Regulus

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IR 10

User Guide **EN**

IR 10 Heating Controlller

v. IR10_CTC_400

IR 10

Technical Description of IR 10 Heating Controller
Ver. IR10 CTC 400

IR 10 Heating Controller (ver. IR10 CTC 400) is a controller of heating systems with a CTC heat pump and solar thermal system. The controller can handle 2 heating zones with a mixing valve, DHW heating by a heat pump, DHW heating by an el. heating element and it can control a backup source (electric or gas-fired boiler).

IR 10 Heating Controller is controlled by 6 keys. Information is shown on a 4-line display. The Controller features 6 inputs for temperatures measured (by Pt 1000 temperature sensors) one universal input for a switch (r.g. a room thermostat) and one input for Ripple control signal. Further it features 6 relay outputs (250V 3A) and two 0-10V outputs capable of continuous control of circulation pumps.
The Controller is fitted with an Ethernet interface a service intervention, firmware upgrades and eventually elementary visualization of the concerned heating system. The Controller also features an RS 232 and RS485 communication interfaces. As an option, an OpenTherm module can be connected to the Controller for communication with a heat source.
This Controller controls CTC Heat Pumps.

1 How to operate IR 10 Controller

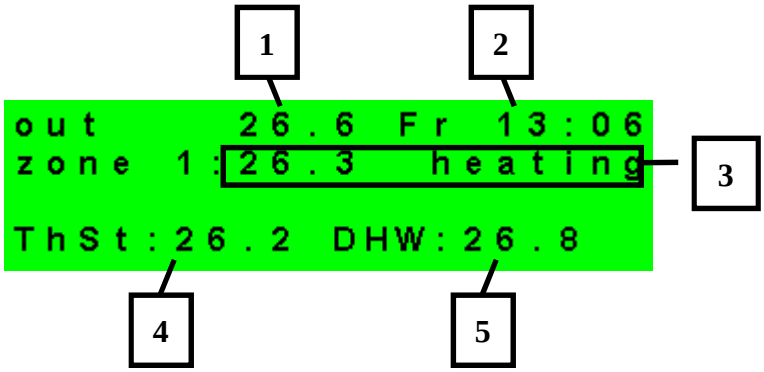
The controller is operated using 6 keys ◄, ►, ▲, ▼, **C**, **OK** on its front panel.
The **DISP** key switches between User and Service display.

Note: The Service display is intended to show info on the Controller itself and therefore it is not needed during common operation.

The keys ⮝, ⮟ are used to browse in the menu. In order to edit a parameter, press **OK** and a cursor appears on the parameter. The values of numeric parameters can be increased/decreased by pressing ⮝ / ⮟ keys. Selection parameters (e.g. ON/OFF) are chosen by pressing keys ⮜, ⮞. When finished, pressing **OK** will move the cursor to the next parameter in the same display. Parameter editing can be also exited without saving by pressing the key **C**.

1.1 Basic User Menu

Pressing **C** in the basic User menu will always bring back the first – basic display.



1 – outdoor temperature

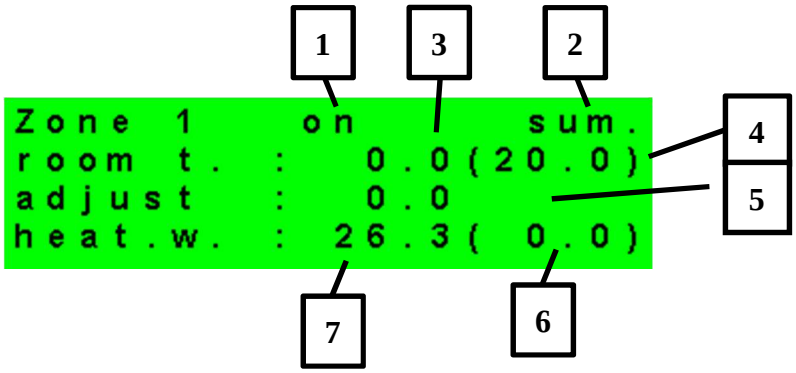
2 – weekday and time

3 – temperature in zone (if room temp. sensor is used)

4 – temperature in Thermal Store

5 – temperature in DHW storage tank

Heating zone display (zone 1, zone 2):



1 – zone NO / ON / OFF / blocked (by low ThSt temper.)

2 – controller mode winter / summer

3 – current room temperature. If no room sensor is used, the data is shown as 0.0)

4 – desired room temperature per program

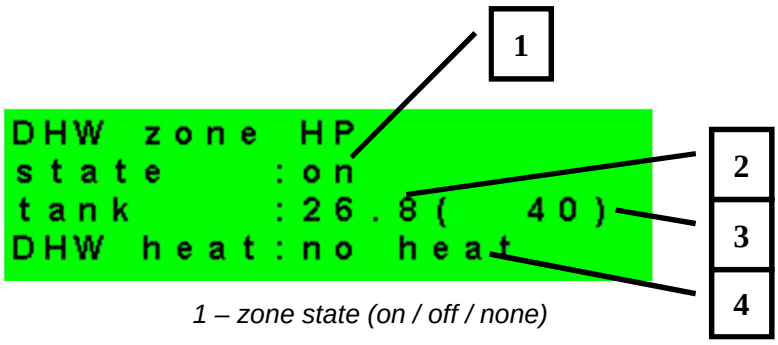
5 – adjustment to the desired room temperature. When RC21 IR room unit is used, "PJ" appears and the adjustment made by this unit is shown

6 – desired heating water temperature for the zone

7 – current heating water temperature

The desired temperature can be adjusted via the parameter "*adjust*".

DHW by Heat Pump display:



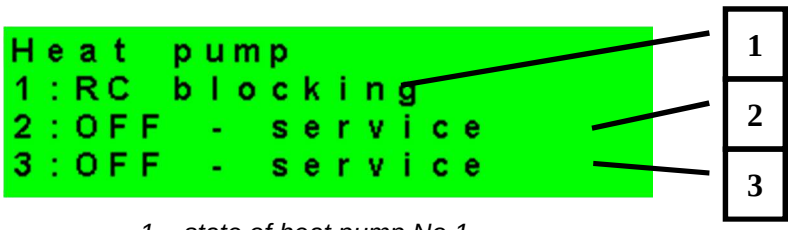
1 – zone state (on / off / none)

2 – current temperature in DHW tank

3 – desired temperature in DHW tank

4 – heating by heat pump (heat / no heat)

Heat Pump, cascade display:



1 – state of heat pump No.1

2 – state of heat pump No..2

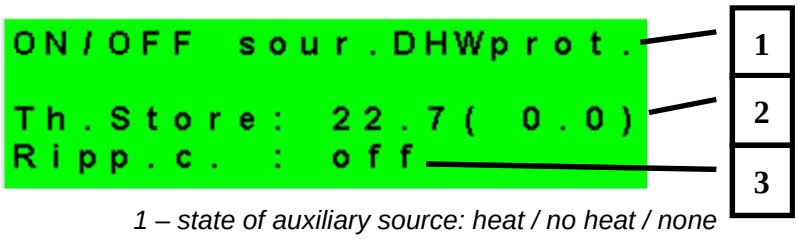
3 – state of heat pump No. 3

In this section, heat pump states are shown that are enabled on the Service level. The states can be following:

- OFF - service : heat pump is turned off by a heating engineer
- OFF – user : heat pump is turned off on the User level
- fault : heat pump is in alarm mode, alarm details are shown on the User level in HP Alarms menu
- return - max.T : heat pump is blocked by max. possible return temperature
- flow - max.T : heat pump is blocked by max. possible flow temperature
- ambient – min.T : heat pump is blocked by min. possible outdoor temperature
- ambient – max.T : heat pump is blocked by max. possible outdoor temperature
- sup.refrig.vapor : heat pump is blocked by max. compressor temperature
- high T earth circ. : heat pump is blocked by max. brine circuit temperature
- vapor –low T : heat pump is blocked by low evaporation temperature
- vapor – high T : heat pump is blocked by high evaporation temperature
- cond. – high T : heat pump is blocked by high condensing temperature

