Electronic controller

IB – Tron 1000 GWC

to control Ground Heat Exchanger

Products is CE marked

and has been produced in accordance with ISO 9001 standard

„INSBUD"
ul. Niepodległości 16a
32-300 Olkusz
POLAND
sales department: +48 (32) 626 18 00
sales department: +48 (32) 626 18 18
technical department: +48 (32) 626 18 07
technical department: +48 (32) 626 18 08
fax: +48 (32) 626 18 19
e-mail: insbud@insbud.net

INSBUD®

WWW.INSBUD.NET

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Contents

IB-TRON 1000 GWC

BASIC INFORMATION

IB-Tron 1000 GWC controller is independent microprocessor controller with large LCD display. The controller is designed to control work of valves, air dampers, electric air heaters, pumps, fans and other two- and three-point controlled appliances (on/off).

IB-Tron 1000 GWC controller allows to control process of heating, cooling and ventilation. The thermostat chooses source of heat or cold in intelligent way including testing periods. An example of this type of installation is controlling of ground heat exchanger (GHE).

A professional and intelligent controller to control systems where you have to choose source of heat or cold from two different sources! This is not a simple differential controller!

FEATURES

- Large, blue backlit (optional) LCD display which shows current temperature, a day of the week and other information.
- Easy, intuitive operating and programming.
- Measurement of two temperatures **T1** and **T2**
- Power supply from network - it doesn't reguire batteries - with baterry memory backup
- Displayed temperature with 0,1 °C accuracy
- Esthetic and modern design
- Large load - to 2 kW - allows to direct connection most of electrical appliances without the use of contactor.
- The possibility of calibrate device (external sensors on long wires, independent calibration of **T1** and **T2**)
- Adjustable hysteresis
- Testing periods of devices to measure
- Heating mode (winter) and cooling mode (summer)
- **GUARD** function - protection devices from damage
- **TEST** function
- Network, **RS - 485** or **Ethernet** communication (optional)
- The possibility of remote control (optional)
- Keyboard lock

TECHNICAL DATA

- Energy consumption: < 2 W
- Storage temperature: -5 ÷ 50 °C
- Displayed temperature: -20 ÷ 140 °C
  every 0,1 °C
- Accuracy: 1 °C
- Hysteresis: 1 ÷ 5 °C
- Test breaks: 1 ÷ 999 min.
- Test period: 0 ÷ 999 sec.
- Maximum load: 2000 W
- Power supply 230V AC
- Casing: ABS
- Dimensions [mm]: 120x120x23
- Display: LCD (4``)
- Control: Electronic
- Protection rating: IP30
- Battery settings protection:
  » 36 months

AVAILABLE MODELS

- **BL** - blue backlight (backlight is activated by pressing any button and deactivated after a certain period of inactivity)
- **RC** - IR remote control
- **NW** - thermostat to work in the network (**RS-485** or **Ethernet** communication)

