

Installation instructions and operating manual for the 8-channel radio receiver with 8-channel timer

IN (STAT) 868 -a8U / 230



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Warning!

The unit must only be opened by a qualified electrician and should be installed in accordance with the circuit diagram shown on the unit and in compliance with these instructions. All valid health and safety regulations must also be complied with.

This is an electronic device that is mounted in a switch cabinet to control thermostats and valves. It is to be used only in dry rooms and enclosed spaces where normal ambient conditions apply. The device confirms to EN 60730, it works according operating principle IC.

1. Application

This unit from the INSTAT 868 family converts information from the INSTAT 868 transmitters into control signals for the valves. Additional functions allow the temperature to be altered for a preset period of time.

2. Features

General:

- Ready to plug in to a 230 V power socket.
- Backlit display
- 230 V thermal actuators are directly connectable (a separate version is available for 24V thermal actuators)
- Heating/cooling changeover using an external signal 230V
- Cooling shutdown at dew-point using an external signal (using mains power signal or a directly connected dew-point sensor)
- Pump logic function via volt free relay (pump off is all valves are closed)
- Heater control function via volt free relay output (Heater off if all valve are closed))
- Valve testing function
- Valve/pump protection (prevents jamming)
- Programming is possible even with cover removed (only if the device is disconnected from mains)

Timer

- 8-channel timer for up to 8 time zones
- Preset real-time timer, no setting required
- Automatic summer/winter time changeover
- 6 time profiles, all adjustable
- Holiday function (reduction for a maximum of 200 days)

Radio communication

- 8 reception channels in one casing
- Master/slave function (master timer thermostat specifies switching times, not the integrated timer)
- One transmitter can control several reception channels
- Transmitter has an auto-learn address setting using learning mode
- A signal lamp for each output displays relay status, faults etc.
- Alarm sounds if a fault is detected
- Monitoring of valid addresses
- Transmitter monitoring (if nothing is received from the transmitter for a long period, for instance if the battery is flat), the output is switched on for 30% of the time and the signal lamp blinks.

3. Operating principles



Room 1 ... Room 8	Radio displays for rooms On = relay energized, see 5.1 Blinking = fault, see 5.6
☾ R1... R8	Room is at reduced temperature if arrow is visible Moon = reduced temperature No moon = 'Comfort' temperature
1...7	Weekday
ESC	back
-/+	Select menus change values
OK	Confirm
☼	Cooling active
☁	Dew-point identified
☀	'Comfort' temperature (programming)
☾	Reduced temperature (programming) or Set-back input is active
☰	Holiday function
Heater	Room 7 is heating or Heater is running
Pump	Room 8 is heating or pump is running

Standard display:

- Actual day of week (1 = Monday)
- Time
- Rooms with reduced temperature (here R1, R3, R5, R7)

Programming with removed display unit (Instatler only)

- switch off mains supply and open the outside cover
- pull of the flat cable from power board
- press OK until the display appears (now without backlight)
- Plug in the display unit only if device is without mains supply.

3.1 Handling Principles

-/+	go through menus change values
OK	activate menu item save value
ESC	cancel or back one step
Activated menu items	will be cancelled after 10 Minutes without saving the actual modification
Menu items	
13:20	basic mode, read actual time (: is blinking)
CLOC	set time
HOL	set holiday (controls rooms at set-back temperature)
Code	access protection
Prog	Programming
Pr:Pr	Program Profile
Pr:ro	Program Room
Funk	maintain RF
LErn	establish radio link
dIST	test radio distance
dEL	delete radio link
Inst	Installer settings
A:In	invert outputs (for valve NO)
uE:TE	valve test
uE:Sc	valve protection
HY:Ab	Hygrostat or set-back

4. Functional description

The INSTAT 868-a8U receiver converts the radio signals from the INSTAT 868-r... transmitter into control signals for electrical consumers such as thermal actuators. The consumers are switched by relays, with signal lamp to display the switched status in each case.

For relay switching behaviour, see 'Functional description' in transmitter installation instructions.

Room temperatures can be influenced by varying the time settings at the built-in 8-channel timer.