- EEV-low T intake : heat pump is blocked by expansion valve's low suction gas temperature
- EEV-low T vapor : heat pump is blocked by expansion valve's low evaporation temper.
- EEV-high T vapor : heat pump is blocked by expansion valve's high evaporation temper.
- EEV-low superheat : heat pump is blocked by expansion valve's low superheat temper.
- EEV-high p cond. : heat pump is blocked by expansion valve's high condensing temper.
- high pressure : heat pump is blocked by high refrigerant pressure
- defrosting : heat pump is defrosting (only for air/source heat pumps)
- min.run time : HP min. running time is active. This activates always after start, DHW heating or defrosting
- DHW heating : heat pump is heating DHW
- rebooting : heat pump is blocked by min. time between 2 comperssor stars
- heating : heat pump is heating your home
- RC blocking : heat pump is blocked by Ripple control
- vol.flow control : heat pump's circulation pump is running
- ready : heat pump is ready to start heating your home as soon as there is call for heat

Display of auxiliary source and thermal store:

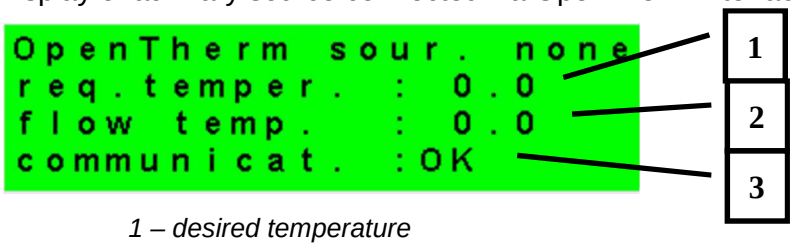


1 – state of auxiliary source: heat / no heat / none

2 – current thermal store temperature (desired)

3 – Ripple c. signal: on / off

Display of auxiliary source connected via OpenTherm interface:

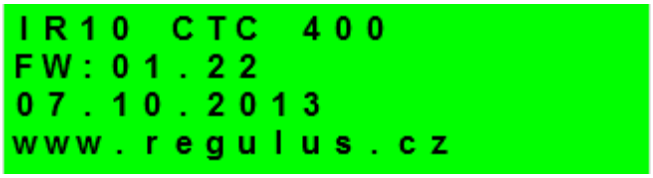


1 – desired temperature

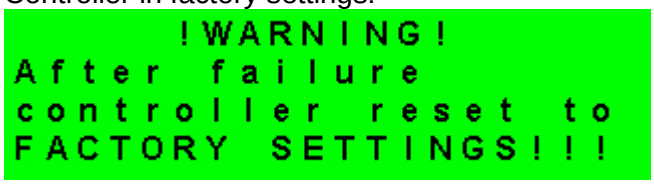
2 – real flow temp. of OT heat source

3 – state of communication with OT heat source: OK / error

Display with firmware version and release date:



Controller in factory settings:



If the display shows the warning (above), then the Controller has been reset to factory setting after alarm mode, and service staff shall be called in to set the respective Controller parameters.

Menu:

While in MENU, use arrow keys ➤, ➤ to select user or service menu, or dispaying additional modules.

Add. Modules – this item will make available basic information on additional modules (if present).

User Menu is intended to set zones, time schedules, OTC curve and date/time.

Service Menu is intended for more detailed adjustments to zones, sources, solar thermal system and other parameters..
Access to the Service Menu is password protected and parameter adjustments are not intended for laymen!

Recirculation is intended to set immediate DHW recirculation (circulation period). After the set recirculation time expires, the function will be turned off automatically.

2. User menu

User menu is comprised of:

- Zone 1
- Time program (time programs, holiday program)
- OTC curves
- HP (heat pump)
- HP errors (error log)
- DHW (DHW heating by heat pump)
- ThSt (thermal store charging)
- DHW recirculation
- Statistics (heat pump statistics)
- Operating data (temperatures and outputs conditions)
- Others (Controller website username and password reset)
- Time and date (time and date)

The keys ➤, ➤ enable browsing, and the selected item can be entered by pressing **OK.**

User menu:

2.1 Zones – user settings

In this Menu, a user can adjust these parameters:

T comfort - setting comfort temperature in zone. This parameter makes sense only when a room sensor is used.

T setback - setting setback temperature in zone. This parameter makes sense only when a room sensor is used.

Note: During a day, the controller switches the desired zone temperatures between T day and T night by the preset time schedule..

zone on - Switching on Zone on the User level. When zone is switched off on this level, the circulation pump and valve outlets will be switched off. The pump and valve outlets can be activated by frost protection, if active.

Summer/winter mode state

- Switching on/off the function for automatic transition between summer and winter modes. Summer/Winter mode is intended to turn off zone heating when the outdoor temperature exceeds the preset threshold **summer** temperature, and vice versa, to turn on zone heating when the outdoor temperature stays below the preset threshold **winter** temperature.

summer temp (°C) - If the outdoor temperature keeps above this value for the time set in parameter ***summer time***, the Controller will switch to ***summer*** mode.

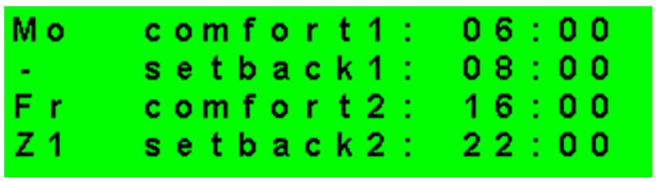
summer time (h) - see ***summer temp.***

winter temp (°C) - If the outdoor temperature keeps below this value for the time set in parameter ***winter time***, the Controller will switch to ***winter*** mode.

winter time (h) - see ***winter temp.***

2.2 Time programs – user settings

Time programs can be set either for separate days, or in blocks Mo-Fr and Sa-Su.
When the program is being set for separate days, there are 2 transitions from Comfort to Setback and 2 from Setback to Comfort for each day.



When the program is being set in blocks, there are similarly 2 transitions from *Comfort* to *Setback* and 2 from *Setback* to *Comfort* for the blocks Mo-Fr and Sa-Su. Answering YES to the question Copy program? will rewrite the respective time program blocks.

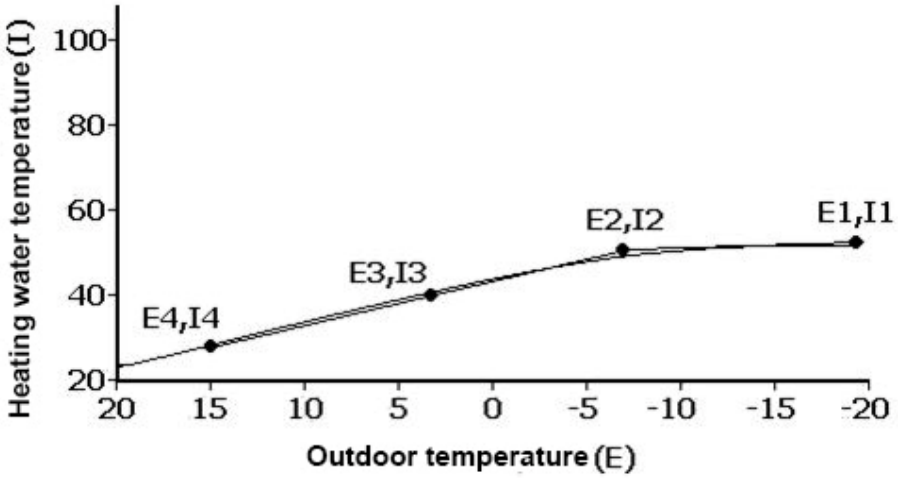
If program copying is not desired, let the question be with no and leave the menu by pressing **C**.

Holiday mode – specific temperatures in zones can be set for the holiday period.

2.3 OTC curve – user settings

The controller works with a linear characteristics between separate points of the curve showing how heating water temperature depends on the outdoor temperature. The real OTC curve is

entered into the controller using a 4-point polyline (see Fig.) with points E1; I1 to E4; I4 (cf. the display picture).



OTC points settings

```
Zone 1   E1: -15   I1: 55
OTC      E2:  -5   I2: 45
curve    E3:   5   I3: 40
         E4:  20   I4: 20
```

Point I1 represents the highest temperature that can be calculated by the controller, while point I4 represents the lowest temperature that can be calculated..

