

Temperature Difference Controller AIR TDC

Installation and operating instructions



Read carefully before installation, commissioning and operation

Content

A. Safety instruction	3	5. Settings	19
A.1. EC declaration of conformity	3	5.1. Tmin Collector	19
A.2. General instructions	3	5.2. Tset Room	19
A.3. Explanation of symbols	3	5.3. Collector / Room	19
A.4. Changes to the unit	4	5.4. Tset Room	20
A.5. Warranty and liability	4	5.8. Collector / Room	20
		5.20. Ventilator Flap	20
B. Specifications	5	5.21. Min Outdoor Temperature	20
B.1. Specifications	5	5.23. Tmax Outdoor	20
B.2. About the controller	6		
B.3. Scope of supply	6	6. Protective functions	21
B.4. Disposal and pollutants	6	6.1. Seizing Protection	21
B.5. Hydraulic variants	7	6.2. Fan Protection	21
		6.3. Night Cooling	21
C. Installation	8		
C.1. Wall installation	8	7. Special functions	22
C.2. Electrical connection	9	7.2. Signal V1	22
C.3. Installing the temperature sensors	10	7.2.1. Type of ventilator	22
		7.2.2. Ventilator	22
D. - Terminal connection diagram	11	7.2.3. Output Signal	22
		7.2.4. 0-10V off / PWM off	22
E. Operation	12	7.2.5. 0-10V on / PWM on	22
E.1. Display and input	12	7.2.6. 0-10V Max / PWM Max	22
E.2. Commissioning help	13	7.2.7. Show signal	22
E.3. Free commissioning	13	7.3. Speed control V1	23
E.4. Menu sequence and menu structure	14	7.3.1. Speed control Modes	23
		7.3.2. Purging time	23
1. Measurement values	15	7.3.3. Sweep time	23
		7.3.4. max. speed	24
2. Statistics	16	7.3.5. min. speed	24
2.1. Operating Hours	16	7.4. Time & Date	24
2.2. Average Temperature Difference ΔT	16	7.5. Sensor calibration	24
2.4. Graphic Overview	16	7.6. Commissioning	24
2.5. Message Log	16	7.7. Factory settings	25
2.6. Reset / Clear	16	7.8. Heat quantity	25
3. Display mode	17	8. Menu lock	25
3.1. Schematic	17		
3.2. Overview	17	9. Service values	26
3.3. Alternating	17		
		10. Language	27
4. Operating modes	18		
4.1. Automatic	18	Z. Malfunctions	27
4.2. Manual	18	Z.1. Malfunctions with error messages	27
4.3. Off	18	Z.2. Replacing the fuse	28
		Z.3. Maintenance	28

Safety instructions

A.1. EC declaration of conformity

By affixing the CE mark to the unit the manufacturer declares that the Temperature-Difference-Controller AIR TDC, conforms to the following relevant safety regulations:

- EC low voltage directive 2006/95/EC
- EC electromagnetic compatibility directive 2004/108/EC

Conformity has been verified and the corresponding documentation and the EC declaration of conformity are kept on file by the manufacturer.

A.2. General instructions

It is essential that you read this!

These installation and operating instructions contain basic instructions and important information regarding safety, installation, commissioning, maintenance and the optimal use of the unit. Therefore these instructions must be read completely and understood by the installation technician/specialist and by the system user before installation, commissioning and operation of the unit.

The valid accident prevention regulations, VDE regulations, the regulations of the local power utility, the applicable DIN-EN standards and the installation and operating instruction of the additional system components must also be observed. The controller does not under any circumstances replace any safety devices to be provided by the customer!

Installation, electrical connection, commissioning and maintenance of the unit may only be carried out by specialists who possess the appropriate training.

For the user: Make sure that the specialist gives you detailed information on the function and operation of the controller. Always keep these instructions in the vicinity of the controller.

A.3. Explanation of symbols



Failure to observe these instructions can result in danger to life from electric voltage.



Failure to observe these instructions can result in serious damage to health such as scalding, or even life-threatening injuries.



Failure to observe these instructions can result in destruction of the unit or the system, or damage to the environment.



Information which is especially important for the function and optimal use of the unit and the system.

Safety instructions

A.4. Changes to the unit



Changes to the unit can compromise the safety and function of the unit or the entire system.

- Changes, additions to or conversion of the unit are not permitted without the written permission from the manufacturer
- It is likewise forbidden to install additional components that have not been tested together with the unit
- If it becomes clear that safe operation of the unit is no longer possible, for example because of damage to the housing, then turn the controller off immediately
- Any parts of the unit or accessories that are not in perfect condition must be exchanged immediately
- Use only original spare parts and accessories from the manufacturer.
- Markings made on the unit at the factory must not be altered, removed or made illegible
- Only the settings actually described in these instructions may be made on the controller

A.5. Warranty and liability

The controller has been manufactured and tested with regard to high quality and safety requirements. The unit is subject to the statutory guarantee period of two years from the date of sale.

