# TF7037GB_A - CONTROL CONSOLE OPERATING INSTRUCTIONS

## AWN ECO+ 111 / 121 / 131 | CONNECT WP 120 / 130

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# 1. SAFETY REGULATIONS

These instructions are for authorised specialists only.

Assembly and wiring work may only be performed on the controller when it is disconnected from the power supply.

The unit may only be opened, connected and commissioned by qualified personnel. In so doing, compliance with all local safety regulations is imperative.

The unit uses the latest available technology and complies with all necessary safety standards. It may only be used and deployed in accordance with the technical data and safety regulations and standards set out below. When using the unit, compliance with the legal and safety regulations relevant to the respective specific usage scenario is also necessary. Any liability claims will be excluded in the case of misuse.

Before commencing any installation or wiring work on the equipment, the controller must be fully disconnected from the mains power supply and secured against being switched on again.

Never confuse the safe low voltage range connections (sensor connections) with the 230 V connections. This can lead to destruction of the unit and the connected sensors and lethally dangerous voltage levels.

For safety reasons, the system may only remain in manual mode for test purposes. No maximum temperatures or sensor functions are monitored in this operating mode.

Safe operation is no longer possible if the controller or connected equipment are visibly damaged, not working, or have been stored in poor conditions for extended periods. In this scenario, the controller and equipment must be decommissioned and measures must be taken to ensure they cannot be used again inadvertently.

# 2. MAINTENANCE

With proper handling and use, the unit does not require maintenance. To clean the unit, use a soft cloth dampened with mild alcohol (e.g. methylated spirit). Caustic cleaning agents and solvents such as chloroethene or tri are not permitted. Since none of the components relevant to the unit's accuracy are subjected to stress with proper handling, the long-term drift is extremely low. The unit therefore does not have any adjustment features. This eliminates the need for any calibration. Any repairs must not alter the structural characteristics of the unit. Replacement parts must match the original spare parts and must also be used in accordance with the manufacturer's conditions.

# 3. OPERATION

This unit is an extremely compact and versatile controller for solar panel and heating systems and the pumps and valves required in such installations. The 16 sensor signals go through a surge protector, a low-pass filter and a multiplexer to the processor's AD converter.

The quality of the measured signal can be calculated using a predefined reference value. All of the operating elements are also scanned periodically by the computer that controls the display and manages the CAN bus. Following calculation of the temperatures and the resulting connection, the appropriate outputs are switched via the load driver. To protect against data loss, the unit has a non-volatile memory (EEPROM) and a super capacitor to provide a power reserve for the clock (for approx. 3 days).

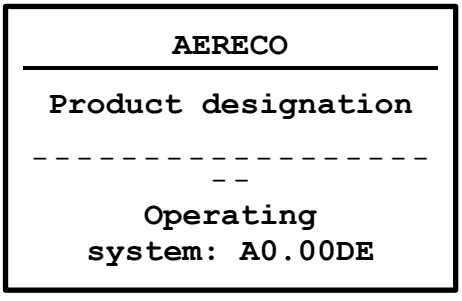
## 3.1. BASICS

### 3.1.1. TURNING THE EXHAUST AIR HEAT PUMP ON/OFF

AWN Eco+: Turn on the main switch next to the exhaust air connection

Connect WP: Turn on the main switch on the front of the unit

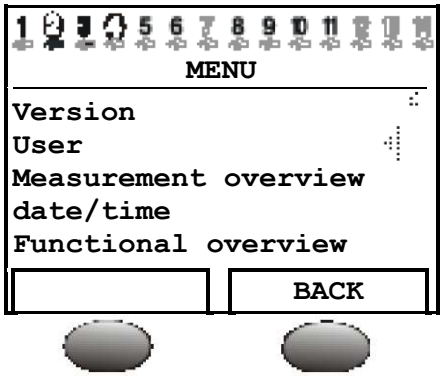
After the unit is switched on, the display will show this menu.




**Operating system:** Unit software version number. The latest software (higher number) can be downloaded from https://www.ta.co.at/en/. It can be transferred to the controller boot loader via an add-on device.

## 3.1.2. DISPLAY

The display consists of four information fields.




**The top line** always provides information about the current baseline conditions.

Empty space instead of the number 5 = output five has not yet been configured

Output five is active, working in automatic mode and is currently **switched off**

Output five is active, working in automatic mode and is currently **switched on**

Output five is active, working in **manual mode** and is currently switched off

Output five is active, working in **manual mode** and is currently switched on

**The second line** is the heading for the subsequent menu and parameter lines

**The central display area** is the work area. Programming, configuration and announcements take place in this area.

**The bottom line** is used to label the two buttons underneath only so these can be assigned different functions.

### 3.1.3. BUTTONS

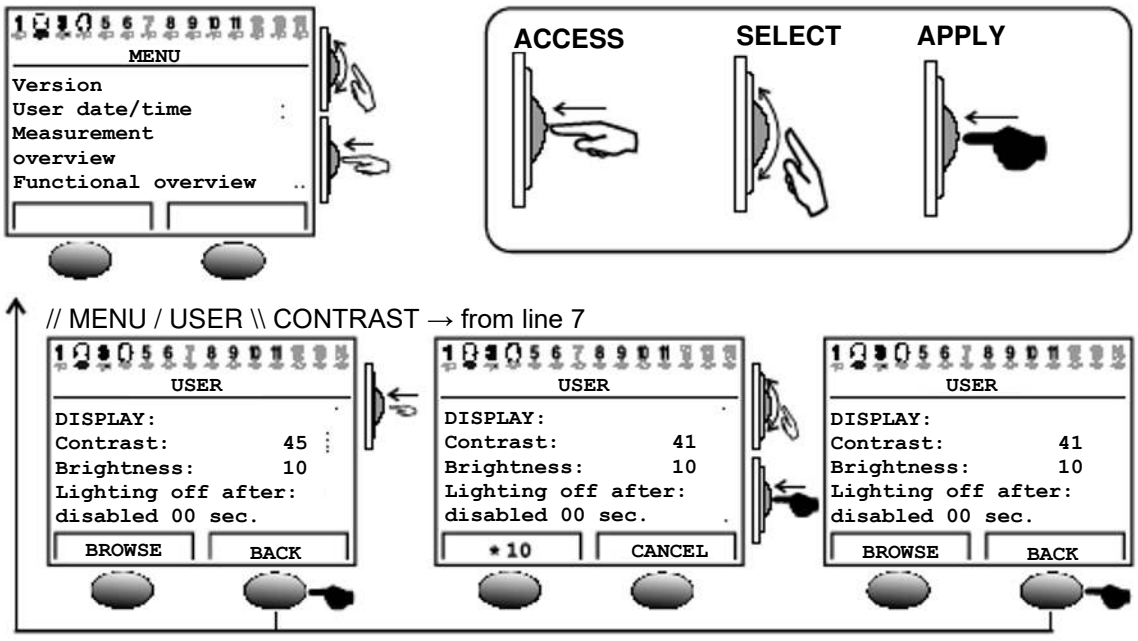
The controller has two buttons underneath the display. These are assigned the current functions via the display:

| | |
|---|---|
| **x10** | this is used to change the adjustable value for each detent by 10 steps each using the scroll wheel |
| **BROWSE** | this function enables the direct "switching" from one menu level to the same level in the next menu when the scroll wheel is rotated at the same time |
| **MENU** | for switching from the opening image (after switching on) to the menu |
| **SERVICE** | for switching from the function overview (the most important menu for the user) to all other menus |
| **BACK** | this button causes the computer to switch straight to the next menu level up |
| **CANCEL** | the current input or value change is cancelled |

### 3.1.4. SCROLL WHEEL

Use the scroll wheel to run through the selected menu using the pointer on the right. The small arrows shown above or below represent the ability to access other menu lines above or below the visible display area.