2.4 Heat pump control

A heat pump (or entire cascade if used) can be switched off by the user.

```
HP in series: on
HP1:  on
HP2:  off
HP3:  off
```

1
2

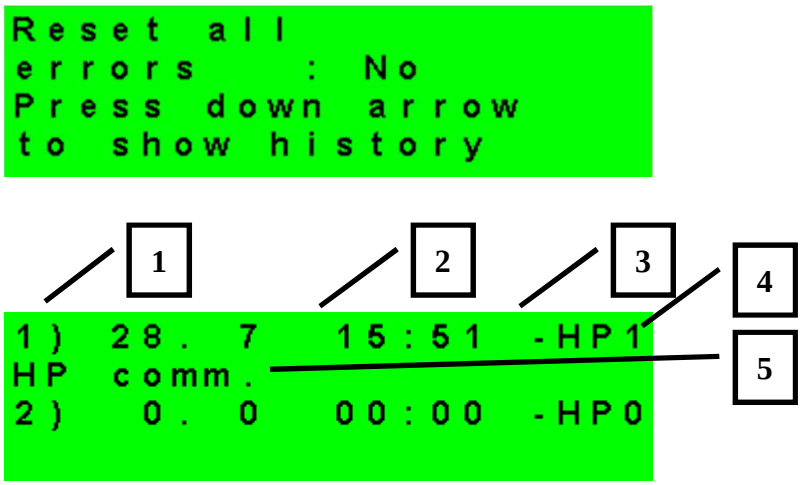
1 – HP cascade on / off (applies to all heat pumps).

2 – single HP on / off

Even when just one heat pump is used, HP cascade shall be on.

2.5 Heat pump errors

In this menu item all heat pump errors can be reset and HP error log is available. The following display is shown:



1 – error serial number (1 – 10)

2 – date & time of error occurrence

3 – information if the error is still active

4 – number of HP with error (1 – 10)

5 – error type

2.6 Setting temperatures for hot water storage tank heated by heat pump (DHW)

If this heating is enabled in the Service menu, a hot water storage tank is heated by a heat pump. Heating is performed by the preset time schedule and the set Comfort and Setback temperatures..

DHW on - Manual switching on DHW heating by a heat pump.

T comfort - Comfort temperature. Hot water storage tank is heated to this temperature if it is set to “Day“ program for the time in question.

T setback - Setback temperature. Hot water storage tank is heated to this temperature if it is set to “Night“ program for the time in question.

2.7 Setting temperatures for thermal store

ThSt on - Switchin on Thermal Store zonr .

T comfort - Comfort temperature. Thermal store gets heated up to this temperature if the program is set to “Comfort” at the moment..

T setback - Setback temperature. Thermal store gets heated up to this temperature if the program is set to “Setback“ at the moment.

2.8 DHW recirculation and time program settings

Here DHW recirculation is enabled and the time schedule of the pump set. When recirculation is on, it is performed following the time schedule set for each day. The time schedule defines from-to operation times. For this period, circulation time and idle time can be set if continuous operation is not desired. E.g. Monday from 6.00 a.m. to 10.30 p.m. the recirculation pump will always run for 10 min. and then idle for 15 min.

on (off / on) - - Recirculation switched on..

circ. time (min) - - Circulation time setting.

idle time (min) - - Idle time setting.

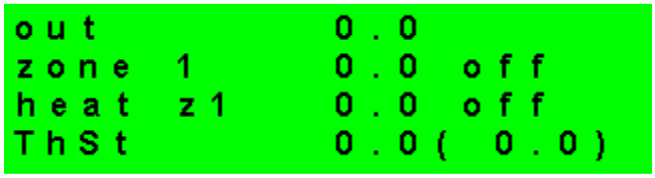
circulation times - - Time setting for separate days when recirculation is on.

2.9 Statistics

HP statistics is displayed here, i.e. number of compressor starts and operating time.

2.10 Operating data

All input temperatures and logic values of controller output are displayed here.



An **E** letter at the end of the temperature sensor line means that the temperature sensor is out of its permitted working range. Its proper connection or the sensor itself shall be checked.

2.11 Others

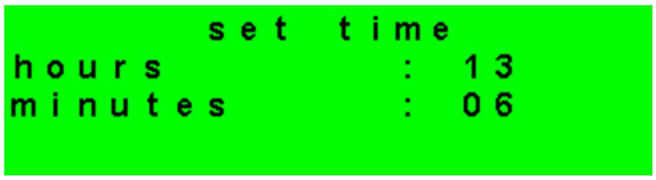
website password reset (no,reset) - Controller website username and password reset for User level. By resetting the default values are set (username: user, password: user)..

language for error messages and HP state: - Language for error messages and HP state shown on the display and website.

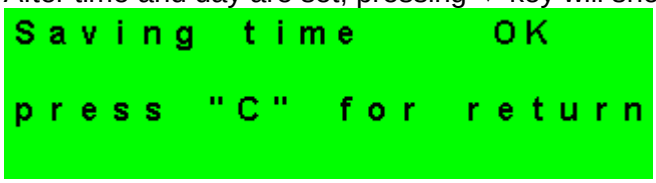
2.12 Time and date setting – user settings

Time and date shall be set to ensure proper operation of time programs. Clock is set in 24 hour format, weekdays are selected using ➤, ➤ keys, Mo-Fr.

Time and date setting



After time and day are set, pressing ➤ key will show the display :

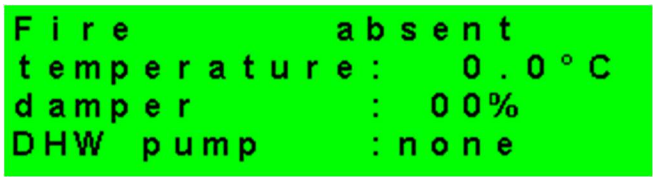


When this display is shown, time and date are saved into the controller's real time circuit.

3 Additional modules

In the menu *Additional modules* on User level, user information on additional modules (if present) can be viewed..

Fire Module:

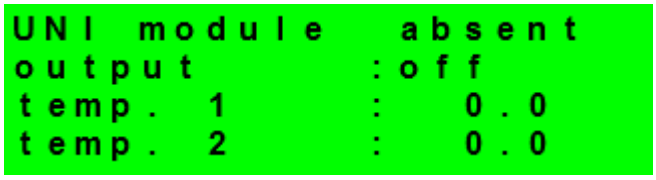


Temperature (displayed °C) - Fireplace flow temperature.

Damper (displayed %) - Fireplace combustion-air damper opened.

DHW pump (on/off) - Display of pump on/off for DHW heated from Thermal Store or fireplace.

UNI Module:



Output (on/off) - State of UNI universal module output displayed

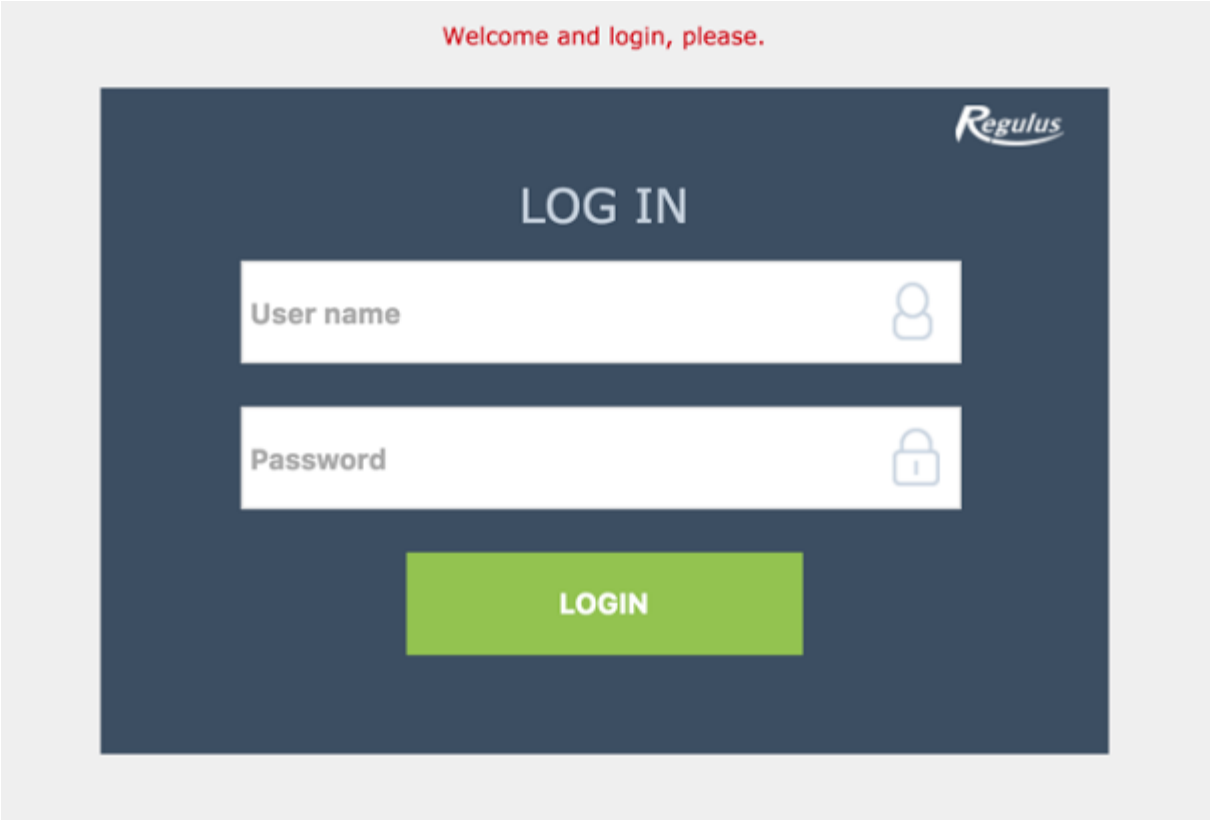
T1 (displayed °C) - T1 temperature from UNI module

