/cm
##Kesselkreis[..].EB.Offset	in l
##Kesselkreis[..].EB.AbStart	Billing start in 0.001 kWh
##Kesselkreis[..].EB.AbEnd	Billing end in 0.001 kWh
##Kesselkreis[..].EB.Preis	in 0,001 ct / kWh
##Kesselkreis[..].EB.Betrag	in 0.01 Euros
##Kesselkreis[..].EB.Counter.Typ	Counter type 1=standard, 3=250ms Eltaco
##Kesselkreis[..].EB.K0	specific heat constant of the volume (!) at 0° (Water = 4216)
##Kesselkreis[..].EB.dK	Change of the specific heat constant of the volume
##Kesselkreis[..].EB.Start	in Wh
##Kesselkreis[..].EB.Menge	Direct access also to the internal counter
##Kesselkreis[..].IsLow.dT	Monitoring: Maximum admissible temperature short-fall in 0.1°K
##Kesselkreis[..].IsLow.Time	Monitoring: Maximum admissible temperature short-fall time in s

5.3.5 Variables of the burner control

##Brenner[..].Aktiv	Burner: Is the burner activated and can it burn whenever it is required?
##Brenner[..].Leistung	Burner output in W
##Brenner[..].Diff_Min	Switching on hysteresis point in 0.1°K (e.g.: 0.0°K) above (below (-)) VL_soll
##Brenner[..].Diff_Max	Switching off hysteresis point in 0.1°K (e.g.: 4.0°K) above VL_soll
##Brenner[..].Einschalt_Min	Min. duty cycle in min (e.g. for CHP unit)
##Brenner[..].Is	Does a burner exist?
##Brenner[..].Is_DA	Is the burner modulating?
##Brenner[..].On	On / Off
##Brenner[..].Abnutzung	Burner wearing time in sec
##Brenner[..].Test	Test boiler 0-100,0°, 0° is off
##Brenner[..].Test_Aktiv	Activate test
##Brenner[..].Time	Running time in sec
##Brenner[..].Count	Switching on
##Brenner[..].Soll	Burner calculates the required temperature in 0.1°C (0 = Burner off)
##Brenner[..].IsKaskade	Burner is participating in a cascade
##Brenner[..].O_Is_DA	Conventional output is used as an analogue output
##Brenner[..].DaCali4mA	Temperature minimum value DA parametrization at 4 mA or 2V (in 0.1°C)
##Brenner[..].DaCali20mA	Temperature maximum value DA parametrization at 2 mA or 10V (in 0.1°C)
##Brenner[..].DaCaliOutMin	Voltage minimum value DA parametrization at 4 mA or 2V
##Brenner[..].DaCaliOutMax	Voltage maximum value DA parametrization at 20 mA or 10V
##Brenner[..].dSoll	Analogue output: Burner required temperature increase in 0.1K
##Brenner[..].SpeicherLaden	Storage loading for CHP unit timer On / Off
##Brenner[..].IsLow.dT	Maximum admissible temperature short-fall in 0.1K
##Brenner[..].IsLow.Time	Maximum admissible temperature short-fall time in s
##Brenner2[..].Aktiv	Peak load burner: Is the burner activated and can it burn whenever it is required?
##Brenner2[..].Leistung	Burner2 Output in W
##Brenner2[..].Diff_Max	Switching off hysteresis point in 0.1°K (e.g.: 4.0°K) above VL_soll
##Brenner2[..].Is	Does a burner exist?
##Brenner2[..].On	On / Off
##Brenner2[..].Abnutzung	Burner wearing time in sec
##Brenner2[..].Test	Test burner 2
##Brenner2[..].Time	Burner running time in sec
##Brenner2[..].Count	Burner switch on

5.3.6 The variables for the VW combined heat and power unit (CHP unit) via CAN-BUS

Note: The index [] starts from 0 to 3, for up to 4 CHP units.