4.1 Time and Date setting

Press key + until CLD is displayed	
Press:	
OK	year is displayed, digits are blinking
-/+	to change
OK	Day, Month is displayed, Day is blinking
-/+	to change
OK	Month is blinking
-/+	to change
OK	day of week is blinking
-/+	to change
OK	Time is blinking
-/+	to change
OK	to save

4.2 Setting the holiday function ☰

The rooms can be reduced in temperature to the value selected at their thermostats for a predetermined period (max. 200 days).

Press + until HOL will be displayed
Press OK The number of days is blinking = 00:1d
The arrow is against the ☰ symbol.

Press -/+ to change the figure.
Press OK to confirm the new setting.

If the holiday function is active, the arrow can be seen against the ☰ symbol. At midnight on the last day of the holiday period, automatic operation is selected again and the preset program goes back into operation. (If for example 1 day is selected as the holiday period, the automatic function is restored at midnight on that day. To deactivate the function, press ESC.

Master comply with their own holiday periods, not the one selected here.

The function continues after a power failure.

Note: this function has no effect in the "Cooling" mode; the temperature is not raised.

5. Installer Settings

These settings should only be modified from an expert. Wrong adjustments could result in a damage of the heating system.

In order to protect from unwanted modifications a CODE protects these menu items

In order to move to the CODE:

Press:
key -/+ until Code is blinking
OK press for ~ 5 sec to accept. This activation of the code will be valid for 1h. In this case Code will not displayed any more

In the descriptions below the necessary key presses will be described in order to go to a specific function, this will be done in the form:

Press key + until {Code} → FunE (OK) → LErn is visible.

(OK) means press OK key

5.1 Radio link set-up

Up to eight transmitters control either one or several 'Heating/cooling ON/OFF' channels (1 ... 8) (channel 7, 8 may be illuminated, see 5.8, 5.9).

One or several thermal actuators can be connected to each output. For an example, see Fig. 1, 2.

Only the INSTAT 868-r1 (without timer) follows the time profile of this receiver in the automatic mode.

The radio link is set up in the following steps:

a) Select the 'Learning mode' at the transmitter for the desired room (see transmitter operating instructions).

b) At the receiver, set the desired channel to the learning mode as follows:

Press key + until {Code} → FunE (OK) → LErn is displayed
OK already learned channels will be displayed
channel LED 1 and R1 is blinking, F0 is displayed to change channel until the lamp of required room is blinking
-/+ to start learning mode
OK The channel LED and room arrow are blinking, digit in front of L increments in sec interval e.g. F1:5L the actual received signal power will be displayed a sound can be heard.

If link is established, blinking and sound stops, the room arrow remains, to show the latest learned channel

c) Stop the learning mode at the transmitter.

To 'learn' the next room, carry out step a) and select the appropriate channel at the receiver, by using -/+ key.

To allocate several reception channels to the same transmitter, leave the transmitter in the learning mode and 'learn' the relevant channels one after the other.

ESC to cancel

Display of signal power

F3= good
F2 = medium
F1 = not enough
F0 = no signal

Notes:

- The function is interrupted automatically if no button is pressed for 10 minutes → return to standard status
- Each channel needs about 30 seconds' learning time.
- Learning at channel 7 cancels heater control.
- Learning at channel 8 cancels pump logic.
- One transmitter can control several reception channels (several valves per transmitter).

5.2 Test radio distance / signal power / learned channels

Each channel provides info about the received signal power. This is used to estimate the signal power/radio distance

Press key + until {Code} → FunE (OK) → dISF is displayed
a) **Note:** Not possible with removed cover
OK already learned channels will be displayed
channel LED 1 and R1 is blinking, the last signal power will be displayed e.g. F1:5L
-/+ to change channel
channel LED and room arrow is blinking, the last signal power will be displayed
Signal power see 5.1
The power of the received signals will be displayed (F1...F3)
F0 for no signal (e.g. between signal packages)

b) Move the transmitter away and turn the temperature set point from min to max and vice versa. This allows estimating the distance
Alternative: INSTAT+ 868 Use function "Test radio distance"
INSTAT 868-r1 press Reset, the corresponding channel will blink several times

5.3 Deleting radio links

To delete all radio links:
Press key + until {Code} → FunE (OK) → dEL is displayed
OK already learned channels will be displayed on the LEDs
dEL will be blinking
OK to delete all links

6. Installation / start-up

Installation:

- Only in the electrical or heating circuit junction box on DIN (i.e. "top-hat section") rails
- Any installed attitude is possible.
- Water must not be allowed to reach the device.