T2 (displayed °C) - T2 temperature from UNI module

4 Web interface

The controller involves an integrated website showing a heating system overview and user settings.
For its website access, the controller shall be connected to a LAN or directly to a PC using a network cable. IP address of the controller can be retrieved by pressing the *DISP* key and then the down arrow. This will display info on its network settings. Pressing *DISP* again will return the controller to user display.

After the controller is connected to a LAN, entering its IP address into the browser address bar, the login form will appear:



Login name for user level is: **user**,
Password for user level is: **user.**

After successful login the welcome screen appears for User level, making available pages with settings.

IR 10 Controller

Service guide

IR10_CTC400

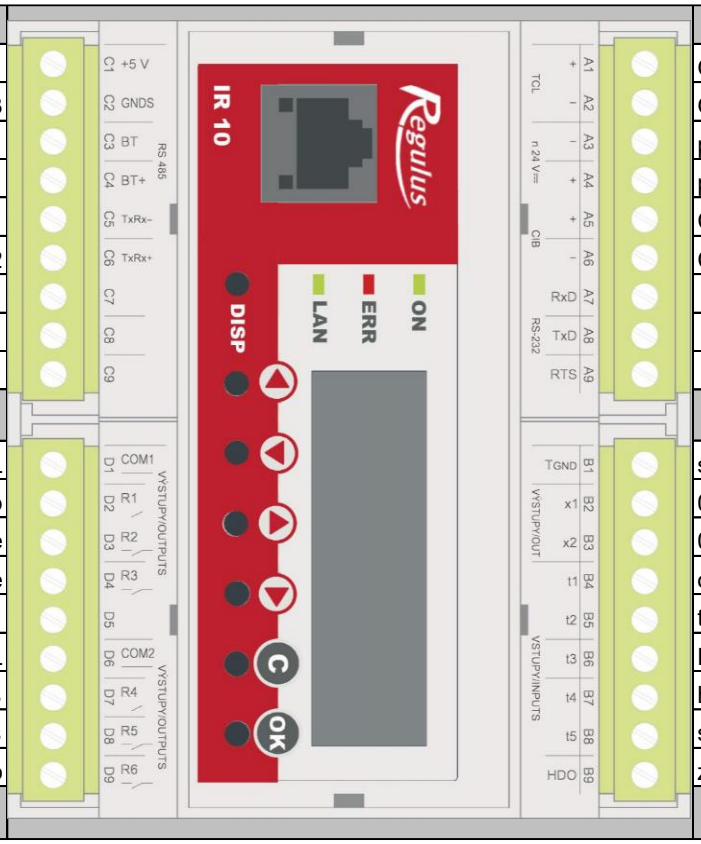
FW: 1.07

S 1 – Controller wiring:

Warning: Controller wiring may be performed by a qualified person only. Layman adjustments of the controller may cause damage to parts of the system.

Description of terminals

		OT module comm. +
CTC400 - comm. 3		OT module comm. -
		power - 24V
		power + 24V
CTC400 - comm. 1		CIB modules (e.g. UNI module)
CTC400 - comm. 2		CIB modules (e.g. UNI module)
power L		sensor common ground
HP circul. pump		0-10V DHW circ. pump control
DHW diverter valve		0-10V UNI output
ON/OFF source		outside
		thermal store
power L		DHW
zone 1 valve opens		heating water - zone 1
zone 1 valve closes		sensor 1/RC21 dial
zone 1 pump		zone 1/RC from relay



S2 -Technical data for IR10 Controller:

Power supply

Voltage	24V DC ± 5%
Power consumption	max.8 W
Installation	power distribution box, DIN rail
IP rating	IP 10B
Working temperatures	0 – 50 °C
Relative humidity	10% - 95% non-condensing

R1-R6 Outputs

Current over common COM terminal	10A
Relay current	3A (12 – 230V AC)
Relay type	electromechanical

0-10V Output

Output voltage	0-10V DC
Common conductor	T_{GND}
Max. current	10mA

Inputs:

Temperature inputs	resistance sensors Pt 1000 (-90°C to 250 °C)

Common terminal	T_{GND}

S3 – Technical data for OpenTherm™ boiler control module IR1x OT

Power supply:

Voltage	24 V DC ± 5%
Power consumption	max. 0.24 W
Installation	power distribution box, DIN rail
IP rating	IP 10B
Working temperatures	0-50 °C
Relative humidity	10-95%, non-condensing

S4 – Controller installation:

The Controller is designed to be installed on DIN rail in a power distribution box. It may be installed by a properly qualified person only!!
The Controller and power supply unit shall be installed next to each other (see wiring fig.). The recommended min. cross section of the power supply conductors is 0.75mm^2.

S4.1 – Wiring diagram

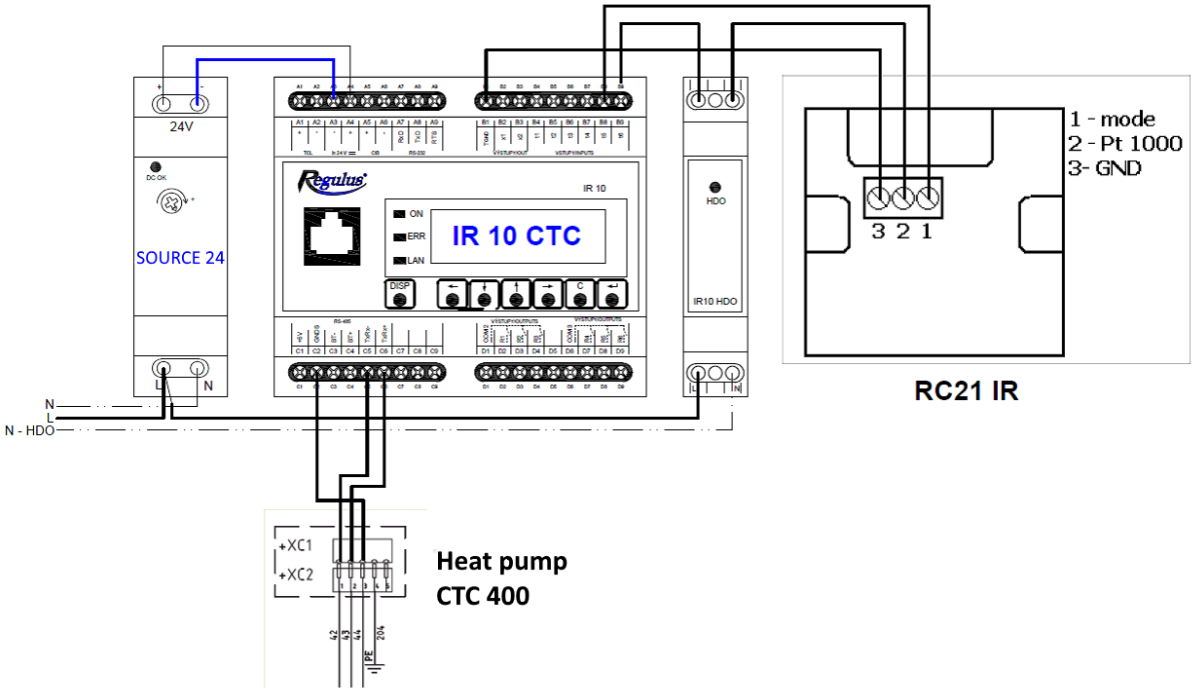


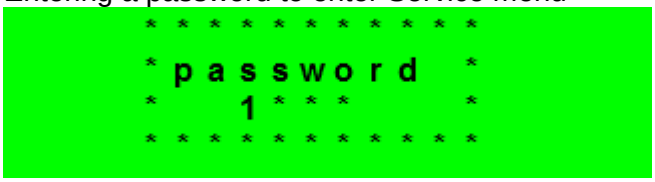
Fig. wiring of power supply unit, ripple control module, room control unit and heat pump to the controller.

