ANS 21-PV

Version 11 EN

Manual version 2

Simple solar control unit
Photovoltaik version

Operation
Installation instructions

en

TA TECHNISCHE ALTERNATIVE

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Safety requirements

	All installation and wiring work on the controller must only be carried out in a zero-volts state.
	The opening, connection and commissioning of the device may only be carried out by competent personnel. In so doing, all local security requirements must be adhered to.

The device corresponds to the latest state of the art and fulfils all necessary safety conditions. It may only be used or deployed in accordance with the technical data and the safety conditions and rules listed below. When using the device, the legal and safety regulations apposite to the particular use are also to be observed.

► The device must only be installed in a dry interior room.

► It must be possible to isolate the controller from the mains using an all-pole isolating device (plug/socket or double pole isolator).

► Solar thermal systems can become very hot. Consequently there is a risk of burns. Take care when fitting temperature sensors!

► For safety reasons, the system should only be left in manual mode when testing. In this operating mode, no maximum temperatures or sensor functions are monitored.

► Safe operation is no longer possible if the controller or connected equipment exhibits visual damage, no longer functions or has been stored for a lengthy period of time under unsuitable conditions. If this is the case, place the controller and equipment out of service and secure against unintentional use.

Maintenance

If used properly, the system does not require maintenance.

As the components relevant to accuracy are not subjected to loads if used properly, long-term deviation is very low. The unit thus cannot be adjusted.

The construction characteristics of the unit must not be changed for repairs. Spare parts must correspond to the original parts and be used as intended.

Selection of the program and sensor type

The selection of the program and the sensor type has to be made before installation. **The controller does not operate or operates incorrectly, if the incorrect sensor type is set.**

Before opening the housing always switch-off the supply voltage!
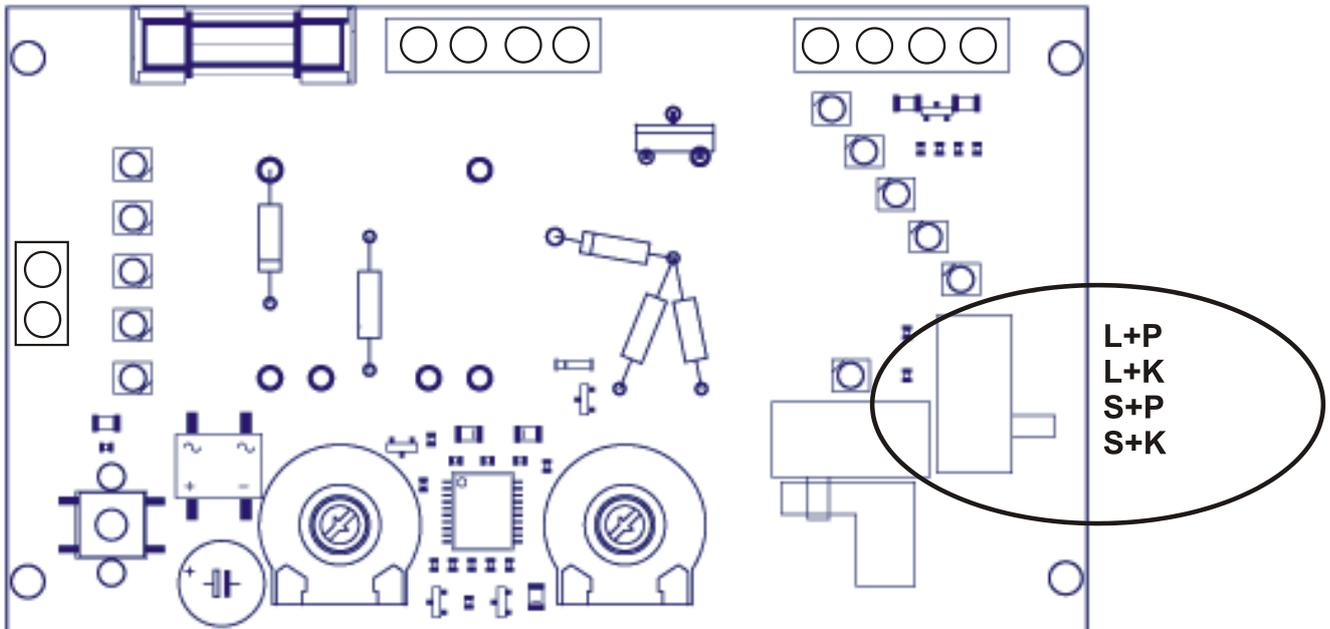
The selection occurs by means of a slide switch on the right border of the board. There is no access possible to the slide switch from outside.

