OPERATION MANUAL

RK-2010

WEATHER-COMPENSATING INTEGRATED CENTRAL HEATING TEMPERATURE CONTROLLER

Version G304

1. Application.

The RK–2010 weather compensating controller is a modern microprocessor device designed for weather compensating central heating temperature control in system presented in the picture 1 containing:

- solid fuel boiler with blow-in fan, a heat accumulator charging pump and a boiler temperature sensor;
- heat accumulator with a temperature sensor;
- central heating circulation mixing valve driven by servomotor;
- central heating pump;
- central heating temperature sensor;
- outdoor temperature sensor;
- optional indoor temperature sensor;
- optional solar heating system with a pump charging the heat accumulator, with temperature sensors inside the solar panel and in the lower part of the accumulator;
- optional household hot water container with hot water pump and water temperature sensor;
- optional additional gas or oil boiler with a valve for switching the circulation of the additional boiler;
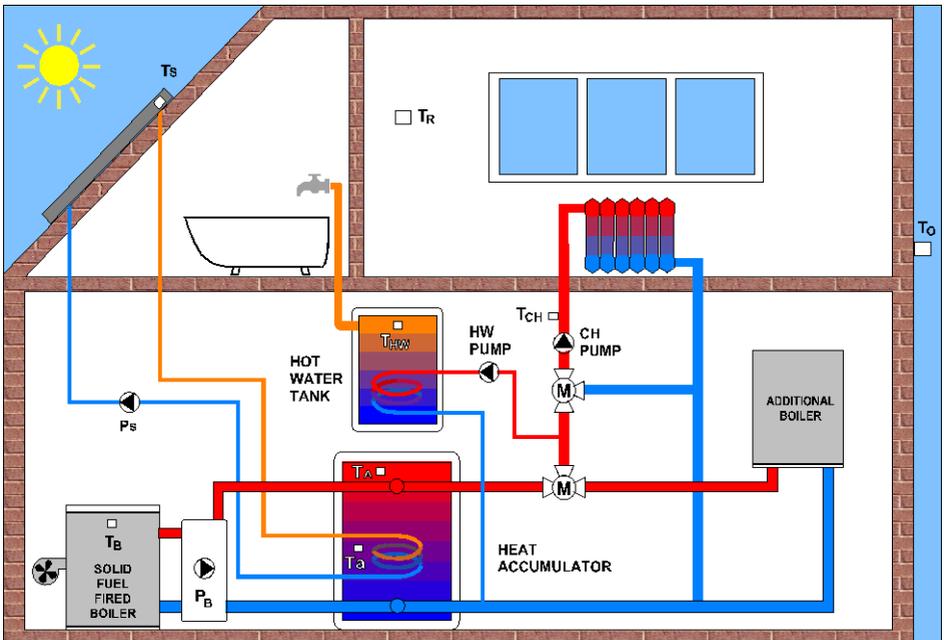
Picture 1. Example of a heating system.

2. Connection.

Before turning the power on, wires powering the controller and all external devices should be connected to appropriate connections on the back side of the controller. Temperature sensors should be placed in appropriately prepared measurement places, which should be dry. Unused outputs may remain unconnected. Detailed connection scheme is presented in the picture 4.

CAUTION! Before plugging in the controller make sure that the wiring system is properly grounded and tighten output connection screws.

CAUTION! The main switch turns off only the fan and the solar system pump. Remaining outputs should be protected by an additional switch and a proper fuse.

CAUTION! Combined total power of fan and solar pump connected to controller output can't exceed 900W. Load of the rest of outputs of the weather compensator is 1A/230V.

3. Operation.

Front panel of the controller (picture 2) consists of:
1 - Power switch,
2 - Display,
3 - DAY and NIGHT temperature setting button,
4 - Fan START/STOP button,
5 - Blow-in fan working indicator,
6 - Solid fuel boiler working indicator,
7 - Solar pump working indicator,
8 - Central heating charging pump working indicator,
9 - Hot water charging pump working indicator,
10- Central heating circulation mixing valve closing indicator,
11- Central heating circulation mixing valve opening indicator,
12- Additional boiler working indicator,
13- TAB button used for moving between parameters during programming the device,
14- Multifunctional turning knob and OK button,
15- ESC button used for canceling changes made and deleting alarms.
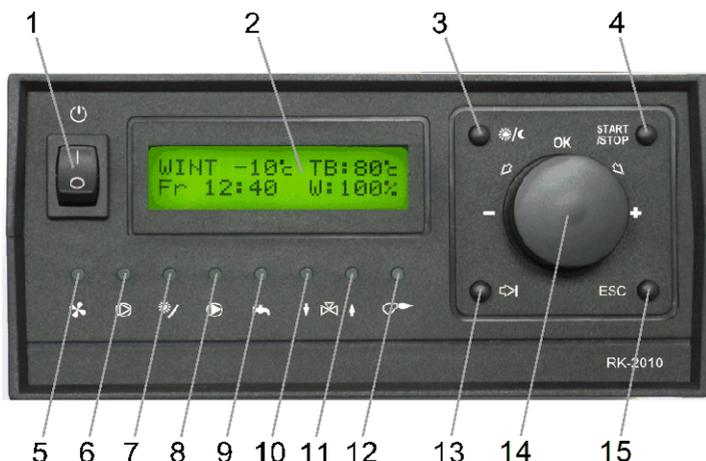
Picture 2. Weather compensator front panel.