To change a parameter, move the pointer to the desired position. Pressing the wheel changes the backlighting of the scroll wheel frame to orange to indicate programming mode. Use the wheel to set the value (using the "*10" button as well where necessary). The action can be cancelled at any time using the corresponding Cancel button. Press the wheel again to apply the parameter and the frame goes back to green.

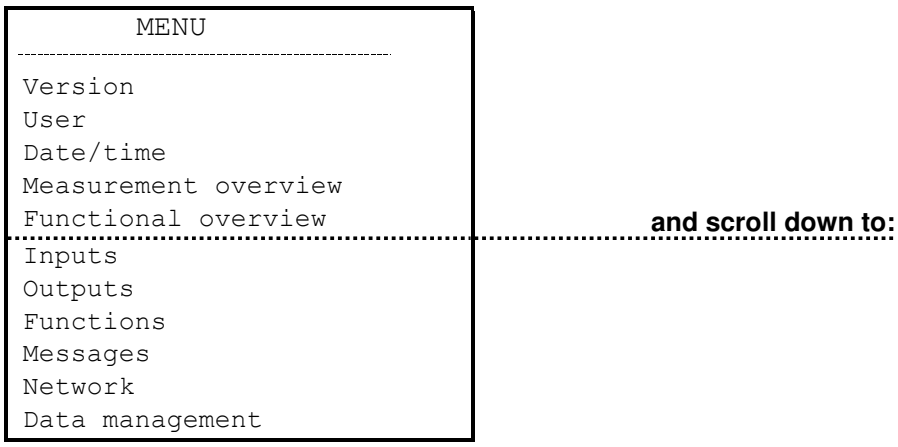


### 3.1.5. TERMS USED

| | |
|---|---|
| **Operating system** | The controller software (operating system) (e.g. version A3.28DE) with an indication of the user language |
| **Boot loader** | An add-on device for transferring data between the controller and the PC |
| **Boot sector** | A protected memory area in the processor that contains a basic program (e.g. B2.00) to "self-program" the chip |
| **CAN bus** | Data bus for exchanging data within the device family |
| **Functional data** | The customer-specific programming and configuration |
| **Functional/Function/module** | The available functions (e.g. solar controller) that provide the control properties. |
| **Infrared interface** | Infrared CAN bus (below both buttons) that enables a wireless connection to the boot loader |
| **Measured data** | Measured values, baseline conditions, calculation results such as kW, etc. |

## 3.2. MENU ITEMS

Press the ***MENU*** button to access the device menu:




**and scroll down to:**

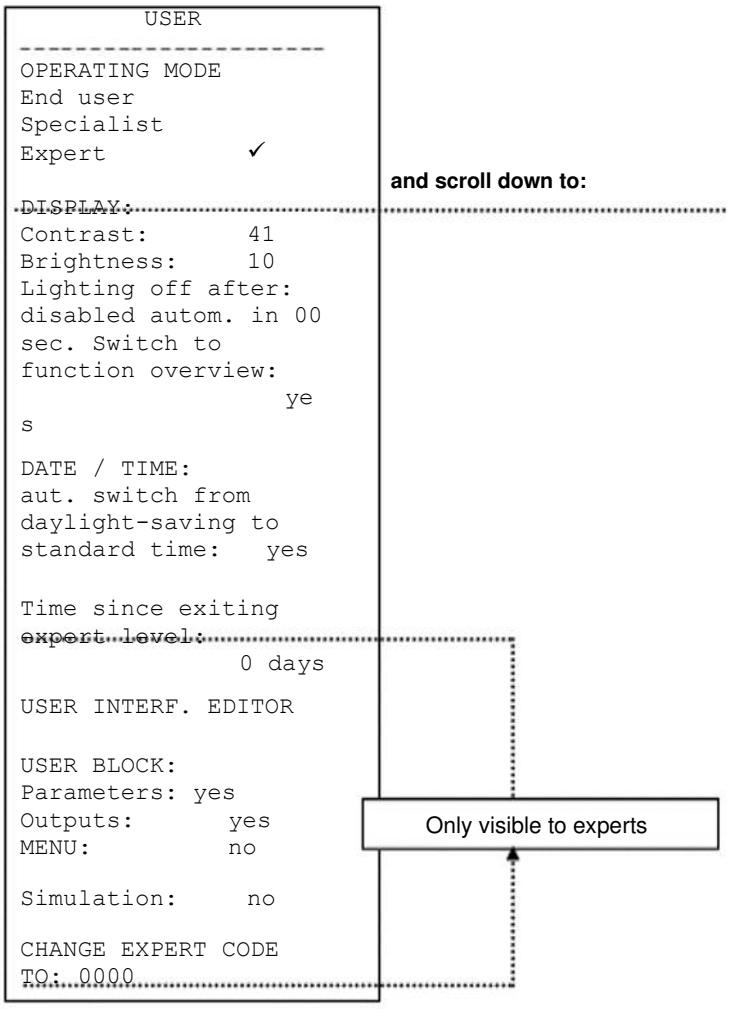
The following overview describes the individual menu items briefly:

| | |
|---|---|
| **Version** | The same display shown after switching the unit on, showing the unit's operating system. |

| | |
|---|---|
| **User** | This menu is used to access the operation levels, display contrast and background lighting, and to access a so-called "user interface editor" which can be used to create a custom menu interface (function overview). |
| **Date/time** | To update the date and time. It is also possible to switch between standard time and daylight-saving time. |
| **Measurement overview** | Displays all measured values and network inputs in table form. |
| **Functional overview** | All key information and parameters (e.g. room temperature) in the defined function module are created by the programmers (experts) in an editor ("user interface editor") and are summarised here. After a few minutes, the computer switches to this overview automatically because it is the most important operating level for the user. |
| **Inputs** | This menu provides an accurate overview of all input values. All inputs are fully configured here. For details, see the "Inputs menu" section. |
| **Outputs** | For the complete configuration of and manual control over all outputs. For details, see the "Outputs menu" section. |
| **Functions** | This is the menu where all of the application’s function modules are listed. The control tasks and all associated parameters are also defined here. |
| **Messages** | Status and error messages, and an alarm tone, can be triggered via this menu by events observed by the programmers. |
| **Network** | All settings (node number, network inputs and outputs, etc.) for integration of the controller within a CAN open bus network must be defined in this menu. |
| **Data management** | This menu includes all data management and backup commands for the experts and commands for an operating system update. |

## 3.2.1. USER MENU

This menu contains the following entries:




**OPERATING MODE**

**End user** All display options, only the main settings are permitted.

**Specialist** All settings are also permitted. Access via code only. This number can be determined by solving a "small puzzle" hidden in the instructions.

