# ELECTRONIC HEAT COST ALLOCATOR WITH INTEGRATED RADIO TRANSMITTER

# E-ITN 40

**Manual for installation service and operation**

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# 1. INTRODUCTION

E-ITN 40 is modern electronic device intended for ratio based allocation of heat cost in buildings with central heating system. The heat cost allocator E-ITN 40 uses the two-sensor measuring principle – integrates temperature difference between sensor of radiator surface temperature and sensor of surrounding temperature. Using this principle, allocator ensures measurement of consumption value only when the radiator really emits heat. Compared to one-sensor allocator it minimizes the risk of summer consumption.

E-ITN 40 is intended to be installed in one-tube horizontal/vertical and two-tube heating systems with the lowest mean design heating medium temperature ≥ 35 °C and highest mean design heating medium temperature ≤ 105 °C.

Each radiator in billing (account) 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 40.

E-ITN 40 is not intended for heat cost allocation for floor heating systems, ceiling radiant heating, flap controlled radiators, radiators with fan, systems with steam heating medium, air heaters and single tube radiators if exceeds the scope of one user. It must not be also used for heating elements that shape and design does not allow reliable transfer of heat to heat cost allocators.

## 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 over-line, 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 indicate end of the battery life, see chapter 4.3.2.


To save the battery, after longer period of inactivity (approx. 30 sec.), energy-saving mode is activated and display is switched off. Display can be activated by pushing the button. (Illustration 1:LC Display).

When pushing the button briefly, notice ----- on the display will appear. If the button is not pushed in 30 seconds, 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 only from mounting of base plate from aluminium alloy and placing of allocator to this base plate. Due to integrated radio transmitter, presence of flat occupant is not required when data are read. No strangers also enter the flat. Data reading can be made by billing company employee using mobile receiving unit RFU 40 outside the house.

**Data from the E-ITN 40 can only be read using the RFU 40 and CRS V3 (cannot be read using the RFU 35 and CRS V2).**

Measured data are transmitted in a short ~ 5-22 ms radio telegrams and secured by encryption. Data are transmitted based on customer's settings.

Possible modes of transmission are:

| Type of transmission | Packet content |
|---|---|
| **Beacon** | • Date of device<br>• Error<br>• Status of external sensor<br>• Status of seals |
| **METRA** | • Date of device<br>• Error<br>• Status of external sensor<br>• Status of seals<br><br>• Temperatures<br>Current temperature of radiator sensor<br>• Maximums<br>Max. temperature of radiator sensor for current monthly billing period<br>Max. temperature of radiator sensor for current yearly billing period<br>Max. temperature of radiator sensor for past yearly billing period<br>Date of maximum temperature of radiator sensor from past billing period<br>Maximum temperature of radiator sensor for -1. to -3. monthly billing period<br>Maximum temperature of radiator sensor for -4. to -6. monthly billing period<br>Maximum temperature of radiator sensor for -7. to -9. monthly billing period<br>Maximum temperature of radiator sensor for -10. to -12. monthly billing period<br><br>• Minimums<br>Min. temperature of radiator sensor for current monthly billing period<br>Min. temperature of radiator sensor for current yearly billing period<br>Min. temperature of radiator sensor for past yearly billing period<br><br>Date of minimum temperature of radiator sensor from past billing period<br>Minimum temperature of radiator sensor for -1. to -3. monthly billing period<br>Minimum temperature of radiator sensor for -4. to -6. monthly billing period<br>Minimum temperature of radiator sensor for -7. to -9. monthly billing period<br>Minimum temperature of radiator f sensor or -10. to -12. monthly billing period<br><br>• Averages<br>Average temperature of radiator sensor for current monthly billing period<br>Average temperature of radiator sensor for previous day<br>Average temperature of radiator sensor for -1. to -3. monthly billing period<br>Average temperature of radiator sensor for -4. to -6. monthly billing period<br>Average temperature of radiator sensor for -7. to -9. monthly billing period<br>Average temperature of radiator sensor for -10. to -12. monthly billing period<br><br>• Environment temperatures<br>Current temperature od environment<br>Averages<br>Average temperature of environment for current monthly billing period<br>Average temperature of environment for current yearly billing period<br>Average temperature of environment for past yearly billing period<br>Average temperature of environment for previous day |

Average temperature of environment for -1. to -3. monthly billing period
Average temperature of environment for -4. to -6. monthly billing period
Average temperature of environment for -7. to -9. monthly billing period
Average temperature of environment for -10. to -12. monthly billing period

- Ti(ss)

Averages
Average temperature Ti(ss) for current monthly billing period
Average temperature Ti(ss) for yearly monthly billing period
Average temperature Ti(ss) for previous day

- Day counters

Number of days with updated Ti(ss) temperature for current monthly billing period
Number of days of changing temperature Ti(ss) for -1. až -3. monthly billing period
Number of days of changing temperature Ti(ss) for -4. až -6. monthly billing period
Number of days of changing temperature Ti(ss) for -7. až -9. monthly billing period
Number of days of changing temperature Ti(ss) for -10. až -12. monthly billing period

- Readings

Total consumption
Date of beginning of measuring of total consumption
Total consumption at the time of breaking electronic seal
Total consumption at the time of error
Monthly billing period
Consumption for current monthly billing period
Consumption for -1. až -3. monthly billing period
Consumption for -4. až -6. monthly billing period
Consumption for -7. až -9. monthly billing period
Consumption for -10. až -12. monthly billing period
Consumption for -13. až -15. monthly billing period
Consumption for -16. až -18. monthly billing period
Consumption for -19. až -21. monthly billing period
Consumption for -22. až -24. monthly billing period
Yearly billing period
Consumption for current yearly billing period
Consumption for -1. až -3. yearly billing period
Consumption for -4. až -6. yearly billing period

- Errors

Date of error
Total consumption at the time of error

- Seals

Date of break of electronic seal
Total consumption at the time of breaking electronic seal

- Dates

Date of breake of electronic seal
Date of error
Date of beginning of measuring of total consumption
Date of reading/ Current date
Start of winter heating season
- Start of summer heating season
- Date of beginning of billing period

| | |
|---|---|
| | • Date of maximum temperature of radiator sensor from past billing period<br>• Date of minimum temperature of radiator sensor from past billing period<br><br>• Device state<br>Count is summer heating season<br>Kq power of radiator<br>Coefficient Kc<br>Current time of allocator<br>Counters<br>Number of days of operation for current monthly billing period<br>Number of days of operation for -1. to -3. monthly billing period<br>Number of days of operation for -4. to -6. monthly billing period<br>Number of days of operation for -7. to -9. monthly billing period<br>Number of days of operation for -10. to -12. monthly billing period<br>Count of switching to single sensor mode for current monthly billing period<br>Count of switching to single sensor mode for past monthly billing period<br>Count of switching to single sensor mode for current yearly billing period<br>Count of switching to single sensor mode for past yearly billing period |
| **WIRELESS M-BUS**<br><br>**WIRELESS M-BUS ENCRYPTED** | • Current date<br>• Serial number of device<br>• Status of seals<br>• Status of external sensor<br>• Start of billing period<br>• Consumption for current monthly billing period<br>• Consumption for -1. až -3. yearly billing period<br>• Consumption in current month<br>• Consumption for -1. až -15. monthly billing period<br>• Average temperature of environment for current yearly billing period<br>• Average temperature of environment for past yearly billing period |
| **WIRELESS M-BUS OMS**<br><br>**WIRELESS M-BUS OMS ENCRYOTED** | • Current date<br>• Sériové číslo odečtového indikátoru<br>• Status of seals<br>• Status of external sensor<br>• Start of billing period<br>• Consumption for current monthly billing period<br>• Consumption for 1 year billing period<br>• Consumption in current month<br>• Consumption for -1. až -15. monthly billing period<br>• Average temperature of environment for current yearly billing period<br>• Average temperature of environment for past yearly billing period |

