ELECTRONIC HEAT COST ALLOCATOR

WITH REMOTE SENSOR

E-ITN 30.xx EX (EXNR) with a remote sensor

Installation, servicing and operation manual

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1. Introduction

E-ITN 30.xx EX (EXNR) serves for a ratio based allocation of heat cost in buildings with central heating. It uses a the two-sensor measuring principle – integrates temperature difference between the radiator temperature and the surrounding temperature. Using this principle, allocator ensures measurement of consumption value only when the radiator really emits heat (i.e. it does not measure in the summer). **The heat cost allocator with the remote sensor is by default equipped with a radio module (type E-ITN 30.xx EX), on request without the radio module (type E-ITN 30.xx EXNR).**

E-ITN 30 is intended to be installed in one-tube horizontal/vertical and two-tube heating systems with the lowest mean design heating medium temperature tmin ≥ 35 °C and highest mean design heating medium temperature tmax ≤ 105 °C.

Each radiator in billing unit with common invoicing heat meter must be equipped with a heat cost allocator of the same type. Technical conditions of heating system must be fulfilled when using heat cost allocators E--ITN 30.xx EX (EXNR).

E-ITN 30.xx EX (EXNR) must not be used in heating systems where the temperature parameters are below or above the temperature limits of the heat cost allocator and in such heating systems, where the evaluation factor K_Q can not be unambiguously determined. It usually concerns floor heating systems, ceiling radiant heating, flap controlled radiators, radiators with fan, systems with steam heating medium and air heaters.

picture1: E-ITN 30.xx EX (EXNR) with remote sensor

1.1. LC Display

Basic allocator status and measured values can be displayed on LCD. LCD can display five alphanumeric characters. These values are highlighted by underline and overline, e.g. oPEn.

Meaning of some values may be different if the additional symbol „SM“ at the right bottom corner is displayed. These values are mentioned with „SM“ symbol in text , e.g. 385 SM.

The last symbol on the display indicates end of the battery life, see chapter 4.5.5. Last year of battery life.

picture 2:LC Display

To save the battery, after longer period of inactivity (approx. 1 min.), energy-saving mode is activated and display is switched off. Display can be activated by pushing the button. (picture1: E-ITN 30.xx EX (EXNR) with remote sensor).

When pushing the button briefly, notice ----- on the display will appear. If the button is not pushed in 1 minute, the display will switch off.

The data displayed on the LCD display may vary depending on the type of the allocator and also on the active operating mode. For more information, see below.

2. Device description

Installation of allocator consists of placing the external sensor on the alluminium alloy base plate (mounted to radiator) and placing of allocator to a wall mountable plastic base plate. Due to integrated radio transmitter, presence of flat occupant is not required when data are read. Data reading can be made by billing company employee using mobile receiving unit RFU 35 from outside of the house.

Measured data are transmitted in a short ~ 5,9 ms radio telegrams and secured by encryption. Data are transmitted in shorter intervals in the „reading period“, for the rest of the year data are transmitted in longer intervals. Time interval between transmissions is not constant – is changed randomly in time frame. So the situation when it would be impossible to read data (in reasonable time) from allocators transmitting in the same time is prevented**.**

Both the allocator and the remote sensor are equipped with a mechanic and an electronic seal. The allocator is delivered in sealed state with both electronic seals activated.

If either electronic seal is violated the allocator saves the date of breach of the electronic seal to its memory and stops to show measured data on the display. Only the notice oPEn is displayed and indicates breach of one or both electronic seals

The allocator continues in measuring and transmitting of measured data. Information about breach of the electronic seal is available in data transmitted by radio module and in data transferred via IR interface.

The notice oPEn will disappear when electronic seal is activated again with reading unit IRU 10.00 via infra-red interface.

The device is resistant to cheating. If any cheating is detected, allocator switches to the single sensor mode inconvenient for the user – after cheating is finished, the allocator switches to standard mode.

2.1. Type E-ITN 30.2 EX (EXNR) with remote sensor

Allocator is equipped with unified scale. No parameters (e.g. parameters related to radiator type, nominal output or coefficient K_C) are set before installation on the radiator. Billing period is year.

2.2. Type E-ITN 30.4 EX (EXNR) with remote sensor

Allocator with remote sensor is equipped with unified scale. No parameters (e.g. parameters related to radiator type, nominal output or coefficient K_C) are set before installation on the radiator. Billing period is month.

2.3. Type E-ITN 30.6 EX (EXNR) with remote sensor

Allocator is equipped with individual scale. For proper evaluation of measured data, it is advisable to set:

- radiator type (Tot)
- radiator nominal output (M)
- evaluation coefficient (K_C) describing heat transfer between radiator and the base plate of the allocator

Parameter can be set by manufacturer or before installation with *Programming unit for changing allocator parameters of E-ITN 20.x, 30.x* connected to PC. Radiator type (Tot) can be set in sleeping mode by pressing the button. Billing period is both year and month.

3. TECHNICAL SPECIFICATIONS

3.1. TECHNICAL SPECIFICATIONS OF E-ITN 30.2 EX (EXNR) AND E-ITN 30.4 EX (EXNR) WITH REMOTE SENSOR

Application	t_{min} ≥ 35 °C t_{max} ≤ 105 °C
Measuring principle	two-sensor measuring principle
Conditions for registration	sensor temperature of the radiator ≥ 23 °C temperature difference between the mean heating medium temperature and the reference air temperature <= 5K (according to standard EN 834:2013), different conditions for registration in the summer period
Billing period	year E-ITN 30.2 EX (EXNR) with remote sensor month E-ITN 30.4 EX (EXNR) with remote sensor
Resulting rating factor K	unified scale, K = 1
Calendar functions	E-ITN 30.2 EX (EXNR) • consumption for current and last billing year • consumption for current and last 11 months • max. radiator sensor temperatures for current and last 11 months • min. radiator sensor temperatures for current and last 11 months • number of billing days for current and last 11 months (1) E-ITN 30.4 EX (EXNR) • consumption for current and last 11 billing months (2) • consumption for last billing year • max. radiator sensor temperatures for current and last 5 months • min. radiator sensor temperatures for current and last 5 months • average radiator temperatures for current and last 5 billing months • number of heating days for current and last 5 billing months (1)
Display	5 digits LCD + 2 special symbols
Protection against cheating	continuous control, if thermal influence is detected, allocator is switched to single-sensor mode mechanical seals with billing company label electronic seal – records manipulation date when uninstalled electronic seal of the remote sensor – records manipulation date when uninstalled
Data backup	daily backup of measured values including real time
Function control	automatic, can be activated and controlled by user
Dimensions	Allocator 100 x 37 x 40 mm, sensor 21 x 37 x 45 mm

Power supply	lithium battery 3,0 V
Material	ABS + PC / Al – F22
IP code	IP 42
Conformity	EN 834
Operating frequency	868 MHz
Transmitting power	< 5 mW
Class of working cycle	1 (duty cycle percentage <0,1 %)
Transmission length	~ 6 ms
Length of the cable to the remote sensor	1.5 m, 2 m, 2,5 m (standard) and 3 m
Radio data transmission intervals	E-ITN 30.2 EX (EXNR) with remote sensor • 30 [s] seconds first month after the billing period beginning • 240 [s] seconds rest of the year E-ITN 30.4 • 30 [s] seconds first 3 days after the billing period beginning during all months except July and August • 240 [s] seconds rest of the year
Transmission range	up to 250 m (outside the building, with additional panel antenna) *Rem.: all metal parts of construction (switch rooms, armouring, lifts, etc.) can negatively affect the range of radio signal.*
Data coding	yes
Data available via radio interface (for exact data structure see manual for decoding software)	E-ITN 30.2 EX (EXNR) with remote sensor, E-ITN 30.4 EX (EXNR) with remote sensor • reading date • serial number • value for the last billing period • alphanumeric code for the last billing period and its validity • current value • electronic seal status • indication of the remote sensor • billing period start date
Data available via IR interface (for exact data structure see manual for decoding software)	E-ITN 30.2 EX (EXNR) with remote sensor • reading date • serial number • date of yearly billing period beginning • value for the last billing period • alphanumeric code for the last billing period and its validity • consumption for current and last 11 months • current consumption • max. radiator temperature in last 11 months • min. radiator temperature in last 11 months • average radiator temperature for current and last 11 months • number of heating days for current and last 11 months (1) • indication of the remote radiator sensor

	• dates of violation of electronic seals E-ITN 30.4 EX (EXNR) with remote sensor • reading date • serial number • date of billing period beginning • consumption for the current and the last 11 billing periods • alphanumeric code for the last billing period and its validity • alphanumeric for the penultimate and 3 previous monthly billing periods • consumption for the last billing year • max. radiator temperatures for current and last 5 billing months • min. radiator temperatures for current and last 5 billing months • average radiator temperature for current and last 5 billing months • number of heating days for current and last 5 billing months • indication of the remote radiator sensor • dates of electronic seals breakage

NOTE:

(1) ... a heating day is indicated if the consumption increment for that day is > 0.