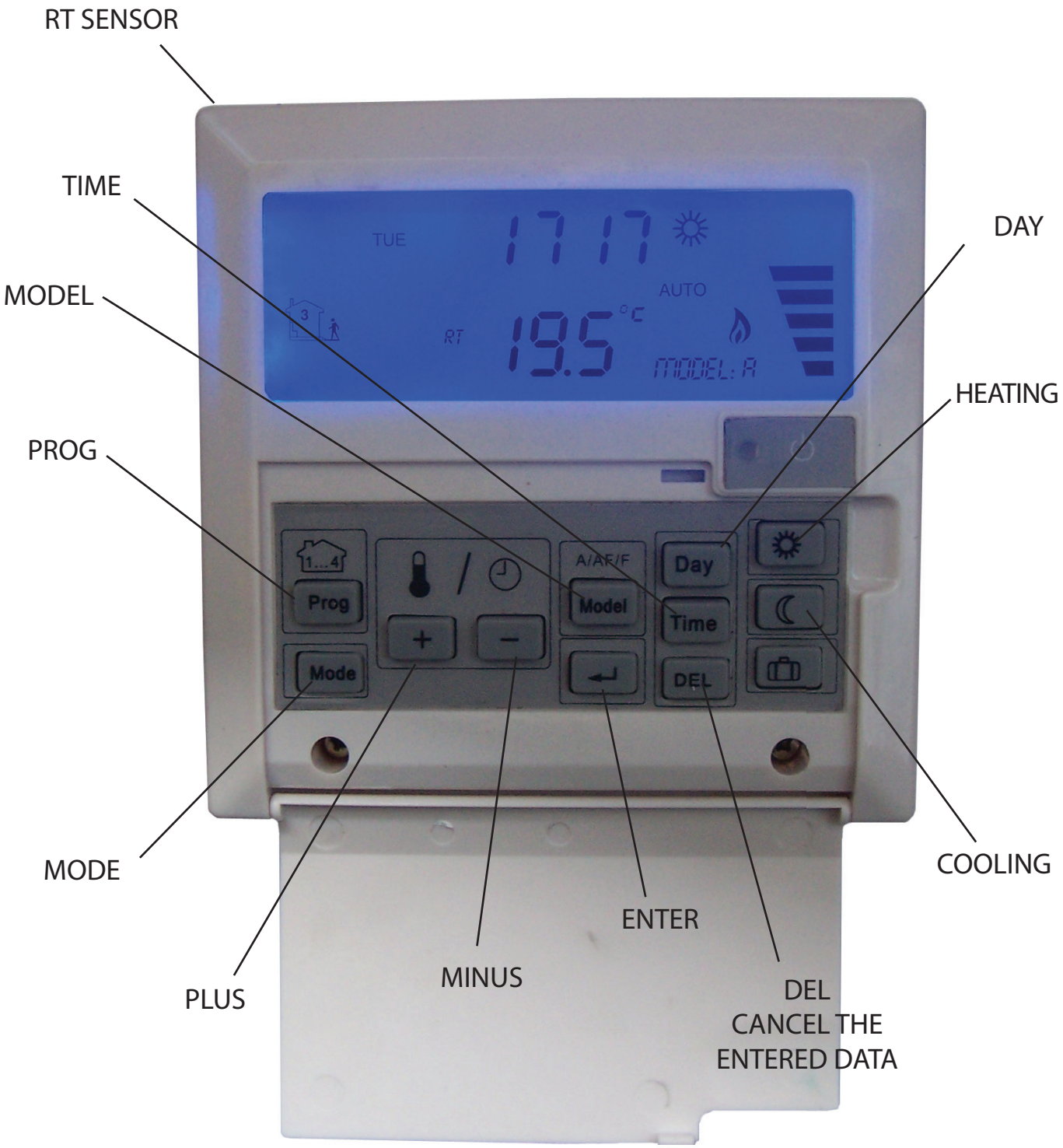
SCOPE OF DELIVERY

- 1x Controller (the main panel)
- 1x Relay box
- 1x Built-in temperature sensor
- 1x Operating manual
- 1x Operating manual for network (only with NW model)
- 1x Pilot of remote control with battery (only with RC model)