**Expert** The programming of all functions is also possible. The code required for this is only disclosed to trained personnel by email or by telephone.

***DISPLAY***

**Contrast** Adapts the display contrast to the lighting conditions.

**Brightness** The display has backlighting which is built into the circuit so it does not require any additional energy. The reduction of the 12 V relay current to the 5 V computer current is converted into heat in many devices but with the UVR1611, it is also converted into light! Switching the unit off therefore does not save energy. The strength of the background lighting varies and can be

switched off after a specified time. During this period, it is not possible to use any operating elements.

**Switch to function overview automatically** The most important information for the user is entered in a function overview in the user interface. This command enables automatic switching when no operating elements have been used for several minutes.

***DATE / TIME***

**Automatic standard/daylight-saving mode switching** This command enables the automatic switching between daylight saving mode and standard time.

***Time since existing expert level*** An inadvertent disclosure of the expert code unfortunately repeatedly results in the changing of key parameters and links by unauthorised parties. This has therefore created an additional possible check.

***USER INTERFACE EDITOR***

Here "experts" can access the Editor menu which can be used to program the dialogue (function overview) between the controller and the user.

***USER BLOCK***

**Parameter** if set to Yes, the user may not change any parameters (exception: function overview, all parameters in the user menu and outputs (MANUAL/AUTO)).

**Outputs** if set to Yes, the baseline conditions also cannot be changed by the user.

**MENU** if set to Yes, the user and the specialist only have access to the function overview and the user menu (switching via left button). After registering as an expert, it is possible to access the function overview in the main menu via the SERVICE button.

***CHANGE EXPERT CODE TO***

Changes the code factory set by the experts. Without knowledge of this code, it will not be possible to read the program (functional data) later.

Ordinarily, the controller switches back to user mode automatically two hours after the last button press. Since this is not preferable in devices used for programming or test purposes, code 0 0 0 0 blocks this switching back process.

Losing the user-defined code can also only be reversed at the factory end by resetting the factory settings, meaning complete loss of all functional data.

### 3.2.2. DATE/TIME MENU

This menu contains the following entries:

```
        DATE / TIME
-------------------------------------------

          Thursday
        16. 12. 2010

   Standard time: 00: 00
```

All values can be selected with the scroll wheel and can be changed accordingly. The date and time function has a power reserve of approximately three days in the event of a power failure. The "Standard time" indication means winter time. Daylight-saving time or summer time can be enabled manually or automatically (see User menu).

### 3.2.3. MEASUREMENT OVERVIEW MENU

This menu contains all of the measured value entries in table form:

```
MEASUREMENT OVERVIEW
-------------------------------------------
1: 60-3 °C      27.6 °C
3: 49.2 °C      88.4 °C
5: 29.0 °C      47.5 °C
               ...
               ...
               ...
NETWORK INP.:
1: OFF          ON
17: 25.4 °C     10.6°C
```

In other words, the temperature at sensor 1 is 60.3°C, 27.6°C at sensor 2 etc. If a network connection exists with other devices, the digital state and analogue values of the defined network inputs will then also be displayed. In the example, the network input 1 (= digital input 1) has the state "OFF", network input 2 has the state "ON", network input 17 (= analogue input 1) has the value 25.4°C, and network input 18 has the value 10.6°C.

The following measured values are displayed in your heat pump control system:

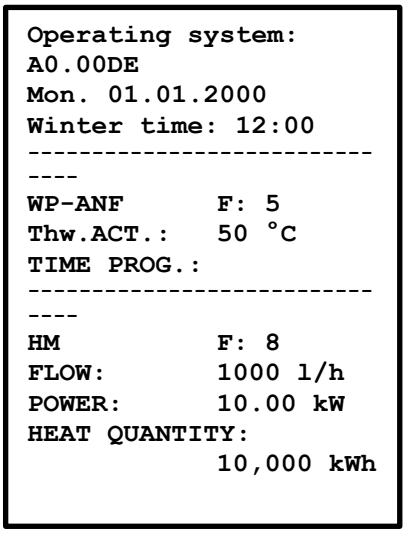
| AWN Eco+ | Connect WP |
|---|---|
| 1: Energy provider approval (local public utility contact) | 1: Energy provider approval (local public utility contact) |
| 2: Set point increase approval (smart grid) | 2: Set point increase approval (smart grid) |
| 3: Heat exchanger exhaust air package temperature | 3: Brine flow outlet temperature |
| | 4: Hot water storage tank temperature |

| | |
|---|---|
| 4: Hot water storage tank temperature | 5: Brine return inlet temperature |
| 5: Heating buffer tank temperature | 6: Heating buffer tank temperature |
| 6: Smoke detector operating status | 7: Brine circuit flow monitoring operating status |
| 7: Filter monitoring operating status | 8: Exhaust air unit heat pump approval |
| 8: High-pressure switch operating status | 9: High-pressure switch operating status |
| 9: Heating circuit flow temperature | 10: Heating circuit flow temperature |
| 12: Outside temperature | 12: Outside temperature |
| 13: Low-pressure switch operating status | 13: Low-pressure switch operating status |
| 14: Compressor motor protection operating status | 14: Compressor motor protection operating status |
| 15: Exhaust fan operating status | 17: Heat pump return water inlet temperature |
| 17: Heat pump return water inlet temperature | 18: Heat pump flow water outlet temperature |
| 18: Heat pump flow water outlet temperature | 19: Heat pump flow rate |
| 19: Heat pump flow rate | |

### 3.2.4. FUNCTION OVERVIEW MENU

All function modules offer a wealth of information, measured values and parameters which can be accessed through the "Functions" menu. To simplify the overview of the main settings for the user, the expert can specify the main information for the user from all menus using the "user interface editor". These later appear in the "Function overview" menu.

Only the key information and parameters should be entered in the "Function overview" menu as otherwise the "overview nature" is lost. This menu is therefore the most important interface for the user. From the factory, the following function overview is predefined:




After start up and after a few minutes, during which no operating elements are used, the controller switches from each menu to the function overview automatically if the automatic option has been enabled in the user menu (recommended).

Code number for specialist:

To enable the approval of all setting parameters, go into the "User" function in the device's main menu and after choosing "Specialist", enter the code number 0064!