Electrical connections:

Caution: Disconnect the device from the power supply before making the electrical connections. On terminals Heat/Cool and HYG/ABS there can remain voltage

See circuit diagram in the device and Figs. 1 – 11.
For normally-open thermal actuators, see 5.7

Connecting the operating voltage:

Insert the plug into the power socket. If a direct connection is needed, remove the plug and connect the wires in the power cable directly. On completion of installation work, a link must be established between the *INSTAT 868-r* ... transmitter and the appropriate channel (1...8) (see 5.1 onwards). After switching on, the display shows the product variant and the software version briefly.

Note:

When switching on power supply it can last up to one minute until the display becomes visible. In order to shorten this, press and hold down a key.

6.1 Difficult environment conditions

If receiving conditions are difficult or in order to increase the radio distance (up to 90 m), the repeater *INSTAT 868-rep* can be used.

6.2 What to do if ...

- 1. Valve does not open:**
→ see Table 1
→ perform a 'reset': see 5.18
- 2. A signal lamp for one radio channel is blinking (a beep signal may also be heard)**
→ Basic information: see 5.6
→ Learning mode, valve test, radio link test not interrupted (see 5.18)!
→ Two transmitters are supplying signals with the same address; one of the radio links must be re-learned (see 5.6.1)!
→ No radio link; see Table 1
→ One or more channels are blinking to indicate that they have no link with their transmitter
Restore the necessary links (see 5.1)
If necessary, carry out "Delete radio links" (see 5.3) and create new links.
- 3. Channel 7 or 8 lights up although no transmitter has been 'learned'**
→ Channel 7 is used for Heater control or channel 8 is used for pump control (see 5.8, 5.9).

If any unexplained faults develop, it is best to press the 'Reset' button on the thermostat and if necessary on the receiver.

7. Technical data

Order reference	<i>INSTAT 868-a8U /230</i>
Article No.	0536 80 14
Operating voltage:	230 V 50Hz
Power consumption:	4 VA
Fuse:	4 A slow-acting
Ambient temperature: (without condensation)	0...+50 °C
Storage temperature:	-20...+60 °C
Antenna	internal
Dew-point sensor optional:	TS 193 683
Displays: for learning	8
For operating voltage	1
Load circuits:	6 relay normally open, 4(2) A *
Channel 7 Heater control	1 relay CO contact volt free, 4(2)A ***
Channel 8 Pump control	1 relay CO contact volt free, 4(2)A ***
Number of thermal actuators 3 W per channel:	max. 10 **
Enclosure rating:	IP 40 / insulated (Moisture condensation not permitted)
Protection category:	II
Timer: minimum switching period:	10 minutes
Battery life:	~ 4 years
Degree of pollution	2
Software class:	A
Rated impulse voltage	4 kV
Brinell test temperature	75 °C
Voltage and current for EMC emitted interference testing	250 V / 0,1 A
Dimensions (with DIN, i.e. "top-hat section" mounting rail):	310 x 90 x 65 mm
Weight: approx.	850 g

*) Total of all currents ≤ 2 A

**) One device can operate up to 15 thermal actuators (fuse)

***) Do not supply pump from inside the receiver

Batteries



Batteries, rechargeable or not, should not be disposed in to ordinary household waste. They have to be recycled properly to protect the environment and cut down the waste of precious resources. Your local waste management authority will apply you with the details concerning the proper disposal of batteries.

In compliance with the EU Directive 2006/66/EC, the button cell battery located on the printed circuit board inside this product, has only to be removed by professional personnel at the end of the product life cycle.

Note: In some rare cases it may not be possible to establish a permanent radio link between the radio transmitter and the radio receiver. We therefore recommend to check the reliability of operation at the specific location. In order to establish longer transmission distances (up to 90 m) or in case of critical locations, the RF repeater *INSTAT 868-rep* can be used.

This thermostat can be used in all EU and EFTA countries.

The manufacturer hereby declares that this device conforms with the basic and other relevant requirements laid down by directive R&TTE 1999/5/EC. The declaration of conformity can be downloaded from „www.funk868MHz.de“.