3.2. TECHNICAL SPECIFICATIONS OF E-ITN 30.6 EX (EXNR) WITH REMOTE SENSOR

Communication protocol	W-MBUS according to EN 13757-4

Mode	T1
Application	t_{min} ≥ 35 °C t_{max} ≤ 105 °C
Measuring principle	two-sensor measuring principle
Conditions for registration	temperature of the sensor of the radiator temperature ≥ 23 °C difference of mean temperature of heating medium and surroundings temperature ≥ 4 °C
Billing period	Both yearly and monthly
Resulting rating factor K	individual scale
Calendar functions	• consumption value for the current and last two billing periods • monthly consumption values for the current and last 11 biling moths • consumption values for previous billing months since the beginnning of the billing year • maximum monthly radiator temperatures (current and 11 previous months) • minimum monthly radiator temperatures (current and 11 previous months) • average monthly radiator temperatures (current and 11 previous months) • number of heating days for the current and last 11 billing months (1) • average surrounding temperatures (current and 3 previous months)
Display	5 digits LCD + 2 special symbols
Protection against cheating	• continuous control, if thermal influence is detected, allocator is switched to single-sensor mode • mechanical seals with billing company label • electronic seal – records manipulation date when uninstalled • electronic seal of the remote sensor – records manipulation date when uninstalled
Data backup	daily backup of measured values including real time
Function control	automatic, can be activated and controlled by user
Dimensions	Allocator 100 x 37 x 40 mm, sensor 21 x 37 x 45 mm
Power supply	lithium battery 3,0 V
Material	ABS + PC / Al – F
IP code	IP 42
Conformity	EN 834
Operating frequency	868,95 MHz
Transmitting power	< 5 mW
Class of working cycle	1 (duty cycle percentage <0,1 %)

Transmission length	~ 4,5 ms (basic data format without encrytion) ~ 4,8 ms (basic data format with AES 128 encrytion) ~ 6,2 ms (extended data format without encrytion) ~ 6,7 ms (extended data format with AES 128 encrytion)
Length of the cable to the remote sensor	1.5 m, 2 m, 2.5 m (standard) and 3 m
Transmission intervals	**Basic data format** ~ 44 [s] for 30 days from the beginning of a billing year ~ 44 [s] for 6 days from the beginning of a billing month ~ 720 [s] in summer heating period (at least 3 months) ~ 250 [s] on other days of year without data encryption ~ 412 [s] on other days of year with data encryption **Extended data format** ~ 44 [s] for 30 days from the beginning of a billing year ~ 44 [s] for 3 days from the beginning of a billing month ~ 720 [s] in summer heating period (at least 3 months) ~ 318 [s] on other days of year (without data encryption) ~ 480 [s] on other days of year (with data encryption)
Transmission range	up to 250 m (outside the building, with additional panel antenna) Note*: all metal parts of construction (switch rooms, armouring, lifts, etc.) can negatively affect the range of radio signal.*
Data coding	optional AES-128, (the size of a block of encrypted data is 16 Bytes, the size of the key is 16 Bytes)
Data available via radio interface	**Basic data format:** • reading date • serial number • remote sensor present • value for the current yearly billing period • value for the last yearly billing period • value for the current monthly billing period • value for the last monthly billing period • date of violating the electronic seal • average surrounding temperature for the last billing period **Extended data format:** • reading date • date of the beginning of the billing period • serial number • remote sensor • value for the current yearly billing period • value for the last yearly billing period • value for the current billing month • value for the last billing month • date of violating the electronic seal (2) • values for the current and last 8 billing months • overall evaluation factor $K = K_c \cdot K_q$

Data available via infra-red interface (for exact data structure see manual for the decoding software)	• serial number • date of billing period beginning • remote sensor • reading date • values for the current and last two billing years • values for the current and last 11 billing months • max. radiator temperatures for the current and last 11 billing months • min. radiator temperatures for the current and last 11 billing months • average radiator temperatures for the current and last 11 billing months • number of heating days for the current and last 11 billing months (1) • dates of the allocator electronic seal violation • dates of the remote sensor electronic seal violation • average ambient temperature for the current and last 3 months • radiator type T_{OT} • evaluation factor Kq for radiator output • evaluation factor Kc for the thermal contact of the sensors • transmision format

NOTE:
(2) ... if both electronic seals (allocator and remote sensor) have been violated, the earlier date is indicated

3.3. DESIGN

Electronic heat cost allocator E-ITN 30.xx EX (EXNR) with remote sensor complies with EN 834:1995.

The allocator consists of a housing and a printed circuit board covered with a mounting plate. The mounting plate is bolted with housing and secured with latch and seal.

Housing, mounting plate, latch and seal are made from plastic material. There are marked values of the lowest and highest heating medium temperature, manufacturer's mark, type of the allocator, serial number (both as number and bar code) and optionally the partner's logo on the housing. The base plate is made of aluminium alloy to ensure of a good thermal contact with the radiator.

The sensor consists of a housing, a printed circuit board, a mounting plated, a seal and a fastening screw. The base plate is made of aluminium alloy and it cares for the thermal contact to the radiator.

To install the heat cost allocator, use suitable mounting material to mount the alluminium base plate to the radiator click the sensor to the base plate and fasten it with a M3x12 screw. Now the heat cost allocator can only be uninstall after breaking the seal.

The device has an electrical circuitry with a 16-Bit microprocessor with extremely low current consumption, is equipped with radio transmitter and powered by lithium battery. The accuracy of the measuring circuit is independent of the battery voltage. The LCD-display has 5 large main digits separated by dots and special symbols.

4. Operation modes

4.1. Operation modes

The allocator can be in four operation modes:

- sleeping mode
- mode of waiting for start date
- working mode
- error mode

4.2. Navigation in the sub menu

The allocator with remote sensor contains simple sub menus (depending on current operation mode), that allow to obtain additional information or perform other activities.

To switch between individual items of menu, push the button briefly. To enter the sub menu, choose relevant item and hold the button (approximately 2 seconds) until --A-- appears on LCD. When you release the button, designation of the 1st sub menu item appears. Move in menu by short presses of the button. If the button is not pushed for 20 seconds, the LCD returns to the main menu.

Activation process of item is the same as entering the sub menu. Find the relevant item and hold the button (for approximately two seconds), till notice --A-- on the LCD appears.

Movement between items follows the same pattern – briefly press the button. Selected option confirmation as well – by long (approx. 4 s) press of the button, till notice --A-- appears on LCD.

4.3. Sleeping mode

Allocator consumption is reduced to a minimum since no measuring and no calculations are carried out and furthermore allocator does not transmit the data. Sleeping mode is suitable for prolonged storage prior to allocator use. The storage period should not exceed one year.

In sleeping mode allocator allows the following operations:

- activation of working mode
- allocator self test
- temperature sensors accuracy test
- E-ITN 30.6 EX (EXNR) only: setting the radiator type
- E-ITN 30.6 EX (EXNR) only: displaying of parameters (radiator type, radiator output factor K_Q, thermal contact factor K_C)

Sleeping mode is indicated with notice uPr on the display. If the display does not show any value or notice (due power saving), press the button briefly to switch LCD on.

4.3.1. Sub menu structure in sleeping mode

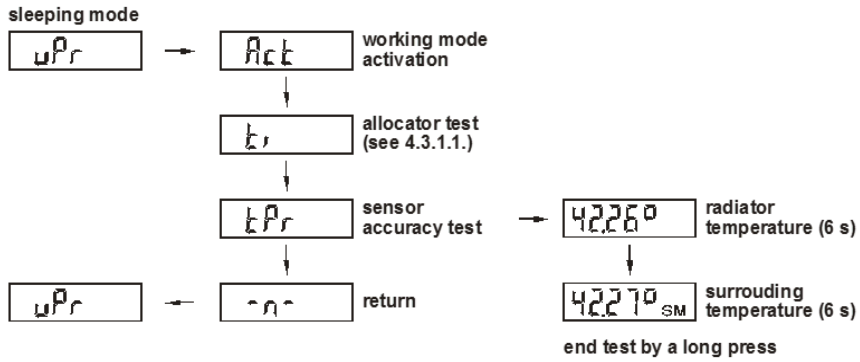
↓

The down arrow represents a short button press, after which ---- appears and then the next sub menu item.

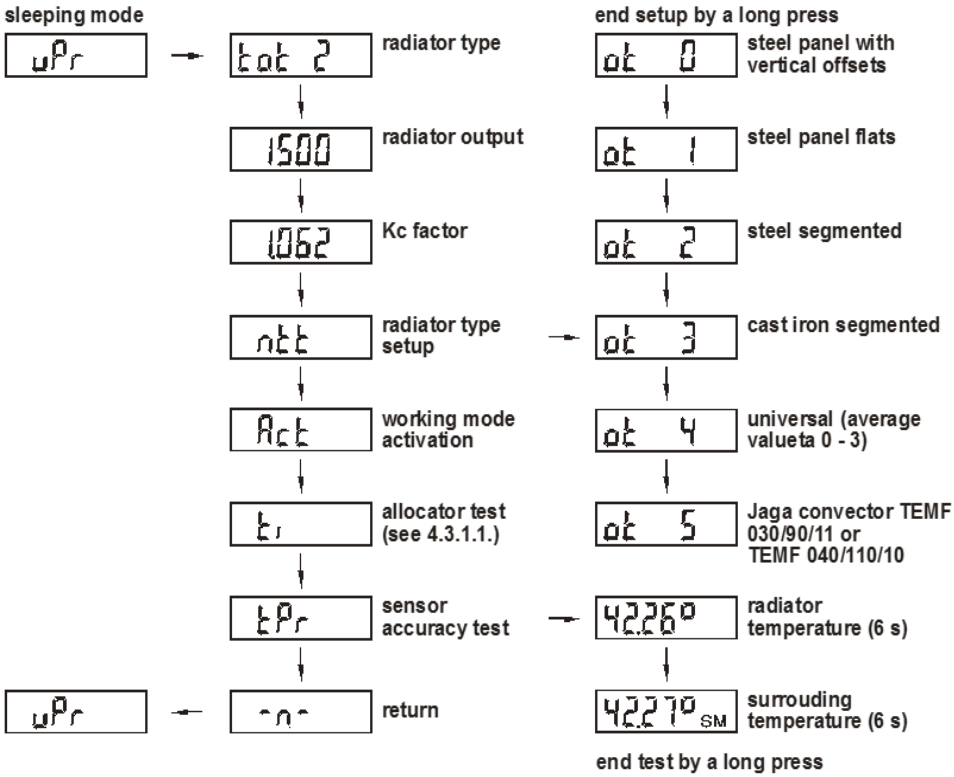
→

The horizontal arrow represents a long button press: Hold the button for approx. 4 seconds, first ---- appears and then --A--.