Four positions are available:

1) **L+P** Feed pump requirement by PT1000 sensors
2) **L+K** Feed pump requirement by KTY sensors
3) **S+P** Solar power system with PT1000 sensors
4) **S+K** Solar power system with KTY sensors

PV-Mode

Parallel to the temperatures, the input voltage is also checked.
Switch-on threshold: >11V
If the voltage falls below the lower value (<9V) or rises above the upper value (26V), the pump is switched off.
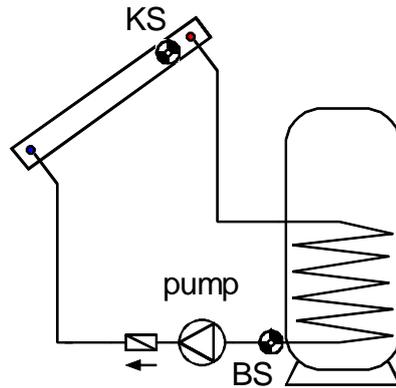By pressing the blue button, the sensor value LED display can be activated for 5 seconds.

Manual / automatic switchover

On the front side of the control is a sliding switch with the functions AUS (=OFF), AUT (= automatic, normal setting) and HAND (=ON, endurance run).

Solar thermal system

function switch in position **S+ (solar)**

The pump runs when sensor **KS** has a temperature of *diff* higher than sensor **BS** and **BS** has not exceeded the threshold *max*.

$$Pump = KS > (BS + diff) \And BS < max$$

Collector excess temperature: if the collector temperature climbs above 130°C, the pump is switched off and only released again, if the temperature falls below 110°C.
During the excess temperature shutoff, the two top LEDs of the collector display flash.

Tank load from boiler

function switch on position **L+ (feed pump)**
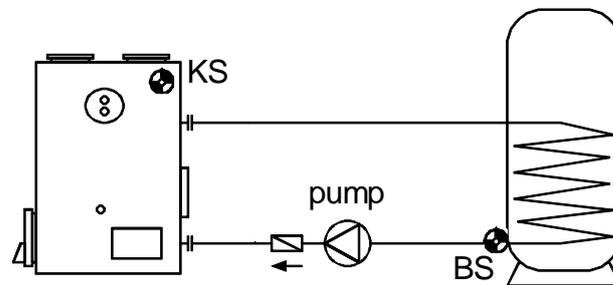
The pump runs when **sensor KS** is greater than the threshold **max** (here used as "min") and **sensor KS** is greater than **BS** by the difference **diff**.

$$Pump = KS > max \And KS > (BS + diff)$$

The difference function:

The output only switches the pump when the temperature of the collector or the boiler is greater than the temperature of the boiler by the set difference **diff**.

The thermostat function:

Solar S: If the **tank temperature** exceeds the set **maximum threshold**, the pump is switched off regardless of the temperature of the collector (protection from calcification).

Feed pump L: If the **boiler temperature** falls below the minimum threshold, the pump is switched off (protection from sooting).

Master – slave – function

Two ANS 21 controllers, can be connected via the data link. Consequently it is possible to charge two tanks, of which one tank is prioritised for charging by the "master".

Both sensors are connected to the master.

Only the tank sensor BS is connected to the slave controller that is subordinate to the master. The slave receives the collector temperature from the master.