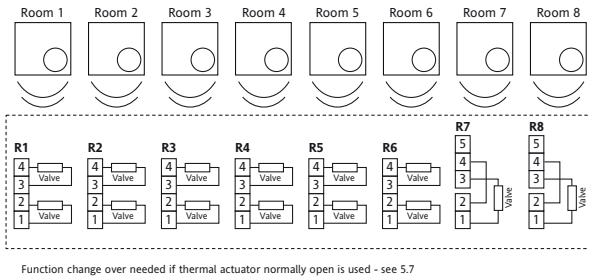
8. Brief manual

Radio functions	Chapter	Action
☺☺☺	5	OK for 5 Sec to accept (code is valid for 1 h).
Establish the radio link, switch output	5.1	Set the transmitter to the learning mode (see instructions supplied with transmitter) At the receiver: Press key + until ☺☺☺ → ☺☺☺ → ☺☺☺ is displayed OK → already learned channels will be displayed -/+ → to change channel OK → to start learning mode The channel LED is blinking, digit in front of [L] increments in sec interval the actual received signal power will be displayed If link is established, the channel LED goes off Terminate the learning mode, start learning for next channel if necessary
Test of radio distance signal power already learned channels	5.2	Press key + until ☺☺☺ → ☺☺☺ → ☺☺☺ is displayed OK → already learned channels will be displayed -/+ → to change channel the last received signal power will be displayed e.g. [F1:d]
Deleting radio link	5.3	Press key + until ☺☺☺ → ☺☺☺ → ☺☺☺ is displayed OK → already learned channels will be displayed → ☺☺☺ is blinking OK → deletes all channels
Master / slave	5.4	Master = thermostat with timer; slave = thermostat without timer Slaves at channels with a higher number than the master comply with the master, (not with the timer in the receiver)
Audible alarm signal	5.5	Is only sounded between 10h and 20h OK → Stops audible warning if pressed while it is being sounded
Other functions		
Connection of valves normally closed / open	5.7	Press key + until ☺☺☺ → ☺☺☺ → ☺☺☺ is displayed OK → last used value blinking -/+ → ☺☺☺ = valve closed when power is shut off, ☺☺☺ = valve is open when power in cut off OK → confirm
Pump logic	5.8	always active if channel 8 has not been 'learned'
Heater control	5.9	always active if channel 7 has not been 'learned'
Valve protection	5.10	Press key + until ☺☺☺ → ☺☺☺ → ☺☺☺ is displayed OK → xx is blinking, (xx = actual value) -/+ → to change, (xx = time in minutes or ☺☺☺) OK → to accept
Valve test	5.11	Press key + until ☺☺☺ → ☺☺☺ → ☺☺☺ is displayed OK → activates the function; ☺☺☺ blinks. -/+ → to switch on or off; ☺☺☺ = all outputs off. ☺☺☺ = all outputs on. OK → to save
Heating/cooling changeover	5.12	Mains voltage to "heat/cool" terminals activates cooling mode, arrow at ☺☺☺
Excluding rooms from cooling	5.13	Press key + until → ☺☺☺☺ or ☺☺☺☺ is displayed. OK → to activates the function the arrow against room 1 on the display is blinking. -/+ → to select a room the status of the room is displayed. OK → activates this room; ☺☺☺ flashes. -/+ → to change ON / OFF OK → To save the setting; next day flashes repeat above points for requested rooms
Select HYG or set-back	5.14	Press key + until ☺☺☺ → ☺☺☺ → ☺☺☺ is displayed OK → activates the function, ☺☺☺ or ☺☺☺ is displayed to change ☺☺☺ = Hygostat function see 5.15 ☺☺☺ = Set-Back Function see 5.16 OK → to save
Dew-point shutdown	5.15	Mains voltage to "HYG" terminals or dew-point signal from sensor "TAU" terminals = valve off during cooling; arrow at ☺☺☺
Set-back all rooms	5.16	Mains voltage at "Abs" will activate set-back mode for all rooms
Timer functions		
Date and Time	4.1	press key + until ☺☺☺ is displayed OK → year is displayed, last 2 digits are blinking -/+ → to change OK → Month is blinking -/+ → to change OK → Day is blinking -/+ → to change OK → day of week is blinking -/+ → to change OK → Time is blinking -/+ → to change OK → to save 4.2 → Press + until HOL will be displayed OK → the number of days is blinking -/+ → to change the days OK → to confirm
Time profiles Select profile	5.21	press key + until ☺☺☺ → ☺☺☺ → ☺☺☺ → ☺☺☺ is displayed OK → arrow on day 1 = profile 1 is blinking -/+ → to change OK → to select profile → arrow at ☺☺☺ / ☺☺☺ is blinking -/+ → to change OK → time is blinking -/+ → to change OK → the next switching event is blinking (arrow at R...)
Change profile		Repeat items for the needed events and profiles ESC → to cancel (at select profile, if day arrow is blinking)
Time profiles for rooms Select room	5.22	press key + until ☺☺☺ → ☺☺☺ → ☺☺☺ → ☺☺☺ is displayed OK → number of room is blinking e.g. [r 1] -/+ → to change OK → arrow at day is blinking -/+ → to change. Blocks of days are possible OK → number of profile is blinking e.g. [P1] -/+ → to change (SP to change events for this day) OK → to save
Select day		For additional rooms, repeat the items above.
Select profile change profile		ESC → to exit