The warranty and liability shall not include, however, any injury to persons or material damage that is attributable to one or more of the following causes:

- Failure to observe these installation and operating instructions
- Improper installation, commissioning, maintenance and operation
- Improperly executed repairs
- Unauthorised structural changes to the unit
- Installation of additional components that have not been tested together with the unit
- Any damage resulting from continued use of the unit despite an obvious defect
- Failure to use original spare parts and accessories
- Use of the device for other than its intended purpose
- Operation above or below the limit values listed in the specifications
- Force majeure

1.1. - Temperature resistance table for Pt1000 sensors

Description of controller

B.1. Specifications

Electrical specifications:

Mains voltage	230VAC +/- 10 %
Mains frequency	50 - 60 Hz
Power consumption	1,5 W - 2,3 W
Internal fuse	T2A / 250V slow blow
Protection category	IP40
Protection class	II
Overvoltage Category	II
Degree of Pollution Category	II

mechanical relay 460VA for AC1 / 460W for AC3	2 (R1 - R2)
0-10V output, tolerance 10 %, 10 k Ω load or PWM output freq. 1 kHz, level 10 V	1
PT1000 sensor input measuring range -40 °C to 300 °C	3

Permissible cable length of sensors and appliances:

Collector and outdoor sensor	< 30 m
other PT1000 sensors	< 10 m
PWM / 0...10V	< 3 m
mechanical relay	< 10 m

Real Time Clock RTC with 24 hour power reserve

Permissible ambient conditions:

Ambient temperature	
for controller operation	0 °C ... 40 °C
for transport/storage	0 °C ... 60 °C
Air humidity	
for controller operation	max. 85 % rel. humidity at 25 °C
for transport/storage	no moisture condensation permitted

Other specifications and dimensions

Housing design	2-part, ABS plastic
Installation methods	Wall installation, optionally panel installation
Overall dimensions	163 mm x 110 mm x 52 mm
Aperture installation dimensions	157 mm x 106 mm x 31 mm
Display	Fully graphical display, 128 x 128 dots
Light diode	Multicolor red/green
Operation	4 entry keys

B.2. Temperature resistance table for Pt1000 sensors

°C	0	10	20	30	40	50	60	70	80	90	100
Ω	1000	1039	1077	1116	1155	1194	1232	1270	1308	1347	1385

Description of controller

B.3. About the controller

The Temperature Difference Controller AIR TDC facilitates efficient use and function control of your solar or heating system. The device is impressive most of all for its functionality and simple, almost self-explanatory operation. For each step in the input process the individual entry keys are assigned to appropriate functions and explained. The controller menu contains headwords for the measured values and settings, as well as help texts or clearly-structured graphics.

The AIR TDC can be used as a temperature difference controller for the various system variants illustrated and explained under B.5.

Important characteristics of the AIR TDC:

- Depiction of graphics and texts in a lighted display
- Simple viewing of the current measurement values
- Analysis and monitoring of the system by means of statistical graphics, etc.
- Extensive setting menus with explanations
- Menu block can be activated to prevent unintentional setting changes
- Resetting to factory settings
- A wide range of additional functions are available.

B.4. Scope of supply

- Temperature Difference Controller AIR TDC
- 3 screws 3,5 x 35 mm and 3 plugs 6mm for wall installation
- 6 strain relief clips with 12 screws, replacement fuse 2A slow-blow
- Installation and operating instructions AIR TDC

Optionally contained depending on design/order:

- 2-3 PT1000 temperature sensors and immersion sleeves

Additionally available:

- Pt1000 temperature sensor, immersion sleeves, overvoltage protection,
- Various additional functions by means of supplementary circuit boards

B.5. Disposal and pollutants

The unit conforms to the European RoHS directive 2011/65/EU for the restriction of the use of certain hazardous substances in electrical and electronic equipment.



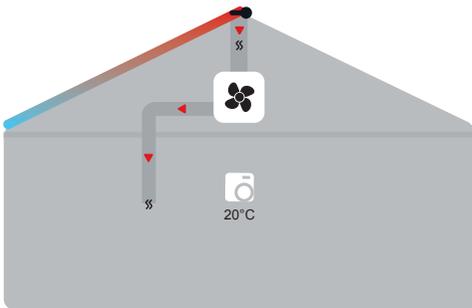
The unit must not under any circumstances be disposed of with ordinary household refuse. Dispose of the unit only at appropriate collection points or ship it back to the seller or manufacturer.

Description of controller

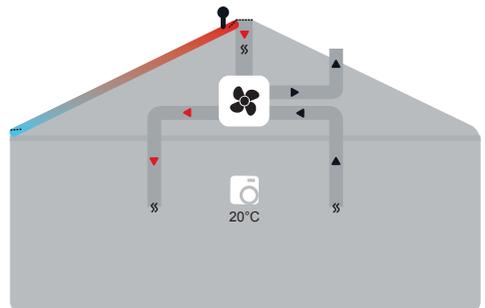
B.6. Hydraulic variants



The following illustrations should be viewed only as schematic diagrams showing the respective hydraulic systems, and do not claim to be complete. The controller does not replace safety devices under any circumstances. Depending on the specific application, additional system components and safety components may be mandatory, such as check valves, non-return valves, safety temperature limiters, scalding protectors, etc., and must therefore be provided.