S 5 – Service menu:

Warning: Service menu may be edited by a specialist only. Layman adjustments of parameters in the Service menu may lead to damage to parts of the heating and/or solar thermal system.

In the User menu, the Service option shall be selected in order to enter Service menu, and confirmed by **OK.**

Entering a password to enter Service menu



By repeated pressing **OK** you browse password numbers. The numbers not being edited are shown as *. After all numbers have been entered, press ➘ (down arrow). The default service password is:: 1234.
It is highly recommended to change the default password to your own!

The Service menu consist of these items:

zone 1	- setting service parameters for Zone 1
HP	- setting service parameters for heat pumps
HP oper. data	- detailed info on heat pumps
on/off source	- setting service parameters for ON/OFF source
OT source	- setting service parameters for source with OT comm.
DHW	- setting service parameters for DHW heating by a heat pump
ThSt	- setting service parameters for thermal store heating
statistics	- statistics for heat pump cascade (starts, operating hours)
control code	- control type setting depending on the tank type used
sensors	- temperature sensors management (offset, sensor condition)
other	- setting other service parameters
Fire module	- setting parameters for Fire add-on module
Uni module	- setting parameters for UNI add-on module (universal)
Addit. module address	- setting HW addresses for Fire and UNI add-on modules
IP address	- setting IP address, subnet mask, default gateway, DNS server
RegulusRoute	- setting RegulusRoute service
output test	- controller output tests

S 5.1 – setting service parameters for Zones 1 and 2:

zone (on/off) - Service switch on / off the zone. When a zone is switched off on service level, there is no zone frost protection function.

max.t do zone (°C) - Setting max. heating water temperature into a zone. The desired temperature calculated by Controller will not exceed this set value.

min.t do zone (°C) - Setting min. heating water temperature into a zone. The desired temperature calculated by Controller will not be below this set value.

room sensor (none, Pt, RC21, RCM2) - Selection if a temperature sensor (Pt1000), a room unit (RC21) or room unit with display (RCM2) is used, or if the controller works without

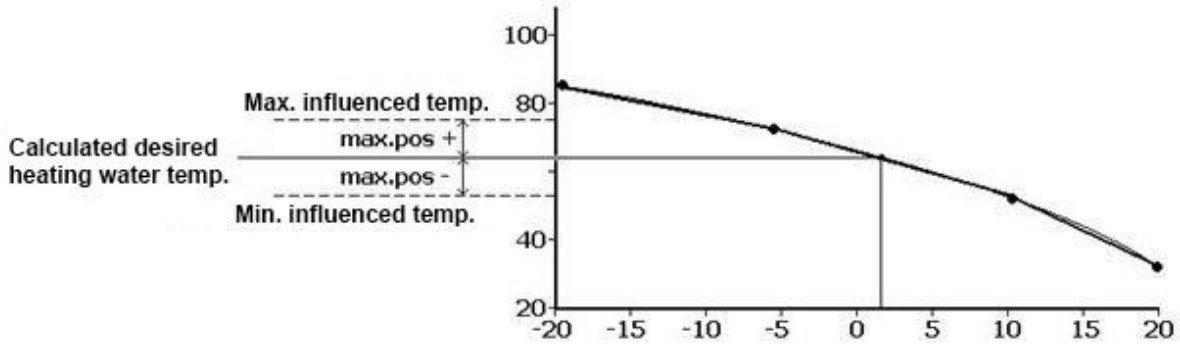
a room sensor. Or you can choose thermostat (therm) for switching between comfort and setback temperature.

no room sens.recalc. DTheat./room (°C) - Setting a temperature drop for heating water and room temperature. E.g. the value 3 means that if the heating water temperature changes by 3°C, the room temperature will change by circa 1°C. This parameter applies when no room sensor is present.

smooth change time day/night (min) -Time adjustment of how many minutes the controller will need to change from comfort to setback temperature during daily scheduled transition between day and night modes and vice versa.

Room temperature influence on heating water:
max. increase (°C) - Setting the max. permitted positive influence on the OTC curve calculated by the Controller based on the difference between the real and desired temperatures in zone (see fig. below).

max. decrease (°C) - Setting the max. permitted negative influence on the OTC curve calculated by the Controller based on the difference between the real and desired temperatures in zone (see fig. below).



Mixing valve:
shift time (sec) - - Setting the shift time between end positions of the mixing valve.

manual gain - If the preset value is not acceptable and the control shall be slowed down/speeded up, the switch shall be turned to yes. Then the following item, **gain**, can be changed.

gain - determines the speed of control. The lower the parameter, the slower is the control. It is not recommended to use values above 1.5. Such values can cause valve cycling.

turn pump OFF (--) - If this function is on, the zone circulation pump will switch off when the temperature in zone reaches the desired value (with ± 0.3 °C difference).

OTC setback (°C) - Setting the heating water temperature drop for transition from Day to Setback mode. This parameter may be set to 0 when a room sensor is used.

S 5.2 – setting service parameters for heat pumps – HP:

The Controller can manage either one CTC 400 heat pump or a cascade of up to 10 CTC 400 heat pumps.

After switching on or off one or more heat pumps and returning to user mode it is advisable to reset the Controller by disconnecting it from power supply. It is necessary to wait a couple seconds between de-energizing and energizing the Controller again. After it turns on, the type and number of heat pumps are detected within seconds.

When a demand to start a HP appears, first a circulation pump starts, then with a delay also a fan/brine pump of the respective heat pump, and finally the HP's compressor. After the heat pump switches off, it may not be switched on again before so called restart time expires that is set to 10 minutes as default.

Heat pump No. 1 (address 1) is able to heat a hot water storage tank (DHW). The diverting valve that distributes HP flow between a hot water storage tank and a thermal store diverts in advance before the HP's compressor starts.

HP (active/no) - this activates the function of CTC 400 heat pump control. It shall be active even when just one heat pump is used.

diff. on (°C) - Temperature difference to switch on a heat pump / cascade. A difference between the desired Thermal Store sensor temperature and the real temperature to switch on the heat pump.

diff. off (°C) - Temperature difference to switch off a heat pump / cascade. A difference between the desired Thermal Store sensor temperature and the real temperature to switch off the heat pump.
RC for heat. (yes / no) - Ripple c. for heating. With no the heat pump runs disregarded of the Ripple control signal.

Control sensors for HP cascade on/off
on (sensor list) - control sensor to switch on a HP/cascade
off (sensor list) - control sensor to switch off a HP/cascade. For a cascade, the default choice *"HP1 return"* is not recommended.

No block by Ripple control under set outdoor temp. (yes/no) - HP is not blocked by Ripple c. below the set outdoor temperature
.
outdoor temp. (°C) - Outdoor temperature below which HP will not be blocked.

delay of next HP in series (min)
- If more heat pumps in a cascade are used, each further heat pump is switched on with this delay.

zone pumps off at DHW (yes/no) - If the heat pump runs in DHW heating mode, zone circulation pumps are blocked.

close zone mixing valves at HW (yes/no) - If the heat pump runs in DHW heating mode, mixing valves for heating zones are closed.