### 3.2.4.1. FUNCTION OVERVIEW FOR YOUR HEAT PUMP CONTROL SYSTEM

Settings for the user

The function overview is used with the scroll wheel (see Scroll wheel section)

### 3.2.4.2. HEATING CIRCUIT 1:

Operation: Timed/Auto Automatic mode for the heat pump is enabled here via time programs and the outdoor temperature sensor.

Room temperature: The room temperature is set for normal and setback mode here. The value set here is computed (except where a reference room sensor is used) and affects the heating flow temperature.

Recommended settings:

T.room.setback 14°C to 20°C

T.room.normal 18°C to 24°C

Time program: Up to 3 different time programs can be stored here for your heat pump. When creating the programs, the set times relate to normal room temperature. The times not set are controlled automatically based on the general setback temperature. In addition however, different room temperatures can be configured individually for different days.

Factory default recommended setting:

TIME PROG.:

TP1: Day: Mon, Tues, Weds, Thurs, Fri

TS1: 06:00 - 22:00 20°C
TS2: 00:00 - 00:00 0°C
TS3: 00:00 - 00:00 0°C

TP2: Day: Sat, Sun

TS1: 07:00 - 22:00 20°C
TS2: 00:00 - 00:00 0°C
TS3: 00:00 - 00:00 0°C

TP3: Day: none

TS1: 00:00 - 00:00 0°C
TS2: 00:00 - 00:00 0°C
TS3: 00:00 - 00:00 0°C

Heating curve: The heating curve for your heating system is set here

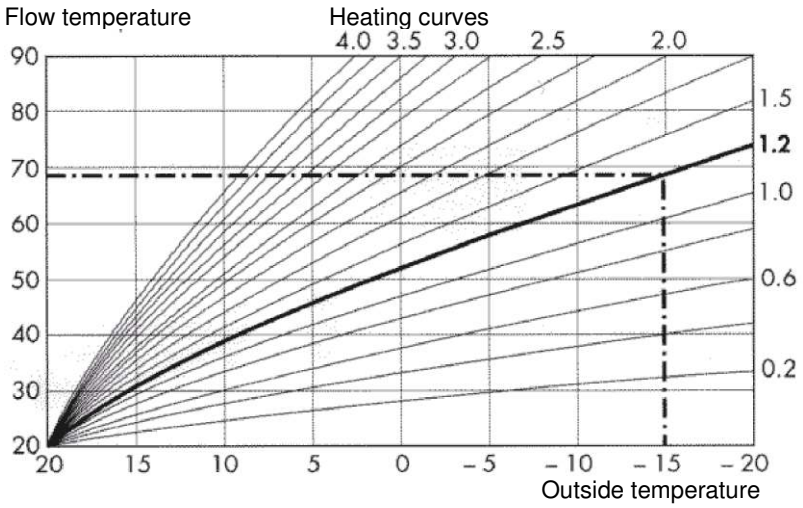
Mode:

Controller: Outside temperature or fixed value (recommended outside temperature)

Heating curve: Temperature or slope

With the temperature setting, flow temperatures can then be set for outside temperatures of +10°C and -20°C. The required flow temperature is then calculated based on these.

With the slope setting, the flow temperature is determined based on a defined heating curve.




Ambient compensation: The effect of a reference room on the heat pump control system when a room sensor is in use. Setting when sensor not used 0%.

Increase in switch-on power: Indicates by how much % the desired flow temperature should be increased. Useful with lower volumes of water in the system (systems with no buffer tank) and heating systems with radiators.

Setting when using a buffer tank and panel heaters 0%.

Flow temperature +10°C: Flow zero point

Flow temperature -20°C: Flow end point

Max. flow temperature: Maximum flow temperature (with heating circuit pump switched off and heating circuit mixer closed)

Min. flow temperature: Minimum flow temperature

With the setting Fixed value in the Controller parameter, the value T.flow.+10°C is the target value for setback mode and the value T.flow.-20°C is the target value for the normal mode of the heating flow.

### 3.2.4.3. HOT WATER TEMPERATURE CONTROL

T.hw.TARGET: Normal mode target value for hot water preparation (45°C - 50°C recommended)

TIME PROG.:

TP1: Day: Mon, Tues, Weds, Thurs, Fri

TS1: 06:00 - 22:00 48°C
TS2: 00:00 - 00:00 0°C
TS3: 00:00 - 00:00 0°C

TP2: Day: Sat, Sun

TS1: 07:00 - 22:00 47°C
TS2: 00:00 - 00:00 0°C
TS3: 00:00 - 00:00 0°C

TP3: Day: none

TS1: 00:00 - 00:00 0°C
TS2: 00:00 - 00:00 0°C
TS3: 00:00 - 00:00 0°C

**T.hw.MIN** Minimum hot water temperature in setback mode (38°C to 44°C recommended)

**DIFF.ON** (Hot water target value minus DIFF.ON results in the switch-on value for hot water production) 3.0 to 6.0 K recommended

**DIFF.OFF** Used to override the hot water temperature limits

**Burner capacity** Heat pump output for hot water production (20 -40% recommended)

### 3.2.4.4. HEAT METER (HM)

The Heat meter menu shows the total heat quantity produced by the heat pump. The heat quantity currently generated can also be read. Activating the menu by selecting the function triangle enables reading of both the inlet and outlet temperatures.

## 3.2.5. INPUTS MENU

The following inputs are shown in your heat pump control system:

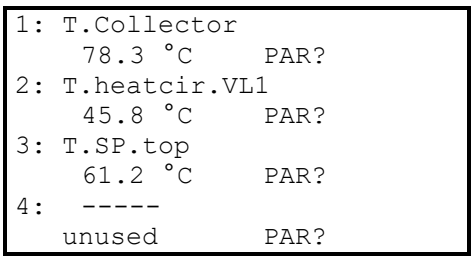
| AWN Eco+ | Connect WP |
|---|---|
| 1: Energy provider approval (local public utility contact) | 1: Energy provider approval (local public utility contact) |
| 2: Set point increase approval (smart grid) | 2: Set point increase approval (smart grid) |
| 3: Heat exchanger exhaust air package temperature | 3: Brine flow outlet temperature |
| 4: Hot water storage tank temperature | 4: Hot water storage tank temperature |
| 5: Antifreeze | 5: Brine return inlet temperature |
| 6: Heating buffer tank temperature | 6: Heating buffer tank temperature |
| 7: Smoke detector operating status | 7: Brine circuit flow monitoring operating status |
| 8: Filter monitoring operating status | 8: Exhaust air unit heat pump approval |
| 9: High-pressure switch operating status | 9: High-pressure switch operating status |
| 10: Heating circuit flow temperature | 10: Heating circuit flow temperature |
| 12: Outside temperature | 12: Outside temperature |
| 13: Low-pressure switch operating status | 13: Low-pressure switch operating status |
| 14: Compressor motor protection operating status | 14: Compressor motor protection operating status |
| 15: Exhaust fan operating status | 15: Compressor auxiliary safety switch |
| 16: Digital input 1 operating mode selection bridge (bridged: on) | 16: Digital input 1 operating mode selection bridge (bridged: on) |
| 17: Water outlet temperature (heat pump flow) | 17: Water inlet temperature (heat pump return) |
| 18: Water inlet temperature (heat pump return) | 18: Water outlet temperature (heat pump flow) |
| 19: Heat pump flow rate | 19: Heat pump flow rate |

The heat pump can be switched on and off via the EVU release. The exhaust fan is intended for continuous operation. A corresponding release line is therefore not provided for the ventilation components.