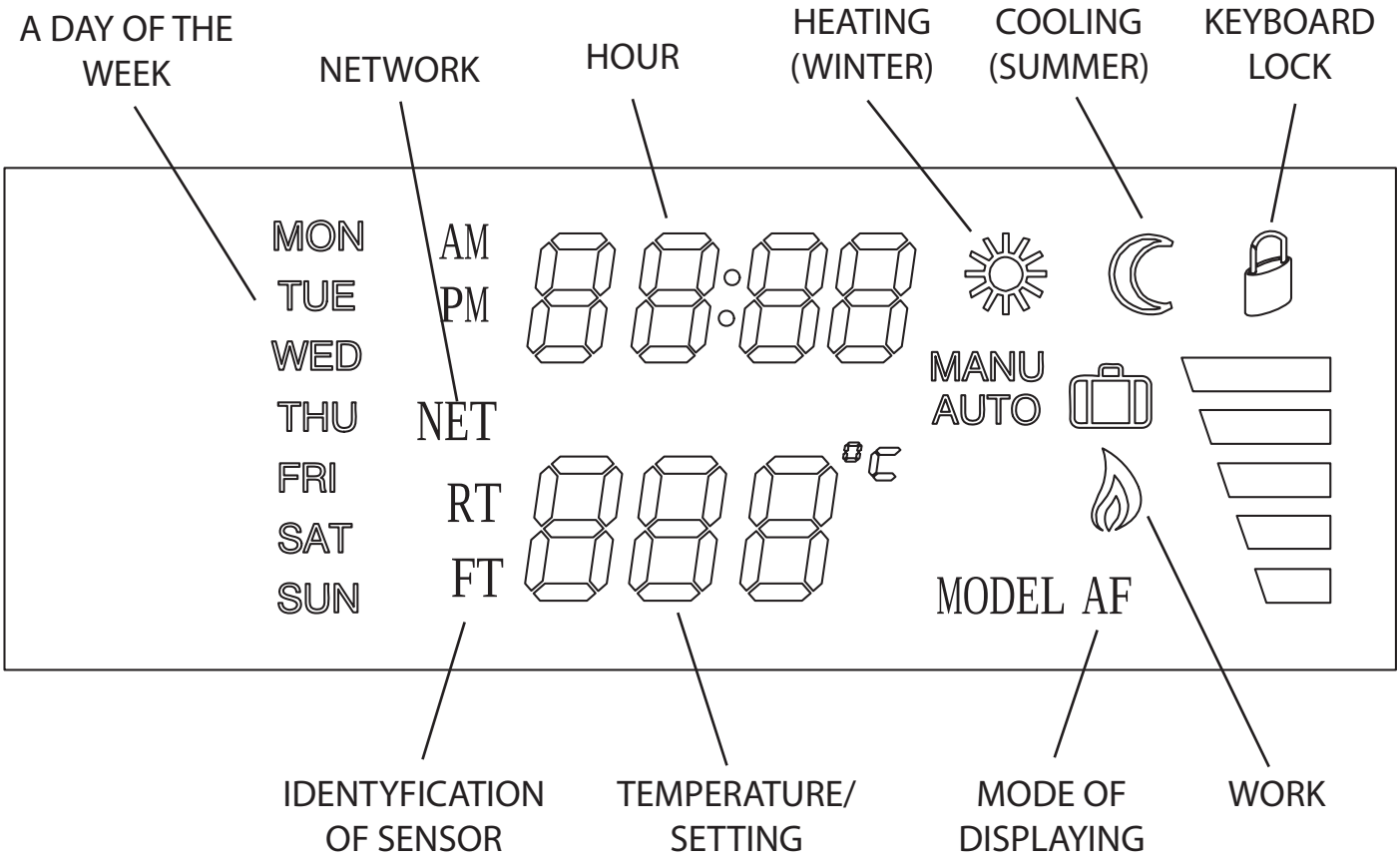
GENERAL CONSIDERATIONS

- During installation of controller, the supply of electricity should be turned off. It's recommended to entrust the installation a specialized institution.
- The controller is for surface-mounting, it sticks out 23mm.
- In the controller a relay box is separately on the 20cm wire and dimensions 30/50/65mm
- Built-in **RT** sensor is complete with thermostat. **FT** sensor isn't supplied with thermostat.
- **RT** sensor is on the 20cm wire and it can be bring out at the back of casing.
- **RT** sensor can be extended according to needs or it can be replaced by another type of sensor (if it's needed).
- Change of **RT** sensor doesn't invalidate the warranty.
- The controller gives 230V voltage on the output (support of pump, valve, air damper, heating mat etc.). If thermostat has to operate normally open/normally closed device, so-called: contact device (for example: gas heating stove), it will be required additional normally open/normally closed relay. Wa have these relays in our offer.

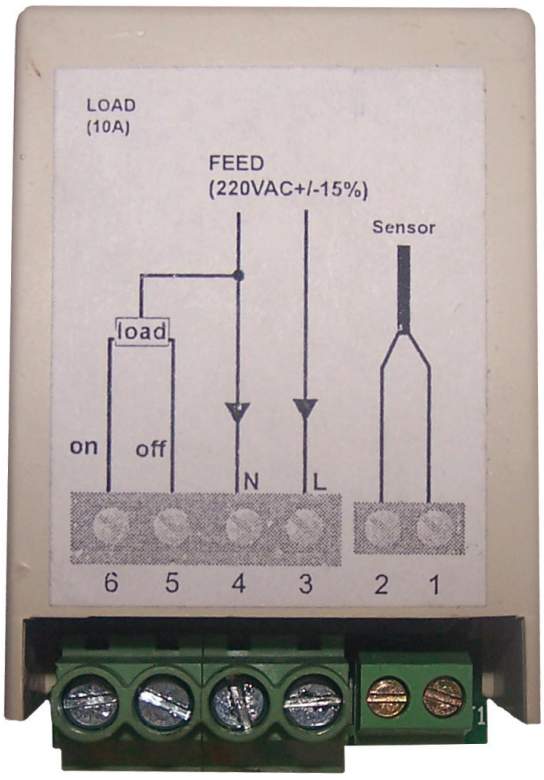
STRUCTURE


RT SENSOR
TIME
MODEL
PROG
MODE
PLUS
MINUS
ENTER
DEL
CANCEL THE
ENTERED DATA
COOLING
HEATING
DAY
TUE
17:17
AUTO
RT
19.5
°C
MODEL: A
1...4
Prog
Mode
A/AF/F
Model
Day
Time
DEL

LCD DISPLAY



CONNECTION



- ☞ 1 - 2 ⇨ **FT** sensor
- ☞ 3 - 4 ⇨ power supply 230V AC
- ☞ 5 ⇨ A phase appears (L) when choosing **FT** source
- ☞ 6 ⇨ A phase appears (L) when choosing **RT** source
- ☞ Two loose wires with thermistor come out from the controller, it can be cut and connect external **RT** sensor

TEMPERATURE SENSORS

⚠ Complete with controller is NTC thermistor on the 20cm wire. It can function as a one sensor if there isn't required an additional casing of sensor. The second sensor isn't supplied with termostat.