Sub menu in sleeping mode for E-ITN 30.2, 30.4 EX (EXNR) with remote sensor



Sub menu in sleeping mode for E-ITN 30.6 EX (EXNR) with remote sensor



4.3.1.1. Allocator self test

Allocator self test is used to check all LCD segments and to test A/D converter for temperature measurement. We can run the test in sleeping mode, working mode and also in mode of waiting for start date. Option is located in sub menu whose activation was described above.

To start the test:

1. Switch to sub menu item marked as t1 (allocator test) with brief press of the button.
2. While t1 is displayed, press and hold the button, till notice --A-- appears.
3. Allocator self test has three phases. 1st phase: all segments are turned on 88.88 BAT SM. 2nd phase: radiator temperature is displayed, e.g. 36.4°C and in 3rd phase surrounding temperature appears. e.g. 25.4°C SM. Every value is displayed for 2 seconds and LCD is automatically switched into the main menu when self test is completed.

If A/D converter malfunction is detected, allocator switches to fault mode and notice Error is displayed on LCD.

4.4. Mode of waiting for start date

This mode is suitable when you require to start multiple allocators on the same date. In this mode, the allocator regularly updates real time and compares current date with start date. When the start date is reached, the allocator will start measuring (switch to working mode).

Mode of waiting for start date is indicated with notice: e.g. o 1.12. (date indicates the date of start). If the display does not show any indication (because of power saving), press the button briefly to switch it on.

In mode of waiting for start date, following actions can be performed:

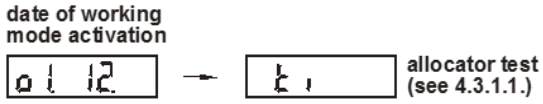
- allocator self test
- E-ITN 30.6 EX (EXNR) only: displaying of parameters (radiator type, radiator output factor K_Q, thermal contact factor K_C)

4.4.1. Sub menu structure in mode of waiting for start date

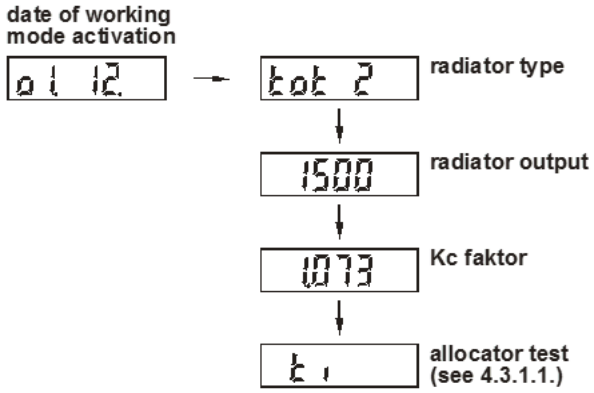
↓
The down arrow represents a short button press, after which ---- appears and then the next sub menu item.

→
The horizontal arrow represents a long button press: Hold the button for approx. 2 seconds, first ---- appears and then --A--.

Sub menu in the mode of waiting for start date for E-ITN 30.2 EX (EXNR) with remote sensor and E-ITN 30.4 EX (EXNR) with remote sensor



Sub menu in the mode of waiting for start date for E-ITN 30.6 EX (EXNR) with remote sensor



4.5. Working mode

In working mode, allocator performs temperature measurement, calculates the increase of consumption value (if measurement conditions are met), transmits measured data, updates real-time and makes some other actions in regular intervals.

4.5.1. Menu structure in working mode

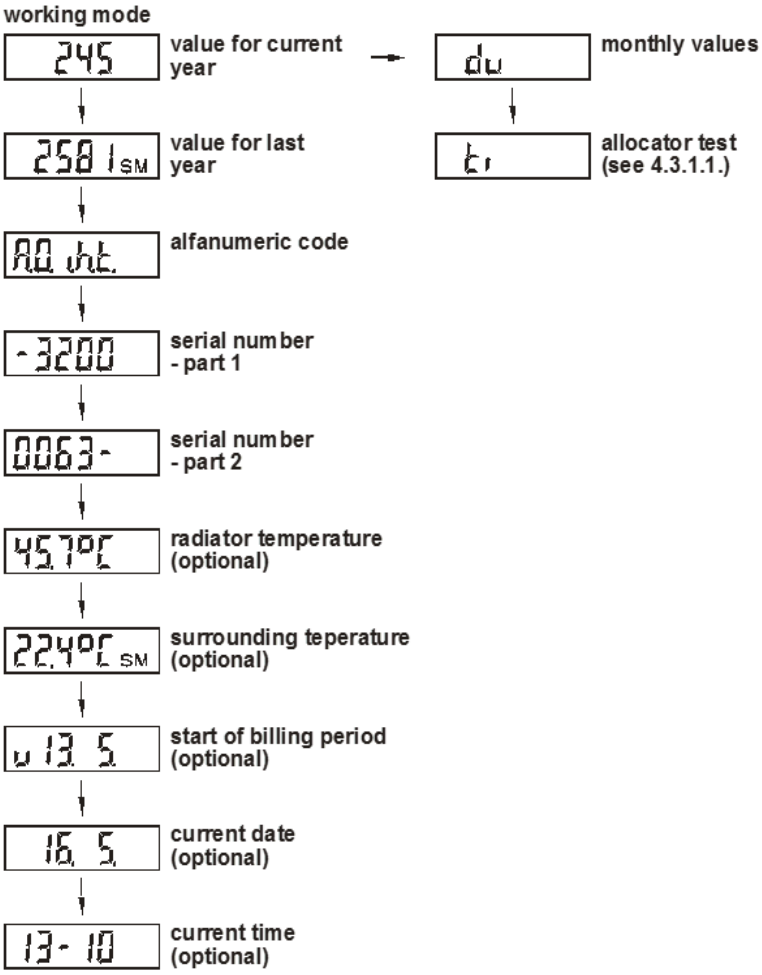
↓

The down arrow represents a short button press, after which ---- appears and then the next sub menu item.

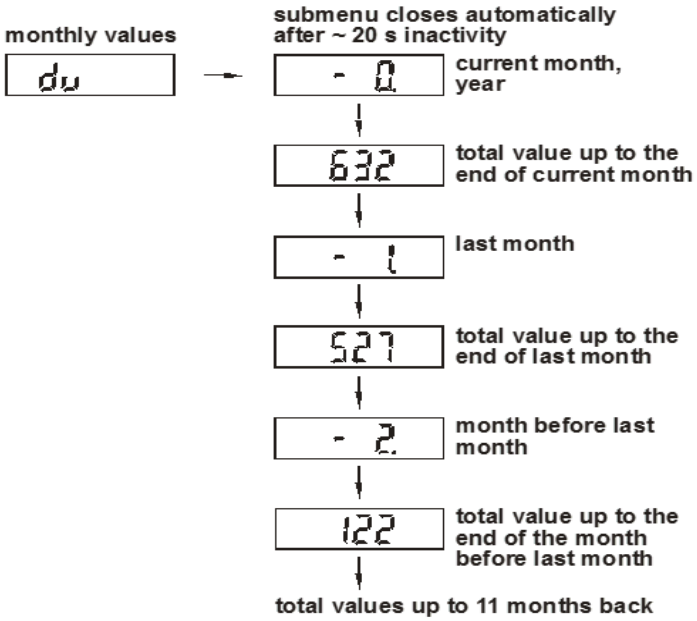
→

The horizontal arrow represents a long button press: Hold the button for approx. 2 seconds, first ---- appears and then --A--.