The "***Inputs***" menu primarily provides an overview of the measured values for the inputs and

sensors. It enables experts to configure all of the inputs used and the following procedure:

The "*Inputs*" line has already been selected from the menu and the scroll wheel then pressed. This results in the following display example:




In the example above, sensor inputs 1 to 3 have already been defined by the user whereas input 4 has not yet been defined. To assign, e.g. the *Bottom buffer* storage sensor to input 4, the arrow must be moved using the scroll wheel to access the *PAR?* parameter level. Press the wheel to confirm access and "TYPE: Unknown" is shown.

At first, the basic property (TYPE) that the sensor has is determined. Available options:

***Unused*** The input is not used

***ANALOGUE*** Temperature, room and radiation sensor, etc.

***DIGITAL*** ON/OFF direct control input (possible on every input!) by another function or connection of a **potential-free** switch contact between the sensor connection and the sensor earth (without supply voltage)

***BOOST*** Volume flowmeter, wind sensor (on inputs 15 and 16 only)

After selecting the type (*ANALOGUE* in the example as this is the analogue "Temperature" measured value), all available parameter lines are shown. Display example:

```
TYPE:        ANALOGUE
MEAS.VAL.:   Temperature

IDENTIFIER
GROUP: General
BIZ:         -------

SENSOR:          Pt 1000
SENSOR CHECK:    No
SENSOR CORR.:    0.0 K

AVERAGE:         1.0 Sec
```

A temperature sensor has the *Temperature* measured value. This is already shown. A radiation sensor would need the *Solar rad.* measured value.

In the next step, the name (Identifier) *Bottom buffer* should be assigned to input 4. For this purpose, the higher level "Identifier groups" *General, Producers, Consumers, Management, Climate* have been defined. *General* is a group that had to be copied over from the old operating systems (< A1.21). A lot of the names from it can also be found in the other groups. *Bottom buffer* is in the *Consumers* group.

Upon choosing the "Identifier", the computer suggests various texts with a consecutive index up to 9 via scrolling (e.g. *T.buffer.m2*). Instead of "0", the index is hidden (e.g. *T.buffer.m*). To move quickly from one identifier to the next, press the (x10) button at the same time. According to our example, we select *T.buffer.u*. Display example:

```
TYPE:        ANALOGUE
MEAS.VAL.:   Temperature

IDENTIFIER
GROUP: Consumers
ID: T.Buffer.u

SENSOR:        Pt 1000
SENSOR CHECK:  No
SENSOR CORR.:  0.0 K

AVERAGE:     1.0 Sec
```

The sensor type must be defined under "**SENSOR**". The available options are *RAS* (KTY) or *RASPT* (Pt1000) for the room sensor, *Pt 1000* and *KTY 10*.

In the event of a short circuit or interruption, an enabled "**SENSOR CHECK**" **automatically** generates an error message in the **Function overview**.

With "**SENSOR CHECK**" enabled, the **Sensor status** is also available: OFF for a sensor working correctly and ON for a fault (KS or UB). Since the **Sensor status** can also be specified as the source of an input variable, a failure of the outdoor sensor can also be responded to appropriately for example. The sensor status can be selected either for individual sensors or for all sensors together ("Sensor status 17").

For a "**SENSOR CORR.**" of e.g. 0.5K and a measured temperature of 60.0°C, 60.5°C is displayed. This corrected value is then also used internally for all calculations.

"**AVERAGE**" refers to the time-related averaging of the measured values. An averaging of 0.3 seconds produces an extremely fast response from the display and the device but value fluctuations must be expected. A high average produces an unpleasant sluggishness and is only recommended for heat meter sensors. For simple measuring tasks, around 1 - 3 seconds should be selected. For hygienic hot water preparation using the ultrafast sensor, 0.3 – 0.5 seconds is preferable.

#### 3.2.5.1. CONNECTION OF ELECTRONIC SENSORS IN DL VERSION

Electronic sensors for temperature, pressure, humidity, differential pressure, etc. are also available in the **DL** version. In this case, the supply and signal transmission occurs via the **DL bus**.

Attention must be paid to the "**Bus load**" due to the relatively high electricity requirement: The UVR 1611 controller has the maximum bus load 100%. The FTS4-50**DL** electronic sensor has, for example, a bus load of 39% therefore a max. of 2 FTS4-50**DL**s can be connected to the DL bus. The bus loads of the electronic sensors are listed in the technical data for the respective sensors.

The advantage of this signal transmission lies in the fact that no sensor inputs are necessary for it. Instead, the information (signals) are transmitted as network variables, as with the CAN bus.

## 3.2.6. OUTPUTS MENU

The "***Outputs***" menu is mainly used to switch between automatic and manual mode for the outputs. Since no specifications can be made about speed levels (if enabled) in the status line of the outputs (top icon line on the display), this display has been placed in the output menu.

The outputs are switched via the Outputs menu item. Here, the individual outputs can be selected and switched between using the scroll wheel:

**MANUAL/ON** The output is permanently switched on

**MANUAL/OFF** The output is permanently switched off

**AUTO/OFF** The output is switched off via the controller

**AUTO/ON** The output is switched on via the controller

**The following outputs are assigned in your heat pump control system:**

| **AWN Eco+** | |
|---|---|
| **WITH HOT WATER BUFFER INCL. HWT PREHEATING STAGE (see recommendation)** | **WITH SEPARATE HOT WATER/DOMESTIC HOT WATER HEATING BY AWN[1]** |
| A5: Heat pump compressor release | A4: Heating/hot water switch-over valves |
| A12: Exhaust fan release | A5: Heat pump compressor release |
| A13: Group fault signal (potential-free) | A12: Exhaust fan release |
| A15: 0-10V mode compressor speed control | A13: Group fault signal (potential-free) |
| A16: PWM mode storage loading pump speed control | A15: 0-10V mode compressor speed control |
| | A16: PWM mode storage loading pump speed control |
| **AWN Connect WP** | |
| **WITH HOT WATER BUFFER INCL. HWT PREHEATING STAGE (see recommendation)** | **WITH SEPARATE HOT WATER/DOMESTIC HOT WATER HEATING BY AWN[1]** |
| A5: Heat pump compressor release | A4: Heating/hot water switch-over valves |
| A12: Brine pump release | A5: Heat pump compressor release |
| A13: Group fault signal (potential-free) | A12: Brine pump release |
| A15: 0-10V mode compressor speed control | A13: Group fault signal (potential-free) |
| A16: PWM mode storage loading pump speed control | A15: 0-10V mode compressor speed control |
| | A16: PWM mode storage loading pump speed control |

[1] For energy-saving use of the exhaust air heat, we recommend using a domestic hot water loading system or fresh water station in the case of deviations from the suggested integration concept (see above).