There are two operating modes for this master-slave operation:
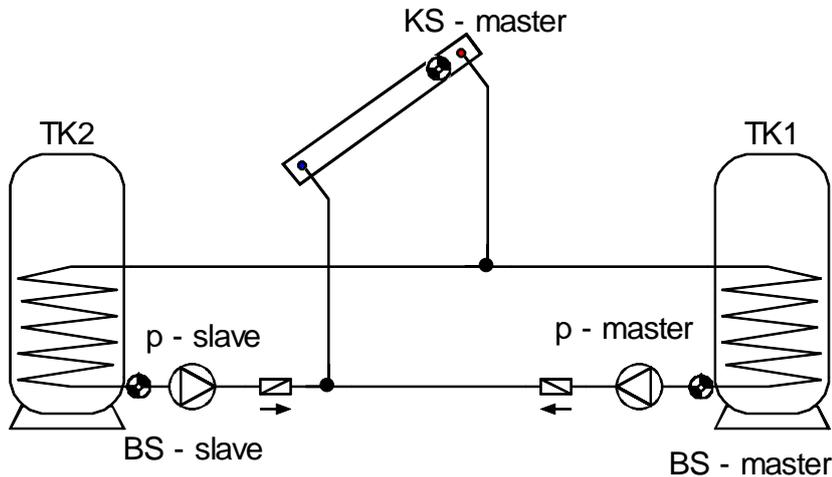
- **2-pump mode:** as can be seen in the schematic diagram, a pump is connected to both master and slave. The master pump has absolute priority, hence the slave pump can only be switched on if the master pump is switched off (dependent on the starting conditions). 2-pump mode is activated if the terminals of the collector sensor at the slave remain disconnected (= interruption).
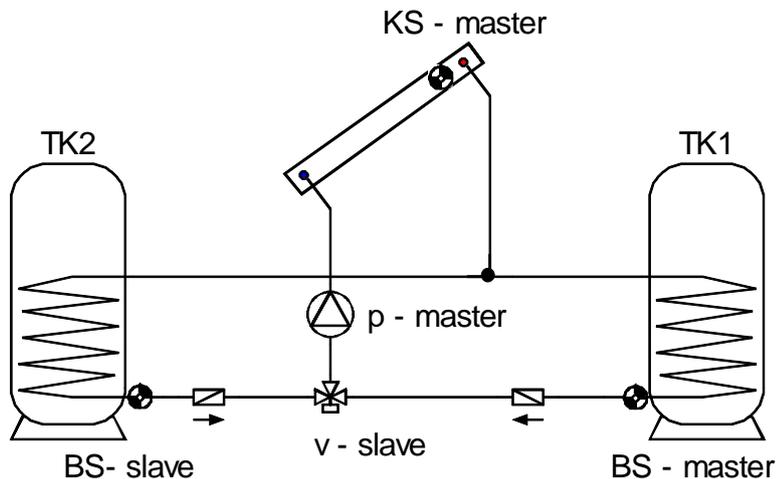
- **Pump-valve mode:** the common pump is connected to the master controller, the slave controls the valve. As soon as the starting condition is no longer fulfilled at the master, the slave receives the command to switch on the pump and switches the valve to "its" consumer TK2. Pump-valve mode is activated if the terminals of the collector sensor at the slave are bridged with a jumper (= short circuit).

Sensor installation

The sensors must be properly arranged and installed for the system to function correctly.

- **Collector sensor (red or grey cable with connection box):** Either insert the sensor in a pipe directly soldered or riveted to the absorber and extending out of the collector casing or screw the sensor onto a T piece on the end of the supply line's collecting tube using an immersion sleeve. No water may be allowed to enter the immersion sleeve (danger of freezing).

- **Storage sensor:** The sensor should be used with an immersion sleeve just above the outlet for the exchanger's return line if heat exchangers with ribbed tubes are used and with a T piece on the outlet of the exchanger's feed line if integrated non-ribbed tubes are used. It should not be installed below the respective register or heat exchanger in any case.

- **Boiler sensor (boiler supply line):** This sensor is either screwed into the boiler using an immersion sleeve or at a short distance from the boiler on the supply line.

- **Pool sensor (swimming pool):** Install directly at the outlet from the pool on the suction line as an attached sensor (see attached sensor). Installation using an immersion sleeve is not recommended due to the possibility of condensation within the sleeve.

- **Attached sensor:** Attach to the line using pipe or hose clamps. Make sure the material used is proper (corrosion, temperature resistance, etc.). Then, the sensor has to be well insulated so that the pipe temperature is measured exactly and the ambient temperature does not influence the measurement.