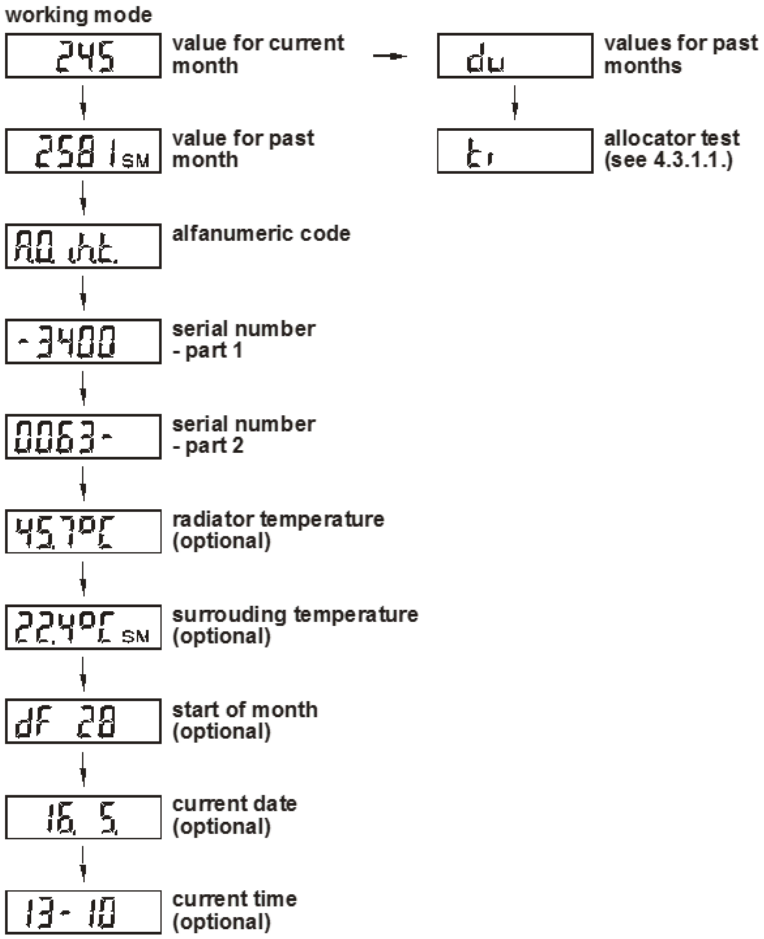
Sub menu in working mode for E-ITN 30.2 EX (EXNR) with remote sensor



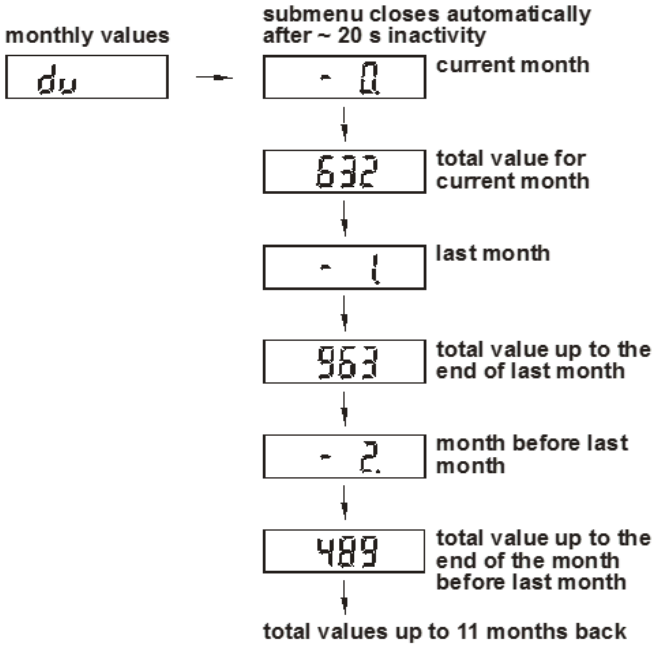
Sub menu monthly values E-ITN 30.2 EX (EXNR)



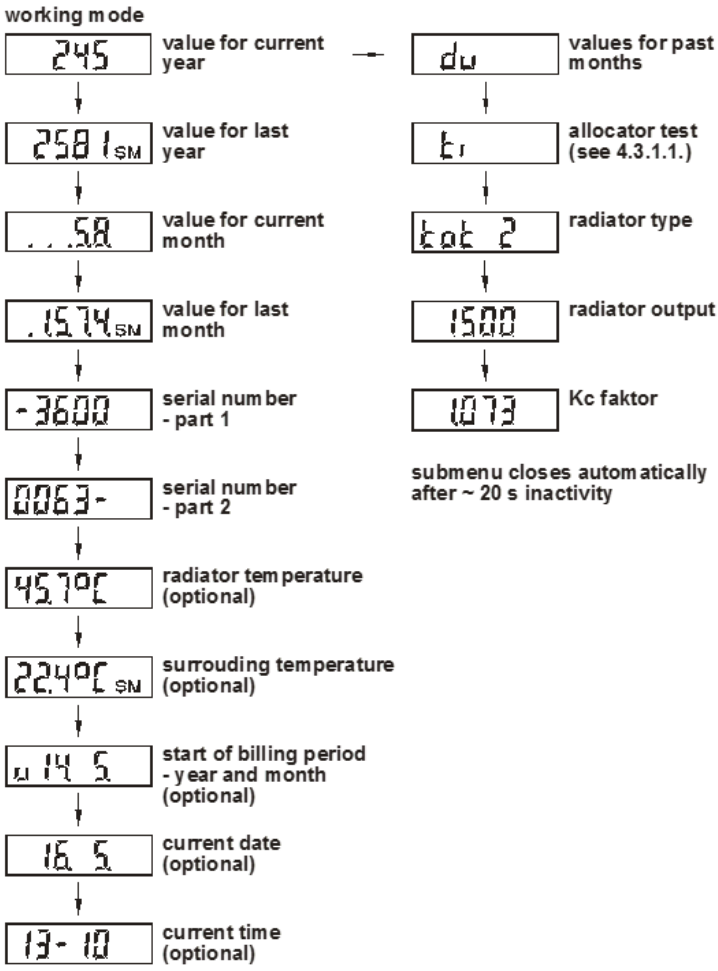
Sub menu in working mode for E-ITN 30.4 EX (EXNR) with remote sensor



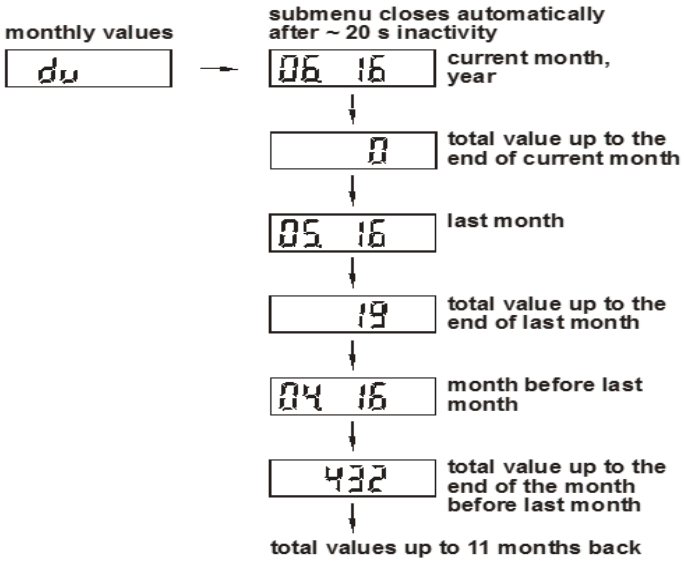
Sub menu monthly values E-ITN 30.4 EX (EXNR)



Sub menu in working mode for E-ITN 30.6 EX (EXNR) with remote sensor



Sub menu monthly values E-ITN 30.6 EX (EXNR)



4.5.1.1. Value for current billing period

Value for current billing period is displayed as 389 (without insignificant zeros). It is calculated from the beginning of the current billing period.

4.5.1.2. Value for the last billing period

Value for the last billing period is displayed as 3258 SM. Transfer of measured value for actual billing period to value for the last billing period is performed, when new billing period is achieved in 00:00:00.

4.5.1.3. Alphanumeric code (tE-ITN 30.2, 30.4 EX (EXNR) with remote sensor only)

The five digit alphanumeric code consists of the following numbers and letters: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, b, c, d, E, F, h, i, J, L, n, o, P, r, t, u.

On LCD it is displayed e.g. A.0.i.h.t. Alphanumerical code is created when transfer of measured value for actual billing period to measured value for last billing period is performed. If transfer of measured value was never done before, . .-.-. . appears on the display (alphanumeric code value is not available).

4.5.1.4. Value for the current billing month - only E-ITN 30.6 EX (EXNR) with remote sensor

Value for current billing month is displayed as ..4.6.9. (without insignificant zeros). It is calculated from the beginning of the current billing month.

4.5.1.5. Value for the last billing month - only E-ITN 30.6 EX (EXNR) with remote sensor

Value for the last billing month is displayed as ..8.5.1.SM. Transfer of measured value for current billing month to value for the last billing month is performed, when new billing month is achieved in 00:00:00.

4.5.1.6. Serial number

Serial number is 8 digit figure and it is also labelled on the housing. Serial number is divided in two parts. E.g. serial number „32000015” is displayed as figure -3200 and 0015-. Symbol „ - “ distinguish between first and second part of the serial number.

4.5.1.7. Temperature of the radiator sensor

Temperature of the radiator sensor is displayed as 45.9°C with accuracy of one decimal place.

4.5.1.8. Temperature of the surroundings sensor

Temperature of the surroundings sensor is displayed as 26.7°C SM with accuracy of one decimal place.

4.5.1.9. Date of the billing period beginning

E-ITN 30.2 EX (EXNR)

The beginning of the billing year is displayed as u 1.2.. After the date is reached, the current consumption value becomes the last consumption value, an alphanumeric code is generated at 00:00:00h. The value for current billing period is set to 0. The beginning of the billing year can be set to any date except 29.2.