Allocator is equipped with mechanic and electronic seal and is delivered in sealed state with activated electronic seal. In the case of unauthorized removing of base plate, the allocator saves the date of breach of the electronic seal to its memory and stop to show measured data on the display. After each press of button it is displayed oPEn and after that a menu item. Allocator continues in measuring and transmitting of measured data.

Notice oPEn will disappear when electronic seal is activated again with NFC.

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

Allocator can work in mode of individual or unified scale. For correct evaluation it is necessary to use individual scale:

- power of radiator
- coefficient ($K_C$) taking into consideration heat transfer from radiator to temperature sensor

For unified scale:

- Power of radiator and coefficient is always the same.

Parameters can be set beforehand in production or before installation using radio or NFC.

All parameters you can set using application Radio Admin:

Measuring

- Count in summer
- Power of radiator
- Coefficient Kc
- Start of heating season
- Start of summer season
- Start of billing period

Menu (LCD)

- Radiator power
- Coefficinet Kc
- Current temperature of radiator sensor
- Current temperature of environment
- Maximum temperature of radiator sensor for past yearly billing period
- Maximum temperature of radiator sensor for past monthly billing period
- Average temperature of radiator sensor for past yearly billing period
- Average temperature of radiator sensor for past monthly billing period
- Date
- Time
- Total consumption

Reading and setting of allocator is done using application Radio Admin for smartphones with system Android. Application can be downloaded in Google Play Store.

# 3. TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Application | $t_{min}$ ≥ 35 °C (min. temperature of the heating medium)<br>$t_{max}$ ≤ 105 °C (max. temperature of the heating medium) |
| Measuring principle | two-sensor measuring principle |
| Conditions for registration | sensor temperature of the radiator ≥ 23 °C<br>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 | yearly or monthly (customer defined) |
| Total evaluation factor | unit scale, K = 1 |
| Calendar functions | **Consumption**<br>- total consumption (from beginning of operation or reset)<br>- consumption for billing period (current yearly + 6 previous)<br>- consumption for previous monthly billing period (current + 24 previous)<br>- date of beginning of measuring total consumption (DD:MM:YY).<br>- date of beginning of billing period (DD:MM)<br>- date of beginning of heating season (DD:MM)<br>- date of beginning of summer season (DD:MM)<br><br>**Temperature of radiator**<br>- max. temperature of sensor of radiator for past billing period (current yearly + past yearly)<br>- max. temperature for sensor of radiator for past monthly billing period (current monthly + 12 previous)<br>- min. temperature of sensor of radiator for past yearly billing period (current yearly + past yearly)<br>- min. temperature of sensor of radiator for monthly billing period (current monthly + 12 previous)<br>- average temperature of sensor of radiator for past monthly billing period (current monthly + 12 previous)<br>- date of record of highest temperature of sensor of radiator for past yearly billing period<br>- date of record of lowest temperature of sensor of radiator for past yearly billing period<br>- average temperature of sensor of radiator for previous day<br>- current temperature of sensor of radiator<br><br>**Environment temperatures**<br>- average temperature of environment for yearly billing period (current |

| | |
|---|---|
| | yearly + past yearly) (just 1. 11. to 31. 3.)<br>- average temperature of environment for past monthly billing period (current monthly + 12 previous)<br>- current average temperature of environment Ti(ss) for yearly billing period (current yearly + past yearly) (in winter heating season configured by customer)<br>- average temperature of environment Ti(ss) for monthly billing period (current monthly + 12 previous)<br>- number of dates with change of temperature Ti(ss) (current monthly + 12 previous). Day of activation is registered when allocator during day at least 1x updates value sTi(ss).<br>- average temperature of environment Ti (ss) for previous day<br>- average temperature of environment for previous day<br>- current temperature of environment<br><br>**Other features**<br>- number of days of allocator operation for monthly billing period (current monthly + 12 previous). Day of operation is registered if allocator during days at least 1x registers increase of consumption<br>- state of electronic seal of allocator and external sensor<br>- date of broken electronic seal (DD:MM)<br>- total consumption at the moment of broken electronic seal<br>- error state (E0000)<br>- date of error state<br>- total consumption at the moment of error state<br>- number of changing to single sensor mode (current yearly + 1 previous)<br>- number of changing to single sensor mode (current monthly + 1 previous)<br>- option to turn off measuring in summer season<br>- adjustable start temperature of radiator in summer season that allocator starts to measure<br>- option to turn off one way transmission in summer period<br>- power of radiator (default 1000)<br>- Kc coefficient (default 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<br>mechanical seal with billing company label<br>electronic seal – records manipulation date when uninstalled<br>mechanical seal is in external sensor and connector of external sensor |
| Data backup | daily backup of measured values including real time |
| Function control | automatic, can be activated and controlled by user |
| Dimensions | 100 x 41 x 31 mm |

| | |
|---|---|
| Power supply | lithium battery 3,0 V |
| Material | ABS + PC / Al – F22 |
| IP code | IP 42 |
| Conformity | ČSN EN 834 |
| Operating frequency | 868 MHz |
| Transmitting power | < 15 mW |
| Class of working cycle | 1 (percentage of working cycle <0,1 %) |
| Transmission length | per customer settings 5-22 ms |
| Reading period | Configured by user using mask of a week.<br>Two way communication always using proprietary protocol metra even in Wireless M-Bus mode. |
| Transmission range | up to 300 m (outside the building, with additional panel antenna)<br>*Rem.: all metal parts of construction (switch rooms, armouring, lifts, etc.) can negatively affect the range of radio signal.* |
| Data coding | yes |
| Data transmitter over NFC interface and radio | - date of reading = current date<br>- serial number of allocator<br>- date of beginning of billing period (1-28. 1-12.)<br>- consumption of allocator for current yearly billing period<br>- (6x) consumption of allocator for 6 past yearly billing periods<br>- reading of allocator for current monthly billing period<br>- (24x) consumption of allocator for 24 previous monthly billing period<br>- date of registering the highest temperature of sensor of radiator for past yearly billing period<br>- max. temperature of sensor of radiator for current yearly billing period<br>- max. temperature of sensor of radiator for past billing yearly period<br>- max. temperature of radiator for current monthly billing period<br>- (12x) max. temperatures of sensor of radiator for 12 past monthly billing periods<br>- min. temperature of radiator sensor for current monthly billing period<br>- min. temperature of radiator sensor for current yearly billing period<br>- min. temperature of radiator sensor for past yearly billing period<br>- (12x) min. temperatures of radiator sensor for 12 past monthly billing periods<br>- date of registering lowest temperature of radiator sensor for previous yearly billing period<br>- average temperature of radiator sensor of current monthly billing period<br>- (12x) average temperatures of radiator sensor for 12 previous monthly billing periods |