After turning the power on using button (1) the controller shows basic group of parameters on the display. This group consists of: day of the week, hour, current work mode (WINTER/SUMMER), measured outdoor temperature, solid fuel boiler measured temperature and work mode, e.g.:

```
W I N T   - 1 1 c   T B : 2 0 c
T h   2 0 : 1 9       S T O P
```

3.1. Changing the day and night temperature.

Basic operation of the controller consists of day and night temperature setting. Other functions are executed according to the parameters programmed. Pressing the day and night temperature change button (3) displays the currently programmed temperatures, e.g.:

```
D e s i r e d     D a y : 2 2 c
t e m p .     N i g h t : 1 7 c
```

The blinking mark indicates the parameter to be changed. Changing the value is done by turning the multifunctional knob (14). Using the TAB button (13) it is possible to move the blinking mark between particular parameters. Adjusted values can be confirmed by pressing the OK button (pressing the multifunctional knob). After pressing the ESC button (15) or automatically after 60 seconds since the last parameter change the changes are canceled.

3.2. Solid fuel boiler operation.

Solid fuel boiler operation consists of adjusting the required boiler temperature (detailed description included in point 5.3), adding fuel, lighting the hearth and turning on the blow-in fan. The work of fan is controlled with the START/STOP button (4). The

last display position shows the work mode the boiler is currently in. The list of available boiler work mode marks with and descriptions are included in the table 1.

Table 1. Table . Solid fuel boiler work mode marks.

Work mode	Description
STOP	Boiler is stopped.
B:15%	Boiler is in the starting mode. Displayed number shows the current power of the blow-in fan.
W:60%	Boiler is working. Displayed number shows the current power of the blow-in fan.
GAS RM	Boiler is working. The fan is working to remove gases.
OVERHE.	Boiler is not working. Stopped due to overheating.
SENS ER	Boiler is not working. Stopped due to boiler sensor damage.
NO FUEL	Boiler is not working. Stopped due to lack of fuel.

Modes marked as **OVERHE.**, **SENS ER** and **NO FUEL** are failure modes. After these appear the boiler work is stopped and the information about the problem is displayed until manual deletion with the ESC button (15).

4. Viewing and changing the parameters.

The work parameters of the controller were divided into groups. Changing the displayed group is done by turning the multifunctional knob (14). Pressing the ESC button (15) at any moment of viewing causes the weather compensator to return to displaying the basic group (as after turning the power on). In order to change the value of any parameter, display the group the chosen parameter is in by turning the multifunctional knob and then press the OK button (pressing the knob). This will cause the controller to enter parameter change mode, indicated by blinking of the mark displayed. The mark indicates the parameter that can be modified. By using the TAB button (13) it is possible to move the mark between particular parameters. Changing the value of the chosen parameter is done by turning the multifunctional knob. Saving the changes made to all parameters in the displayed group is done after pressing the OK button. Pressing the ESC button at any moment causes the previous values to be restored and exits the parameter change mode. Automatic exit from the parameter change mode and restoring the previous values takes place also when no button is pressed for 60 seconds. Allowed ranges of particular parameter values are presented in table 3.

In some groups parameters that are measured values or depend on regulation program are displayed. An attempt to change such parameters will end with a message:

```
P a r a m e t e r s   c a n ' t
      b e   c h a n g e d
```

5. User parameters.

5.1. Changing the work mode and clock setting.

While displaying the basic group of parameters after pressing the OK button, it is possible to manually change the regulation mode and set the device's clock. In the WINTER mode, the weather controller heats rooms as well as household water. In the SUMMER mode, boiler is turned on only for heating the household water.

CAUTION! As the controller changes the work mode automatically according to the set threshold temperatures and current outdoor temperature, manual mode change can be ignored.

```
Work mode:WINTER
RTC:We  20:15
```

5.2. Changing the work mode of the additional boiler.

If the system is equipped with an additional boiler, it is turned on automatically in case of insufficient amount of heat in the accumulator. User is able to turn the automatic mode of the additional boiler on and off. This parameter is not displayed if the additional boiler was turned off in the service settings.

```
Add.  boiler:AUTO
```

5.3. Required temperatures.

This group displays the required temperatures the controller is trying to achieve by properly steering the output devices. Required temperatures of central heating and hot water result from parameters programmed for particular circulations, whereas the required solid fuel boiler temperature is set by the user. In case when system does not have the hot water circulation the required hot water temperature is not displayed.

```
Desired     THW:55c
TB:93c      TCH:40c
```

5.4. Measured temperatures.

In the following two groups, measured temperatures are displayed.

```
Measured   THW:40c
TCH:45c     TR:20c
```

```
Measured   TA:70c
TS:105c     Ta:55c
```

Particular symbols indicate:
TCH - water temperature of the central heating circulation
THW - household water temperature (not displayed if system is not equipped with the container of hot water);

TR   - room temperature (not displayed if the system is not equipped with the room sensor);

TA   - water temperature in the heat accumulator;

TS   - solar panel water temperature (not displayed if the system is not equipped with a solar panel);

Ta   - water temperature in the solar system heat accumulator (not displayed if the system is not equipped with the solar panel)