Switch at DHW heat.
- If there is a concurrent demand for DHW and space heating, HP No. 1 will oscillate between DHW and space heating following the times:

to DHW (min) - Max. time of HP1 running in DHW heating mode under concurrent space heating demand

to heat.wat. (min) - Max. time of HP1 running in space heating mode under concurrent DHW heating demand

Ripp.for DHW (yes/no) - Ripple c. for DHW. With *no* the heat pump runs disregarded of the Ripple control signal.

No block by Ripple c. under set outdoor temp. (yes / no) - Heat pump is not blocked by Ripple c. during DHW heating under the set outdoor temp.

outdoor temp. (°C)- - Outdoor temperature below which HP will not be blocked by Ripple c. during DHW heating.

Menu Heat pump 1 to 3
In these menus, specific parameters for separate heat pumps are set.

State (on/off) - switching on/off the specific heat pump

Max.flow t. (°C) - Setting max. flow temperature from a heat pump. If the flow temperature exceeds this value, the HP will switch off. It will also switch off when the flow temperature exceeds a value set by the manufacturer for a specific HP type (see the respective Service Manual).

Max.return t. (°C) - Setting max. return temperature to a heat pump. If the return temperature exceeds this value, the HP will switch off. It will also switch off when the return temperature exceeds a value set by the manufacturer for a specific HP type (see the respective Service Manual).

Min.outd.t. (°C) - Minimum outdoor temperature for a heat pump operation. If the outdoor temp. drops below this value, the heat pump will switch off. It will also switch off when outdoor temp. drops below a value set by the manufacturer for a specific HP type (see the respective Service Manual).

Max.outd.t (°C) - Max. outdoor temperature. If the outdoor temperature rises above this value, the HP will switch off.

Max.brine t. (°C) - Max. temperature for the brine circuit. If the brine temperature rises above this value, the HP will switch off. Applies to ground source heat pumps only.

Restart time (min) - Min. delay between 2 heat pump starts.

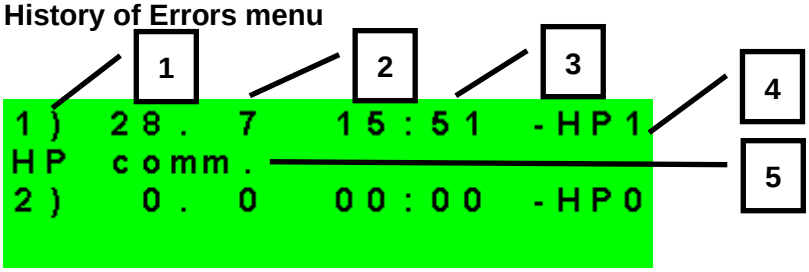
Min.run.time - Min. heat pump running time. It is activated after compressor start, or after DHW heating is finished (if the demand for heating is above 10°C), or after defrosting.

S 5.3 – HP operating data and History of Errors menu
In this menu, detailed info on separate heat pumps are shown, as well as the history of HP blocking errors.

Menu of Heat pump 1 to 3 states

Flow temp. (°C) - HP flow temp.
Return t. (°C) - HP return temp.
Hot gas (°C) - HP compressor hot gas temp.
Cond.temp. (°C) - HP condensing temp.
Cond.press. (bar) - HP condensation pressure
Evapor.1 t. (°C) - Temperature of discharged air/incoming brine circuit
Evapor.2 t. (°C) - Temperature of brine into the ground loop from HP
Outdoor t. (°C) - Outdoor temp. to TČ (air source HPs only)
Evapor. t (°C) - HP evaporation temp.
Suction t. (°C) - HP compressor intake temp.
Superheat (°C) - Superheat at HP compressor suction
Evap.press. (bar) - HP Evaporation pressure
EEV opened (%) - HP EEV opened in %
HP SW ver. (-) - HP SW ver.
EEV SW ver. (-) - HP EEV electronics ver.

History of Errors menu



1 – error serial number (1 – 10)

2 – date & time of error occurrence

3 – information if the error is still active

4 – number of HP with error (1 – 10)

5 – error type

S 5.4 – setting service parameters for a switched auxiliary source:

source (active/off) - Switching on a auxiliary source on service level.

diff. on (°C) - Setting a temperature difference between the desired Thermal Store upper and real temperature for switching on a auxiliary source.

diff. off (°C) - Setting a temperature difference between the desired Thermal Store upper and real temperature for switching off a auxiliary source.

delay (min) - Setting the delay for auxiliary source start after the demand for start appeared.

block out.t (°C) - Setting outdoor temp. above which a auxiliary source is blocked.

Ripple cont. (yes/no) - Ripple control. With no the heat pump runs disregarded of the Ripple control signal.

The following parameter apply to Lyra/Vega Thermal Stores only!!

bival. valves delay:
zone 1 (min) - Delay for Zone 1 bivalent vale before diverting to Lyra/Vega upper section.

Auxiliary source at HP failure (on/off) - If *On*, a boiler is switched on in case of a heat pump fault. For cascades, all the heat pumps must be out of operation.

Auxiliary source contr. sens. - Control sensor to switch on/off a backup source

S 5.5 – setting service parameters for an auxiluary source with OT:

source (active/off) - Switching on a auxiliary source on service level.

DHW in boiler (0 / 1 / 2) - - Determines a DHW type in the boiler:
0 - Boiler with no integrated DHW tank
1 - Boiler with a hot water storage tank and thermostat
2 - Boiler with a hot water storage tank and temperature sensor

winter oper. (yes/no) - - Winter operation of auxiliary source. When On, the source accepts demands for space heating to zones and DHW. When Off (summer operation) the source ignores heating demands and accepts DHW heating demands only.

delay (min) - Setting the delay for auxiliary source start after the demand for start appeared.

block. out.t. (°C) - Setting outdoor temp. above which an auxiliary source is blocked

Ripple cont. (yes/no) - Ripple control. With *No* the auxiliary source runs disregarded of the Ripple control signal.

The following parameter apply to Lyra/Vega Thermal Stores only!

backup valves delay:
zone 1 (min) - Delay for Zone 1 bivalent vale before diverting to Lyra/Vega upper section.

max. temper. (°C) - Max. source temperature. When this temperature is exceeded, the source is switched off. At the same time, this is the upper limit for demands (e.g. if a DHW demand is 95°C and a boiler max. temp. is 80°C, the DHW temperature demand sent to the boiler is 80°C).

at HP fail. (yes/no) - Switching on the source when the heat pump shows a fault. In case of an active heat pump fault (or of all heat pumps in a cascade) the OT source acts as a main heat source instead of the heat pump (takes over heating/DHW demands from the heat pump).

commun.speed (0 - 9) - Speed of OT communication with the source. The parameter sets the communication bus speed between the IR and source. Lower numbers mean higher speed but higher inclination to a communication fault. The recommended setting is 4 or 5..

send max. temperat. when heating DHW (yes/no) - Selection if during DHW heating the demanded DHW temperature from the Controller is sent to the source, or the max. flow temperature (parameter **Max. temp**.).

The webserver involves further settings, incl. a list of OT parameters used by the Controller.

S 5.6 – setting service parameters for DHW heating by a heat pump (DHW):

on (active/off) - Switching on DHW heating by a heat pump on service level

diff. on (°C) - Setting the DHW heating switch-on difference

diff. off (°C) - Setting the DHW heating switch-off difference

S 5.7 – setting service parameters for thermal store heating:

on (active/off) - Switching on Thermal Store zone on service level

S 5.8 – heat pump statistics:

The Controller registers a simple heat pump statistics. This is the log:

HPx number of starts
- **today:** number of starts on the current day
- **yesterday:** number of starts yesterday
- **total:** total number of starts

HPx oper. hours
- **today:** compressor operating time on the current day
- **yesterday:** compressor operating time yesterday
- **total:** total compressor operating time

DHW heat. oper. hours
- **today:** time of DHW tank heating by HP on the current day
- **yesterday**: time of DHW tank heating by HP yesterday
- **total**: total time of DHW tank heating by HP

Backup heat oper. hrs
- **today:** backup source operating time on the current day
- **yesterday**: backup source operating time yesterday
- **total:** total time of backup source operating time

S 5.9 – control code:
Setting a control code following the code chart for IR12 Controllers. Version and control type are already entered (ver. IR12 CTC400).