| | |
|---|---|
| | - number of days in operation for current monthly billing period<br>- (12x) number of days in operation for 12 past monthly billing period<br>- average temperature of environment for current monthly billing period (1. 1. to 31.12.)<br>- (12x) average temperatures of environment for 12 past monthly billing periods (1. 1. to 31. 12.)<br>- average temperature of environment for current yearly billing period (1. 11. to 31. 3.)<br>- current temperature of environment for previous yearly billing period (11. 11 to 31. 3.)<br>- number of days with changing temperature Ti(ss) for current and monthly billing period<br>- (12x) number of days with changing temperature Ti(ss) for 12 past monthly billing periods (1. 1. to 31. 12.)<br>- average temperature Ti(ss) for current monthly billing period (1. 1. to 31. 12.)<br>- (12x) average temperature Ti(ss) for 12 past monthly billing periods (1. 1. to 31. 12.)<br>- average temperature Ti(ss) for current yearly billing period (only 1. 10. to 30. 4.)<br>- average temperature Ti(ss) for past yearly billing period (only 1. 10. to 30. 4.)<br>- average temperature of environment Ti(ss) for previous day<br>- number of changes to single sensor mode for current yearly billing period<br>- number of changes to single sensor mode for past yearly billing period<br>- number of changes to single sensor mode for current monthly billing period<br>- number of changes to single sensor mode for past monthly billing period<br>- measuring in summer season turned on (0=no, 1=yes)<br>- one way transmission in summer period turned off (0=no, 1=yes)<br>- temperature of radiator for beginning of summer season<br>- power of radiator<br>- coefficient Kc<br>- date of beginning of heating season (1-31. 1-12.)<br>- date of beginning of summer season (1-31. 1-12.)<br>- state of electronic seal<br>- date of breaking electronic seal<br>- total consumption at the time of breaking electronic seal<br>- error state (standard 0, else e.g. 2046)<br>- date of error state<br>- total consumption at the moment of error state<br>- current temperature of radiator sensor<br>- current temperature of environment<br>- current time of allocator |

| | |
|---|---|
| | - total consumption<br>- date of beginning of measuring of total consumption<br>- average temperature of radiator sensor for previous day<br>- average temperature of environment sensor for previous day |

**3.1.**

## 3.2. CONSTRUCTION

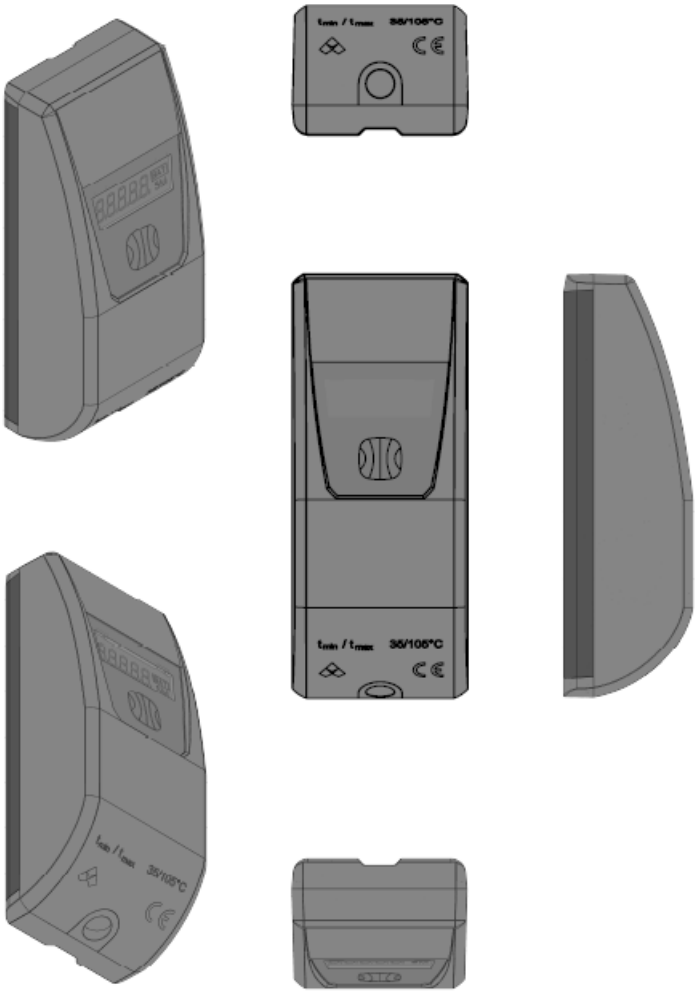
Electronic heat cost allocator E-ITN 40 complies with ČSN EN 834:2014.

Allocator consist of cover and printed circuit board covered with mounting plate. Mounting plate is bolted with cover and secured with latch and seal.

Cover, 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 2D data matrix) and optionally the partner's mark on the cover. The base plate is made of aluminium alloy to ensure of a good thermal contact with the radiator.

To install the heat cost allocator, place it at the upper end of the aluminium back plate, push down so that the locks in the housing fit in the aluminium back plate and push the bottom part of allocator towards back plate. Allocator is fastened to back plate by latch and seal. Now the heat cost allocator can only be uninstall after breaking the seal.

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.



Design E-ITN 40

# 4. OPERATION MODES OF ALLOCATOR

## 4.1. OPERATION MODES

The allocator can be in four operation modes:

- working mode
- error mode

## 4.2. SUBMENU NAVIGATION

The allocator contains a simple submenus (depending on current operation mode), that allow to obtain additional informations or perform other activities.

To switch between individual items of menu, push the button briefly. To enter the submenu, choose relevant item and hold the button (approximately 2 seconds) until --A-- appears on LCD. When you release the button, designation of the 1st submenu item appears. Move in menu by short presses of the button. If the button is not pushed for 30 seconds, the LCD returns to the main menu.

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

Movement in options is the same – briefly press the button. Selected option confirmation as well – by long (approx. 2 s) press of the button, till notice --A-- appears on LCD.

## 4.3. WORKING MODE

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

### *4.3.1. Menu structure in working mode*

If nothing is displayed press the button briefly.