5.5. Central heating regulation type.

This group displays the active central heating regulation program. If the system is equipped with a room temperature sensor, user can set one of three factory programs (PROG.1, PROG.2 or PROG.3), user daily program (DAILY), fixed regulation program (CONST.), or protection program (PROTECT). Parameters of factory programs are presented in the table 5. Daily program change mode is described in the point 5.9. Fixed regulation consists of keeping the permanent, programmed TR temperature for a determined number of days (setting the number of days to 0 will cause the program to be in effect until turned off manually). This function is useful in case of long absence of household members. After the required number of days has elapsed, the fixed regulation program is turned off, and RK–2010 shifts to program set before turning on the fixed regulation. PROTECTION program is a fixed regulation program, but without possibility of changing the required room temperature (5°C) and number of days of running (works until turned off manually). The lower line of display shows the current parameters of the program set. For daily programs (PROG.1, PROG.2 PROG.3 and DAILY) it is the temperature type (DAY/NIGHT) resulting from the daily program and clock indications as well as temperature value. For permanent regulation programs the driver displays the required room temperature and the number of days remaining until the end of this regulation.

```
Reg.      CH:DAILY
Day    ->  TR:20c
```

```
Reg.      CH:CONST.
TR:11c      Days:99
```

```
Reg.      CH:PROG.1
Night->  TR:17c
```

In the case when the system is not equipped with the room sensor, the user can only set the own daily or fixed programs. In such a case the required temperature does not apply to the temperature level in the heated room, but indicates the value by which the central heating installation water will be changed, calculated from the weather characteristics. It can be calculated in accordance with the below relation:

TCHreq = TCHwch + TCH

where:

TCHreq   -   central heating circulation required temperature,

TCHwch   -   temperature calculated on the basis of the central heating circulation weather characteristics and outside temperature.

TCH   -   increase or decrease value resulting from the set central heating circulation program.

```
R e g .      C H : C O N S T .
T C H : - 1 0 c   D a y s : 2 0
```

5.6. Hot water regulation type.

Similarly to regulating the central heating with TR sensor turned off, the hot water regulation can be done accordance with daily program or fixed program. Daily hot water program change mode has been described in the point 5.11. Required hot water temperature value (THW), is a temperature the weather compensator will be trying to achieve by properly steering the hot water container loading pump. In a case when the system is not equipped with hot water circulation, the group "Hot water regulation type" is not displayed.

```
R e g .      H W : D A I L Y
T H W : 5 8 c
```

5.7. Hot water regulation parameters.

In this group of parameters, the user can turn on the hot water priority (P), bacterial flora liquidation program (BR) and determine the running time of the program. Hot water priority means that when the in the case of the container being to cool, the weather compensator using the mixing valve closes the central heating circulation, and the heat gathered in the accumulator is used for fast usable water heating. In case when the priority is turned off, the usable water is heated simultaneously with water in circulation. Bacterial flora liquidation consists of heating the water in the hot water container to the temperature of 75°C and maintaining this temperature for 90 minutes on a weekly basis.

CAUTION! Choosing the day and time of starting the program, remember about danger of being burned during its operation.

```
P a r a m .   H W    P : Y E S
B R : Y E S   → W e   0 3 : 0 0
```

5.8. Threshold temperatures.

In order to eliminate the influence of the often changing outside temperature on the work of the weather compensator, a possibility of programming the threshold temperatures for changing to WINTER mode and SUMMER mode has been implemented. Changing between these mode is automatic after the outside temperature crosses one of the threshold temperatures.

```
Thresh.   WINT:18c
temp.     SUMM:20c
```

5.9. Daily central heating program.

RK–2010 enables the possibility of programming night inside temperature decrease for every day of the week in five subranges. Daily heating program begins and ends always at 00:00. In order to view or change, by using the handle select the function as below on the display:

```
     CH  program
       settings
```

After pressing the OK button, the weather compensator transfers to central heating daily program operation menu. The user can choose the following functions:

- changing the daily central heating program:

```
       CH  DAILY
program  change
```

- copying to daily central heating program:

```
Copy   to  DAILY
    CH  program
```

- copying days of the daily central heating program:

```
      Copy  CH
program  days
```

- finishing setting the central heating program:

```
Exit  CH  program
       settings
```

5.9.1. Changing the daily program.

Choosing this function by pressing the OK button results in the first subrange for Monday to be displayed. By using the handle and the TAB button, the user can choose any day and any subrange number. Changing the time of operation of the program consists of setting the cursor, by using the TAB button, to the end time of the current range. Changing the temperature for a chosen time range is done in a similar way. Confirmation of changes is done by pressing the OK button. Switching the day or the subrange without prior confirmation cancels the changes made. Press the ESC button to exit the daily program view/change mode.

```
Mo  1  00:00-00:30
TR:Night
```

CAUTION !! It is not possible to change the time range for the 5th subrange as it has to end at midnight. Time range change is also not possible, if the end of the previous range for the given day has been programmed to 00:00.

5.9.2. Copying to daily central heating program.

The user has the possibility to copy one of the producer's programs (PROG.1, PROG.2 or PROG.3) to own daily program, and then to make adjustments. After choosing the copying function, the driver will display:

```
      C o p y    p r o g r a m
P R O G . 1    t o    D A I L Y
```

Producer's program to be copied to the user's daily central heating program is chosen by using the handle. After confirming the choice by pressing the OK button, the weather compensator will display the following question:

```
D o   y o u    c o n f i r m
c o p y i n g ?   N O
```

Because copying from the producer's programs deletes the whole previous user program, the default message displayed by the RK–2010 is NO. If the copying is to take effect - the user should chose the answer YES by using the handle and confirm by pressing OK. After the copying is finished the message is displayed:

```
      C o p y i n g
      f i n i s h e d
```

and the weather compensator returns to producer's programs menu. Exiting the copying function takes place after pressing the ESC button.