##BHKW_VW[.].Is	Combined heat and power units available Yes/No
##BHKW_VW[.].VPSSensor1_Oil_Level	Oil filling level 0mm to 70mm
##BHKW_VW[.].VPSSensor1_PWG	Back measurement of the gas pedal encoder (PWG) signals 0 to 4095
##BHKW_VW[.].VPSSensor1_TGEN1	Generator temperature in 4 stages
##BHKW_VW[.].VPSSensor1_OilTemp	Temperature motor oil, analysis TOG in 0.1°C
##BHKW_VW[.].VPSSensor1_TG2a	Temperature - Sensor electrical module on the board in 0.1°C
##BHKW_VW[.].VPSSensor1_TOEL	Oil temperature separate sensor in 0.1°C
##BHKW_VW[.].VPSSensor2_TKM1	Cooling water temperature V motor inlet (after WWT) in 0.1°C
##BHKW_VW[.].VPSSensor2_TKM2	Cooling water temperature V motor outlet (after motor) in 0.1°C
##BHKW_VW[.].VPSSensor2_TA1	Exhaust gas temperature after exhaust gas heat exchanger in 0.1°C
##BHKW_VW[.].VPSSensor2_TH1	Hot water temperature at the outlet of the WW heat exchanger in 0.1°C
##BHKW_VW[.].VPSSensor2_THKEV	Temperature upstream the motor valve V3 in 0.1°C
##BHKW_VW[.].VPSSensor2_THKER	Temperature downstream the motor valve V3 in 0.1°C
##BHKW_VW[.].VPSSensor3_TEGS	Temperature of the EGS recorded by the EGS in 0.1°C
##BHKW_VW[.].VPSSensor3_TGrm	Temperature from the basic module recorded by the EGS in 0.1°C
##BHKW_VW[.].VPSSensor3_TKmot	Temperature in the motor cooling circuit recorded by the EGS in 0.1°C
##BHKW_VW[.].VPSSensor3_PSaugr	Suction pipe pressure 0mbar to 1310,7mbar in steps of 0.02mbar
##BHKW_VW[.].VPSSensor3_PUmgb	Ambient pressure 0mbar to 1310,7mbar in steps of 0.02mbar
##BHKW_VW[.].VPSVolt1_Volt1	Voltage of the wire phase 1 / 0 to 255V
##BHKW_VW[.].VPSVolt1_Volt2	Voltage of the wire phase 3 / 0 to 255V
##BHKW_VW[.].VPSVolt1_Volt3	Voltage of the wire phase 3 / 0 to 255V
##BHKW_VW[.].VPSVolt1_NetFreq	Network frequency from 0 to 63.9375Hz in 0.001 Hz
##BHKW_VW[.].VPSVolt1_PGenTotal	Sum of the generator power of all three phases -32768 to 32767W
##BHKW_VW[.].VPSVolt2_Curr1	Effective value of the apparent current of the phase L1
##BHKW_VW[.].VPSVolt2_Curr2	Effective value of the apparent current of the phase L2
##BHKW_VW[.].VPSVolt2_Curr3	Effective value of the apparent current of the phase L3
##BHKW_VW[.].VPSVolt3_BHKWVolt1_CosPhi1	Cos Phi of the phase L1 0 to 2.55
##BHKW_VW[.].VPSVolt3_BHKWVolt1_CosPhi2	Cos Phi of the phase L2 0 to 2.55
##BHKW_VW[.].VPSVolt3_BHKWVolt1_CosPhi3	Cos Phi of the phase L3 0 to 2.55
##BHKW_VW[.].VPS_BHKWOperData1_OperTimeBhkw	Operating seconds of the CHP unit 0 to 4294967295 sec.
##BHKW_VW[.].VPS_BHKWOperData1_OperCycCnt	Number of starts 0 to 16777215
##BHKW_VW[.].VPS_BHKWOperData2_Rpm	Motor speed 0 to 2047 1/min
##BHKW_VW[.].VPS_BHKWOperData2_State	Operating state of the CHP unit control 0 to 15
##BHKW_VW[.].VPS_BHKWOperData2_OperTimeHp	Operating seconds of the heating cartridge 0 to 4294967295 sec.
##BHKW_VW[.].VPS_BHKWOperData3_OperTimeV3	Operating seconds of the motor valve V3 0 to 4294967295 sec.
##BHKW_VW[.].VPSState_POEL	Electrical oil pump / 0 - Off, 1 - On
##BHKW_VW[.].VPSState_ExHeat	Contactor for external heating rod: 0 - Off, 1 - On
##BHKW_VW[.].VPSState_ESAStart	Start requirement for the safety controller: 0 - Off, 1 - On