E-ITN 30.4 EX (EXNR)

The beginning of the billing month is displayed as dF 15. . After the date is reached, the current consumption value becomes the last consumption value, an alphanumeric code is generated at 00:00:00h. The value for current billing period is set to 0. The beginning of the billing year can be any date within the interval from <1;28>.

E-ITN 30.6 EX (EXNR)

The beginning of the billing period is displayed as u 1.2. (yearly billing) or dF 15 (monthly billing). After the date is reached, the current consumption value becomes the last consumption value, an alphanumeric code is generated at 00:00:00h. The value for current billing period is set to 0. The beginning of the billing month can be set to any date except 29.2

The start of the billing period can be set by the manufacturer or by means of the Programming device connected to a computer.

4.5.1.10. Current date

Current date is displayed as 3.12.. Calendar takes leap years into account.

4.5.1.11. Current time

Current time is displayed in 24 cycle, e.g. 8-56 (8:56 AM). Summer time is not distinguished.

4.5.2. Last year of battery life

Battery lifetime is programmed in the microprocessor memory and the last year of battery lifetime is indicated on LCD by blinking of the special symbol: BAT. After finishing this time the symbol stays displayed permanently. Calculated battery lifetime is 10 years + 1 year reserve.

4.6. Error mode

In error mode the notice Error is permanently displayed and allocator does neither measure temperatures, count the increase of consumption nor transmit measured data. Allocator just updates the real time. Allocator switches from working mode to error mode automatically after registration of serious error (e.g. fault in A/D converter, when the power supply of microprocessor was interrupted and loss of data in RAM memory occurred, etc.).

Allocator backups important data to permanent memory daily. Data in this memory are saved even if the power supply is interrupted. Even in the case of battery failure these data are not lost. Saved data could be read by special tools.

5. Other information

5.1. Electronic seal reactivation

Reactivation of the electronic seal upon allocator removal

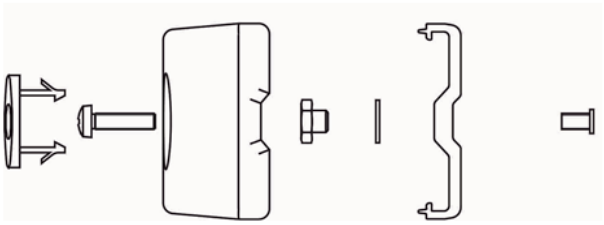
The electronic seal is used for detection if allocator was removed from back plate. If you need to re-fit the allocator, it is necessary to reactivate the seal.

1. Insert new latch into allocator. If use the old one, please check its condition, especially electro-conductive rubber.
2. Secure the latch with mechanical seal.
3. Read the allocator data with IRU 10.00 unit (for more information see Installation and service manual for infra-red reading unit IRU 10.00).
4. Install allocator on the base plate.

Reactivation of the electronic seal upon sensor removal

The electronic seal is used for detection if sensor was removed from back plate. If you need to re-fit sensor, it is necessary to reactivate the seal.

1. Make sure the electroconductive rubber sticks well in place.
2. Check the condition of the PCB.
3. Snap the mounting plate into the sensor housing and then snap onto the base plate.
4. Secure the sensor with a screw and seal.
5. Read allocator with IRU 10.00 unit (for more informations see Installation and service manual for infra-red reading unit IRU 10.00).
6. Install sensor on the radiator.



Picture 3: Seal assembly

Note: If the display shows *oPEn* one or both seals are not active. The allocator registers the consumption and transmits data (if equipped with a radio module). Only the display is locked.

5.2. Allocator parameters setting

Basic settings as per Setting protocol is done by manufacturer. Parameters can be changed later with *Programming unit for changing allocator parameters of E-ITN 20.x, 30.x* connected to PC. Settings or parameters adjustment can be performed only via built-in interface that is available only when allocator is removed from the mounting plate.

5.2.1. List of adjustable parameters of E-ITN 30.2 EX (EXNR) with remote sensor and E-ITN 30.4 EX (EXNR) with remote sensor

- allocator mode
- time shift from UTC
- start date in the mode of waiting for start date
- start of summer heating period

- start of winter heating period
- start of billing period
- optional display of following data
  - current radiator temperature
  - current surrounding temperature
  - date of the beginning of the billing period
  - current date
  - current time
- length of the cable to the remote sensor

5.2.2. List of adjustable parameters of E-ITN 30.6 EX (EXNR) with remote sensor

- allocator mode
- radiator type
- radiator output (20 to 5000 W, with resolution 20 W)
- Kc factor (0.800 to 1.700 [-], with resolution 0.001 [-])
- time shift from UTC
- start date in the mode of waiting for start date
- start of summer heating period
- start of winter heating period
- start of billing period (must be in interval <1 ; 28>, the month serves for computing the yearly value – information accessible through IR interface).
- optional display of following data
  - current radiator temperature
  - current surrounding temperature
  - date of the beginning of the billing period
  - current date
  - current time
- length of the cable to the remote sensor
- the shift of the 12 min interval transmissions towards the beginning and end of the summer heating period in the range <0; +60> days.
- radio data (varies with SW version):
  - version SW = 7 standard format without encryption
  - version SW = 8 standard format with AES – 128 encryption
  - version SW = 5 extended format without encryption
  - version SW = 6 extended format with AES – 128 encryption
- 16 B encryption key ytes with customisible 6 B (12 characters: 0 – 9, A - F)

5.3. Transportation

E-ITN 30.xx EX (EXNR) with remote sensor can be transported under following conditions:

- devices can be transported by all usual covered means of transport
- devices must be in original package

- originally packed devices must be stored and secured to avoid mechanical damages during transportation
- devices can not be transported together with aggressive substances
- temperature during transportation from -10 °C to +50 °C
- relative humidity from 45 % to 75 %

5.4. Storage

E-ITN 30 is an electrical device and can be stored under these conditions:

- devices must be originally packed by manufacturer and individually stored in antistatic bags
- storage temperature from +10 °C to +30 °C
- relative humidity from 45 % to 75 %
- devices must be stored in clean covered areas without aggressive substances and stored properly to avoid mechanical damage

WARNING!!!
To protect the functionality of allocators with remote sensor it is not recommended to transport or store them in working mode.

5.5. Application and disposal

"This device is subject to a waste management in accordance with local legislation."

5.6. Defects and their elimination

Any defect of E-ITN 30.xx EX (EXNR) with remote sensor should be repaired by manufacturer only.

5.7. Warranty

If E-ITN 30.xx EX (EXNR) with remote sensor is installed and handled according to manufacturer instructions mentioned in Installation and service manual, manufacturer provide warranty under the valid legislation unless agreed differently.

The warranty is void if device was used contrary to Installation and service manual or damaged:

- during transport or storage by customer or reseller
- when mounted or dismantled to the customer device
- because of improper handling or installation into other device than agreed in manual
- if the product was exposed to different environment than agreed in manual
- if mechanically or in other way damaged by user

6. Accompanying documentation

6.1. Ordering

Order must include Setting protocol that is available on the website for business partners. In every order following items must be specified:

- quantity
- type
- attach Setting protocol – if column "required value" is empty, default values are set
- spare parts (extra pieces)
- delivery date
- method of transport

Order example: 100 pcs E-ITN 30.2, required delivery 28.2.2012, EXW + filled Setting protocol.

6.2. Packing

Allocators are disassembled (allocator, back plates, mounting material) and packed in the boxes of max. 100 pcs. Packing sheet is included in every box with mark of the producer, device type, number of items and their serial numbers, packing date and the name of the operative who checked and packed the products. The lids of boxes are marked with label "FRAGILE, THIS SIDE UP!". The boxes are non-returnable. Boxes are stored always cover up on the standard shipping pallets.

Electronic heat cost allocator E-ITN 30.xx EX (EXNR) with remote sensor is sensitive to static electricity. For this reason, each allocator is shipped in antistatic packaging. Antistatic package should be removed just before installation.

picture 4: Packing list for heat cost allocators with remote sensor

APATOR METRA	**Packing sheet** Production order
Product: Electronic heat cost allocator **E-ITN EX**	

Serial numbers		
Month / year	**Initial serial number**	**Final serial number**

Package content	
Part	**Quantity**
Housing – assembly E-ITN 30 EX (1 pc)	
Base remote sensor (1 pc)	
Seal E-ITN 10 (for remote sensor) (1 pc)	
Base plate remote sensor	
Screw M3x12 (1 pc)	
Wall plug dia 6 mm (2 pc)	
Sheet metal screw ST4, 2x25 (2 pc)	

Montagematerial					
Typ	**Anzahl**	**Typ**	**Anzahl**	**Typ**	**Anzahl**
0001		0008		0052	
0002		0009		0053	
0003		0010		0054	
0004		0011		0055	
0005		0012		0056	
0006		0020		0057	
0007		0051		0058	

Packed by:	
Date of packing:	Signature:
Checked by:	
Date of checking:	Signature:

APATOR METRA s.r.o., Havlíčkova 919/24, 787 64 Šumperk, IČ 26834073, DIČ CZ26834073
Registered at County court in Ostrava, section C, enclosure 40113
tel.: +420 583 718 111; fax: +420 583 718 110; e-mail: prodej@metra-su.cz; WWW: http://www.metra-su.cz

E-ITN 30.xx EX (EXNR) WITH REMOTE SENSOR INSTALLATION

7. Installation methods

7.1. Allocator installation

The allocator is mounted to the base fitted on the wall. The sensor is snapped to the aluminium back plate mounted on the radiator and secured by a screw and seal. Mounting material is provided by manufacturer and supplied with allocator, see chapter 7.3.