All of the sensor lines with a cross-section of 0.5mm2 can be extended up to 50m. With this length of line and a Pt1000 temperature sensor, the measurement error is approx. +1K. Longer lines or a lower measurement error require an appropriately larger cross-section. The sensor and the probe can be connected by putting the heat-shrinkable sleeve truncated to 4 cm over a wire and twisting the bare ends. If one of the wire ends is tinned then the connection must be made through soldering. Then the heat-shrinkable sleeve is put over the bare, twisted ends and carefully heated (such as with a lighter) until it has wrapped the connection tightly.
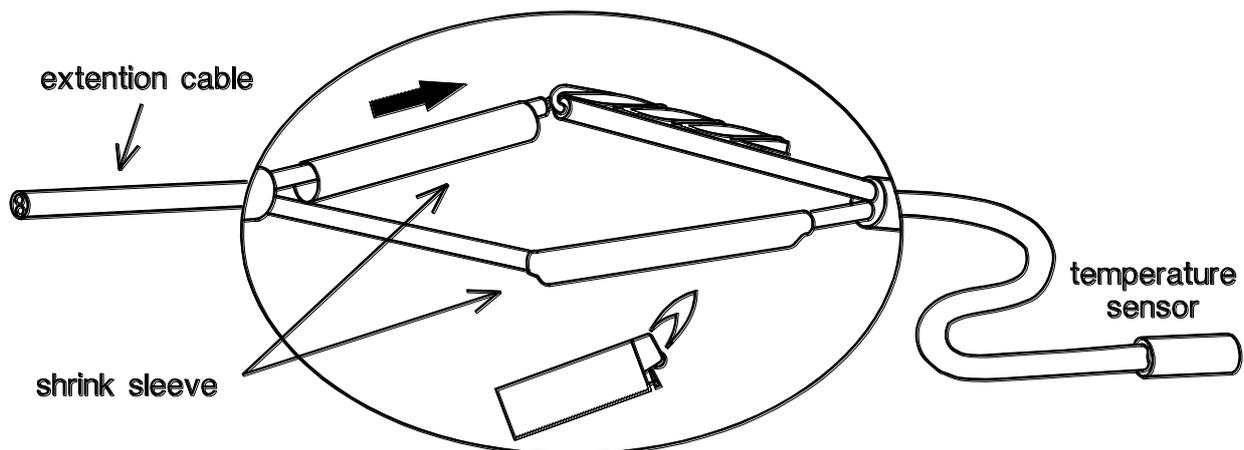
In order to prevent measurement fluctuations, the sensor cables must not be subject to negative external influences to ensure fault-free signal transmission. When using non-screened cables, sensor cables and 230V network cables must be laid in separate cable channels and at a minimum distance of 5 cm. If screened cables are used, the screen must be connected to the sensor earth.

Installing the device

WARNING! ALWAYS PULL THE MAINS PLUG BEFORE OPENING THE CASING!

Unscrew the four screws on the edges of the case and screw on the basin through the two holes on the bottom side using the fastening screws provided.

Electrical connection

Only a trained electrician may provide the electrical connection in compliance with local guidelines. The sensor lines must not be laid in the same cable channel as the supply voltage. In a commonly used cable channel, appropriate shielding has to be provided.

Operation without a charge controller is also possible using PV panels with outputs greater than 30W used in conjunction with special solar pumps (e.g. Ecocirc D5-Solar made by Laing).
For special applications with pump capacities > 20W, a capacitor block (special accessory) is recommended for improving the motor start-up.

Caution: Only work on the inside of the control system when it is dead. The connections are to be put according to the marking of the clamps.

Note: The system has to be grounded properly and furnished with surge arresters to protect it from damage due to lightening. Sensor failures due to storms and static electricity are usually the result of faulty construction.