Aircollector



Aircollector with vebtilation flap

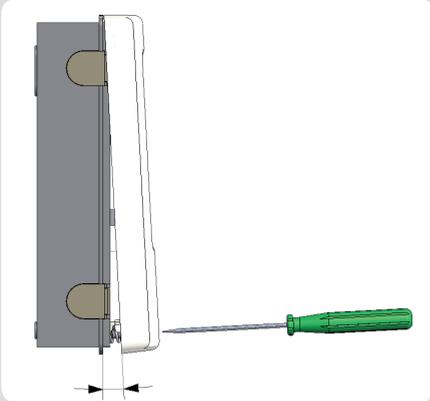
Installation

C.1. Wall installation



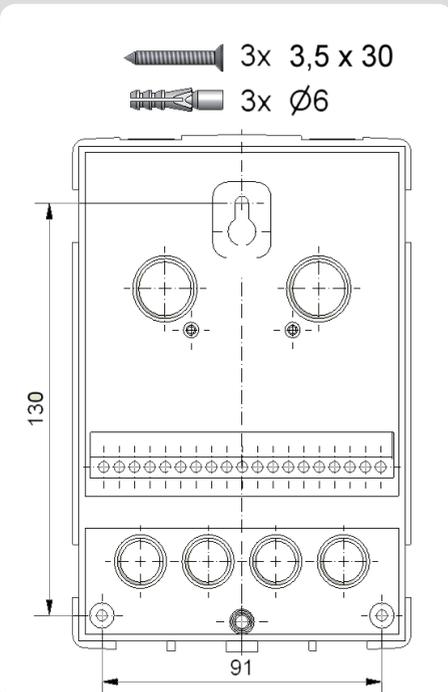
Install the controller only in dry areas and under the ambient conditions described under B.1 "Specifications". Carry out the following steps 1-8.

C.1.1



1. Unscrew cover screw completely
2. Carefully pull upper part of housing from lower part.
3. Set upper part of housing aside, being sure not to touch the electronics when doing so.
4. Hold the lower part of the housing up to the selected position and mark the 3 mounting holes. Make sure that the wall surface is as even as possible so that the housing does not become distorted when it is screwed on.

C.1.2



5. Using a drill and size 6 bit, drill 3 holes at the points marked on the wall and push in the plugs.
6. Insert the upper screw and screw it in slightly.
7. Fit the upper part of the housing and insert the other two screws.
8. Align the housing and tighten the three screws.

Installation

C.2. Electrical connection



Before working on the unit, switch off the power supply and secure it against being switched on again! Check for the absence of power! Electrical connections may only be made by a specialist and in compliance with the applicable regulations.
Do not use the controller if the housing shows visible damage.



Low-voltage cables such as temperature sensor cables must be routed separately from mains voltage cables. Feed temperature sensor cables only into the left-hand side of the unit, and mains voltage cables only into the right-hand side.



The customer must provide an all-pole disconnecting device, e.g. a heating emergency switch.



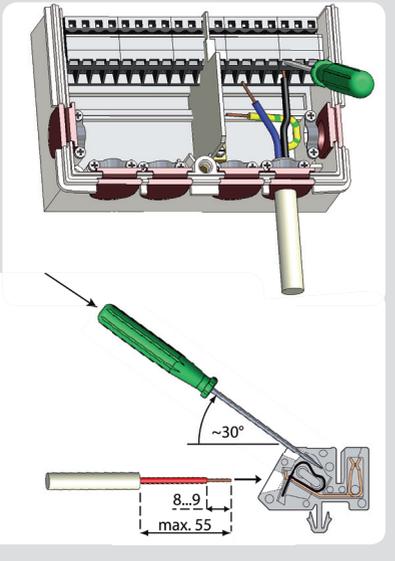
The cables being connected to the unit must not be stripped by more than 55mm, and the cable jacket must reach into the housing just to the other side of the strain relief.



With hydraulic variant D1 - D8 relays R1 and R2 are switched on simultaneously to allow the connection of another load at R2.
If in D1 speed control is active, R2 is switched on during purging time.

Installation

C.2.1



1. Select necessary program/hydraulics (Fig. B5)
2. Open controller as described under C.1.
3. Strip cables by 55 mm max., insert, fit the strain relief devices, strip the last 8 - 9mm of the wires (Fig. C.2.1)
4. Open the terminals using a suitable screwdriver (Fig. C.2.1) and make electrical connections on the controller (s. D.1 - D.20)
5. Refit upper part of housing and fasten with screw.
6. Switch on mains voltage and place controller in operation.

C.3. Installing the temperature sensors

The controller operates with Pt1000 temperature sensors which are accurate to the degree, thus ensuring optimal control of system functions.



Caution

If desired the sensor cables can be extended to a maximum of 30 m using a cable with a cross-section of at least 0.75 mm². Make sure that there is no contact resistance!