5.9.3. Copying days of the daily central heating program.

Because the daily program is very often the same for a few days of the week - it is possible to copy the settings between chosen days. After confirmation of the function of copying the days, weather compensator displays:

```
      C o p y    p r o g r a m
f r o m : M o    t o : M o
```

By using the handle and the TAB button choose the day from which the program is to be copied and the day to which the copying will take place. The choice is confirmed by using the OK button. Similarly to copying producer's programs, weather compensator asks for confirmation. Exiting the copying function takes place after pressing the ESC button.

5.9.4. Finishing setting the central heating program.

Confirmation of this function causes the exit from the „Central heating program setting" menu.

```
Exit  CH  program
       settings
```

5.10. Daily central heating program with TR sensor turned off.

Changing and copying the days of the daily central heating circulation program with the sensor turned off is similar to changing the daily central heating circulation program with the sensor turned on. The difference is that instead of the room temperature, the user programs the installation water temperature increase or decrease (TCH) calculated from the weather characteristics.

```
Mo  1  00:00-00:30
TCH:-15c
```

5.11. Daily hot water program.

Changing and copying the the days of the daily hot water program takes place similarly to changing the daily program of the main central heating circulation. The difference is that instead of the room temperature, the user programs the water temperature in the hot water container. With the hot water circulation turned off the user does not have the possibility of viewing and changing the daily program.

```
Mo  1  00:00-03:30
THW:45c
```

6. Service parameters.

Access to service parameters is protected by password. For entering this mode the following option should be chosen by using the handle:

```
Enter  service
        mode
```

After confirmation by the OK button, the weather compensator will ask for service password:

```
Enter  password
       00000
```

Values of particular numbers are set by using the handle. To switch between the numbers the TAB button is used. After giving the password, it should be confirmed by OK button. If the password is correct the weather compensator changes to service mode. In case of a wrong password, the message is displayed:

```
Wrong  password
```

6.1. Blow-in fan work parameters.

6.1.1. Modulation of the rotating speed of the blow-in fan.

It is possible to turn the rotating speed modulation of the fan (Mod) on or off and determine the modulation factor (fMod) in this group. Modulated work is based on a gradual decrease of fan's rotation speed as the water temperature in the boiler is getting closer to the required temperature. E.g. setting the modulation factor to 5 value means, that if water temperature in the boiler is 5°C lower than the required temperature the fan works at maximum power. Subsequent temperature increase will cause a gradual decrease of the fan's rotation speed till minimum power at water temperature in the boiler being equal to the temperature required. If power modulation is turned off, the fan is steered basing on the „ON/OFF" rule.

```
Fan
Mod:YES   fMod:05
```

6.1.2. Range of power and hysteresis of the fan's work.

This group is used for determining the fan's threshold powers (Min, Max) and hysteresis of work (hyst). Hysteresis is used in the case of „ON/OFF" mode and determines the value by which the boiler water temperature has to decrease in order for the weather compensator to start the fan again. If fan works with power modulation, this parameter is not displayed. Fan's threshold power values are applied both when using power modulation and the "on/off" rule.

```
Fan         hyst:5c
Min:0%   Max:100%
```

6.1.3. Scavenge.

Scavenge is turning the fan on in order to remove the gases gathered in the boiler on a cyclical basis. Scavenges are performed every determined period of time (tP). During the scavenge the fan is turned on with the maximum programmed power for the time programmed in the parameter (tW).

```
Fan    GAS  RM:YES
tW:20s    tP:05min
```

6.1.4. Lighting function.

The RK–2010 weather compensator enables the fuel lighting function. This function is based on gradual fan's rotation speed increase after turning the regulation process on from minimum to maximum power. Lighting is active through a determined period of time (t) or until the boiler reaches the minimum temperature.

```
Fan  Slow  Start
YES  t:10min
```

6.2. Solid fuel boiler work parameters.

6.2.1. Boiler's threshold temperatures.

Boiler's minimum (Tmin), maximum (Tmax) and overheating (TBO) temperatures can be set in this group. The minimum and maximum temperatures limit the solid fuel boiler's required temperature range, which can be set by the user. Overheating temperature is a temperature value after which the weather compensator will raise the overheating alarm and turn of the fan.

```
Boiler     Tmin:65c
TBO:99c  Tmax:98c
```

6.2.2. Boiler pump work parameters.

This group of parameters enables setting the boiler temperature, which after it is reached causes the boiler heat accumulator pump (T) to be turned on. Hysteresis (hyst) determines by what value, below the temperature on which it is turned on, does the water temperature have in the boiler has to drop for the pump to be turned off.

```
Boiler   pump
Ton:65c    hyst:2c
```

6.2.3. Lack of fuel test.

This group enables commencing the lack of fuel test. If solid fuel boiler is working and is not in the lighting mode, and water temperature in the boiler falls below the temperature set in the parameter (T) and not rise above this value within a determined period of time (t), then weather compensator raises the alarm caused by the lack of fuel.

```
NO FUEL  test:YES
T:40c      t:010min
```

6.3. Heat accumulator work parameters.

It is possible to determine the maximum temperature of the heat accumulator (Tmax) in this group. In the case when the water temperature in the accumulator rises above the programmed value, the weather compensator will definitely turn off the solar pump and, if the solid fuel boiler was tuned on, it will switch to the mode of maintaining minimum temperature. Resuming normal work will take place after decreasing the water temperature in the accumulator decreases by the programmed hysteresis (hyst) value of hysteresis.

```
Accumulator
hyst:5c  Tmax:90c
```