### 3.2.6.1. ANTI-SEIZING PROTECTION

Circulation pumps that are not run for extended periods (e.g. heating circuit pump in the summer) frequently have problems starting up as a result of internal corrosion. This problem can easily be avoided by periodically running the pump for 30 seconds. The ***ANTI-SEIZING PROTECTION*** menu attached to output 16 enables the specification of a time and all outputs to receive this anti-seizing protection.

```
Mon Tues Weds Thurs Fri Sat
Sun
at:       16:30


OUTPUT:
1 2 3 4 5 6 7 8
9 10 11 12 13 14
15 (=analogue=) 16
```

According to the example, pumps 3, 4, 6, 9 and 10 will be run at 16:30 on Tuesday and Friday for 30 seconds if the output has not been active since the start of the controller or since the anti-seizing protection was last called. The computer does not turn on all outputs at once, it starts with output 3, switches to output 4 after 30 seconds, and so on.

In line with the energy-saving concept, a switching time is selected at which neither industry nor typical households place a burden on the power grid. It is enough to set this for one day a week.

All of the outputs used are configured as follows: The "*Outputs*" line has already been selected from the menu and the scroll wheel then pressed. This results in the following display example:

```
1: Solari pump
   MANUAL/ON      PAR?
2: Hctrl pump
   AUTO/OFF       PAR?
   Speed level.:  0
3: Hcir. mixer
   AUTO  PAR?
   open: Off
4: CLOSED:
         OFF
5:      -----
        -----     PAR?
```

In the example, outputs 2 - 4 are set to Automatic and are showing the current operating status (OFF). If the pointer is placed after this position, it is possible to switch to Manual mode on/off (press wheel / select status / press wheel). The current output status is visible in the status line of the outputs immediately. Since the speed control function is enabled on output 2, the current speed level is also shown. This can only be changed for testing purposes in manual mode.

As shown for output 5, neither the "Identifier" or the output status appear before configuration (similar to input configuration). The corresponding icon is therefore missing for this output from the top line of the output status display. If, for example, the solar pump is now to be assigned to the (not yet defined) output 1, then the arrow must be moved using the scroll wheel to access the *PAR?* configuration level. Press the wheel to confirm access and the following display is shown:

```
TYPE:    unused
```

At first, the basic property (TYPE) that the sensor should have is determined. Available options:

***SWITCH OUTPUT*** Output can only be used for switching (not controlling speed)

***SPEED CONTROL*** Output is ready for speed control

For outputs 3, 8, 10 and 12, instead of the type *SPEED CONTROL*, the suggestion *MIXER* appears. In this case the respective first output refers to "Mixer open" and the next one (4, 9, 11 and 13) to "Mixer closed". In other words, output 4 is defined as a switch output and if output 3 is then configured as a mixer, output 4 will automatically become a second mixer output!

After choosing the type (e.g. *SPEED CONTROL* since a solar pump on output 1 should subsequently run with speed control), all of the parameter lines available for that type are shown.

```
OUTPUT STATUS:
TYPE: SPEED CONTROL

IDENTIFIER
GROUP: General
ID: -----

MODE: Wave packet
DELAY:            0 Sec
AFTERRUN:         0 Sec
```

**(this line is omitted for *SWITCH OUTPUTS*)**
**Turn-on delay**

In the next step, the name (Identifier) *Solar1 pump* must be assigned to output 1. As with the sensor configuration, the higher level "Identifier groups" and a consecutive index up to 9 (e.g. *Solar4 pump*) have once again already been defined here. Most of the suggestions, including *Solar1 pump* can be found in *General*. To move quickly from one identifier to the next, press the (x10) button at the same time.

The signal form can be selected using the "**MODE**" speed controller parameter. Standard pumps are controlled using wave packets (turn the motor on and off quickly) whereas fan motors need phase control (such as in the case of a light dimmer).

**NOTE:** The menu even enables the choice between wave packet and phase control but the "Phase control" signal form cannot be output by standard devices! Probe types upon request.

"**DELAY**" enables the specification of a configurable turn-on delay.

"**AFTERRUN**" can be used to define the shut-off delay for the output.

If *MIXER* is selected after accessing the TYPE, the following display is shown:

```
OUTPUT STATUS:
TYPE: MIXER.

IDENTIFIER
GROUP: General
ID: -----

RUNTIME: 2.5 min
```

"**RUNTIME**" specifies the total run time of the mixer motor.

In the case of stability problems in the mixer control circuit, the mixer run time can be increased or reduced to extend or shorten the boosts or breaks. This has no impact on the remaining time as this is always loaded with 20 minutes for changes of direction and release.

The factory default setting for total motor runtime is zero seconds! The mixer is therefore not controlled. For technical reasons, it is unfortunately not possible to predefine the factory setting with a different value. Thus, this parameter must be entered without fail when setting up a mixer output.

The "**OUTPUT STATUS**" submenu item is a particular feature. A list of all the functions and notifications (including status) that trigger the output is stored here. This makes it easier to see on the system why a pump has been triggered just now or not. It is also possible to access the respective functions from the output status in order to check the function status there (see function modules).

If an output is controlled by multiple functions, the output is switched ON when at least one function is active (OR - function)!

The outputs (manual and automatic) are only triggered 30 seconds after the controller starts.

```
Output status:
MODE: 0-10 v

SCALING:
        0 :    0.00 V
      100 :   10.00 V

Output    voltage    Digital
command
          : 10.00 V
```

**The percentage has no decimal point**

## 3.2.7. FUNCTIONS MENU

The Functions menu item contains all of the programming and basic settings of importance for operating the heat pump. All of the settings here must be defined with extreme care. Incorrect settings can result in system malfunctions. For this reason, the settings stored here should be password-protected for specialist and expert levels.

### 3.2.7.1. PARAMETERS FOR CONFIGURING IHE SYSTEMS (INTELLIGENT HEAT EXCHANGER SYSTEMS)

All Aereco exhaust air heat pumps have the specially developed IHE system. This system provides a great many advantages, both in hot water preparation and in heat pump heating mode. The output modulation of all Aereco exhaust air heat pumps means that they produce different heat outputs in heating mode.

These parameters also used to achieve an ideal balance between all of the heat pump components in all operating points.

During hot water preparation, the IHE system provides usable hot water for this purpose immediately and at any time. These parameters also need to be configured.