Position the sensor precisely in the area to be measured!

Only use immersion, pipe-mounted or flat-mounted sensor suitable for the specific area of application with the appropriate permissible temperature range.

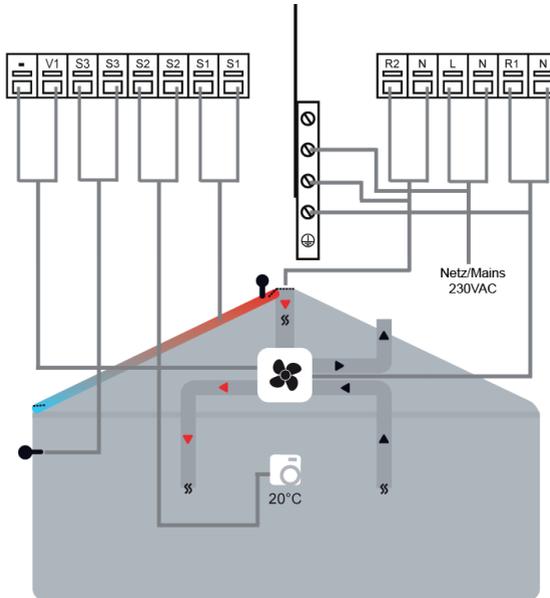


Caution

The temperature sensor cables must be routed separately from mains voltage cables, and must not, for example, be routed in the same cable duct!

Installation

D. - Terminal connection diagram



max. 12V

Achtung

Low voltage max. 12VAC/DC

Terminal: Connection for:

S1 (2x) Sensor 1
 S2 (2x) Sensor 2
 S3 (2x) Sensor 3

V1 speed controlled
 output for ventilators
 - Mass Ground
 output for ventilators



Netzseite

Gefahr

230VAC

Mains voltage 230VAC 50-60Hz

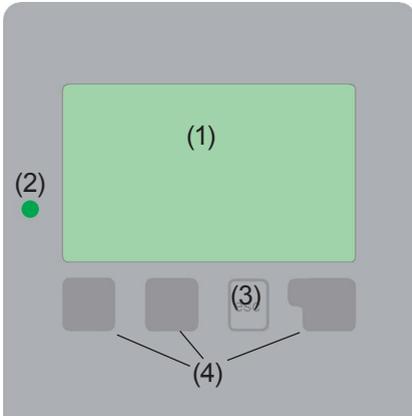
Terminal: Connection for:

R1 Ventilator
 N Neutral conductor N
 R2 Ventilator flap
 N Neutral conductor N
 L Mains phase conductor L
 N Mains neutral conductor N

The PE protective conductor must be connected to the PE metal terminal block!

Operation

E.1. Display and input



Examples of display symbols:



Pump (rotates in operation)



Ventilator



Ventilator flap



Temperature sensor



Warning/error message



New information available

The display (1), with its extensive text and graphics mode, is almost self-explanatory, allowing easy operation of the controller.

The LED (2) lights up green when a relay is switched on.

The LED (2) lights up red when operating mode “Off” is set.

The LED (2) flashes slowly red in the operating mode “Manual”.

The LED (2) flashes quickly red when an error is present.

Entries are made using four keys (3+4), which are assigned to different functions depending on the situation. The “esc” key (3) is used to cancel an entry or to exit a menu. If applicable there will be a request for confirmation as to whether the changes which have been made should be saved.

The function of each of the other three keys (4) is shown in the display line directly above the keys; the right-hand key is generally has a confirmation and selection function.

Examples of key functions:

+/-	= enlarge/shrink values
▼/▲	= scroll menu down/up
yes/no	= approve/reject
Info	= additional information
Back	= to previous screen
ok	= confirm selection
Confirm	= confirm setting

Parametrisation

E.2. Commissioning help



The first time the controller is turned on and after the language and time are set, a query appears as to whether you want to parametrise the controller using the commissioning help or not. The commissioning help can also be terminated or called up again at any time in the special functions menu. The commissioning help guides you through the necessary basic settings in the correct order, and provides

brief descriptions of each parameter in the display.

Pressing the “esc” key takes you back to the previous value so you can look at the selected setting again or adjust it if desired. Pressing the “esc” more than once takes you back step by step to the selection mode, thus cancelling the commissioning help. Finally, menu 4.2 under operating mode “Manual” should be used to test the switch outputs with the consumers connected, and to check the sensor values for plausibility. Then switch on automatic mode.



Caution

Observe the explanations for the the individual parameters on the following pages, and check whether further settings are necessary for your application.

E.3. Free commissioning

If you decide not to use the commissioning help, you should make the necessary settings in the following sequence:

- Menu 10. Language (see 14.)
- Menu 7.4 Time and date (see 12.2)
- Menu 5. Settings, all values (see 10.)
- Menu 6. Protective functions if adaptations are necessary (see 11.)
- Menu 7. Special functions if additional changes are necessary (see 12.)

Finally, menu 4.2 under operating mode “Manual” should be used to test the switch outputs with the consumers connected, and to check the sensor values for plausibility. Then switch on automatic mode.