Installation can be done only by person professionally trained by the manufacturer.

Warning!

Static electricity is harmless for humans but can seriously damage electronic devices. When handling or installing the product follow these rules:

• discharge accumulated static electricity by touching a grounded metal object (e.g. a radiator) before installation,
• keep the product in antistatic package until installation,
• do not touch the PCB before or during installation,
• avoid PCB contact with other items, especially metallic,
• never remove PCB from the housing,
• do not touch metal parts when handle the product (e.g. temperature sensor body).

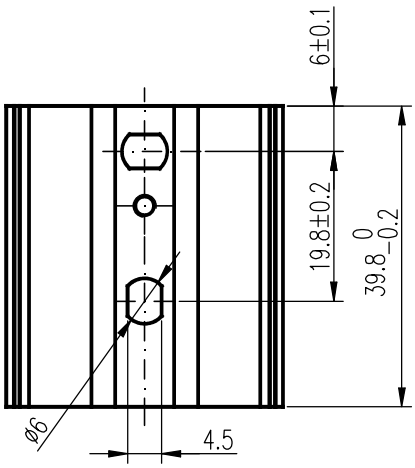
Use only original parts or parts approved by the manufacturer for installation, pay attention to the tightening of mounting material specified torque.

7.2. Sensor back plate

The back plate is made of aluminium alloy and designed to have the best heat transfer from the radiator to the allocator. it is necessary to install back plate to the radiator with recommended mounting material to ensure the optimal thermal contact.

The standard back plate is produced with mounting holes as shown in picture 5: Standard back plate.

If agreed with manufacturer, custom back plate version can be produced, e.g. to install the allocators to formerly installed welding bolts on panel radiators.



Picture 5: Standard back plate

7.3. List of installation material

Mounting material is used to install allocator to the radiator. Manufacturer does not guarantee the accuracy of coefficient Kc when used a different installation material.

Type	Mounting accessories content
0001	bolt M4x25 + serrated lock washer + clamp III
0002	bolt M4x50 + serrated lock washer + clamp IV + spacer 45
0003	bolt M4x35 + serrated lock washer + clamp III
0004	bolt M4x50 + serrated lock washer + clamp III
0005	bolt M4x115 + serrated lock washer + clamp III
0006	bolt M4x25 + serrated lock washer + clamp
0007	bolt M4x50 + serrated lock washer + clamp
0008	bolt M4x80 + serrated lock washer + clamp III
0009	2 pcs nut M3 special + 2 pcs serrated lock washer + clamp FONAL (8 mm)
0010	2 pcs screw DIN 7982 ST 2.2x16 shape Z
0011	2 pcs nut M3 special + 2 pcs serrated lock washer + clamp FONAL (10 mm)
0012	2 pcs nut M3 special + 2 pcs serrated lock washer + clamp FONAL (12 mm)
0020	2 pcs nut M3 special + 2 pcs serrated lock washer + clamp FONAL (20 mm)
0051	2 pcs bolt M3x6 type G DIN 32 501 AlMg3 + 2 pcs serrated lock washer + 2 pcs nut M3 special
0052	2 pcs bolt M3x6 type G DIN 32 501 ST 36-2 + 2 pcs serrated lock washer + 2 pcs nut M3 special
0053	2 pcs bolt M3x10 type G DIN 32 501 ST 36-2 + 2 pcs serrated lock washer + 2 pcs nut M3 special
0054	2 pcs bolt M3x12 type G DIN 32 501 ST 36-2 + 2 pcs serrated lock washer + 2 pcs nut M3 special
0055	2 pcs bolt M3x10 type G DIN 32 501 ST 36-2 + 2 pcs serrated lock washer + 2 pcs nut M3 special + 1pc washer spec.
0056	bolt M3x6 type G DIN 32 501 ST 36-2 + 2 pcs bolt M4x8 + nut M3 + spacer – tubular heating radiator
0057	2 pcs bolt M3x8 type G DIN 32 501 ST 36-2 + 2 pcs serrated lock washer + 2pcs nut M3 spec.
0058	2 pcs bolt M3x33 copper coated + 2 pcs serrated lock washer + 2pcs nut M3 spec.

7.4. E-ITN 30 MOUNTING PLACE ON SEGMENTED AND PANEL RADIATORS

Place E-ITN 30.xx EX (EXNR) with remote sensor with suitable relation between the displayed value and the heat emission of the radiator over a sufficiently operating range must be determined for allocator installation. Place of installation must be determined according to the unified criteria in single billing (accounting) unit. E-ITN 30.xx EX (EXNR) with remote sensor must be permanently protected against manipulation.

Warning: Failure to comply mounting procedure may result allocator malfunction!

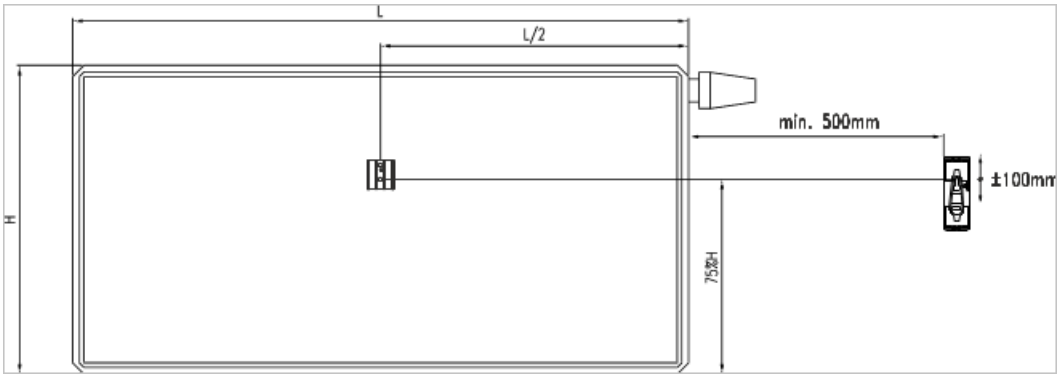
7.4.1. Vertical position:

Install E-ITN 30.xx EX (EXNR) with remote sensor into 75% of the total radiator height (measured from bottom) – in relation to lower hole of back plate. The wall part must be mounted at least 500 mm from the radiator on the side opposite to the inlet, but never above the radiator. The wall part must not be obstructed by furniture.

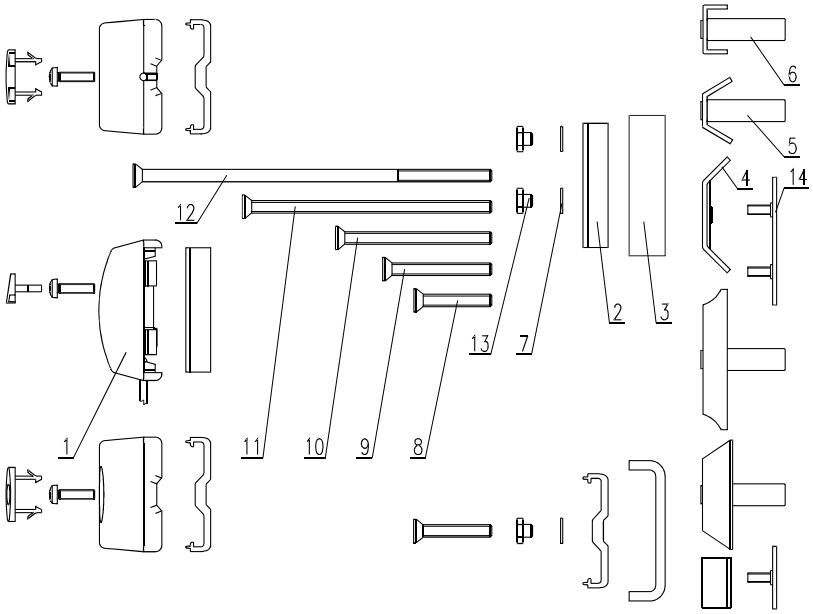
7.4.2. Horizontal position:

Place E-ITN 30.xx EX (EXNR) with remote sensor into the half of the radiator length L. In cause of odd number of the spaces, place E-ITN 30.xx EX (EXNR) with remote sensor into the gap closer to the end of the radiator, i.e. at radiator with 10 segments between 5. and 6. segment. On radiators with length L>2000 mm or radiators with excessive nominal output install two sensors E-ITN 30.xx EX (EXNR).

Picture 6: Placing E-ITN 30.xx EX (EXNR) with remote sensor to a radiator



7.5. Installation on segmented radiators



Picture 7: Mounting material for the installation of E-ITN 30.xx EX (EXNR) with remote sensor on segmented radiators

1	Remote sensor assembly	8	Bolt M4x25
2	Remote sensor back plate	9	Bolt M4x35
3	Spacer 45	10	Bolt M4x50
4	Clamp	11	Bolt M4x80
5	Clamp III	12	Bolt M4x115
6	Clamp IV	13	Nut M3 spec.
7	Washer 4	14	Clamp FONAL

7.5.1. Description of installation

The back plate should be installed on the radiator with clamps and bolts as follows:

- place back plate into the final location and fix with clamp and bolt through the centre hole,
- tighten to a torque 1 Nm,
- place the sensor into the back plate profile groove from top, align it with the base plate and push allocator to connect it with the back plate.