#### 3.2.7.2. HOT WATER PREPARATION SETTINGS

Hot water outlet temperature during hot water preparation

Par. PID controller SPDCTRL.2

**Setpoint** ABSOLUTE VALUE CTRL. Tabs.TARGET (42°C to 52°C recommended)

The absolute outlet temperature from the heat pump for hot water preparation can be set here.

DIFFERENTIAL CONTROL, TARGET DIFF.: (3.0 to 6.0 K)

Once the hot water has reached the target temperature in the outlet, the IHE system is controlled via the differential temperature defined here until the target hot water value is reached.

CONTROL PARAMETER P: 5 I: 10 D: 10

#### 3.2.7.3. SETTINGS FOR HEATING MODE

Par. PID controller SPDCTRL.2

DIFFERENTIAL CONTROL DIFF.TARGET (5.0 TO 10.0 K recommended)

CONTROL PARAMETER P: 5 I: 10 D: 10

The differential temperature between the heat pump flow and return can be set here.

The rule here is the lower the temperature different, the greater the efficiency (COP) of the heat pump

## 3.3. PARAMETERS FOR OTHER ADD-ON FUNCTIONS

### 3.3.1. AWN ECO+ AND CONNECT WP OUTPUT MODULATION

As a result of differing exhaust air volume flows and different temperature and humidity conditions, the heat quantity that can be extracted from the exhaust air can vary widely. By using our modern inverter technology, the heat output from the heat pump continuously adjusts to the heat quantity available in the exhaust air. This ensures constant use of the heat pump exhaust air and optimal exploitation of the exhaust air heat. Speed control 3 allows the heat pump to be optimally adapted to the system as a whole.

The rule here is the lower the setpoint, the higher the heat extraction. The higher the setpoint, the greater the efficiency of the heat pump exhaust air.

Par. PID controller SPDCTRL.3

| | |
|---|---|
| Eco setpoint + | Absolute value control Tabs.TARGET: 6.0°C to 12.0 °C recommended |
| Connect setpoint | Absolute value control Tabs.TARGET: 4.0°C to 10.0 °C recommended |

CONTROL VARIABLE:

| | |
|---|---|
| maximum: | maximum speed (setpoint 100) |
| minimum: | minimum speed (setpoint 20) |
| current: | current compressor speed |
| CONTROL PARAMETER P: | 5 I: 10 D: 10 |

### 3.3.2. ANTIFREEZE TEMPERATURE FOR CONNECT WP

With the Connect WP heat pump exhaust air, there is a risk of the heat exchanger freezing in the exhaust air unit if the temperature of the brine/water mixture falls below a specific point. This can cause significant damage to the heat pump and failure of the ventilation system. When commissioning the system, it is therefore essential to determine the freezing point of the brine/water mixture using a suitable refractometer. The target value for the system's antifreeze should be above the freezing point.

Setting the value for the heat pump antifreeze:

Par. MINFUNCT1 COMPARE

VALUEa: Act. value of heat pump brine output °C

VALUEb: Antifreeze value for switching off heat pump (2°C recommended)

### 3.3.3. DISABLING SUMMER MODE

In summer mode, the heat pump exhaust air unit can be switched off above a specific outside temperature. This will not affect hot water preparation.

The time for measuring the average outside temperature for deactivation can be configured in Outside temp.> Average>Deactivate.

**Par. Heating circ. ctrl.**

Function: Deactivation condition

Menu item: if outside.T

Setpoint: MAX.outside.T**: Target value** for system summer mode (above the set temperature, the heating circuits close and deactivate the heating circuit pumps).

Antifreeze: Active when system is in standby mode and outside temperature drops below the value set (Av.outside.T <5°C)

# 4. MALFUNCTIONS AND MESSAGES

All of the functions necessary for the smooth operation of the heat pump are monitored constantly by the heat pump controller. In the event of a malfunction, a message is displayed in the function overview. These fault messages are:

**Motor protection fault** Fault on the heat pump compressor due to overheating or overload. This fault is reported to the AWN controller by the inverter module. The heat pump is deactivated, the fan continues to run.

**High pressure fault** Excess pressure in the heat pump refrigerant circuit. Monitored by the high-pressure switch in the refrigerant circuit. Heat pump is deactivated. Fan continues to run.

**Low pressure fault** Low pressure in the heat pump refrigerant circuit. Monitored by the low-pressure switch in the refrigerant circuit. Heat pump is deactivated. Fan continues to run.

**Sensor fault (Connect WP only)** Heat pump brine circuit flow monitoring active. Monitored by differential pressure switch in the heat exchanger brine circuit. Heat pump is deactivated. Fan continues to run. Brine pump continues to run.

**Minimum temperature fault (Connect WP only)** Frost monitoring! Brine outlet temperature has dropped below the minimum in the heat exchanger brine circuit. Heat pump is deactivated. Fan continues to run. Brine pump continues to run.

**Fan fault** Indicates a malfunction with the exhaust fan. Heat pump is deactivated. Fan continues to run if not faulty.

**Smoke detector fault** The smoke detector is activated when smoke forms in the building. Heat pump is deactivated. Fan is deactivated. Smoke exhaust damper is opened

Certain operating states of the heat pump are also reported in the function overview. These reports are:

**Utility co. block message** Heat pump deactivated by the energy supplier

**Filter message** This will be reported via the controller if the air filter is dirty. Fan and heat pump remain in operation.

# 5. INFORMATION ABOUT INCIDENTS

**No display** indicates a power failure. First of all therefore, the fuse (6.3A, quick acting) that protects the unit and the outputs (pumps, valves, etc.) against short circuit, and against surges in conjunction with the integrated surge protector, should be checked. The glass tube fuse is located on the rear of the controller behind a screw fitting.

**Realistic temperature values but malfunctioning of the outputs** indicates incorrect settings or clamping. Switch the outputs ON and OFF in manual mode, is the device functional? Also check for clamping and all settings.

- Does running continuously and stopping the output produce the same result? In other words, when the solar pump is activated manually, does it actually run or is the heating circuit pump perhaps running instead of the solar pump?
- Are all sensors connected with the right clamps (heat the sensor with a lighter and check temperature display)?

If a fault still cannot be found on the system, installing a data logger (bootloader or D-LOGG) on the system and logging the switching states is recommended. Output 14 must be set to "data line" for data logging via the DL bus.

**Incorrect temperatures** can be caused by the following:

- Display values like -999 in the case of a sensor short circuit or 9999 in the case of a sensor disconnection do not necessarily indicate an equipment or clamping fault. Has the correct sensor type been selected in the input menu (KTY, PT1000, RAS, GBS, etc.)?
- A sensor can also be checked without a measuring instrument by swapping the suspected faulty sensor with a working sensor on the terminal strip and checking the temperature display. If the fault goes as well, the problem is with the sensor. If the problem persists on the same unit input, then either the sensor type setting is incorrect or the input itself is faulty (e.g. faulty surge protector).