Caution

Observe the explanations for the the individual parameters on the following pages, and check whether further settings are necessary for your application.

Operation

E.4. Menu sequence and menu structure



The graphics or overview mode appears when no key has been pressed for 2 minutes, or when the main menu is exited by pressing "esc".



Pressing a key in graphics or overview mode takes you directly to the main menu. The following menu items are then available for selection there:



1. Measurements

Current temperature values with explanations

2. Statistics

Function control of the system with operating hours, etc

3. Display Mode

Select graphics mode or overview mode

4. Operating Mode

Automatic mode, manual mode or switch unit off

5. Settings

Set parameters needed for normal operation

6. Protections

Solar and frost protection, recooling, anti-seizing protection

7. Special functions

Program selection, sensor calibration, clock, additional sensor, etc.

8. Menu lock

Against unintentional setting changes at critical points

9. Service data

For diagnosis in the event of an error

10. Language

Language selection

Measurement values

1. - Measurement values



The menu “1. Measurement values” serves to display the currently measured temperatures.

The menu is closed by pressing “esc” or selecting “Exit measurement values”.

Selecting “Info” leads to a brief help text explaining the measurement values.

Selecting “Overview” or “esc” exits the Info mode.



Caution

If “--” appears on the display instead of the measurement value, then there may be a defective or incorrect temperature sensor.

If the cables are too long or the sensors are not placed optimally, the result may be small deviations in the measurement values. In this case the display values can be compensated for by making entries on the controller. Follow the instructions under 7.3.

What measurement values are displayed depends on the selected program, the connected sensors and the specific device design.

Statistics

2. - Statistics



The menu “2. Statistics” is used for function control and long-term monitoring of the system.

The menu is closed by pressing “esc” or selecting “Exit statistics”.



Caution

For analysis of the system data it is essential for the time to be set accurately on the controller. Please note that the clock does not continue to run if the mains voltage is interrupted, and must therefore be reset. Improper operation or an incorrect time may result in data being deleted, recorded incorrectly or overwritten. The manufacturer accepts no liability for the recorded data!

2.1. - Operating Hours

Display of operating hours of the ventilator connected to the controller; various time ranges (day-year) are available.

2.2. - Average Temperature Difference ΔT

Display of the average temperature difference between the reference sensors of the solar system with the consumer switched on.

2.4. - Graphic Overview

This provides a clearly-organised display of the data listed under 2.1-2.3 as a bar graph. Various time ranges are available for comparison. The two left-hand keys can be used to page through the data.

2.5. - Message Log

Display of the last 10 events occurring in the system with indication of date and time.

2.6. - Reset / Clear

Resetting and deleting the individual analyses. The function “All statistics” clears all analyses but not the error messages.

Display mode

3. - Display mode



Menu “3. Display mode” is used to define the controller’s display for normal operation.

This display appears whenever two minutes go by without any key being pressed. The main menu appears again when a key is pressed.

The menu is closed by pressing “esc” or selecting “Exit display mode”.

3.1. - Schematic

In graphics mode, the selected hydraulic systems are depicted with the measured temperatures and operating states of the connected consumers.

3.2. - Overview

In overview mode, the measured temperatures and operating states of the connected consumers are depicted in text form.

3.3. - Alternating

In alternating mode the schematic mode and then the overview mode are active for 5 seconds at a time.

Operating modes

4. - Operating modes



In menu “4. Operating modes” the controller can either be placed in automatic mode, switched off, or placed in a manual operating mode.

The menu is closed by pressing “esc” or selecting “Exit operating modes”.

4.1. - Automatic

Automatic mode is the normal operating mode of the controller. Only automatic mode provides proper controller function taking into account the current temperatures and the parameters that have been set! After an interruption of the mains voltage the controller automatically returns to the last operating mode selected!

4.2. - Manual

The relay and thus the connected consumer are switched on and off by pressing a key, with no regard to the current temperatures and the parameters which have been set. The measured temperatures are also shown to provide an overview and function control.



Danger

When operating mode “Manual” is activated, the current temperatures and the selected parameters are no longer considered. There is a danger of scalding or serious damage to the system. The operating mode “Manual” may only be used by specialists for brief function tests or during commissioning!

4.3. - Off



Caution

When the operating mode “Off” is activated, all controller functions are switched off. This can lead, for example, to overheating on the solar collector or other system components. The measured temperatures are still displayed to provide an overview.

Settings

5. - Settings



The necessary basic settings required for the control function are made in menu "5. Settings".



Caution

This does not under any circumstances replace the safety facilities to be provided by the customer!

The menu is closed by pressing "esc" or selecting "Exit settings".



Caution

Various settings can be made depending on the selection of hydraulic variant 1-20. This is explained in more detail in Table 5.17. This table also indicates the associated reference sensors and switch outputs. The following pages contain generally valid descriptions for the settings.

5.1. - Tmin Collector

Enable/start temperature at sensor 1

If this value is exceeded at the collector sensor S1 and the other conditions are also met, then the controller switches on the associated ventilator. If the temperature at the sensor drops below this value by 5 °C, then the ventilator is switched off again.