When using cast iron radiator with a very rough surface (large grain) it is recommended to grind off these grains at the place where back plate will be installed.

After installation, installation protocol has to be filled in (including date of installation, room, type of the radiator, allocator serial number, etc.).

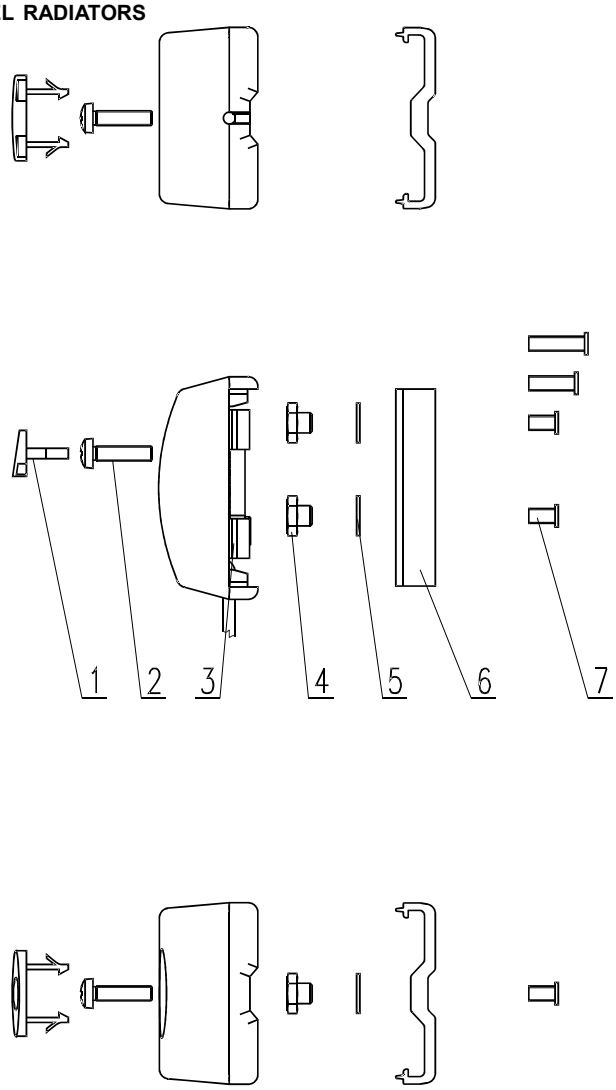
7.5.2. Installation differences

a) When installing on the radiators with difficult access (KALOR 3,TERMO) follow these steps:
   - insert the mounting bolt through centre hole of the back plate and screw it on several threads to the clamp,
   - slide prepared set from the top between radiator segments (clamp is in upright position) and place in the mounting height,
   - tighten the back plate to a torque 1 Nm.

b) For installation on radiators with larger distance between the segments (Svratouch radiator):
   - use clamp IV and insert the spacer 45 under the back plate (Picture 7: Mounting material for the installation of E-ITN 30.xx EX (EXNR with remote sensor).

c) For radiators with solid and long cells, as KUVAL radiators:
   - use a screw with a length 80 mm (Picture 7: Mounting material for the installation of E-ITN 30.xx EX (EXNR with remote sensor).

7.6. Installation on panel radiators



Picture 8: Mounting material for the installation of E-ITN 30.xx EX / EXNR with remote sensor on plate radiators

1	Seal	5	Washer 4
2	Bolt M3x12	6	Back plate
3	Assembly for remote sensor	7	Welded bolt
4	Nut M3 spec.		

7.6.1. Description of installation

The back plate should be installed on the panel radiators with two welded bolts thread M3 and special nuts as follows:

- mark the place for both welding bolts on the radiator,
- remove the paint within the diameter of 10 mm on the marked places,
- weld the bolts to the radiator with two-head welding pistol,
- if one-head welding pistol is used, second bolt have to be in distance 19,8±1 mm towards the upper edge of the radiator, remove the paint within the diameter of 10 mm on the marked place,
- attach back plate to the bolts and than to the radiator, screw the nuts to the bolts with socket wrench M7,
- tighten the nuts to a torque 1 Nm,

- place the sensor into the back plate profile groove from top, align it with the base plate and push.

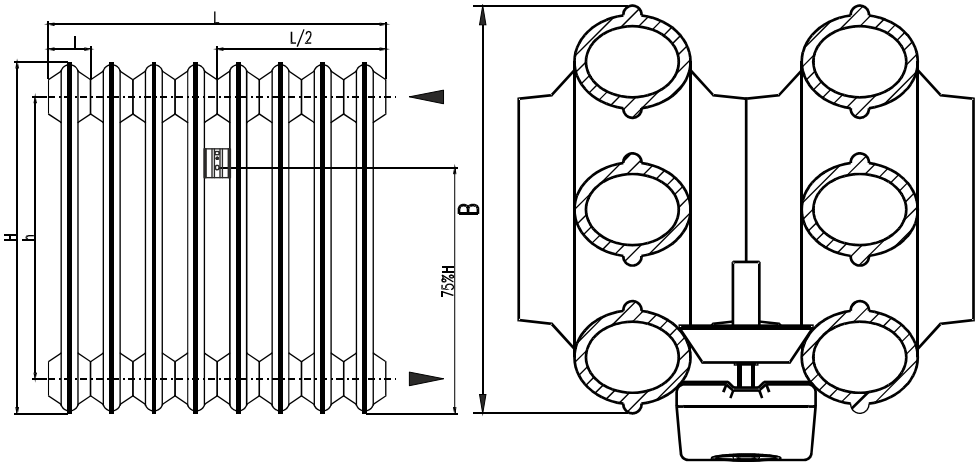
After installation, installation protocol have to be filled in (including date of installation, room, type of the radiator, allocator serial number, etc.)

Warning!

Televisions or other devices with screen must be apart at least 2-3 meters from the place welding. Devices must be switched off and disconnected from electrical network. Shock during welding can negatively affect pacemaker. It is necessary to warn the user and explain him requirement of his absence during installation.

7.7. Model No. 1 – Cast iron radiators

Verified on: KALOR 500/110, manufacturer: ŽDB GROUP a.s., plant Viadrus



Basic dimensions of the KALOR – 500x110 for 10 segments, data for correct allocator installation (mm):

Height – H	Mounting distance - h	Length- L	Segment length - l	Depth - B	MM
580	500	600	60	110	0001

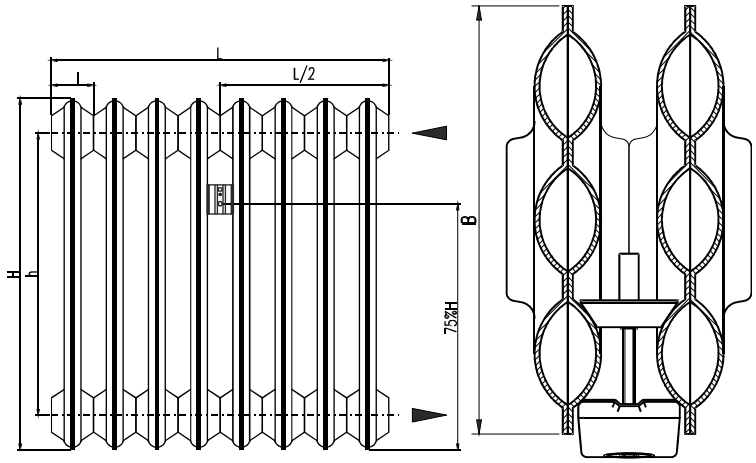
Heat output Q_N [W] of the KALOR radiators can be found in manufacturer catalogue: ŽDB GROUP a.s., plant VIADRUS, Bezručova 300, 735 93 BOHUMÍN

Table 1: Types of heating elements belonging to the model group 1

	Type of the radiator	Manufacturer of the radiator	MM
1	KALOR 1	ŽDB GROUP a.s., plant VIADRUS	0001
2	Slávia 500,1000/100	ŽDB	0004
3	Slávia 500,600,1000/150	ŽDB	0004
4	Slávia 300,500,600,1000/200	ŽDB	0004
5	Slávia 300,500,600,1000/250	ŽDB	0004
6	500/150	KUVAL s.r.o Kralovice	0008
7	DIN 4703	Buderus	
8	Combiotherm DIN 4703	Arbonia	0001
9			
10			

7.8. Model No. 2 – Cast iron radiators with flat vertical front panel

Verified on: KALOR 3, manufacturer: ŽDB GROUP a.s. , plant Viadrus



Basic dimensions of the KALOR 3 for 10 segments, data for correct allocator installation (mm):