***Data shown on display.***

***Basic**:*

- **Serial number of allocator** (scrolling – moves 1 character per 1 sec., starts and ends with a space)
- **Start of billing period** (e.g.: u01.02.) o In submenu allocator test, error code, date of error, reading countdown (in sec).
- **Consumption for current annual billing period** (e.g. 65534)
- **Consumption for past annual billing period** (e.g. 65534 $_{SM}$) o In submenu annual consumption for year -2 to -5 year, switching by pressing button, shows value: scrolls 2018-2014
- **Consumption for current monthly billing period** (e.g. 3.2.7.6.7)
- **Consumption for past monthly billing period** (e.g. 3.2.7.6.7 $_{SM}$) o In submenu consumption for -2 to -24 month, switching by pressing button, shows values: scrolls 12.2019.-1.2018 and for 4 seconds a value shows e.g. 3.2.7.6.7

**Optional data (sample unit shows all)**

- **Power of radiator** (e.g. 1000.)
- **Kc value** (e.g. 1.000)

- **Current temperature of radiator sensor** (e.g. 27.65°)
- **Current temperature of environment** (e.g. 27.65°$_{SM}$)
- **Maximum temperature of radiator sensor for past annual billing period** (e.g. ¯27.6°)
- **Maximum temperature of radiator sensor for past monthly billing period** (e.g. _27.6°)
- **Average temperature of environment for past annual billing period** (e.g. ¯27.6°$_{SM}$)
- **Average temperature of environment for past monthly billing period** (e.g. _27.6°$_{SM}$)
- **Date** (e.g. 20.01.)
- **Time** (e.g. 12-30)
- **Total consumption** (scrolled – moves 1 character per 1 sec., begins with character C)

Display turns off after 30 seconds of inactivity and returns to first menu item.

#### 4.3.2. 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 + 2 years reserve.

### 4.4. 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 actualizes 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. NFC chip has a memory. Into this memory is backed up current data every day. If E-ITN 40 stops working, you can read this memory using NFC.

## 5. Other information about product

### 5.1. Electronic seal reactivation

The electronic seal is used for detection if allocator was removed from back plate – more in chapter 2. If you need to re-fit allocator (e.g. replace old radiator with new radiator), 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 allocator with NFC
4. Install allocator to the radiator.

### 5.2. Transportation

E-ITN 40 allocators 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 0 °C to +55 °C
- relative humidity from 45 % to 75 %

### 5.3. Storage

E-ITN 40 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

### 5.4. Application and disposal

"This device is subject to a waste management in accordance with local legislation." More information on www.metra-su.cz

### 5.5. Defects and their elimination

Any E-ITN 40 defect should be repaired by manufacturer only.

### 5.6. Warranty

If device 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. 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 "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 40 is sensitive to static electricity. For this reason, each allocator is shipped in antistatic packaging. Antistatic package should be removed just before installation

# E-ITN 40 INSTALLATION

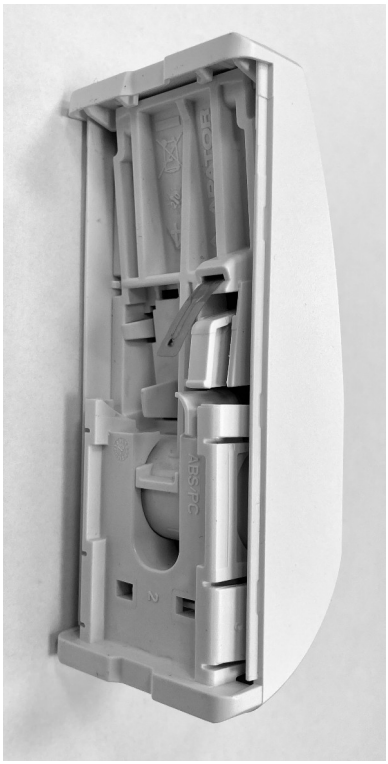
# 7. MOUNTING METHODS

## 7.1. ALLOCATOR INSTALLATION

The back plate is mounted on the radiator using mounting material in compliance with EN 834:2014 and with Installation and service manual. Mounting material is provided by manufacturer and supplied with allocator.

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

When installing allocator, make sure the temperature sensor is pointed downwards.



**Warning!**

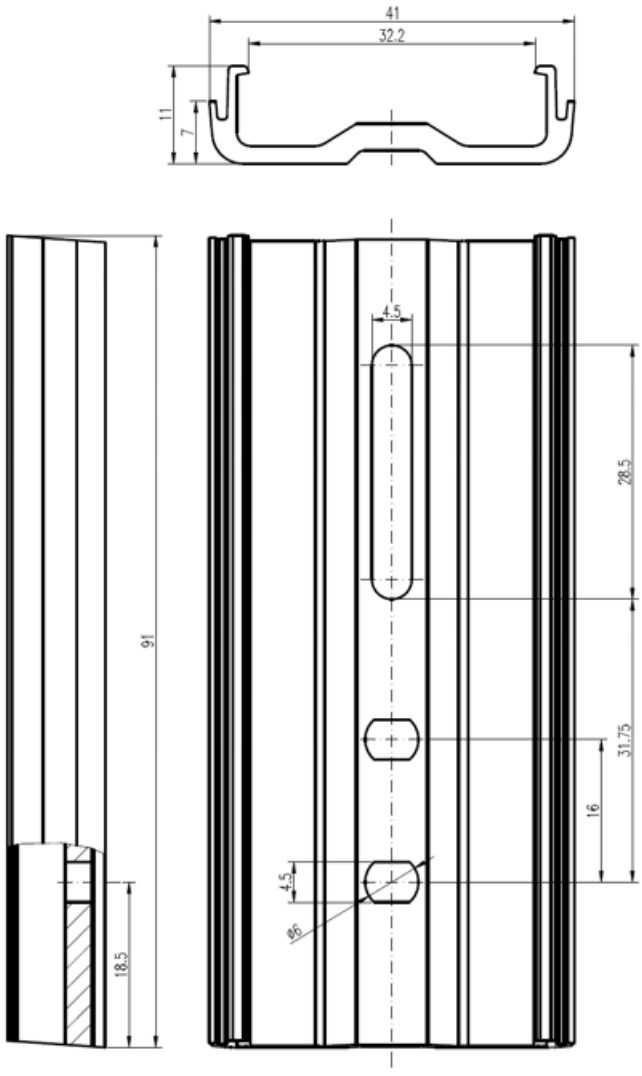
**Static electricity is harmless for humans but can seriously damage electronic devices. When handling or installing the product follow these rules:**

- **discharge accumulated static electricity by touching the hand with a grounded metal object (e.g.**
- **radiator) before installation,**
- **keep the product in antistatic package until installation,**
- **never remove PCB from the housing.**

**Use only original parts or parts approved by the manufacturer for installation, pay attention to the tightening of mounting material specified torque (more in chapter 8.4).**