6.4. Solar system work parameters.

This group enables turning the solar system on and off and programming the solar system pump turning on hysteresis (hyst). The hysteresis determines, by what value the solar collector's temperature has to be higher that the temperature in the lower part of the heat accumulator for the weather compensator to turn of the solar system pump. This pump is turned off when both temperatures are equal.

```
Solar:YES
hyst:10c
```

6.5. Additional boiler work parameters.

The RK–2010 weather compensator enables steering the additional gas or oil boiler as an auxiliary heat source. This boiler is included into heating circulation by the means of the switching valve and charges the hot water container and central heating circulation directly omitting the heat accumulator. The additional boiler is turned on in case when there is not enough energy in the accumulator to maintain the required room and hot water container temperature. This group of parameters enables turning on or off the additional boiler's operation and setting the minimum time of its work (tmin). Turning the additional boiler's operation on results in additional options being displayed in the user's menu allowing for the additional boiler to be turned on or off automatically. As turning the oil and gas boilers on and off to often may cause explosive work of the burner, the weather compensator allows for the programming of the minimum period of time that has to elapse since the boiler is turned on until it can be turned off.

```
Add. boiler:YES
tmin:30s
```

6.6. Hot water channel work parameters.

This group of parameters enables turning the usable hot water circulation on and determining the hysteresis used for turning on of the hot water container loading pump (hyst).

```
HW circ:YES
hyst:3c
```

6.7. Central heating circulation.

6.7.1. Central heating circulation work parameters.

Central heating's maximum temperature (Tmax).

The RK–2010 weather compensator limits the central heating circulation temperature increase to the programmed maximum, which is useful e.g. floor heating systems, where the temperature cannot exceed 50°C.

Caution! Independent of programming the maximum temperature, additional floor heating systems protections should be provided for.

Room sensor (TR).
    The user has possibility to turn the room sensor off. In such a case the weather compensator does not control whether the sensor work correctly. Moreover the temperature in the central heating circulation depends on the outside temperature, weather characteristics and user-programmed central heating temperature decrease. These relations are described in detail in the point 5.5.

Required central heating temperature correction factor (fCor).
    If the room sensor is turned on, the user has possibility to program the value of the temperature correction in the room. This factor is used for calculating the installation water temperature correction in a case when the programmed inside temperature is different from actual room temperature. Correction is calculated in accordance with the below:

$$TCHreq = TCHwch + (TRreq - TRm) \times fCor$$

where:
TCHreq - required installation water temperature,
TCHwch - installation water temperature calculated from the weather
                 characteristics,
TRreq   - required room temperature,
TRm   - measured inside temperature,
fCor   - programmed correction factor.

CAUTION! Programming the factor to 0 causes the correction to be turned off. It means that the temperature inside does not influence the installation water temperature. In such a case the room sensor does not have to be connected.

```
CH  circ  Tmax:95c
TR:YES    fCor:3
```

6.7.2. Mixing valve servomotor work parameters.
    The user has the possibility to program the way the servomotor works by defining the time of impulse steering mixing valve's servomotor (tW) and the pause between the impulses (tP). In case of using fast servomotors longer pause is recommended, however for slow servomotors, the pause should be shorter. Mixing valve's servomotor is turned off once the central heating circulation water reaches the required temperature, resulting from the regulation process. If the temperature decreases by the programmed hysteresis (hyst) after turning off the servomotor, the weather compensator will start to open the valve. In case when the temperature increases by the programmed hysteresis - the servomotor will be closed.

```
CH  circ  hyst:2c
tW:02s        tP:02s
```

6.7.3. Weather characteristics.
    Installation water temperature needed for maintaining fixed room temperature depends mostly on the outside temperature and heating properties characteristic for a particular building. The RK–2010 weather compensator determines the relation in accordance with the programmed heating characteristic. The user programming the

weather characteristics determines the installation water temperature level for outside temperatures at -15°C (Pt1), 0°C (Pt2) and +5°C (Pt3) required for maintaining the fixed room temperature. Sample characteristics are shown in the picture 3.

```
C H   c i r c       P t 1 : 6 0 c
P t 2 : 5 0 c       P t 3 : 4 0 c
```
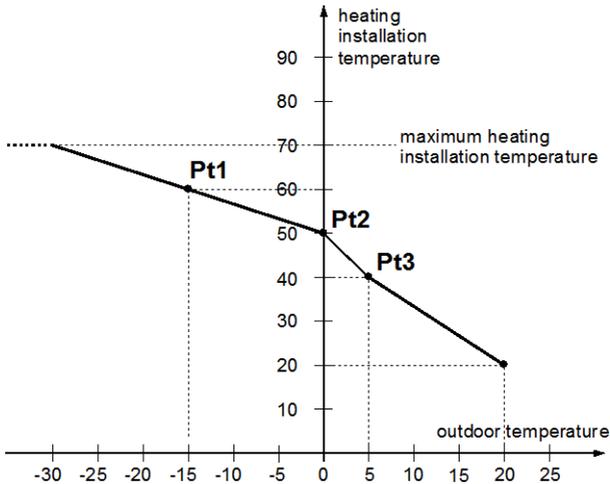

Picture 3. Example of weather characteristics.