##BHKW_VW[.].VPSState_GenoRel	Generator relay: 0 - Off, 1 - On
##BHKW_VW[.].VPSState_Kl15	Switching clamp 15 for MSG ignition: 0 - Off, 1 - On
##BHKW_VW[.].VPSState_PKM	Circulation pump coolant circuit: 0 - Off, 1 - On
##BHKW_VW[.].VPSState_DGAS	Status of the gas minimum pressure controller: 0 - not OK, 1 - OK
##BHKW_VW[.].VPSState_ENS31	Automatic isolation unit ENS31: 0 - not OK, 1 - OK
##BHKW_VW[.].VPSState_PWG	Set point value of the pedal value sensor 0 to 4095
##BHKW_VW[.].VPSState_PowSwtState	Generator contactor monitoring: 0 - not OK, 1 - OK
##BHKW_VW[.].VPSState_SoftStart	Status of the smooth start-up / Frequency converter: 0 - not OK, 1 - OK
##BHKW_VW[.].VPSState_FSKM	Cooling water level FS-KM: 0 - not OK, 1 - OK
##BHKW_VW[.].VPSState_BhkwCanError	Error status CHP unit-CAN: 0 - not OK, 1 - OK
##BHKW_VW[.].VPSState_P1	Pump rate P1 0 to 100%

5.3.7 Variables for energy metering

##Energy_Gas_Bezug.nZaehlerSpeed[..]	Energy gas:
##Energy_Gas_Bezug.Typ	Basic type of the energy purchase counter
##Energy_Gas_Bezug.I	Status of the input at the clamp
##Energy_Gas_Bezug.Is	Gas counter
##Energy_Gas_Bezug.Is_HZ	Is it a main meter (1)? or an intermediate meter(0)?
##Energy_Gas_Bezug.Speed	Uncalculated counter speed
##Energy_Gas_Bezug.ZaehlerSpeed	Gas in W
##Energy_Gas_Bezug.ZaehlerStand	the display displayed on the external counter
##Energy_Gas_Bezug.Zaehler	internal counter
##Energy_Gas_Bezug.MengeProImpuls	Gas in 0.001 l/ impulse or in Ws / impulse
##Energy_Gas_Bezug.MengeMax	Maximum gas output in W (50 kWh) or max. flow, etc...
##Energy_Gas_Bezug.Prellzeit	Debouncing in ms
##Energy_Gas_Bezug.Konstante	mostly in 0.000001 kWh/cm
##Energy_Gas_Bezug.Offset	in l
##Energy_Gas_Bezug.AbStart	Billing start in 0.001 kWh
##Energy_Gas_Bezug.AbEnd	Billing end in 0.001 kWh
##Energy_Gas_Bezug.Preis	in 0,001 ct / kWh
##Energy_Gas_Bezug.Betrag	in 0.01 Euros
##Energy_Gas_Bezug.Counter.Typ	Counter type 1=standard, 3=250ms Eltaco
##Energy_Gas_Bezug.K0	specific heat constant of the volume (!) at 0° (Water = 4216)
##Energy_Gas_Bezug.dK	Change of the specific heat constant of the volume
##Energy_Gas_Bezug.Start	in Wh
##Energy_Gas_Bezug.Menge	Direct access also internal counter
##Energy_Strom_Eigenverbrauch.nZaehlerSpeed[..]	Energy own consumption
##Energy_Strom_Eigenverbrauch.Typ	Basic type of the energy purchase counter
##Energy_Strom_Eigenverbrauch.I	Status of the input at the clamp
##Energy_Strom_Eigenverbrauch.Is	Gas counter
##Energy_Strom_Eigenverbrauch.Is_HZ	Is it a main meter
##Energy_Strom_Eigenverbrauch.Speed	Uncalculated counter speed
##Energy_Strom_Eigenverbrauch.ZaehlerSpeed	in W
##Energy_Strom_Eigenverbrauch.ZaehlerStand	the display displayed on the external counter
##Energy_Strom_Eigenverbrauch.Zaehler	internal counter
##Energy_Strom_Eigenverbrauch.MengeProImpuls	in 0.001 l/ impulse
##Energy_Strom_Eigenverbrauch.MengeMax	Maximum gas rate in W
##Energy_Strom_Eigenverbrauch.Prellzeit	Debouncing in ms
##Energy_Strom_Eigenverbrauch.Konstante	mostly in 0.000001 kWh/sqm
##Energy_Strom_Eigenverbrauch.Offset	in l
##Energy_Strom_Eigenverbrauch.AbStart	Billing start in 0.001 kWh
##Energy_Strom_Eigenverbrauch.AbEnd	Billing end in 0.001 kWh
##Energy_Strom_Eigenverbrauch.Preis	in 0.001 ct / kWh