Settings

5.4. - Tset Room

Switch-off temperature at sensor 2

If this value is exceeded at the room sensor S2, the controller switches the ventilator off. If the temperature falls below this value again and the other conditions are also met, then the controller switches the ventilator on again.



Temperature values that are set too high can lead to scalding or damage to the system. Scalding protection must be provided by the customer!

5.8. - Collector / Room

Switch-on/switch-off temperature difference for R1/V1:

If this temperature difference between the reference sensors is exceeded and the other conditions are also met, then the controller switches the ventilator on. When the temperature drops to ΔT Off, then the ventilator is switched off.



If the set temperature difference is too small, this may result in ineffective operation, depending on the system and sensor positions. Special switching conditions apply for speed control (see 7.3. - Speed control V1" on page 23)

5.20. - Ventilator Flap

Switching temperature of the ventilator flap.

If this temperature at the outdoor sensor S3 is exceeded the controller switches the ventilator flap at relay R2. If the temperature drops below the controller switches the ventilator off.

5.21. - Min Outdoor Temperature

Hysteresis for thermostat function at sensor 3

By setting the hysteresis value the heating of the sensor can be adjusted. If the temperature of the Tsetpoint at sensor 3 is exceeded by the set hysteresis, additional heating at relays R2 is deactivated. If the Energy saving mode is active (see 5.16) the system heats up until $T_{minS3} + \text{hysteresis}$ temperature is reached.

5.23. - Tmax Outdoor

Switch-off temperature at sensor 3

If this value is exceeded at the applicable sensor 3, the controller switches the associated ventilator off. If the temperature falls below this value again and the other conditions are also met, then the controller switches the ventilator **on again**.



Temperature values that are set too high can lead to scalding or damage to the system. Scalding protection must be provided by the customer!

Protective functions

6. - Protective functions



Menu "6. Protective functions" can be used to activate and set various protective functions.



Caution

This does not under any circumstances replace the safety facilities to be provided by the customer!

The menu is closed by pressing "esc" or selecting "Exit settings".

6.1. - Seizing Protection

If the seizing protection is activated, then the controller switches the relay in question and the connected consumer on every day at 12:00 and on Sundays at 12:00 for 5 seconds in order to prevent the ventilator from sticking after an extended stationary period.

6.2. - Fan Protection

In order to protect the fan at high temperatures here a fan protection temperature can be activated.

6.1.1. - Fan Protection

Activate function

6.1.2. - VS Tein / Taus

If the collector temperature exceeds this value the ventilator is turned off by the controller to provide the system. If temperature drops below and the other conditions are met the controller turns the ventilator on again.

6.3. - Night Cooling

At high room temperature the cooler outside temperature can be used to cool the room.

6.3.1. - Night Cooling

Activate function

6.3.2. - Night Cooling Tsoll

If the set room temperature is exceeded and the collector temperature is 1 K below room temperature, the controller switches on the fan. Shall the temperature set here below or the difference between the room sensor S2 and the collector sensor S1 is less than 1 K, the controller switches the fan out again.

Special functions

7. - Special functions



Menu "7. Special functions" is used to set basic items and expanded functions.



Other than the time all settings may only be made by a specialist.

The menu is closed by pressing "esc" or selecting "Exit special functions".



7.2. - Signal V1

This menu contains the settings for the speed controlled output V1.

7.2.1. - Type of Ventilator

The type of speed controlled ventilator must be entered here.

0-10V: Speed control of ventilators by 0-10V signal.

PWM: Speed control of ventilators by PWM signal.

7.2.2. - Ventilator

In this menu, preconfigured profiles for various ventilators can be selected. Please note that individual settings are still possible even when a profile has been selected.

7.2.3. - Output Signal

The signal can become inverted here for special ventilating fans. This function is for ventilating fans which run with 10 % / 100% smallest speed and with 0.1 V / 1% biggest speed.

7.2.4. - 0-10V off / PWM off

This signal / this voltage is put out when the ventilator is switched off (ventilators that can detect cable break need a minimum signal).

7.2.5. - 0-10V on / PWM on

This signal / this voltage is needed to turn the ventilator on at minimum speed / minimum voltage.

7.2.6. - 0-10V Max / PWM Max

This determines the output signal / the output voltage for the highest speed of the ventilator, that is used e.g. during purging or manual operation.

7.2.7. - Show signal

Displays the set signal in text and a graphical diagram.

Special functions

7.3. - Speed control

This menu determines the calculated and displayed speed of the pump. If e.g. 30% is set here and the signal set in „PWM on/0-10V on“ is put out, 30% speed is displayed. When the signal set in „PWM max/0-10V max“ is put out, 100% speed is displayed. Everything in between is calculated accordingly.

7.3.1. - Speed control Modes

The following speed variants are available here:

Off: There is no speed control. The connected ventilator is only switched on or off with full speed.