Pin configuration:
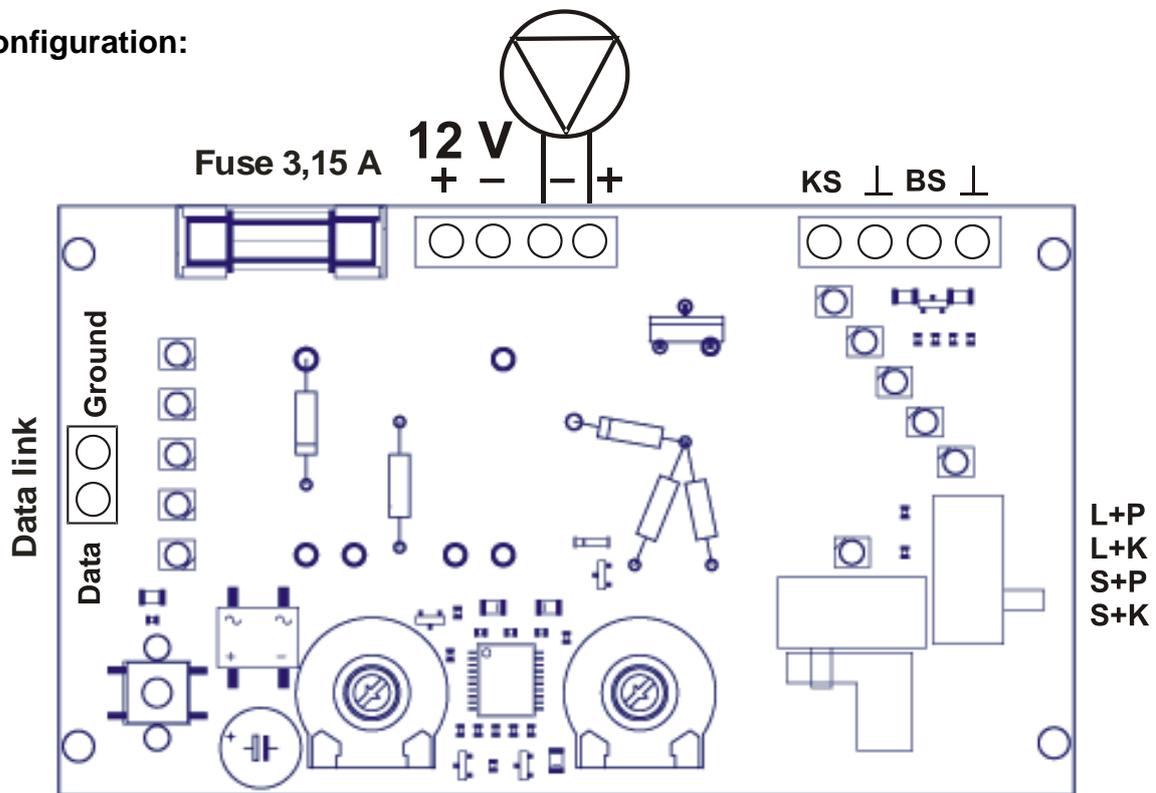
When using the master-slave function, the data link must be connected in-phase to both units (data to data, ground to ground).

Tips on troubleshooting

   When the control system does not function properly on automatic mode, the function switch and the sensors should be checked.

Version display: as the controller is connected, the version is temporarily displayed using the right tank LEDs (binary code - reading from the top down).

A short-circuit or an interruption of a sensor are displayed directly on the control system. If a short-circuit occurs, the lowest LED of the collector or tank icon blinks. In case of an interruption, the top LED of the icon blinks.

Collector excess temperature: if the collector temperature climbs above 130°C, the pump is switched off and only released again, if the temperature falls below 110°C.

During the excess temperature shutoff, the two top LED's of the collector display flash.

Master-slave mode: the control circuit continues to function at least partly, if an error occurs at a sensor:

- if the master tank sensor fails, the master pump is deactivated, however it can activate the slave at any time, depending on the operating mode.
- if the slave tank sensor fails, the master operates in stand-alone mode (master-slave mode is deactivated)
- if the master collector sensor fails, the system shuts down completely (LEDs continue to display the error)

In addition, the sensors can be measured by means of an ohmmeter.

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	2980	3182	3392

   If the system is not in operation although supply voltage is connected, the 3.15A quick-blowing fuse that protects the control system and the output should be checked and exchanged if necessary.

Technical data

Temp.difference:	adjustable from 2-12°C (hysteresis = 3K)
Overheating temp./ Min.threshold:	adjustable from 40-100°C (hysteresis = 3K)
Accuracy:	tip. +-2%
Operating voltage:	9 – 26V
Current consumption at 12V (all outputs = OFF):	< 10mA
Current consumption at 12V (all outputs = ON):	< 55mA

Dimensions in mm:

45.4

51.1

126.8

76.0
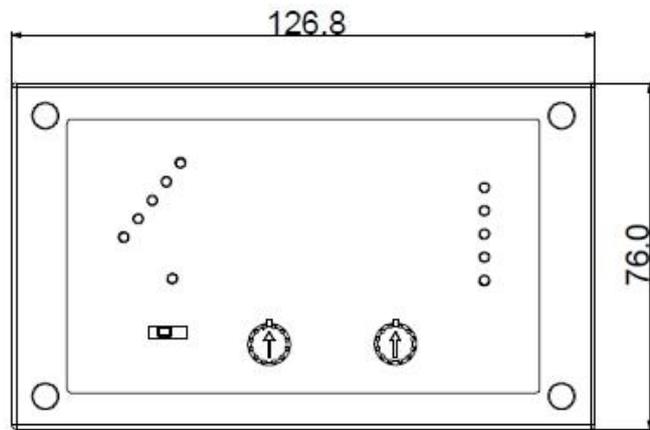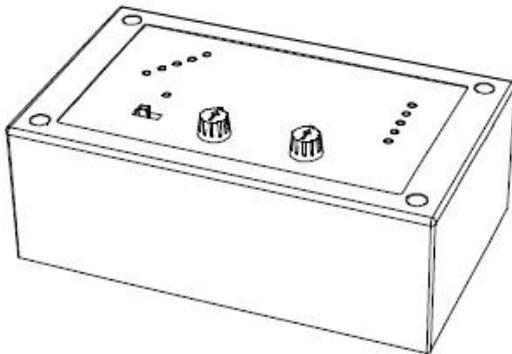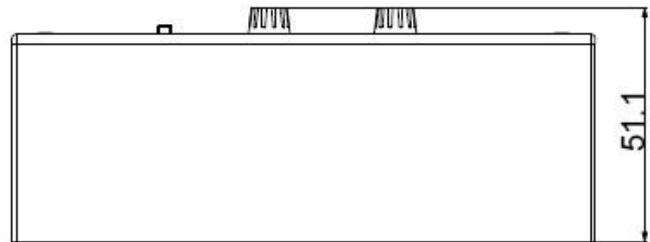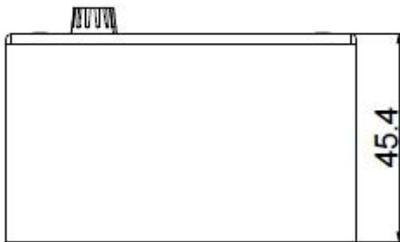
We reserve the right to make technical changes.   © 2016

EU Declaration of conformity

Document- Nr. / Date: TA17008 / 02/02/2017

Company / Manufacturer: Technische Alternative RT GmbH

Address: A- 3872 Amaliendorf, Langestraße 124

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

Product name: ANS21-PV

Product brand: Technische Alternative RT GmbH

Product description: Simple solar control unit

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

2014/35/EU	Low voltage standard
2014/30/EU	Electromagnetic compatibility
2011/65/EU	RoHS Restriction of the use of certain hazardous substances
2009/125/EC	Eco-design directive

Employed standards:

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

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

$$C\,\epsilon$$

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

This declaration is submitted by

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

This declaration certifies the agreement with the named standards, contains however no warranty of characteristics.

The security advices of included product documents are to be considered.

Guarantee conditions

Note: The following guarantee conditions do not in any way limit the legal right to a guarantee, rather expand your rights as a consumer.

1. The company Technische Alternative RT GmbH provides a two-year guarantee from the date of purchase by the end consumer for all the devices and parts which it sells. Defects must be reported immediately upon detection and within the guarantee period. Technical support knows the correct solution for nearly all problems. In this respect, contacting us immediately will help to avoid unnecessary expense or effort in troubleshooting.

2. The guarantee includes the free of charge repair (but not the cost of on site fault-finding, removal, refitting and shipping) of operational and material defects which impair operation. In the event that a repair is not, for reasons of cost, worthwhile according to the assessment of Technische Alternative, the goods will be replaced.

3. Not included is damage resulting from the effects of over-voltages or abnormal ambient conditions. Likewise, no guarantee liability can be accepted if the device defect is due to: transport damage for which we are not responsible, incorrect installation and assembly, incorrect use, non-observance of operating and installation instructions or incorrect maintenance.

4. The guarantee claim will expire if repairs or actions are carried out by persons who are not authorised to do so or have not been so authorised by us or if our devices are operated with spare, supplementary or accessory parts which are not considered to be original parts.

5. The defective parts must be sent to our factory with an enclosed copy of the proof of purchase and a precise description of the defect. Processing is accelerated if an RMA number is applied for via our home page www.ta.co.at. A prior clarification of the defect with our technical support is necessary.

6. Services provided under guarantee result neither in an extension of the guarantee period nor in a resetting of the guarantee period. The guarantee period for fitted parts ends with the guarantee period of the whole device.

7. Extended or other claims, especially those for compensation for damage other than to the device itself are, insofar as a liability is not legally required, excluded.

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