6.8. Temperature sensor corrections.

If any of the sensors is situated far from the weather compensator, the long connection wires can cause measured temperature distortions. In such a case the user has the possibility to correct the indications of particular sensors. Three further groups of parameters are used for this.

```
S e n s . c o r .   T A : + 0 c
T S : + 0 c         T a : + 0 c
```

```
S e n s . c o r .   T B : + 0 c
T C H : + 0 c       T H W : + 0 c
```

```
S e n s . c o r .
T R : + 0 c         T O : + 0 c
```

.
6.9. Output testing.

In order to facilitate the check whether the weather compensator works correctly it is possible to test particular output systems. In order to turn this function on, by using the handle choose and confirm the option:

```
T e s t i n g
o u t p u t s
```

CAUTION! Turning the testing on causes all output appliances to be turned off and suspends the weather compensation process.

After initiating the RK–2010 testing:

```
Output:          OFF
Fan
```

By turning the handle the user switches between particular outputs in the following order:
- fan,
- boiler pump,
- solar pump,
- central heating pump,
- hot water pump,
- opening the central heating mixing valve,
- closing the central heating mixing valve,
- additional boiler,
- additional boiler's circulation switching valve.

Turning the chosen output on is effected by pressing the OK button. Output is active as long as the button is pressed. Finishing the testing and returning to weather compensation takes place after choosing and confirming the option:

```
Exit   output
    tests
```

6.10. Producer's settings.

The weather compensator enables returning to standard values permanently included by the producer. The list of default parameters is presented in the table 4. After choosing and confirming the function:

```
Factory
defaults
```

The weather compensator will display:

```
Restore  factory
defaults? NO
```

As restoring settings deletes the values of all parameters, the default answer is NO. Setting the handle to the YES answer and confirming by using the OK button will cause the following message to be displayed:

```
Memory  config.
Please  wait...
```

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After finishing the configuration the weather compensator is going to restart (as after turning the power on).

CAUTION! Restoring producer's settings also changes all user's daily programs. PROG.1 is assigned to the daily central heating program. Default settings for all programs are shown in the table 5.

6.11. Exiting service mode.
Exiting the service mode is done by choosing and confirming the option:

```
E x i t   s e r v i c e
        m o d e
```

7. Weather compensator damages.

Weather compensator is constantly testing if its internal systems and temperature sensors are working correctly. After detecting the damage, the RK–2010 displays an error code and reacts accordingly. List of possible errors and description of ways of reacting is presented in the table 2.

```
A l a r m : R T C
T CH   T R
```

8. Dismantlement of the weather compensator.

In case it is necessary to dismantle the weather compensator:
- disconnect the boiler and the weather compensator power from the power source,
- take out the weather compensator from the assembly site,
- disconnect the cable couplings from the weather compensator.

9. Specification.

Voltage:	230V ± 10%, 50Hz
Power consumption (without effective appliances)	< 6VA.
Temperature measurement range	-40°C ÷ 109°C ± 1°C.
Solar's temperature measurement range	-30°C ÷ 500°C ± 1°C.
Load capacity of remaining particular outputs	1A/230V.
Dimensions (H x W x T)	80x170x10.

10. Weather compensator connection diagram.
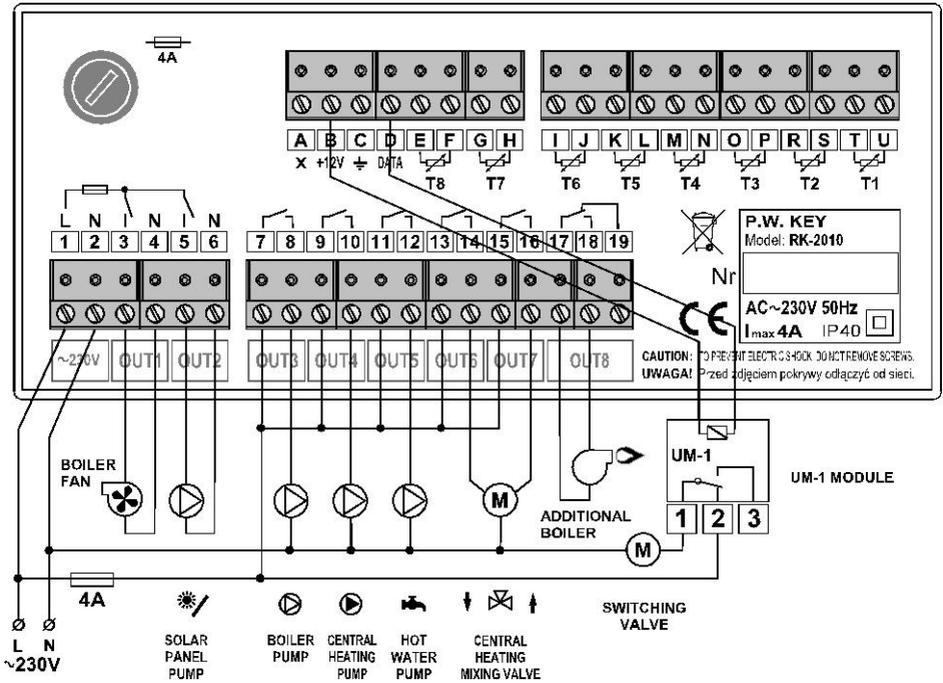
Picture 4. RK–2010 Weather compensator connection diagram.