## 7.2. ALLOCATOR 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.



## 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 |
| 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 M4x80 + serrated lock washer + clamp III |
| 0008 | 2 pcs nut M3 special + 2 pcs serrated lock washer + clamp FONAL (8 mm) |
| 0009 | 2 pcs screw DIN 7982 ST 2.2x16 shape Z |
| 0010 | 2 pcs nut M3 special + 2 pcs serrated lock washer + clamp FONAL (10 mm) |
| 0011 | 2 pcs nut M3 special + 2 pcs serrated lock washer + clamp FONAL (12 mm) |
| 0012 | 2 pcs bolt M3x6 type G AlMg3 + 2 pcs serrated lock washer + 2 pcs nut M3 special |
| 0051 | 2 pcs bolt M3x6 type G + 2 pcs serrated lock washer + 2 pcs nut M3 special |
| 0052 | 2 pcs bolt M3x10 type G + 2 pcs serrated lock washer + 2 pcs nut M3 special |
| 0053 | 2 pcs bolt M3x12 type G + 2 pcs serrated lock washer + 2 pcs nut M3 special |
| 0054 | 2 pcs bolt M3x10 type G + 2 pcs serrated lock washer + 2 pcs nut M3 special + spacer |
| 0055 | bolt M3x6 type G + 2 pcs bolt M4x8 + nut M3 + spacer – tubular heating radiator |
| 0056 | bolt M4x25 + serrated lock washer + clamp III |
| 0057 | 2 pcs bolt M3x8 type G DIN 32 501 ST 36-2 + 2 pcs serrated lock washer + 2pcs nut M3 spec. |

## 7.4. E-ITN 40 MOUNTING PLACE ON SEGMENTED AND PANEL RADIATORS

Place 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 40 installation must be permanently protected against manipulation.

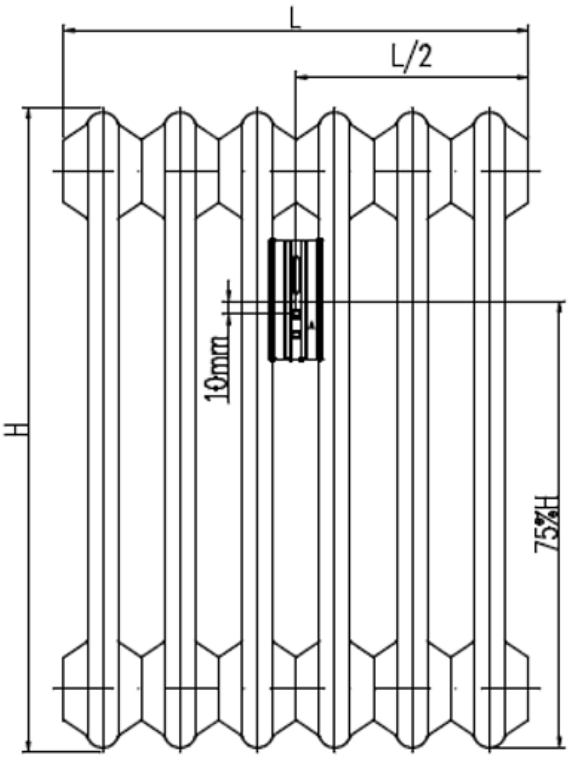
Warning: Failure to comply mounting procedure may result allocator malfunction!

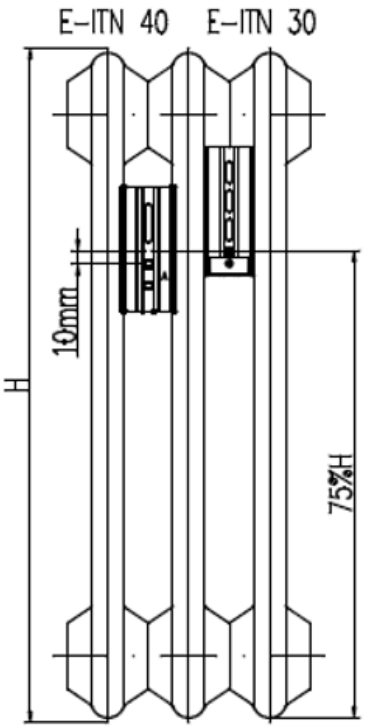
### *7.4.1. Vertical position:*

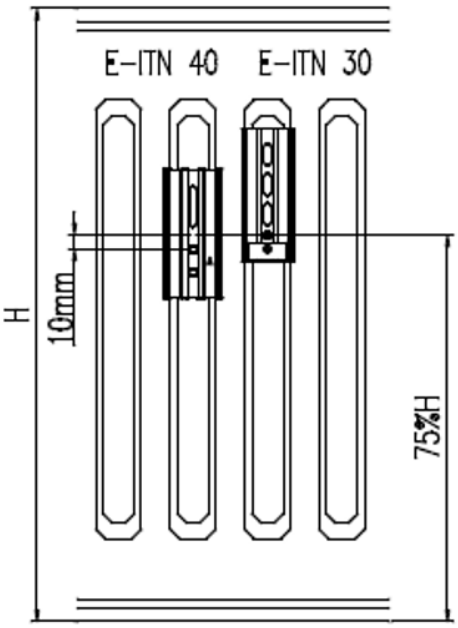
Install E-ITN 40 into 75% of the total radiator height (measured from bottom) – in relation to center of back plate. If the height of the radiator is less than 400mm install allocator to 50 % of total height. Variations of the mounting points height must not exceed ± 10 mm.