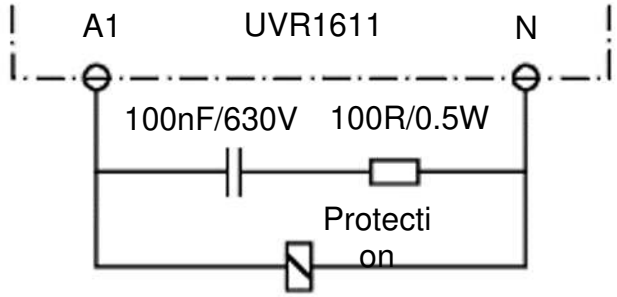
Checking the sensors with a multimeter (ohmmeter) should return the following values:

| Temp. [°C] | 0 | 10 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R(PT1000) [Ω] | 1000 | 1039 | 1078 | 1097 | 1117 | 1155 | 1194 | 1232 | 1271 | 1309 | 1347 | 1385 |
| R(KTY) [Ω] | 1630 | 1772 | 1922 | 2000 | 2080 | 2245 | 2417 | 2597 | 2785 | 1980 | 3182 | 3392 |

If the sensor is faulty, be sure to pay attention to the sensor type when replacing it. It is in fact possible to use a different sensor type but to do so, the configuration of the respective input must also be set to the type used.

Manual switching of the output not possible:

- If it is a speed variable output (A1, A2, A6 or A7), and if it is actually set to speed control, care should be taken with MANUAL/ON to the speed level in manual mode. Ideally, set the pump to level 30 to test the basic functions.
- Due to their internal structure, **electronic pumps cannot** be speed controlled! The connection to one of the outputs A1, A2, A6 or A7 as a **switch output** is possible. It is recommended however that these pumps are connected to one of the relay outputs (A3 - A5, A8 - A11).
- If a valve or protection device is controlled with a speed variable output (also in parallel with a pump), this output should be configured as a switched output because speed control cannot work on loads of this kind!
- Speed variable outputs may not switch **small loads** (<5 W, e.g. valve, protection, etc.) reliably. This is particularly true for output A1 with its integrated mains filter which can only be operated with a minimum load of ≥ 20W. If **only** a small load is being controlled with a speed variable output (A2, A6, A7), an additional parallel load or the following RC element is required for reliable switching (available as an optional accessory).




- With outputs 5, 12 and 13, care should be taken to ensure that these are always potential free and carry no live voltage. Direct switching of a 230V consumer is therefore only possible with the appropriate wiring.

If it is not possible to switch on output ON or OFF in manual mode because the cursor on the device cannot be positioned next to the relevant parameter, the following two scenarios are possible:

- A message is currently active and switching the dominant output in question ON or OFF (message displayed in function overview). In this scenario, manual mode is not possible.
- The user block (outputs) setting has been set to Yes by experts. Doing so means manual operation of the outputs is only possible for specialists or experts.

# 6. TECHNICAL DATA

| | |
|---|---|
| All sensor inputs | suitable for KTY (2 kΩ/25°C), PT1000 and RAS and RASPT room sensor and radiation detector types, voltages up to 5V =, and as a digital input |
| Sensor input 8 | also for current loop (4-20 mA), voltage (0-10 V=) or resistance (0-12, 50kΩ) |
| Sensor input 15.16 | also boost input, e.g. for VSG volume flowmeter |
| Output 1, 2, 6, 7 | Variable speed for standard circulation pumps |
| Output 3, 4, 8-11 | Relay outputs, sometimes with normally open and normally closed contacts |
| Output 5 | Relay switching contact - potential-free |
| Outputs 12, 13 | Expansion capability for dual auxiliary relay module |
| Output 14 | Data line (DL bus) for recording from suitable sensors and for data logging (in specific cases, can be configured as a switching output with 12V relay) |
| max. bus load (DL bus) | 100% |
| Outputs 15, 16 | Analogue outputs 0-10V/20mA or PWM (10V/2kHz) |
| CAN bus | Data rate 50 kb/sec., supply for ext. devices with 12V= / 100mA |
| Differential temperatures | equipped with separate activation and deactivation difference |
| Threshold values | sometimes set up with configurable hysteresis, or alternatively, with separate activation and deactivation thresholds |
| Speed control | 30 speed levels produce a quantity change of max. 10, control based on absolute value, difference and event-based absolute value |
| Temperature display | -50°C to +199°C with a resolution of 0.1K |
| Accuracy | standard 0.4 and max. ±1K in the range from 0 - 100°C |
| max. switching capacity | A1: 230V/0.7A, A2, 6, 7: 230V/ 1A each<br>Relay outputs, each 230 V/3A max. |
| Connection | 230V, 50- 60Hz, (outputs and device together fused with 6.3A F) |
| Supply line | 3 x 1mm² H05VV-F in acc. with EN 60730-1 (appropriate cable with safety plug included in basic pack) |
| Power consumption | max. 4 W (not including add-on devices) |
| Protection class | IP40 |
| Perm. ambient temperature | +5 °C to 45 °C |

# 7. ACCESSORIES

**CAN monitor**

Room sensor, display unit and operating unit for UVR1611. Same operating concept as the controller, communication via CAN bus. Multiple CAN monitors can be accessed on one controller and access is also possible from a CAN monitor to multiple controllers on the network. Order reference: 01/CAN-MT

**CAN Touch**

10" LCD screen with touch-sensitive surface. Display unit and operating device for UVR1611 and CAN I/O module. Installation of a temperature and humidity sensor possible. Programming with *TA-Designer* software. Order reference: O1/CAN-TOUCH

**C.M.I. - Control and Monitoring Interface**

The C.M.I. is an interface for convenient system monitoring**,** remote control**,** data logging and visualising all controllers with DL or CAN bus. Features:

Remote maintenance of CAN bus devices

- Function data management for CAN bus devices
- Operating system management for CAN bus devices
- System viewing via PC, smartphone or tablet
- Changing the parameters of CAN bus devices
- Data logging via CAN bus or DL bus
- Event-triggered notification by email
- Rail or wall mounting
- Server-based plug & play solution
- Slot for GSM module MDC-GSM mode - access
- via the LAN network directly
- via the web portal: https://cmi.ta.co.at/

**WNA Wireless router**

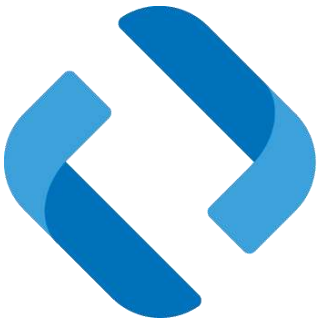
This router is an expansion of the C.M.I. It comes with its own power supply unit and can handle the following tasks via the C.M.I.'s ethernet connection:

- WLAN connection of the C.M.I.
- Internet access for the C.M.I via UMTS

## NOTES

# NOTES

EXHAUST AIR HEAT PUMP OPERATING INSTRUCTIONS: TF7037GB_A_NOT - CONTROL CONSOLE



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