Mode V1: After the purging time the controller switches to the set max. speed. If the temperature difference ΔT between the reference sensors (collector and sensor) is less than the set value, then the speed is decreased by one stage after the control time elapses. If the temperature difference between the reference sensors is greater than the set value, then the speed is increased by one stage after the control time elapses. If the controller has adjusted the speed of the ventilator down to the smallest stage and the ΔT between the reference sensors is ΔT off, the ventilator is switched off.

Mode V2: After the purging time the controller switches to the set min. speed. If the temperature difference ΔT between the reference sensors (collector and sensor) is greater than the set value, then the speed is increased by one stage after the control time elapses. If the temperature difference ΔT between the reference sensors is below the set value, then the speed is decreased by one stage after the control time elapses. If the controller has adjusted the speed of the ventilator down to the smallest stage and the ΔT between the reference sensors is $T\Delta$ off, the ventilator is switched off.

Mode V3: After the purging time the controller switches to the set min. speed. If the temperature at the reference sensor (collector) is greater than the setpoint to be set subsequently, then the speed is increased by one stage after the control time expires. If the temperature at the reference sensor (collector) is less than the setpoint to be set subsequently, then the speed is decreased by one stage after the control time expires.

7.3.2. - Purging time

During this time period, the ventilator is running with full speed (100 %) to ensure trouble-free startup. After this time has passed, the ventilator is set to speed control and is set to max. speed or min speed, depending on the speed control variant „7.2.1. - Modes“ auf Seite 23 chosen. Purging time can not be applied with PWM or 0-10V output.

7.3.3. - Sweep time

Sweep time determines the inertia of the speed control to prevent strong fluctuations in temperature. Sweep time is the timespan for a complete change from minimum to maximum ventilator speed.

Special functions

7.3.4. - max. speed

The maximum speed of the ventilator is specified here. During the setting the ventilator runs at the specified speed and the flow rate can be determined.



Caution

The indicated percentages are guide values that may vary to a greater or lesser extent depending on the system, ventilator and ventilator stage.

7.3.5. - min. speed

The minimum speed of the ventilator at relay R1 is specified here. During the setting the ventilator runs at the specified speed and the flow rate can be determined.



Caution

The indicated percentages are guide values that may vary to a greater or lesser extent depending on the system, ventilator and ventilator stage..
100 % is the maximum possible voltage/frequency of the controller.

7.4. - Time & Date

This menu is used to set the current time and date.



Caution

For analysis of the system data it is essential for the time to be set accurately on the controller. Please note that the clock continues to run for 24 hours if the mains voltage is interrupted, and should be reset afterwards.

7.5. - Sensor calibration

Deviations in the temperature values displayed, for example due to cables which are too long or sensors which are not positioned optimally, can be compensated for manually here. The settings can be made for each individual sensor in steps of 0.5 °C.



Caution

Settings are only necessary in special cases at the time of initial commissioning by the specialist. Incorrect measurement values can lead to unpredictable errors.

7.6. - Commissioning

Starting the commissioning help guides you in the correct order through the basic settings necessary for commissioning, and provides brief descriptions of each parameter in the display. Pressing the “esc” key takes you back to the previous value so you can look at the selected setting again or adjust it if desired. Pressing the “esc” more than once takes you back to the selection mode, thus cancelling the commissioning help. (see also E.2).



Caution

May only be started by a specialist during commissioning! Observe the explanations for the individual parameters in these instructions, and check whether further settings are necessary for your application.

Special functions

7.7. - Factory settings

All of the settings that have been made can be reset, thus returning the controller to its delivery state.



Caution

The entire parametrisation, analyses, etc. of the controller will be lost irrevocably. The controller must then be commissioned once again.

7.8. - Heat quantity

A simple heat metering function for basic system control can be activated in this menu. Additional settings regarding the glycol, the percentage of type of glycol and the flow rate of the system are required. A correction value for the heat metering is also possible by adjusting the "Offset ΔT "



Caution

Keep in mind that the system is not changed, adjustments made in this menu are only used to calculate the heat volume and should be based on the actual system. Resulting data is only approximate value for function control!

Menu lock

8. - Menu lock



Menu "8. Menu lock" can be used to secure the controller against unintentional changing of the set values.

The menu is closed by pressing "esc" or selecting "Exit menu lock".

The menus listed below remain completely accessible despite the menu lock being activated, and can be used to make adjustments if necessary:

1. Measurement values
2. Analysis
3. Display mode
- 7.4. Time & date
8. Menu lock
9. Service values

To lock the other menus, select "Menu lock on". To enable the menus again, select "Menu lock off". Setting range: on, off/default setting: off

Service values

9. - Service values

9.1.TDC3-ML 2010/04/14.6825	
9.2.Collector	50°C
9.3.Storage	42°C
▲	▼



The menu “9. Service values” can be used for remote diagnosis by a specialist or the manufacturer in the event of an error, etc.



Caution

Enter the values at the time when the error occurs e.g. in the table.

The menu can be closed at any time by pressing “esc”.