##Energy_Strom_Eigenverbrauch.Betrag	in 0.01 Euros
##Energy_Strom_Eigenverbrauch.Counter.Typ	Counter type 1=standard, 3=250ms Eltaco
##Energy_Strom_Eigenverbrauch.K0	The specific heat constant of the volume
##Energy_Strom_Eigenverbrauch.dK	Change of the specific heat constant of the volume
##Energy_Strom_Eigenverbrauch.Start	in Wh
##Energy_Strom_Eigenverbrauch.Menge	Direct access also internal counter
##Energy_Strom_Erzeugung.nZaehlerSpeed[..]	Energy generation: in W
##Energy_Strom_Erzeugung.Typ	Basic type of the energy purchase counter
##Energy_Strom_Erzeugung.I	Status of the input at the clamp
##Energy_Strom_Erzeugung.Is	Gas counter
##Energy_Strom_Erzeugung.Is_HZ	Is it a main meter?
##Energy_Strom_Erzeugung.Speed	Uncalculated counter speed
##Energy_Strom_Erzeugung.ZaehlerSpeed	in W
##Energy_Strom_Erzeugung.ZaehlerStand	the display displayed on the external counter
##Energy_Strom_Erzeugung.Zaehler	internal counter
##Energy_Strom_Erzeugung.MengeProImpuls	in 0.001 l/ impulse
##Energy_Strom_Erzeugung.MengeMax	Maximum gas output in W (50 kWh) or max. flow, etc...
##Energy_Strom_Erzeugung.Prellzeit	Debouncing in ms
##Energy_Strom_Erzeugung.Konstante	mostly in 0.000001 kWh/sqm
##Energy_Strom_Erzeugung.Offset	in l
##Energy_Strom_Erzeugung.AbStart	Billing start in 0.001 kWh
##Energy_Strom_Erzeugung.AbEnd	Billing end in 0.001 kWh
##Energy_Strom_Erzeugung.Preis	in 0.001 ct / kWh
##Energy_Strom_Erzeugung.Betrag	in 0.01 Euros
##Energy_Strom_Erzeugung.Counter.Typ	Counter type 1=standard, 3=250ms Eltaco
##Energy_Strom_Erzeugung.K0	The specific heat constant of the volume
##Energy_Strom_Erzeugung.dK	Change of the specific heat constant of the volume
##Energy_Strom_Erzeugung.Start	in Wh
##Energy_Strom_Erzeugung.Menge	Direct access also internal counter
##Energy_Strom_Bezug.nZaehlerSpeed[..]	Energy import: in W
##Energy_Strom_Bezug.Typ	Basic type of the energy purchase counter
##Energy_Strom_Bezug.I	Status of the input at the clamp
##Energy_Strom_Bezug.Is	Gas counter
##Energy_Strom_Bezug.Is_HZ	Is it a main meter
##Energy_Strom_Bezug.Speed	Uncalculated counter speed
##Energy_Strom_Bezug.ZaehlerSpeed	in W
##Energy_Strom_Bezug.ZaehlerStand	the display shown on the external counter
##Energy_Strom_Bezug.Zaehler	internal counter
##Energy_Strom_Bezug.MengeProImpuls	in 0.001 l/ impulse or in Ws / impulse
##Energy_Strom_Bezug.MengeMax	Maximum gas output in W (50 kWh) or max. flow, etc...
##Energy_Strom_Bezug.Prellzeit	Debouncing in ms
##Energy_Strom_Bezug.Konstante	mostly in 0.000001 kWh/sqm