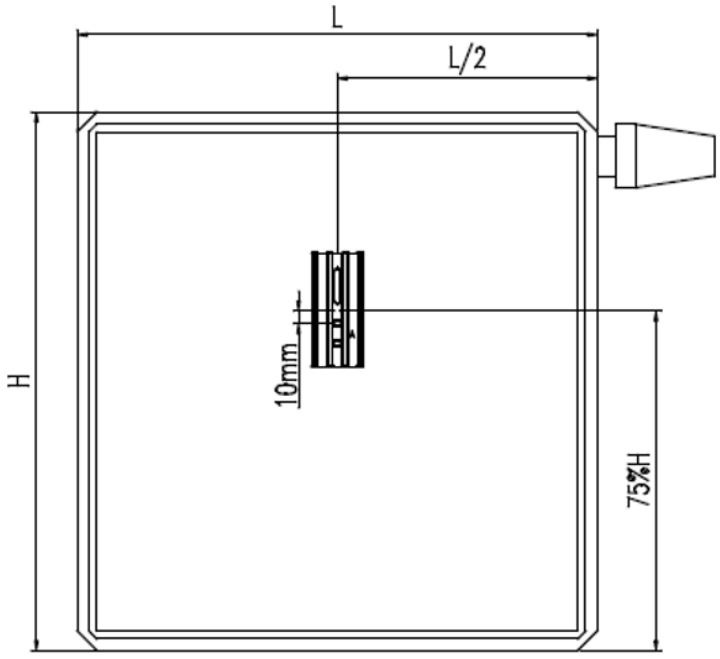
### *7.4.2. Horizontal position:*

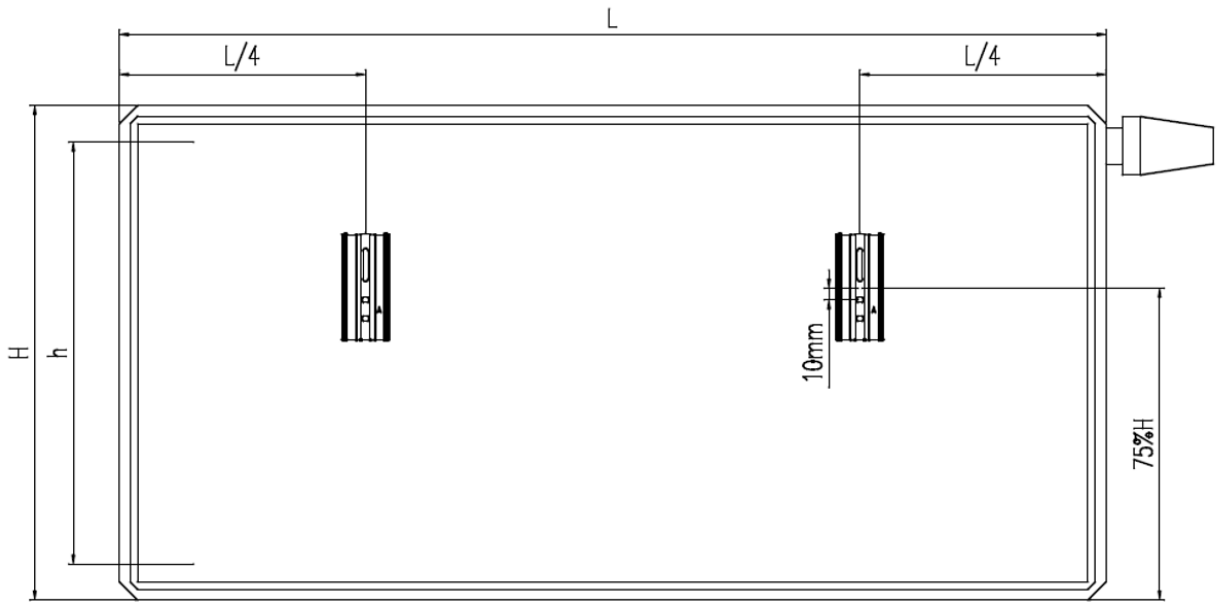
For both variants of vertical installation, place E-ITN 40 into the half of length L. In cause of odd number of the spaces, place E-ITN 40 into the gap closer to the end of the radiator, i.e. at radiator with 9 gaps place EITN 40 into gap 5. For an even number of gaps or recesses, place the E-ITN 40 in the gap closer to the end of radiator. E.g. at radiator with 10 gaps place E-ITN 40 into gap 6. On radiators with length L>2000 mm or radiators with excessive nominal output install two E-ITN 40 placed in 25% of total radiator sized (measured from sides of radiator)


L
L/2
H
10mm
75%H


E-ITN 40
E-ITN 30
H
10mm
75%H

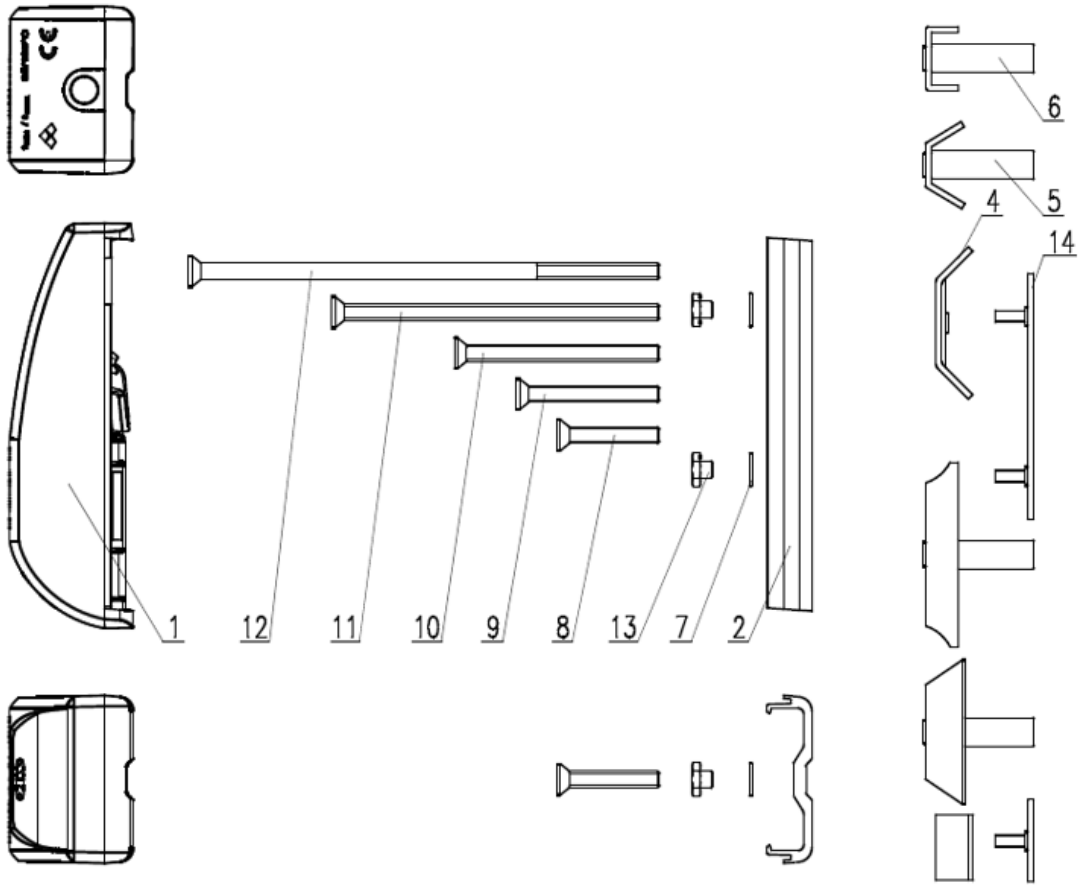

E-ITN 40
E-ITN 30
H
10mm
75%H


L
L/2
H
10mm
75%H


L
L/4
L/4
H
h
10mm
75%H

## 7.5. INSTALLATION ON SEGMENTED RADIATORS

## 7.6.




| | | | |
|---|---|---|---|
| 1 | Allocator body | 9 | Bolt M4x35 |
| 2 | Back plate | 10 | Bolt M4x50 |
| 4 | Clamp | 11 | Bolt M4x80 |
| 5 | Clamp III | 12 | Bolt M4x115 |
| 6 | Clamp IV | 13 | Nut M3 spec. |
| 7 | Washer 4 ČSN 02 1746.25 | 14 | Clamp FONAL |
| 8 | Bolt M4x25 | | |

### *7.6.1. Description of installation*

E-ITN 40 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 allocator 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 up (including date of installation, room, type of the radiator, allocator serial number, etc.).

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 up (including date of installation, room, type of the radiator, allocator serial number, etc.).