Sensors input description:

T1 - solid fuel boiler temperature sensor (TB).
T2 - solar temperature sensor (TS).
T3 - room temperature sensor (TR).
T4 - hot water container temperature sensor (TWH).
T5 - outside temperature sensor (TO).
T6 - central heating temperature sensor (TCH).
T7 - solar systems heat accumulator's water temperature sensor (Ta).
T8 - heat accumulator water temperature sensor (TA).

11. Tables.

Table 2. List of errors.

Code	Error	Weather compensator reaction
RTC	Clock.	No current readings. Program of elimination of bacterial flora is turned off. DAYTIME temperature in rooms.
IO	Internal systems of weather compensator.	The indicators' readings displaying the status of particular outputs might be random. Clock alarm might occur simultaneously.
THW	Hot water sensor.	Hot water channel is turned off. Usable water is not heated.
TCH	Central heating sensor.	Weather compensator opens the mixing valve of central heating circulation. Temperature of circulation depends on the heat gathered in the accumulator. If the system has got an emergency boiler, the boiler is turned on after depleting accumulator energy.
TO	Outside temperature sensor.	Weather compensator does not switch the WINTER/SUMMER modes automatically. 0˚C outside temperature is used for calculating weather characteristics.
TR	Room sensor.	No correction of inside temperature.
TB	Boiler sensor.	Work of solid fuel boiler is stopped.
TA	Heat accumulator sensor.	Heat accumulator is not protected from overheating. If the system has got an auxiliary boiler, the boiler is turned on permanently. In other case the weather compensator assumes the heat accumulator has sufficient amount of energy.
TS	Solar collector sensor.	Solar system is turned off.
Ta	Solar system's heat accumulator sensor.	Solar system is turned off.

Table 3. Range of changes of the values of particular parameters.

Name of parameter	Minimum value	Maximum value	Step to change
DAYTAIME/NIGHTTIME temperatures.	5°C	30°C	1°C
Required hot water temperature.	5°C	75°C	1°C
Fixed compensation time.	0	99	1 day
Central heating temperature decrease value with TR sensor turned off.	-20°C	20°C	1°C
Required boiler temperature.	Minimum boiler temperature	Maximum boiler temperature	1°C
WINTER temperature threshold.	0°C	SUMMER temperature threshold	1°C
SUMMER temperature threshold	WINTER temperature threshold	20°C	1°C
Fan power modulation factor.	1	20	1
Fan work hysteresis.	1°C	9°C	1°C
Minimum fan power.	0%	Maximum fan power -1%	1%
Maximum fan power.	Minimum fan power +1%	100%	1%
Time of fan scavenges.	1 sec.	99 sec.	1 sec.
Pause times between scavenges.	1 min.	99 min.	1 min.
Lighting time.	1 min.	99 min.	1 min.
Minimum boiler temperature.	30°C	Maximum boiler temperature -1°C	1°C
Maximum boiler temperature.	Minimum boiler temperature +1°C	Boiler overheating temperature -1°C	1°C
Boiler overheating temperature.	Maximum boiler temperature. +1°C	99°C	1°C
Boiler pump turn on temperature.	30°C	80°C	1°C
Boiler pump work hysteresis.	1°C	9°C	1°C
Temperature of lack of fuel testing.	20°C	70°C	1°C
Time of lack of fuel testing.	1 min.	270 min.	1 min.
Heat accumulator maximum temperature.	50°C	99°	1°C
Heat accumulator's protection maximum temperature hysteresis.	1°C	9°C	1°C
Solar pump hysteresis.	1°C	50°C	1°C
Minimum work time of the additional boiler.	10 sec.	99 sec.	1 sec.
Hot water pump work hysteresis.	1°C	9°C	1°C
Maximum temperature of the central heating circulation.	30°C	95°C	1°C
Inside temperature correction factor.	0	9	1
Mixing valve's servomotor work time.	1 sec.	99 sec.	1 sec.
Mixing valve's servomotor pause time.	1 sec.	99 sec.	1 sec.
Mixing valve's servomotor work time hysteresis.	1°C	9°C	1°C
Temperature of particular points of weather characteristics.	35°C	95°C	1°C
Measurement sensors corrections value.	-9°C	+9°C	1°C

Table 4. Factory settings.

Name of parameter		Factory settings
CH circ.	DAYTIME temperature	20°C
	NIGHTTIME temperature.	18°C
	Compensation type.	PROG.1
	Maximum temperature of the central heating circulation.	50°C
	Room sensor TR.	YES
	Inside temperature correction factor.	0
	Mixing valve's servomotor work time.	2 sec.
	Mixing valve's servomotor pause time.	2 sec.
	Mixing valve's servomotor work time hysteresis.	2°C
	Weather characteristics.	Pt1:50°C
		Pt2:45°C
		Pt3:40°C
	Central heating temperature sensor correction.	0°C
	Room temperature sensor correction.	0°C
HW circ.	Hot water channel.	NO
	Hot water compensation type.	(channel is turned off)
	Hot water priority.	(channel is turned off)
	Program of elimination of bacterial flora.	(channel is turned off)
	Time to turn on the elimination of bacterial flora program.	(channel is turned off)
	Hot water pump work hysteresis.	(channel is turned off)
	Hot water temperature sensor correction.	0°C
Others	WINTER temperature threshold.	10°C
	SUMMER temperature threshold.	18°C
	Outside sensor temperature correction.	0°C
Fan	Fan power modulation.	YES
	Fan power modulation factor.	5
	Minimum fan power.	0%
	Maximum fan power.	100%
	Fan work hysteresis.	(no - power modulation)
	Fan scavenges.	NO
	Time of fan scavenges.	(turned off)
	Pause times between scavenges.	(turned off)
	Lighting.	YES
	Lighting time.	10 min.
Boiler	Required boiler temperature.	90°C
	Minimum boiler temperature.	65°C
	Maximum boiler temperature.	98°C
	Boiler overheating temperature.	99°C
	Boiler temperature sensor correction.	0°C
Pump of boiler.	Boiler pump turn on temperature.	65°C
	Boiler pump work hysteresis.	2°C
Fuel	Lack of fuel testing.	YES
	Temperature of lack of fuel testing.	40°C
	Time of lack of fuel testing.	45 min.
Accumulator.	Heat accumulator maximum temperature.	90°C
	Heat accumulator's protection maximum temperature hysteresis.	5°C
	Heat accumulator sensor correction.	0°C
Solar.	Solar.	YES
	Solar pump hysteresis.	10°C
	Solar temperature sensor correction.	0°C
	Solar system's heat accumulator temperature sensor correction.	0°C
Additional boiler	Additional boiler.	YES
	Minimum work time of the additional boiler.	30 sec.