⚠ The sensors can be extended to any length but we should remember that extension above 10m may cause a deviation of measurement with each meter and falsifying results. Therefore, for distance above 10m device has to be calibrated. Sensors have to be extend of wires:

- » to 50 meters 2x 0,75 mm^2
- » above 50 meters 2x 1,50 mm^2

☞ The controller is compatible with NTC 10kΩ sensors having the following characteristics:

Temperature [°C]	Resistance [Ω]
-50	687 803
-40	346 405
-30	181 628
-20	99 084
-10	56 140
0	32 960
10	20 000
20	12 510
25	10 000
30	8 047
40	5 310
50	3 588
60	2 476
70	1 743
80	1 249
90	911
100	647

OPERATING PRINCIPLE

In the controller we have to set three time values:

☞ Testing break - value in minutes specifying, at what time do the measuring test. This value depends on devices, which 'receive' heat or cold and more precisely depends on how often the temperature conditions may change in this device. In the typical size of GHE (typical family house) this value is most in the range of 10 ÷ 30 minutes.

☞ Testing periods - value in seconds specifying, how long device has to work before reading of sensor reaches the appropriate level of temperature (starting period, starting delay). Testing period is set separately for each device.

In case of installation of GHE the first device is directly external inlet probe and sensor has to be placed near to the inlet probe (direct measurement of external temperature). Testing period of this device should be set to 0 (there isn't any delay, the reading is current). The second device is GHE. Delay of this device should be set to optimal value for the GHE - mostly it's time to move air through the GHE (it depends on length and size of GHE). For the typical size of GHE (for typical family houses) this delay is in the range of 20 ÷ 120 seconds.

Depending on the mode in which the controller operates (heating or cooling), device chooses warmer or colder device.

The controller is intelligent. It means that it remembers readings and change the temperatures on the both devices. For example: when controller during data analysis determines that there is probability of more favorable temperature conditions on the second device than currently used device, may be

Operating principle

earlier testing of the second device.

Example of operating

Typical GHE installation. The controller is designed to decide from where take the air:

- ☞ from the GHE - there is closing of the air damper with actuator from the external inlet probe. The air damper with actuator is opening from the GHE simultaneously and the controller starts the GHE fan.
- ☞ from the external inlet probe - there is closing of the air damper with actuator from the GHE and turning off the GHE fan. The air damper with actuator is opening from the inlet probe simultaneously.

Testing period of inlet probe is set on 0 seconds (current measurement without delay). RT sensor is placed near external inlet probe so as to measure the outside air temperature (shady, sheltered from the wind and moisture place).

Testing period of GHE is set on 30 seconds (this is air flow from the onlet probe of GHE to recuperator). FT sensor is placed in the ventilation duct from the GHE before the recuperator.

Testing break is set on 15 minutes.

Heating mode is set (selection of a hotter heat source). In the summer the controller by pressing single button switches onto the cooling mode to cooling the building.

Exemplary logic of device operating:

- ☞ The air is taken from the GHE.
- ☞ When the outside temperature is found

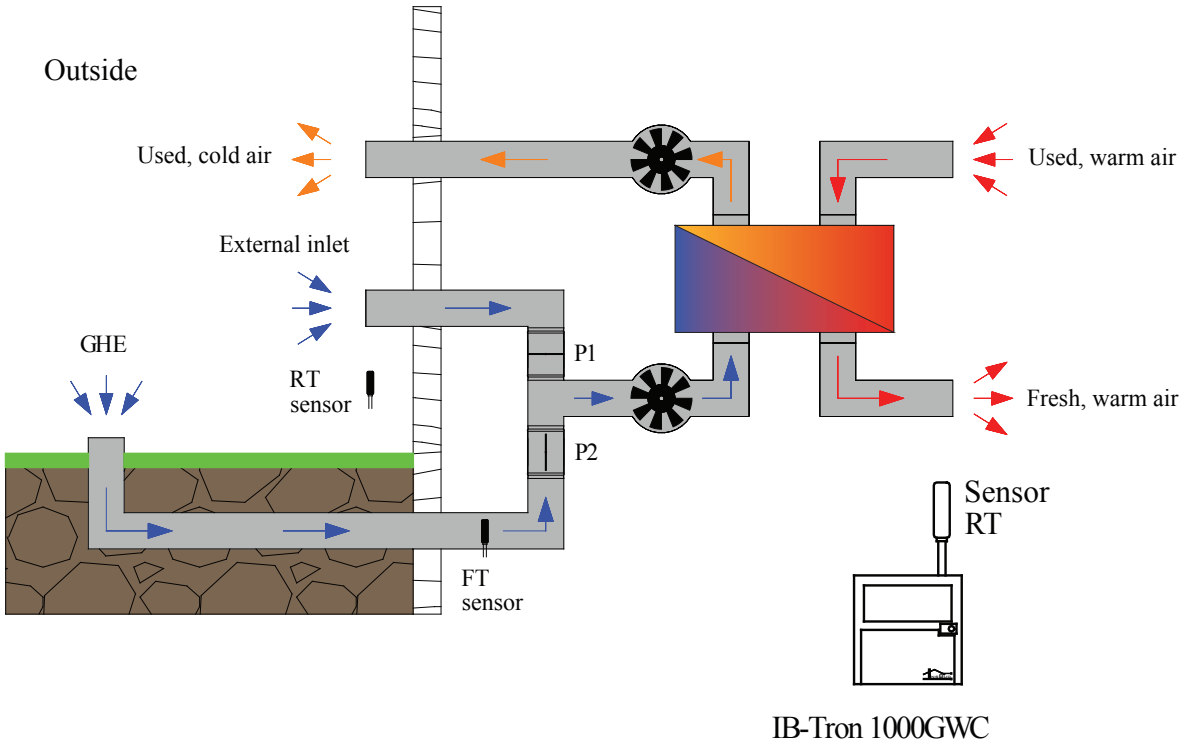
Example of operating

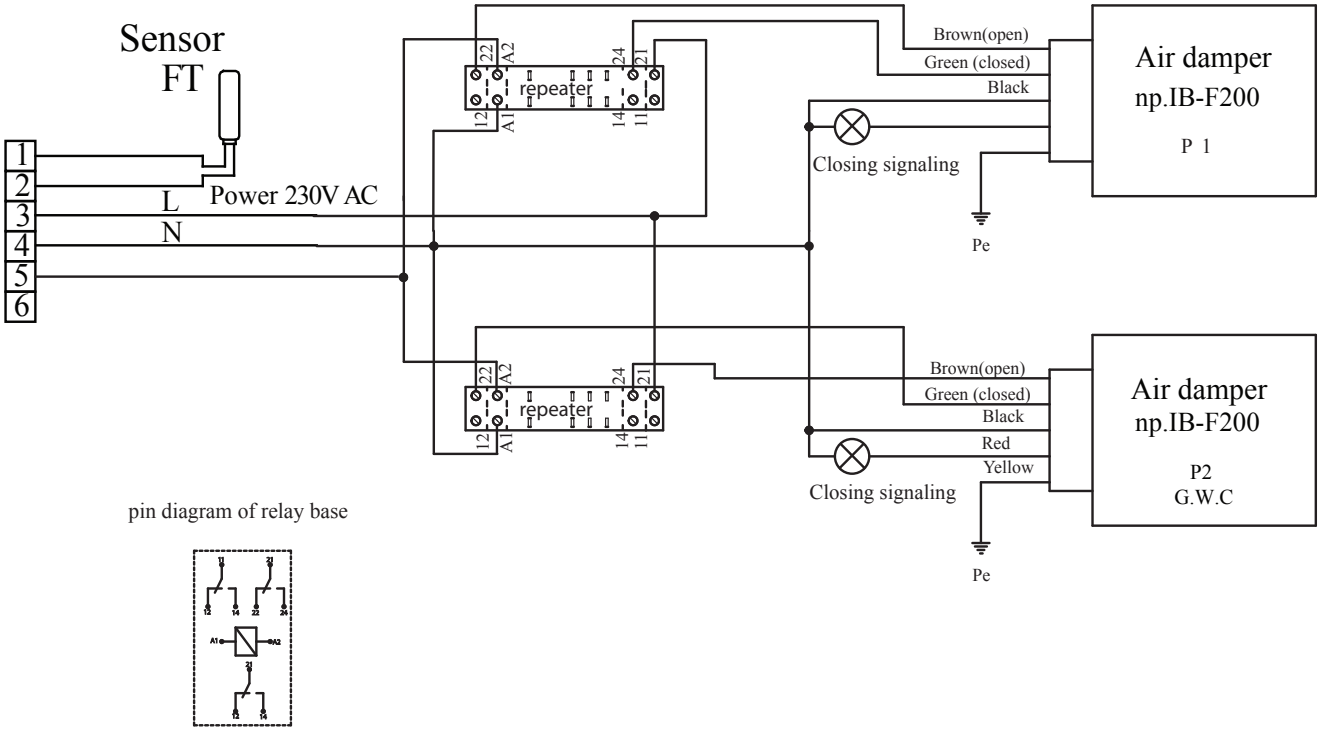
to be higher than the air temperature from the GHE, the controller will switch devices so that the air was taken from the external inlet probe (it happens immediately because testing period of inlet probe is set on 0 seconds but including hysteresis).