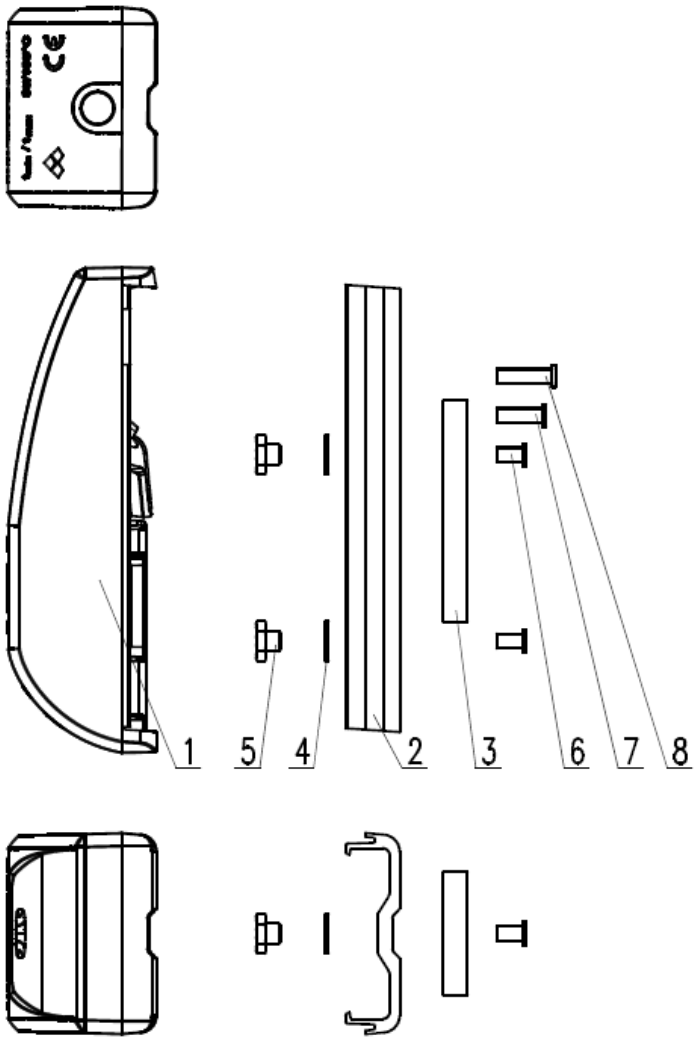
### *7.6.2. Installation differences*

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.

a) For installation on radiators with larger distance between the segments (Svratouch radiator):
   - use clamp IV and insert the spacer 45 under E-ITN 40 back plate

a) For radiators with solid and long cells, as KUVAL radiators:
   - use a screw with a length 80 mm

## 7.7. INSTALLATION ON PANEL RADIATORS




| | | | |
|---|---|---|---|
| 1 | Allocator body | 5 | Nut M3 spec. |
| 2 | Back plate | 6 | Bolt M3x6 |
| 3 | Waher | 7 | Bolt M3x10 |
| 4 | Washer 4 | 8 | Bolt M3x12 |

### *7.7.1. Description of installation*

E-ITN 40 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,

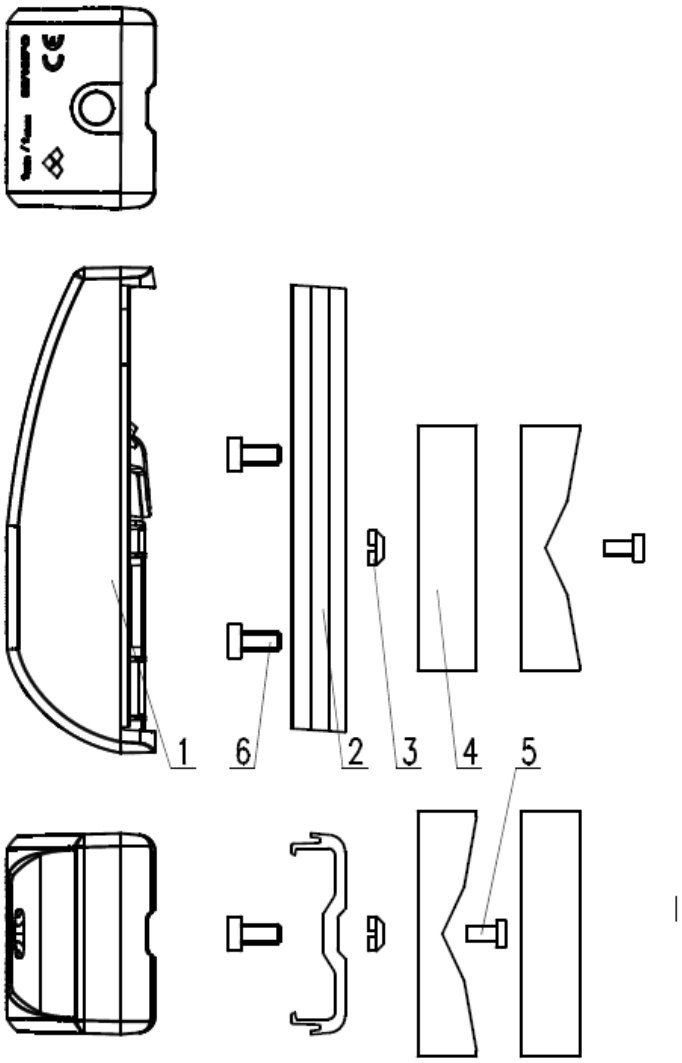
- if one-head welding pistol is used, second bolt have to be in distance 39±1 mm towards the upper edge of the radiator, remove the paint within the diameter of 10 mm on the marked place,
- attach back plate to the bolts and than to the radiator, screw the nuts to the bolts with socket wrench M7,
- tighten the nuts to a torque 1 Nm,
- place the allocator into the back plate profile groove from top, align it with the base plate and push allocator to connect it with the back plate.

After installation, installation protocol have to be filled up (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.***

## 7.8. INSTALLATION ON HORIZONTAL AND VERTICAL REGISTERS




| | | | |
|---|---|---|---|
| 1 | Allocator body | 4 | Spacer - registr for ø 30 - 110 mm |
| 2 | Back plate | 5 | Bolt M3x6 |
| 3 | Nut M3 | 6 | Bolt M4x8 |

### *7.8.1. Installation description*

E-ITN 40 back plate should be installed on the tubular radiators with spacer, welded bolt M3x6 and nut M3, and two bolt M4x8:

- mark the place for welding bolt on the radiator,
- remove the paint within the diameter of 10 mm on the marked place to see metal surface,
- weld bolt M3x6 onto the register pipes with a one-head welding pistol,
- place the spacer on the bolts tighten to a pipe that front surface is always perpendicularly to the ground,
- screw the back plate in vertical position to the spacer with two bolts M4,
- place the allocator into the back plate profile groove from top, align it with the base plate and push allocator to connect it with the back plate.