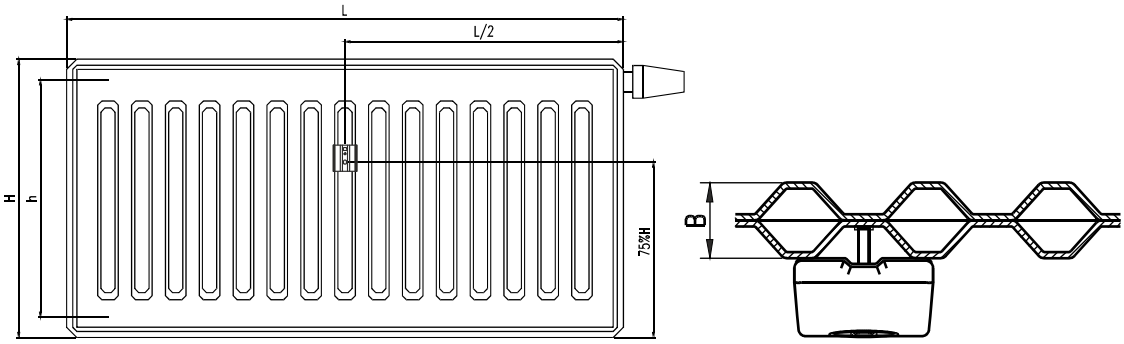
Length - H	Mounting distance – h	Length- L	Segment length - l	Depth - B	MM
580	500	600	60	110	0006

Heat output Q_N [W] of the KALOR 3 radiator can be found in manufacturer catalogue: ŽDB GROUP a.s., plant VIADRUS, Bezručova 300, 735 93 BOHUMÍN

Table 2: Types of heating elements belonging to the model group 2

7.9. Model No. 6 – Panel radiators with shaped front side

Verified on: RADIK, KLASIK mod, type 10, manufacturer: KORADO, a.s. Česká Třebová



Basic dimensions of the RADIK, KLASIK modification, type 10 and data for correct allocator installation (mm):

Height - H	Mounting distance - h	Length- L	Depth - B	MM
600	546	1200	47	0053

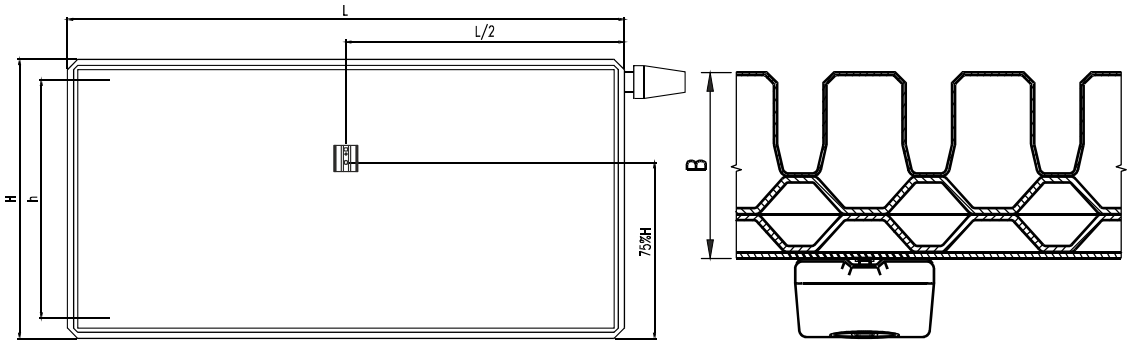
Heat output Q_N [W] of the RADIK radiator can be found in manufacturer catalogue: KORADO, a.s. Bratří Hubálků 869, 560 02 ČESKÁ TŘEBOVÁ

Table 3: Types of heating elements belonging to the model group 6

	Type of the radiator	Manufacturer of the radiator	MM
1	RADIK D91 D93 D95 D97	KORADO a.s., Č.Třebová	0054
2	P-3, P-4, P-4B, PJ-4, PJ-4B, P-40	VSŽ Košice	0053
3	RADIK KLASIK ,VK,VKL,VKU,VKC	KORADO a.s., Č.Třebová	0053
4	Korad	U.S. Stell Košice s.r.o.	0053
5	Profil	Kermi	0054
6	Kompakt, Universalkompakt	Brugman	0054
7	Danuferr LUX - N	Danuferr	0053
8	Dia Plus, Dia Ventil	Rurmo-DiaNorm	0053
9	Purmo VKO	Rettig-Heating Sp.z o.o.	0053
10	VN 4000 NTR	Vogel a Noot	0053
11	Cosmoprofil	Cosmoprofil (Vogel a Noot)	0053
12	Cosmonova	Cosmonova (Vogel a Noot)	0053
13	Compact,Integra,Vertical,Faro	Radson	0053
14	Compact,Novello	Caradon Stelrad B.V.	0053
15	Logatrend	Buderus	0054

7.10. Model No. 7 – Panel radiators with a flat front panel

Verified on: RADIK PLAN, VENTIL KOMPAKT mod, type 11, manufacturer : KORADO, a.s. Česká Třebová



Basic dimensions of the RADIK, VENTIL KOMPAKT modification, type 11 PLAN VK and data for correct allocator installation (mm):

Height - H	Mounting distance - h	Length- L	Depth - B	MM
600	546	1200	65	0052

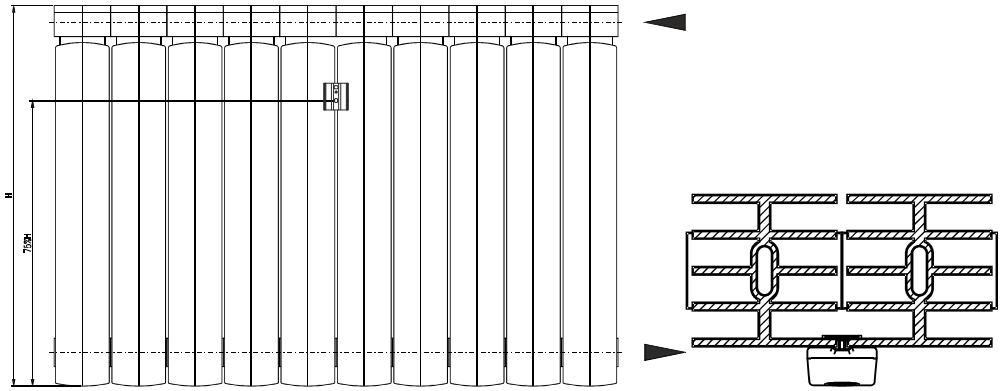
Heat output Q_N [W] of the RADIK radiator can be found in manufacturer catalogue: KORADO, a.s. Česká Třebová, Bratří Hubálků 869, 560 02 ČESKÁ TŘEBOVÁ

Table 4: Types of heating elements belonging to the model group 7

	Type of the radiator	Manufacturer of the radiator	MM
1	RADIK Plan Klasik,VK, VKL,Hygiene	Korado a.s. Č.Třebová	0052
2	Piano-Universalkompakt	Brugman (JAM Praha)	0052
3	Plan	Kermi	0052
4	Plan-Ventil, Duo Finesse	Purmo - DiaNorm	0052
5	Purmo Plan	Rettig-Heating Sp. z o.o.	0052
6	Radson Planora	Radson	0052
7	Plano	Zehnder	0052
8			
9			
10			

7.11. Model No. 8 – Aluminium radiator with vertical ribs

Verified on: SOLAR 500/10, manufacturer: LIPOVICA trade s.r.o. , Reissigova 15, BRNO 612 00



Basic dimensions of the SOLAR 500 radiator and data for correct allocator installation (mm):

Height - H	Mounting distance - h	Length	MM
579	500	820	0009

Heat output Q_N [W] of the radiator find in manufacturers catalogue:

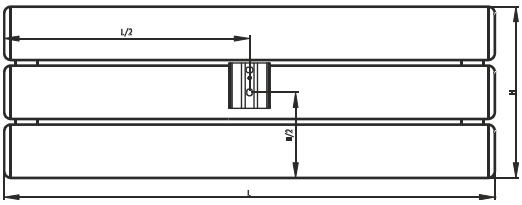
LIPOVICA trade s.r.o. , Reissigova 15, BRNO 612 00

Table 5: Types of heating elements belonging to the model group 12

	Type of the radiator	Manufacturer of the radiator	MM
1	SOLAR, EKONOMIK	LIPOVICA trade s.r.o.	0009
2	EKO CALIDOR	TRIO Brno s.r.o.	0009
3	FONDITAL		0009
4	GHIDINI	WÄRME s.r.o. Brno	0009
5	TEPOR	Kamenice u Prahy	0009
6	CM	REGULUS s.r.o.	0009
7	ODEON	F.A.I.S. Brno k.s.	0009
8	GIACOSTAR	GIACOMINI	0009
9	ARMAT	ARMATMETAL s.r.o.	0009
10	Spaceline	Alutherm	0011

7.12. Model No. 13 – Radiator JAGA TEMPO

Verified on: TEMF.040/110/10, manufacturer: JAGA N. V. , Čsl. armády 325, 253 01 Hostivice



Basic dimensions of the TEMF.040/110/10 radiator and data for correct allocator installation (mm):

Height - H	Mounting distance - h	Length	MM
400	50	1100	0010

Heat output Q_N [W] of the radiator can be found in manufacturer catalogue: JAGA N. V., Čsl. armády 325, 253 01 Hostivice

Table 6: Types of heating elements belonging to the model group 13

	Type of the radiator	Manufacturer of the radiator	MM
1	Radiapaneele Horizontal	Zehnder – Beutler	0052
2			
3			
4			
5			
6			
7			
8			
9			
10			