- ☞ If the outside temperature falls below the last memorized temperature which was on the GHE or from the appropriate algorithm, the controller „suspects" that air temperature from the GHE will be higher than outside temperature or 15minutes (testing break)have passed since the last switching air dampers. The GHE is turning on (on thirty-seconds testing period). After the test, the controller decides from where take the air.

⚠ In our offer are available air dampers with actuators with different cross-section.

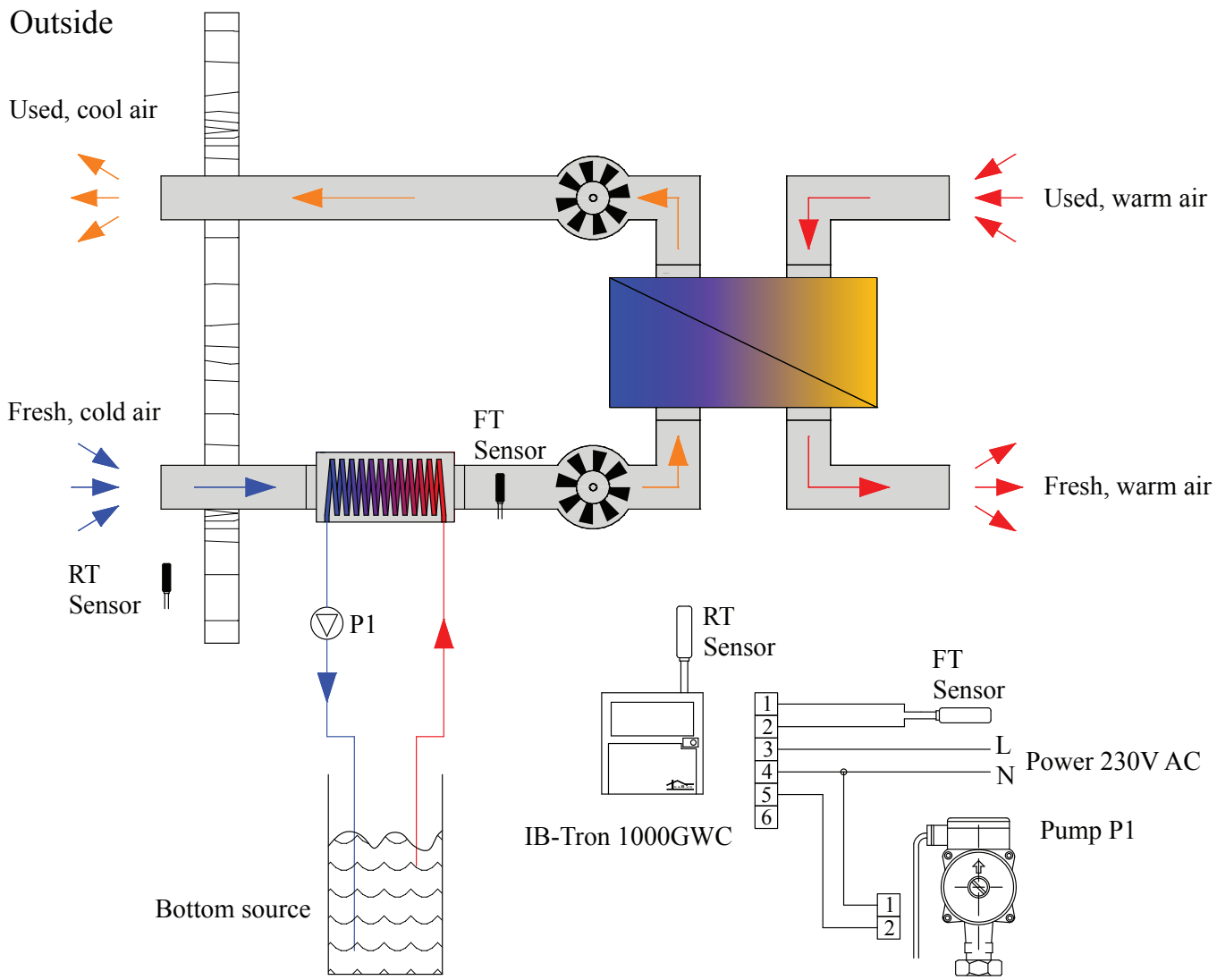
EXEMPLARY CONNECTION DIAGRAM





pin diagram of relay base

EXAMPLE OF CONTROLLING WATER HEAT EXCHANGER



IB-Tron 1000 GWC controller measures two temperatures: outside temperature (by RT sensor) and air temperature after passing through the heater, when water circulation pump is turned on (glycol or brine), by FT sensor. Measurement of the outside temperature (RT) is current, measurement of air temperature (FT) at the switching on heater has to be cyclic.

Testing period should be as short as possible but has to ensure proper stabilization of the air temperature after passing through the heater (installation which leads water, heater and air from the heater has to warm up).

If the controller after this testing period recognizes that favorable temperature conditions provides water heat exchanger, the pump still works and measurement of FT temperature is current. Measurement of RT temperature is current too, so if favorable temperature conditions are at the external inlet probe, the P1 pump will be turned off.

If favorable temperature conditions after testing period are still at the external inlet probe, P1 pump is turned off. The pump is again turned on only after testing period.

CALIBRATION

After proper connection the controller is ready to work. The controller is factory calibrated to work with standard sensor. However, with long wires, displayed temperature may be different from real temperature.

In this case you have to calibrate the device by yourself.:

DEL Press and hold. On display start flashing current value of the calibration settings and kind of sensor. By repeatedly pressing button you can change calibrated sensor.

+ **-** Calibrate sensor by setting the appropriate value settings.

↵ Confirm the data.

ZEGAR

A clock doesn't affect to controller work. It's only information.

To set current hour please:

TIME Press and hold. On display start flashing current value of the clock settings.

+ **-** Set current hour (longer holding the button will faster change time)

↵ Confirm the data.

CLOCK DISPLAYING

Time can be displayed in 24-hour system or 12-hour system.