### *7.8.2. Proper E-ITN 40 installation on different register types*

**Horizontal tubes - bare and ribbed:**

I. Ribbed tube straight with l ≤ 6 m and bare with l ≤ 12 m
   - 1x E-ITN 40 in the centre of the tubular element

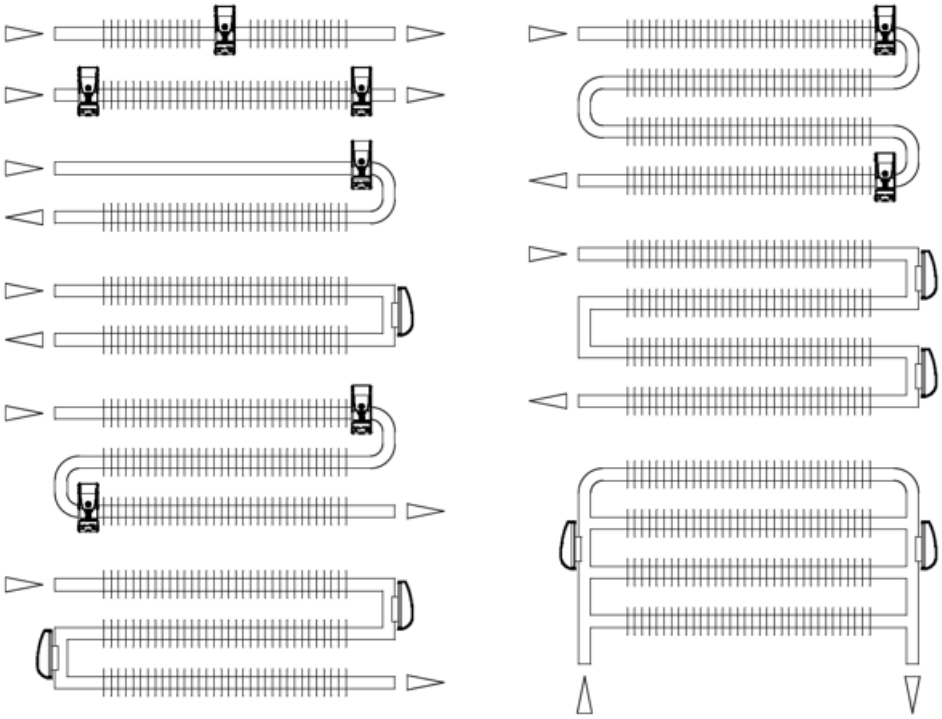
I. Ribbed tube straight with l > 6 m and bare with l > 12 m
   - 2x E-ITN 40 in the beginning and the end of the tubular element

I. Ribbed or bare tube with one curve
   - 1x E-ITN 40 in the beginning of the tubular element arch
   - in case of register welded into the frame, place E-ITN 40 on a vertical tube

I. Ribbed or bare tube with two curves
   - 2x E-ITN 40 in the beginning of the upper curve and in the end of the lower curve
   - in case of register welded into the frame, place E-ITN 40 on a vertical tube

I. Ribbed or bare tube with more than two curves
   - 2x E-ITN 40 always in the beginning of the upper curve and in the end of the lower curve
   - in case of register welded into the frame, place E-ITN 40 on a vertical tube

I. Ribbed or bare tubes connected in parallel
   - 2x E-ITN 40 into the middle or approximately to 75% (odd number of tubes) of the height of the tubular element



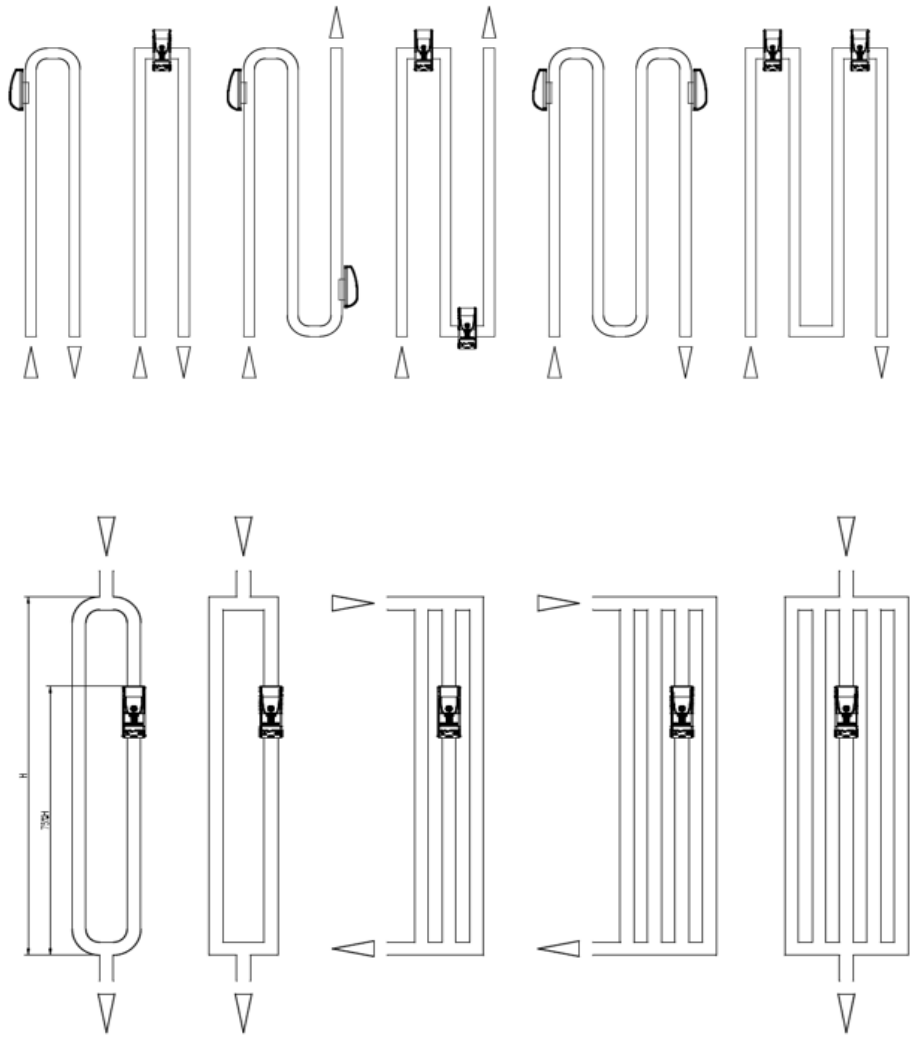
**Vertical bare tubes:**

I. Bare tube with one curve
- 1x E-ITN 40 in the beginning of the tubular element curve
- in case of register welded into the frame, place E-ITN 40 on a horizontal tube

I. Bare tube with two curves
- 2x E-ITN 40 in the beginning of the upper curve and in the end of the lower curve
- in case of register welded into the frame, place E-ITN 40 on a horizontal tube

I. Bare tube with more than two curves
- 2x E-ITN 40 in the beginning of the first curve and in the end of the (last) upper curve
- in case of register welded into the frame, place E-ITN 40 on a horizontal tub

IV. Two or more small tubes connected in parallel
- 1x E-ITN 40 in 75% of the total height and nearest to the centre of tubular element



Note: If your register does not match any of the listed patterns, ask for information manufacturer.

# External sensor for E-ITN 40