Table 1: If the radio link does not operate ...

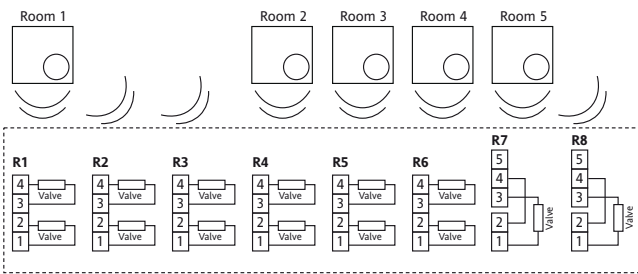
Test as follows	Yes	NO
1 Receiver: is the round signal lamp on?	Continue at 2	Check mains power supply, renew fuse inside receiver if necessary
2 Receiver: Is a channel (1...8) signal lamp flashing Can the audible warning signal be heard? (possibly only after 1 hour)	Duplicate address; see 5.6.1 or Transmitter signal still missing; continue at 3	Continue at 5
3 Check active links: see 5.2 Are the 'learned' channels visible?	Continue at 4	New learning procedure: see 5.1
4 Transmitter: is the battery OK?	Continue at 5	Fit new batteries
5 Transmitter: set to 30 °C Is the relay energised after 30 seconds (lamp comes on)?	Continue at 6	Relay was already on, cont. with 6, or No transmitter signal: continue at 7
6 Transmitter: Set to 5 °C Is the relay switched off after approx. 30 seconds (lamp off)?	Everything OK	No transmitter signal: continue at 7
7 Transmitter - receiver - thermal actuator: check wiring, if necessary re-learn link with receiver Can items 5 and 6 now be performed successfully?	Everything OK	cont. with 8, test radio link (see 5.2 Radio link range test)
8 Reduce distance between transmitter and receiver to approx. 2 metres. Can items 5 and 6 now be performed successfully?	If necessary, use the Repeater	Receiver may have a fault

Fig. 1
Single-room control with simple thermostat; 8 rooms, each with separate thermostat control



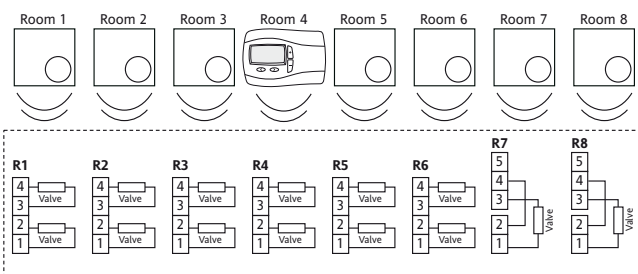
Function change over needed if thermal actuator normally open is used - see 5.7

Fig. 2
Single-room control; one transmitter supplies signals on various channels (several valves for 1 room); 5 rooms, each controlled by a thermostat. Room 1 = 6 valves; room 5 = 2 valves



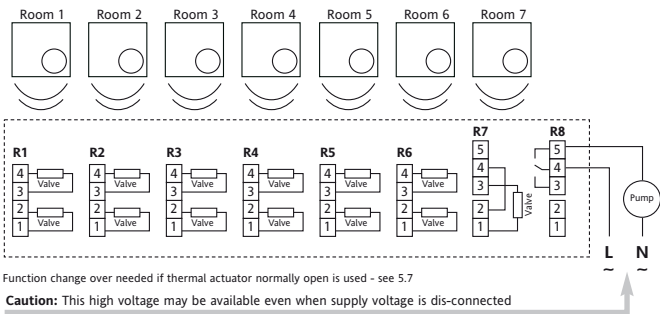
Function change over needed if thermal actuator normally open is used - see 5.7

Fig. 3
Single-room control with master/slave system
8 rooms, each controlled by a thermostat. Rooms 1 ... 3 comply with the internal timer, rooms 4 ... 8 comply with the master timer program on channel 4.