Table 5. Producer's daily programs.

Program		PROG.1			PROG.2			PROG.3			CH without TR			HW		
Day	Range	From	To	Temp.	From	To	Temp.	From	To	Temp.	From	To	TCH	From	To	Temp.
Mo	1	00:00	06:00	N	00:00	07:30	N	00:00	07:00	N	00:00	06:00	-15°C	00:00	05:30	20°C
	2	06:00	07:30	D	07:30	09:00	D	07:00	15:00	D	06:00	07:30	+0°C	05:30	09:00	50°C
	3	07:30	15:30	N	09:00	17:30	N	15:00	00:00	N	07:30	15:30	-15°C	09:00	15:00	30°C
	4	15:30	23:30	D	17:30	00:00	D				15:30	23:30	+0°C	15:00	00:00	50°C
	5	23:30	00:00	N							23:30	00:00	-15°C			
Tu	1	00:00	06:00	N	00:00	07:30	N	00:00	07:00	N	00:00	06:00	-15°C	00:00	05:30	20°C
	2	06:00	07:30	D	07:30	09:00	D	07:00	15:00	D	06:00	07:30	+0°C	05:30	09:00	50°C
	3	07:30	15:30	N	09:00	17:30	N	15:00	00:00	N	07:30	15:30	-15°C	09:00	15:00	30°C
	4	15:30	23:30	D	17:30	00:00	D				15:30	23:30	+0°C	15:00	00:00	50°C
	5	23:30	00:00	N							23:30	00:00	-15°C			
We	1	00:00	06:00	N	00:00	07:30	N	00:00	07:00	N	00:00	06:00	-15°C	00:00	05:30	20°C
	2	06:00	07:30	D	07:30	09:00	D	07:00	15:00	D	06:00	07:30	+0°C	05:30	09:00	50°C
	3	07:30	15:30	N	09:00	17:30	N	15:00	00:00	N	07:30	15:30	-15°C	09:00	15:00	30°C
	4	15:30	23:30	D	17:30	00:00	D				15:30	23:30	+0°C	15:00	00:00	50°C
	5	23:30	00:00	N							23:30	00:00	-15°C			
Th	1	00:00	06:00	N	00:00	07:30	N	00:00	07:00	N	00:00	06:00	-15°C	00:00	05:30	20°C
	2	06:00	07:30	D	07:30	09:00	D	07:00	15:00	D	06:00	07:30	+0°C	05:30	09:00	50°C
	3	07:30	15:30	N	09:00	17:30	N	15:00	00:00	N	07:30	15:30	-15°C	09:00	15:00	30°C
	4	15:30	23:30	D	17:30	00:00	D				15:30	23:30	+0°C	15:00	00:00	50°C
	5	23:30	00:00	N							23:30	00:00	-15°C			
Fr	1	00:00	06:00	N	00:00	07:30	N	00:00	07:00	N	00:00	06:00	-15°C	00:00	05:30	20°C
	2	06:00	07:30	D	07:30	09:00	D	07:00	15:00	D	06:00	07:30	+0°C	05:30	09:00	50°C
	3	07:30	15:30	N	09:00	17:30	N	15:00	00:00	N	07:30	15:30	-15°C	09:00	15:00	30°C
	4	15:30	23:30	D	17:30	00:00	D				15:30	23:30	+0°C	15:00	00:00	50°C
	5	23:30	00:00	N							23:30	00:00	-15°C			
Sa	1	00:00	08:00	N	00:00	07:30	N	00:00	07:00	N	00:00	08:00	-15°C	00:00	06:00	30°C
	2	08:00	00:00	D	07:30	09:00	D	07:00	15:00	D	08:00	00:00	+0°C	06:00	00:00	50°C
	3				09:00	14:30	N	15:00	00:00	N						
	4				14:30	00:00	D									
	5															
Su	1	00:00	09:00	N	00:00	09:00	N	00:00	00:00	N	00:00	09:00	-15°C	00:00	07:00	30°C
	2	09:00	23:00	D	09:00	23:00	D				09:00	23:00	+0°C	07:00	00:00	50°C
	3	23:00	00:00	N	23:00	00:00	N				23:00	00:00	-15°C			
	4															
	5															

Description of marks:
- D - DAYTIME temperature.
- N - NIGHTTIME temperature.

12. Notes.