To change mode of time displaying please:

DAY **TIME** Press for 3 seconds both buttons.

DAY OF THE WEEK

Day of the week doesn't affect to controller work. It's only information.

To set current day of the week please:

DAY Press the button. On display start flashing a day of the week.

+ **-** Set current day of the week

- MON - Monday
- TUE - Tuesday
- WED - Wednesday
- THU - Thursday
- FRI - Friday
- SAT - Saturday
- SUN - Sunday

↵ Confirm the data.

TEMPERATURE UNITS

Temperature can be displayed in °C and °F

To change units please:

PROG **MODE** Press and hold two buttons for 3 seconds.

WORK MODE

The controller can work in two modes:

- ☞ Heating mode (selection of warmer source)
- ☞ Cooling mode (selection of colder source)

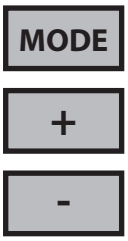
To change mode please press the button:

Heating

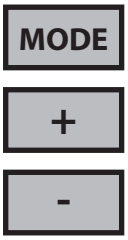
Cooling

TEST PERIOD AND TEST BREAK

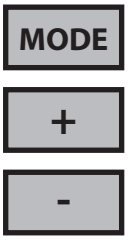
To set the appropriate testing periods for **RT** and **FT** and testing break please:



Press and set testing break. Adjustable value is in minutes. **RT** and **FT** symbol are invisible on display.



Press and set testing period for **RT**. Adjustable value is in seconds. **RT** symbol is visible on display.



Press and set testing period for **FT**. Adjustable value is in seconds. **FT** symbol is visible on display.

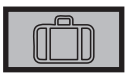
Confirm the data.

HYSTERESIS

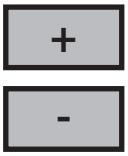
Hysteresis means a delay in switching on/ switching off the device. If it's higher value of the hysteresis, controlled device performs less cycles (e.g: air dampers) - therefore vitality of the device increases.

In normal conditions it's recommended to set hysteresis value to 1°C. Value setting of hysteresis depends on where is the measurement (e.g. for liquid suggested is higher hysteresis).

To change value of hysteresis please:



Press and hold. On display start flashing current value of settings hysteresis.



Set hysteresis value.

Confirm the data.

KEYBOARD LOCK

To protect controller from unwanted change settings, you can lock controller keyboard.

When keyboard lock is activated, on display is visible a padlock symbol and keyboard doesn't respond to pressing keys.

To activate/deactivate keyboard lock please:

Press for 3 seconds.

GUARD FUNCTION

If the controlled device (e.g.: air damper, valve or pump) is not working for a long period of time, it may be damaged. Therefore it is important that each element was periodically turned on even when there is no need from point of view of system logic.