Function change over needed if thermal actuator normally open is used - see 5.7

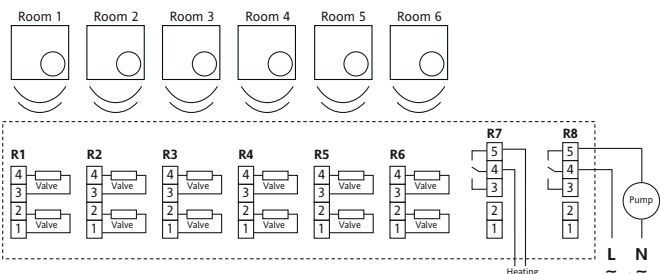
Fig. 4
Pump logic - single-room control for 7 rooms, channel 8 for pump logic Note: a valve cannot be connected to channel 8 if the pump logic is used.



Function change over needed if thermal actuator normally open is used - see 5.7

Caution: This high voltage may be available even when supply voltage is dis-connected

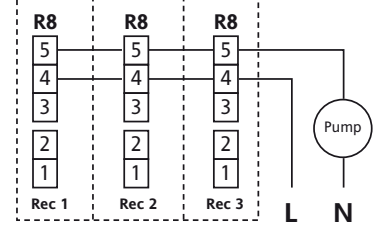
Fig. 5
Pump logic and Heater control
6 rooms are controlled individually
Channel 7 = heater control see 5.8, no valve can be connected
Channel 8 = pump control see 5.9, no valve can be connected



Function change over needed if thermal actuator normally open is used - see 5.7

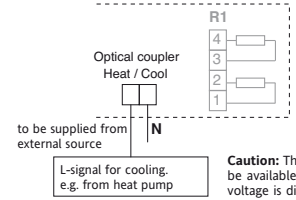
Caution: This high voltage may be available even when supply voltage is dis-connected

Fig. 6 Pump logic with 3 receivers
for extending heater control use the same principle



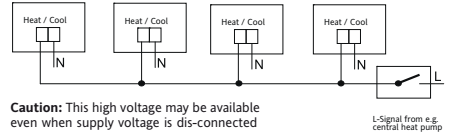
Caution: This high voltage may be available even when supply voltage is dis-connected

Fig. 7 Heating/cooling changeover



Caution: This high voltage may be available even when supply voltage is dis-connected

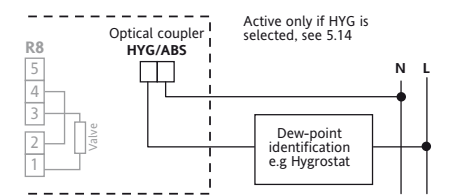
Fig. 8 Heating/cooling changeover



Caution: This high voltage may be available even when supply voltage is dis-connected

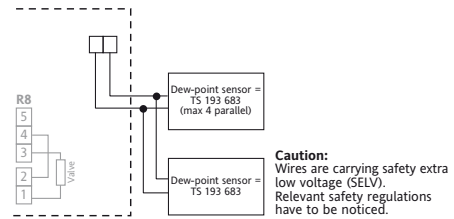
L-Signal from e.g. central heat pump

Fig. 9 Dew-point identification by hygostat



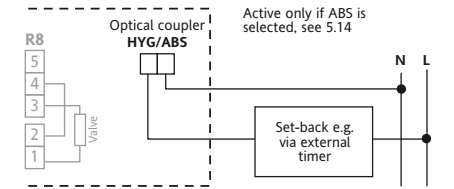
Caution: This high voltage may be available even when supply voltage is dis-connected

Fig. 10 Dew-point identification by specific dew-point sensor



Caution: Wires are carrying safety extra low voltage (SELV). Relevant safety regulations have to be noticed.

Fig. 11 Set-back all rooms
If active, all rooms will be controlled at it's set-back temperature.



Caution: This high voltage may be available even when supply voltage is dis-connected