Thermal Store (0 - 5) - Type of thermal store used, select from Thermal Store and DHW tank combination, and combi tanks as HSK, DUO and Lyra/Vega. Follow the code chart.

Thermal Store type (0 - 3) - Variant of thermal store used, no impact on control. Follow the code chart.

Heat pump type is filled in automatically from the communication.

zone 1, 2 (0 - 3) - Zone type (mixed independent, mixed dependent, unmixed, with 4-way valve). Follow the code chart.

DHW heat. type (0 - 5) - Manner of DHW heating (DHW-E zone). Options: heating elements (controlled by Controller, with own thermostat), switched boiler, modulating boiler, OpenTherm controlled boiler. Follow the code chart.

DHW recirc. (0 - 5) - DHW recirculation switched on/off. Follow the code chart.

solar sink 1, 2, 3 (0 - 5) - Type of solar sinks – Thermal Store, DHW, pool, general heat sink with optional sensor, deep bore regeneration. Follow the code chart.

backup source (0 - 5) - Backup source type – switched, modulating, or OpenTherm controlled. Follow the code chart.

UNI function (0 - 2) - Defines the universal function output on UNI module – pool heating, general UNI function. Follow the code chart.

fire (0 - 2) - Defines the Fire module output – fireplace pump, fire with heat exchange function between Thermal Store and DHW tank. Follow the code chart.

Display alarm on configuration change (yes/no) - If a user changes manually some function assigned by a control code, alarm webpage/display will be shown.

S 5.10 – sensor management:
The temperature measured by the Controller may differ from a real temperature due to defects. The measured value may be affected e.g. by the preciseness of the temperature sensor, the length and cross section of the cable used for sensors, by the quality of contact between the temperature sensor and the medium measured. The temperature data can be adjusted by offset in the range from -15.0 to +15.0 °C.

connected (yes/no) - *No* option shall be selected in case no temperature sensor is connected (to avoid the program reporting an error when the sensor is disconnected). For some temperature sensors, this option cannot be changed. The setting depends on the system configuration (e.g. when DHW zone is switched on in service menu, the HP sensor is activated, while when the DHW zone is switched off, the sensor deactivates automatically).

adjustment (°C) - Temperature sensor offset

state (OK / error) - The sensor state – if the sensor is in an error state (either a too high or a too low temperature is sensed), the text *fault* is displayed.

S 5.11 – other service parameters:

password - Setting a numeric password for access to the menu service level.

Frost protection:
When Frost protection is on, the temperature is monitored for a switched off zone. Should the outdoor temperature drop below the value set in the parameter *out. temp.*, then the heating water temperature to the zone is kept at value set by parameter *water temp.*

state (active / off) - Turning frost protection On/Off.

out. temp. (°C) - Setting outdoor temperature limit below which Frost prot. is activated.

water temp. (°C) - Heating water temperature kept in a zone when Frost prot. is active.

Critical ThSt temp.:
If the temperature in Thermal Store exceeds the set critical temperature, cooling will start with heating into all zones switched on in service menu, i.e. incl. those switched off in user menu. During cooling, the zone pump is on and the max. temperature is set for the zone *(Max.t to zone)*. Cooling will be finished when the Thermal Store temperature drops by 5°C.

Temper. (°C) - Setting critical temperature in Thermal Store.

Pump antiblock func.:
When this function is active, selected heating elements (pumps, valves) are spun for a while once a week (at a preset day and time). If any of these components was in operation the previous week due to the Controller intervention, this anti-block function will not apply.

state (active, off) - Turning on/off the antiblock function.

on day (Mo - Su) - Selection of day when the spin shall occur.

at hour (0 - 23) - Hour when the spin starts.

Website password reset (no/reset) - Selecting reset will reset the website service level password and username to default values.

S 5.12 – Fire module:
This add-on module is designed to control a fireplace connected into a heating system. At the same time it permits efficient control of heating a hot water storage tank from a thermal store via a 3-way zone valve.

module (off/active) - Option if the module is used in the system.

ThSt sensor for Fire (sensor list) - Selecting a sensor for differential function of switching on a fire circulation pump.

min. Fire temp. (°C) - Setting the water temperature from fireplace above which the fireplace circulation pump starts.

dif. Fir/ThS on (°C) - Setting the switch-on difference to start the fire pump.

dif. Fir/ThS off (°C) - Setting the switch-off difference to stop the fire pump.

max. ThSt temp (°C) - Max. temperature in thermal store (or exactly at the sensor selected in parameter *ThSt sensor for Fire* for fire circulation pump operation.

DHW heating by ThSt:
DHW pump (no/yes) - Turning on/off the function of heat transfer from thermal store to hot water storage tank.

diff. on (°C) - Setting the switch-on difference for differential function to start DHW pump.

diff. off (°C) - Setting the switch-off difference for differential function to stop DHW pump.
.
DHW sens. for DHW pump (sensor list) - Selecting a sensor in hot water storage tank for differential function to start DHW pump.

ThS sens. for DHW pump (sensor list) - Selecting a sensor in thermal store for differential function to start DHW pump.

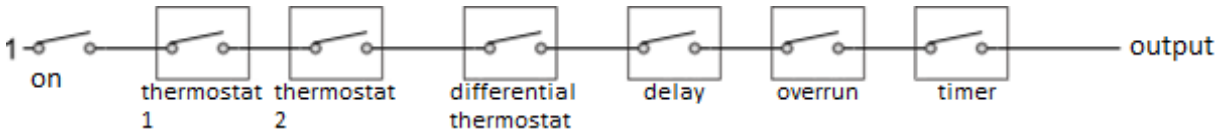
Max DHW temper. for DHW heating by ThSt (°C) - Max. hot water storage tank temperature for operation of circulation pump between thermal store and hot water storage tank when the temperature difference is met.

S 5.13 – UNI module:

This is a universal add-on module for IR10 and IR12 controllers.
The module features the following functions:

- Switching on the add-on module
- Selecting sensor 1
- Selecting sensor 2
- Thermostat 1
- Thermostat 2
- Differential thermostat
- Delay
- Overrun
- Timer

The function logic is designed in such a way that the output is closed when the add-on module is switched on and all the permitted functions are fulfilled, see fig. below. A function not permitted is equivalent to a closed switch.



It is obvious from the picture that the Delay function can delay signal from thermostat and diff. thermostat functions, the Overrun function can hold disconnection (switching off) from thermostat, diff. thermostat and delay functions. The Timer function is superior over the preceding functions.

Description of separate functions and parameters of the add-on module
module - Switching on the add-on module.

Sens. 1 - Selection of sensor 1 for UNI module functions

Sens. 2 - Selection of sensor 2 for UNI module functions

Thermostat 1 (2) - Thermostat function related to temperature input 1 (2)
t. on (°C) - Thermostat 1 (2) switch-on temperature

t. off (°C) - Thermostat 1 (2) switch-off temperature. If the switch-on temperature is higher than the switch-off temperature, thermostat 1 works in “cooling” mode, when vice versa, it works in “heating mode.

Call for heat
from Thermostat 1 (2) (on/off) - Switch-off temperature for Thermostat 1 (2) will be taken over as the desired temperature for heat sources. Valid only if Thermostat 1 (2) is set in “heating” mode. When Timer function is also On, the request will be taken over during active time period only.

Differential thermostat: - differential thermostat function
diff. on (°C) - Switch-on difference between temperatures t1 and t2.

diff. off (°C) - Switch-off difference between temperatures t1 and t2.

Delay: - output delay function
period (minutes) - Delay time in case when all the preceding functions are fulfilled.

Overrun: - overrun function / output delayed switch-off
overrun (minutes) - Overrun time after the preceding functions are switched off.

Timer: - timer functions with two time periods
on 1 (hh:mm) - The first period switch-on time

off 1 (hh:mm) - The first period switch-on time

on 2 (hh:mm) - The second period switch-on time

off 2 (hh:mm) - The second period switch-off time.

reset state of T1&T2 with every
start of the period of the program - When this function is On, at every start of time period in time program the state of both thermostats, T1 and T2, will be reset according to the current temperatures

S 5.14 – HW addresses of add-on modules:
An add-on module can be connected to the Controller on CIB bus. The module is also power-supplied from this bus. After the module is connected, its HW address shall be set in the Controller, otherwise the module will not work together with the Controller. The module’s HW address is printed on its side.