This protective function is **GUARD** function. It monitors work of controlled devices. If the device doesn't change its status of the operating by 240 hours, the controller changes the status for 20 seconds.

To activate/deactivate GUARD function please:

PROG Press for 3 seconds. On display will appear the status of **GUARD** function.

- ON - turned on
- OFF - turned off

+ **-** Set the status of function.

↵ Confirm the data.

FACTORY SETTINGS

To reset controller and go back to factory settings please:

+ **-** Press for 5 seconds both buttons.

TEST OF RELAYS

TEST function is used to check the controlled device (e.g.: air damper) - if it's well connected and working properly.

To test relays please:

Model ↵ Press for 3 seconds both buttons.

↵ Set relay status by repeatedly pressing the button.

- ON - choice of RT
- OFF - choice of FT

Model ↵ Press for 3 seconds both buttons to go back to normal work.

MODES OF TEMPERATURE DISPLAYING

Controller can display **RT** and **FT** temperature in three modes::

- **AF** - alternating, **RT** and **FT** temperature are displayed every few seconds.
- **A** - **RT** temperature is continuously displayed.
- **F** - **FT** temperature is continuously displayed.

To change mode of displaying temperature please:

MODEL Press repeatedly to change mode. Choosen mode is shown on the display.

↵ Confirm the data.

SOFTWARE VERSION

InsBud company supports policy of development. Thats why rights to making changes and improvements in products and manuals without prior notice reserved!

Our company is open to all suggestions to improve our controllers. If you have any idea to add new features or require unusual solutions, please contact us.

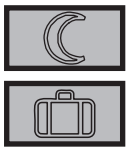
This manual applies to **IB-Tron 1000 GWC** controller with software version number

001

If your controller has other software version, operation and functionality may be different from information contained in this manual.

To check software version please:

Turn off the controller by button so that on display was visible only temperature.



Press for 5 seconds both buttons. On display will show software version.

Turn on the controller by button to go back to normal work.

If you want to free update your software, please contact us.

NETWORK COMMUNICATION

Controller is also available in versions adapted to work in network.

There are versions based on **RS-485** or **Ethernet** communication.

Issues relating to network communication of controllers are contained in separate manuals connected with **IB-System**.

ERRORS

On display may appear symbols that signify:

- **LO** - temperature on current sensor is below the lower measuring range.
- **HI** - temperaturw on current sensor is above the upper measuring range.
- **ERR** - current sensor is not connected or is damaged.

Visible symbol of **RT** and **FT** in the course when appears above symbol of this error, determines the current sensor (sensor which concern the error)

Remote Control

RC model allows to remote control of controller.

- Comprehensive, remote operating of the controller.
- Dimensions: 85x40x5 mm
- Battery: CR2025 3V (included)

Warranty

- Warranty is given for 24 months from date of purchase of goods.
- Any defect disclosed in warranty period will be removed within 21 working days, counting from date of adoption of goods for service.
- In need of import goods or parts from abroad, repair time is extended by time required for their transportation.
- Customer provides product to service at their own cost.
- At time of repair service will not provide buyer replacement product

Warranty

- Warranty repairs will be made upon presentation of properly and legibly filled your hardware warranty card, signed by guarantor and with sale document
- Warranty covers only defects arising from causes inherent in goods. They are not covered damage resulting from external causes such as: mechanical injury, pollution, flooding, weather, improper installation or improper wiring and operations. Warranty does not apply in case customer's unauthorized repairs, changes in software (firmware) and device formatting.
- Due to natural material use, some of them are not covered by warranty (for example: cables, battery, charger, micro switches, buttons).
- In event of unjustified claims for warranty repair, all additional cost are on customer's side.
- Service has right to refuse to perform warranty repairs for following: differences between documents and goods marks, make repairs on their own by customer, changes in product construction without authorization. This case warranty is not valid anymore.
- If it is not possible to test product before its purchase (sale at distance), it is possible to return goods within 10 days. Returned goods cannot bear signs of exploitation, it must contain all elements with which it was delivered.
- In the case of return of purchased goods all shipping costs are on buyer side. Before return of goods please contact with seller.
- Terms of warranty may be changed by local InsBud company partner.

WARRANTY

„INSBUD”
ul. Niepodległości 16a
32-300 Olkusz
POLAND
sales department: +48 (32) 626 18 00
sales department: +48 (32) 626 18 18
technical department: +48 (32) 626 18 07
technical department: +48 (32) 626 18 08
fax: +48 (32) 626 18 19
e-mail: insbud@insbud.net