##Energy_Strom_Bezug.Offset	in l
##Energy_Strom_Bezug.AbStart	Billing start in 0.001 kWh
##Energy_Strom_Bezug.AbEnd	Billing end in 0.001 kWh
##Energy_Strom_Bezug.Preis	in 0.001 ct / kWh
##Energy_Strom_Bezug.Betrag	in 0.01 Euros
##Energy_Strom_Bezug.Counter.Typ	Counter type 1=standard, 3=250ms Eltaco
##Energy_Strom_Bezug.K0	The specific heat constant of the volume
##Energy_Strom_Bezug.dK	Change of the specific heat constant of the volume
##Energy_Strom_Bezug.Start	in Wh
##Energy_Strom_Bezug.Menge	Direct access also internal counter
##Energy_Strom_Lieferung.nZaehlerSpeed[..]	Energy delivery:
##Energy_Strom_Lieferung.Typ	Basic type of the energy purchase counter
##Energy_Strom_Lieferung.I	Status of the input at the clamp
##Energy_Strom_Lieferung.Is	Gas counter
##Energy_Strom_Lieferung.Is_HZ	Is it a main meter?
##Energy_Strom_Lieferung.Speed	Uncalculated counter speed
##Energy_Strom_Lieferung.ZaehlerSpeed	in W
##Energy_Strom_Lieferung.ZaehlerStand	the display shown on the external counter
##Energy_Strom_Lieferung.Zaehler	internal counter
##Energy_Strom_Lieferung.MengeProImpuls	in 0.001 l/ impulse
##Energy_Strom_Lieferung.MengeMax	Maximum gas output in W (50 kWh) or max. flow, etc...
##Energy_Strom_Lieferung.Prellzeit	Debouncing in ms
##Energy_Strom_Lieferung.Konstante	mostly in 0.000001 kWh/sqm
##Energy_Strom_Lieferung.Offset	in l
##Energy_Strom_Lieferung.AbStart	Billing start in 0.001 kWh
##Energy_Strom_Lieferung.AbEnd	Billing end in 0.001 kWh
##Energy_Strom_Lieferung.Preis	in 0.001 ct / kWh
##Energy_Strom_Lieferung.Betrag	in 0.01 Euros
##Energy_Strom_Lieferung.Counter.Typ	Counter type 1=standard, 3=250ms Eltaco
##Energy_Strom_Lieferung.K0	specific heat constant of the volume
##Energy_Strom_Lieferung.dK	Change of the specific heat constant of the volume
##Energy_Strom_Lieferung.Start	in Wh
##Energy_Strom_Lieferung.Menge	Direct access to also an internal counter
##Energy_Strom_Photovoltaik.nZaehlerSpeed[..]	Energy photovoltaic:
##Energy_Strom_Photovoltaik.Typ	Basic type of the energy purchase counter
##Energy_Strom_Photovoltaik.I	Status of the input at the clamp
##Energy_Strom_Photovoltaik.Is	Gas counter
##Energy_Strom_Photovoltaik.Is_HZ	Is it a main meter?
##Energy_Strom_Photovoltaik.Speed	Uncalculated counter speed
##Energy_Strom_Photovoltaik.ZaehlerSpeed	in W
##Energy_Strom_Photovoltaik.ZaehlerStand	the display shown on the external counter
##Energy_Strom_Photovoltaik.Zaehler	internal counter

##Energy_Strom_Photovoltaik.MengeProImpuls	in 0.001 l/ impulse or in Ws / impulse
##Energy_Strom_Photovoltaik.MengeMax	Maximum gas output in W (50 kWh) or max. flow, etc...
##Energy_Strom_Photovoltaik.Prellzeit	Debouncing in ms
##Energy_Strom_Photovoltaik.Konstante	mostly in 0.000001 kWh/sqm
##Energy_Strom_Photovoltaik.Offset	in l
##Energy_Strom_Photovoltaik.AbStart	Billing start in 0.001 kWh
##Energy_Strom_Photovoltaik.AbEnd	Billing end in 0.001 kWh
##Energy_Strom_Photovoltaik.Preis	in 0.001 ct / kWh
##Energy_Strom_Photovoltaik.Betrag	in 0.01 Euros
##Energy_Strom_Photovoltaik.Counter.Typ	Counter type 1=standard, 3=250ms Eltaco
##Energy_Strom_Photovoltaik.K0	specific heat constant of the volume
##Energy_Strom_Photovoltaik.dK	Change of the specific heat constant of the volume
##Energy_Strom_Photovoltaik.Start	in Wh
##Energy_Strom_Photovoltaik.Menge	Direct access to also an internal counter