Module addr. (-) - Hexadecimal HW address of a module

load address (no/yes) - After entering the HW address, confirm *YES* to load the address into the Controller. The lower line will read *OK* and the green RUN lamp on the module will start flashing.

S 5.15 – IP addresses:
Setting the IP address, network mask, gateway, DNS server address, possibly also DHCP.

IP (192.168.100.014) - Controller IP address.

Mask (255.255.252.000) - Network mask the Controller is connected to

GW (000.000.000.000) - IP address of the default gateway the controller is connected to.

DNS (008.008.008.008) - IP address of DNS server.

Set new IP (yes/no) - Confirmation of the new IP addresses set. The Controller will not work with the new IP addresses without this confirmation.

Set DHCP (yes/no) - When Yes is selected, the Controller will receive the address from the DHCP server. If the IP address cannot be received within 4 seconds (e.g. DHCP server is not present in the LAN), the IP address set above will be used as a replacement configuration.

MAC (00.00.00.00.00.00) - MAC address of the Controller.

S 5.16 – RegulusRoute:
RegulusRoute service enables remote access to the Controller avoiding the need to use a public IP address. If you wish to have this service configured, kindly contact Regulus.

RegulusRoute (yes/no) - Enabling RegulusRoute service

Status - RegulusRoute service state

IR12 name - Controller login name to RegulusRoute service

IR12 description - Controller description for RegulusRoute service

IR12 password - Controller login password to RegulusRoute service

Set new Regulus Route parameters (yes/no) - When Yes is selected, the Controller will start using the newly entered name and password for RegulusRoute service (parameters can be entered via web interface only)

S 5.17 – output test:
When *Output test* in Service Menu is entered, all outputs from the Controller are switched off. Then separate outputs can be tested. The output turns on when a display with the name of the output in question is shown and the option *test* = 1 selected. On leaving a display with the option *test* = 1, the respective output switches off..

termin - Terminal number for the respective Controller output.

Operat - Description of the output function.

test (0,1) - State of the tested output, 1 = output on

S6 – Web Server – service level:

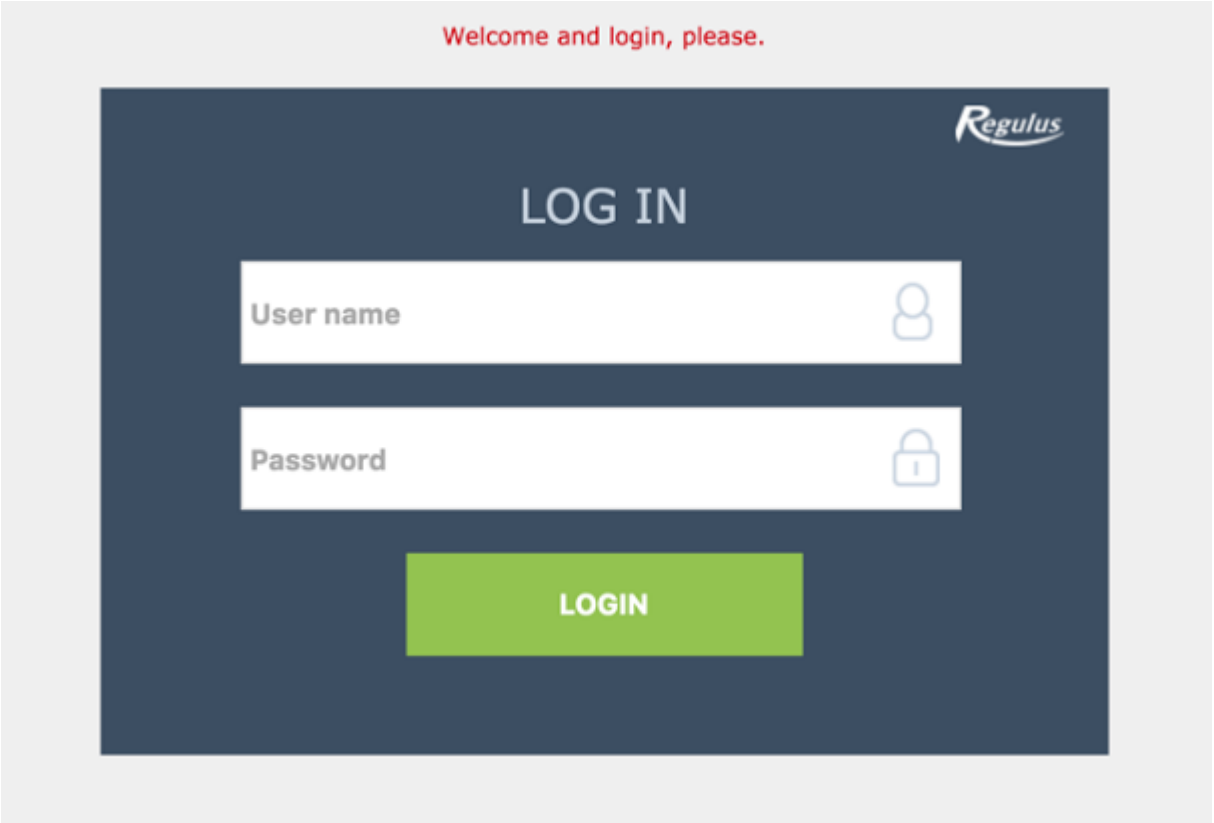
IR12 Controller is equipped with integrated web server that enables displaying either User or Service screen.

S 6.1 Access to Service web interface, checking the IP address of the Controller:

In order to access the Controller's interface via web browser, you need to know its IP address.
The IP address set in the Controller can be revealed by hitting *DISP* key. Then pressing arrow down key will display the IP address of the device, its mask and gateway.

Entering the IP address into the address bar of your browser will open a log-in window that enables visiting either User or Service level.

level	username	password
user	user	user



Login window

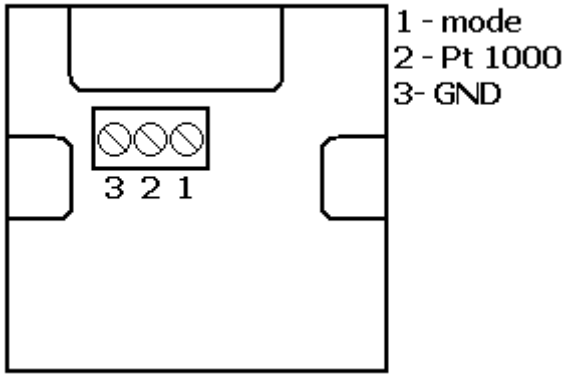
After successful login with the Service username and password the welcome screen appears with the Service Menu.

S7 - RC21 IR Room Unit, wiring

RC21 IR Room unit can be connected to the Controller. It involves a temperature sensor, keys for temperature correction and for a permanent temperature level, either *Comfort* or *Setback*.

The room unit shall be wired to the Controller with a shielded twisted cable 4x0.5 or 3x0.5, or 4x0.75 or 3x0.75 (e.g. JYTY).

Terminal board description:



Room unit connection to the Controller:
Room unit in Zone 1:

Unit terminal 1 → IR12 terminal B8 (t5) (sensor 1)
Unit terminal 2 → IR 12 terminal B9 (HDO) (Zone 1)
Unit terminal 3 → IR 12 terminal B1 (T_{GND})

The RC21 sensor type needs to be enabled on the Service level.

WARRANTY CERTIFICATE

IR 10 Heating Controller

Seller: ..... Date of Purchase: .....

WARRANTY CONDITIONS

1. The warranty period is 24 months from the date of purchase.
2. The product shall be installed and commissioned by a competent company or a person trained by the manufacturer.
3. When claiming warranty, this Warranty Certifi cate must be submitted together with the purchase receipt.
4. The warranty is valid only when the technical conditions set by the Manufacturer, installation manual and instructions in the documentation and on the product itself are maintained.
5. The warranty does not cover defects caused by external conditions or improper operation conditions, defects caused by usual wear and tear, further when the product is not used in compliance with its purpose and when the defect was caused by mechanical damage, improper handling, tampering by a third person, improper installation, improper stocking, natural disaster etc.

COMMISSIONING

Company: .....

Date: .....

Rubber stamp print and signature of the installing person:

REGULUS spol. s r.o.
E-mail: sales@regulus.eu
Web: www.regulus.eu