9.1.	
9.2.	
9.3.	
9.4.	
9.5.	
9.6.	
9.7.	
9.8.	
9.9.	
9.10.	
9.11.	
9.12.	
9.13.	
9.14.	
9.15.	
9.16.	
9.17.	
9.18.	
9.19.	
9.20.	
9.21.	
9.22.	
9.23.	
9.24.	
9.25.	
9.26.	
9.27.	
9.28.	
9.29.	
9.30.	

9.31.	
9.32.	
9.33.	
9.34.	
9.35.	
9.36.	
9.37.	
9.38.	
9.39.	
9.40.	
9.41.	
9.42.	
9.43.	
9.44.	
9.45.	
9.46.	
9.47.	
9.48.	
9.49.	
9.50.	
9.51.	
9.52.	
9.53.	
9.54.	
9.55.	
9.56.	
9.57.	
9.58.	
9.59.	
9.60.	

Language

10. - Language

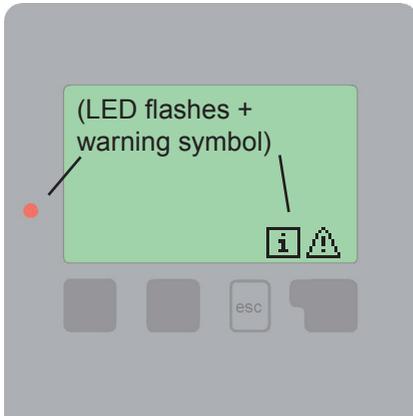


Menu “10. Language” can be used to select the language for the menu guidance. This is queried automatically during initial commissioning.

The choice of languages may differ, however, depending on the device design. Language selection is not available in every device design!

Malfuctions

Z.1. Malfuctions with error messages



If the controller detects a malfunction, the red light flashes and the warning symbol also appears in the display. If the error is no longer present, the warning symbol changes to an info symbol and the red light no longer flashes.

To obtain more detailed information on the error, press the key under the warning or info symbol.



Do not try to deal with this yourself.
Consult a specialist in the event of an error!

Possible error messages:

Sensor x defective ----->

Notes for the specialist:

Means that either the sensor, the sensor input at the controller or the connecting cable is/was defective.
(Resistance table see B.1)

Restart ----->

Means that the controller was restarted, for example due to a power failure. Check the date&time!

Time & date ----->

This message appears automatically after a mains failure because the time&date have to be checked, and reset if necessary.

Malfunctions

Z.2. Replacing the fuse

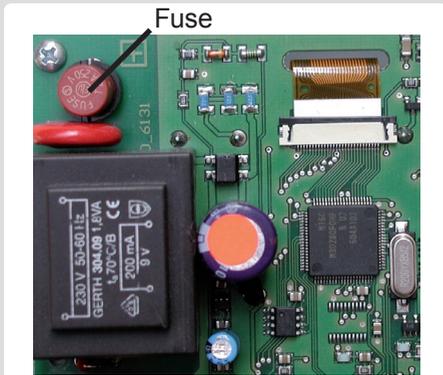


Repairs and maintenance may only be performed by a specialist. Before working on the unit, switch off the power supply and secure it against being switched on again! Check for the absence of power!



Only use the supplied spare fuse or a fuse of the same design with the following specifications: T2A / 250V

Z.2.1



If the mains voltage is switched on and the controller still does not function or display anything, then the internal device fuse may be defective. In that case, open the device as described under C, remove the old fuse and check it.

Exchange the defective fuse for a new one, locate the external source of the error (e.g. ventilator) and exchange it.

Then first recommission the controller and check the function of the switch outputs in manual mode as described under 4.2.

Z.3. Maintenance



In the course of the general annual maintenance of your heating system you should also have the functions of the controller checked by a specialist and have the settings optimised if necessary.

Performing maintenance:

- Check the date and time (see 7.4.)
- Assess/check plausibility of analyses (see 2.4)
- Check the error memory (see 2.5.)
- Verify/check plausibility of the current measurement values (see 1.)
- Check the switch outputs/consumers in manual mode (see 4.2.)
- Poss. optimise the parameter settings

Tips & Tricks



The service values (see 9.) include not only current measurement values and operating states, but also all of the settings for the controller. Write the service values down just once after commissioning has been successfully completed.



In the event of uncertainty as to the control response or malfunctions the service values are a proven and successful method for remote diagnosis. Write the service values down (see 9.) at the time that the suspected malfunction occurs. Send the service value table by fax or e-mail with a brief description of the error to the specialist or manufacturer.



In programs 13 with pool the charging of the pool, e.g. for winter operation, can be switched off using a simple function. To do this, simply press and hold the “esc” key down for several seconds on the diagram/overview screen. A message appears on the display as soon as the pool is switched off or when the pool is switched on again.



To protect against loss of data, record any analyses and data that are particularly important to you (see 2.) at regular intervals.

Hydraulic variant set:

Commissioned on:

Commissioned by:

Final declaration:

Although these instructions have been created with the greatest possible care, the possibility of incorrect or incomplete information cannot be excluded. Subject as a basic principle to errors and technical changes.

Your specialist dealer: