Sontex ■ Thermal Energy ■ Flow Metering ■

User Manual

Electronic
Heat cost allocator

Sontex 565
Sontex 566
Sontex 868

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Manufacturer : Sontex SA
2605 Sonceboz, Switzerland
Tél : +41 32 488 30 00
Fax : +41 32 488 30 01
Email : sontex@sontex.ch
Internet : www.sontex.ch

Technical modifications subject to change

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Table of Contents

1. General

This manual serves as a reference for users and service personnel of the Sontex heat cost allocators. It describes the use of the **Sontex 565**, **Sontex 566** and **Sontex 868** heat cost allocators. As the measuring functions of the three heat cost allocators are identical, the descriptions in this manual apply to all three versions. In case of deviations, a special note is made.

1.1 Application

The heat cost allocator is a measuring device to record the heat output of radiators in units.
Units are apartments, offices, and business, commercial or industrial premises whose heat is supplied through a central heating system or via a conjoint district heating station.
The group of units constitutes one billing unit.
If one billing unit includes units with differences, for example, from a technical standpoint (in the form of different heating systems) or in terms of consumption behaviour (i.e. in the case of industrial premises and apartments), a subdivision of the billing units into unit groups may be necessary.
Each radiator is fitted with a heat cost allocator which records and assesses the heat output of the radiator and displays the consumption value. The consumption value is the basis for allocating the heating costs to each unit, which is necessary for the annual billing of the heating costs.

The heat cost allocators are principally used in the following units:

- Collective housing buildings.
- Offices or administrative buildings.

The typical users are:

- Measuring and billing services.
- Cooperatives or property managers.
- Building service companies, letting agencies.

The heat cost allocators can be installed on:

- Sectional radiators.
- Column/tube radiators.
- Panel radiators with horizontal or vertical water flow.
- Flat register radiators.
- Convector heaters.

1.2 General Guidelines

1.2.1 Hazards and Disposal

The heat cost allocators are equipped with lithium batteries. This type of battery falls into the category of hazardous goods. Please respect the transport directives applicable in your country.

Handling of Lithium Batteries:

- Store in a dry place.
- Do not heat to more than 100°C and do not throw into a fire.
- Do not store near a heat source.
- Do not store in direct sunlight.
- Do not short-circuit.
- Do not open or damage.

- Do not recharge.
- Keep out of reach of children.

1.2.2 Changing the Battery

The heat cost allocator's battery is soldered. Changing the battery is neither provided for nor permitted.

Disposal

In order to protect the environment, to reduce waste of natural resources and prevent pollution, the European Union has adopted a directive stipulating that electrical and electronic devices must be recovered by their manufacturers in order to ensure proper destruction or recycling.
Should you dispose of the device yourself, please get information from your local authority on recycling options.

1.2.3 Installation with Glue

Due to their chemical composition, the use of glues emits vapours and can damage the plastic casing of the heat cost allocator.

1.2.4 Warranty

The warranty rights are only valid if the devices have been installed and used in compliance with regulations and if the technical guidelines in force have been followed.

1.2.5 Compliant Use

Installation of this product must comply with the installation directives described in this manual and carried out by personnel trained for this purpose.

1.2.6 Non-compliant Use

Any application other than that described above is not permitted.

1.2.7 Notes regarding Installation

Any inappropriate handling or faulty installation may result in radiator leakage. Please respect the recommendations of the installation notice for the radiator.

1.2.8 Protection against Outside Influences

1.2.8.1 Lead seal

The heat cost allocator is closed with a safety seal which cannot be removed without causing damage. It is therefore impossible to open the device without this being detected. After installation, the electronic part of the device is no longer accessible. The LCD display, the push button and the optical interface are protected. It is impossible to access the interior of the device without damaging it.

1.2.8.2 Electronic Detection of Opening

The electronic detector detects unauthorised opening and closing of the heat cost allocator. As soon as the housing of the heat cost allocator is opened and / or removed, the electronic detector triggers an error message. During this time, the date of opening of the case, the number of openings and the cumulative length of time for which the case was open are saved and may be read using the optical interface or the radio.

1.2.9 Data Collection while the Device is open

The heat cost allocators continue to collect data, even if the electronic detector is activated.

1.2.10 Transport in Original Packaging

The heat cost allocators must be transported in their original packaging.

1.2.11 New Programming

Before each new instance of programming, save the history of previous value readings.

1.3 Restrictions

1.3.1 Applications

The heat cost allocators may not be used in the following cases:

- Steam heating.
- Air radiators.
- Floor heating.
- Ceiling radiant heating.
- Flap-controlled radiators.
- Radiators with a removable front plate (attached with clips).

Heat cost allocators may only be attached to radiators controlled by a combination of flaps and valves if the control is disassembled or locked in the 'open' position.

A mixed assembly (old generation (555 / 556) and new generation (565 / 566)) on the same installation is permitted under certain conditions. Please contact us for further information

1.3.2 Measurement using Single or Dual Sensors

Combining the two systems in the same building or in a single calculation unit is not permitted.

1.3.3 Exclusion of Liability

Sontex SA rejects all liability when the conditions of assembly and use described in this manual as well as those described by the standard **EN 834:2013** are not observed.

1.3.4 Modifications

Sontex SA reserves the right, without prior notice, to make any modifications with a view to improving the product.

2. Product Description

2.1 Packaging

Contents of the **Sontex 565 / 566/ 868** allocator box:

Box with label describing the product

5 10-piece trays with pre-mounted lead seal

1 box of 50 back plates

Installation guide

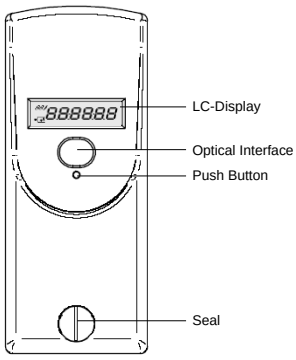
2.2 General Description

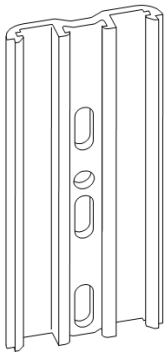
2.2.1 Type

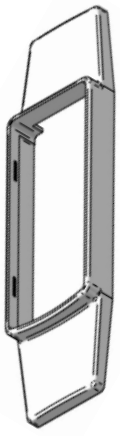
The electronic heat cost allocators **Sontex 565 / 566 / 868** operate either according to the single sensor principle with start sensor or the double sensor principle. The device has been developed and approved in accordance with the European Standard **EN 834:2013**.

2.2.2 Design

The heat cost allocator consists of a microprocessor, a lithium battery, two temperature sensors, a heat conducting aluminium back plate, a multi-functional display and a plastic housing.
The measuring circuit consists of the temperature sensors, the analogue-digital conversion, the reference resistance for standardising the measuring transformation and the microprocessor for accessing the radiator heat output. During each measuring the circuit tolerances are eliminated with a reference resistance and the heat cost allocator carries out an automatic self-test.







Standard aluminium back plate for

Snap-on blind to cover colour

nearly all existing bolts with common dimensions and mounting possibilities – thus easy installation	shadows for increased aesthetics

2.2.3 Characteristics

- Measuring by two temperature sensors, radiator and ambient temperature sensor (NTC-resistor).
- Optional measuring principle: 1 sensor mode with start sensor or two sensor mode.
- Unit scale or product scale.
- Recording of cumulated heat consumption on the annual set day.
- Recording of 144 monthly values and 18 half monthly values for cumulated heat consumption.
- Recording of 18 monthly values for the maximum radiator temperature.
- Optical interface for the readout of the data and programming
- For heat cost allocator **Sontex 566 Radio**, the Sontex radio system (**Supercom**) is a bidirectional system. Reading and programmable by radio.
- For heat cost allocator **Sontex 868 Radio**, the radio module comprises a unidirectional radio transmitter.
  Two telegrams: short telegram, OMS compliant and long telegram for Walk-by reading.
- User-friendly operation by push button.
- 6-digit and high-contrast LCD display.
- Automatic commissioning during the mounting on the aluminium back plate (available when ordering).
- Check code for postcard mail-in method
- Possibility to connect a remote sensor on each version of heat cost allocator. The remote sensor will be automatically detected by the heat cost allocator.
- Remote sensor version with 2 m cable.
- Standard aluminium back plate for nearly all existing bolts with common dimensions and installation possibilities – thus easy installation (no cutting and welding of bolts necessary).
- Snap-on blind to cover colour shadows for increased aesthetics.
- Safe operation and fraud/manipulation detection.
- Lithium battery with a capacity of up to 10+1 year.
- Meets EN 834:2013.

2.2.4 Display

The heat cost allocator has a LCD-display with 6 large main digits on the right and 2 smaller digits on the left as well as two special symbols and one communication indicator. The main digits are separated by four decimal points. Below, please find the display segments:

Display with all active segments

Normally, the heat cost allocators **565 / 566 / 868** are supplied with switched-off LCD-display. On request, the heat cost allocators can also be supplied with permanent LCD- display.

2.2.5 Electronics

The device has an electrical circuitry with an 8-Bit-CMOS-micro controller of the latest generation STM8L with extremely low current consumption operating at a voltage as from 1.8 V.

The temperature measuring circuit with automatic self-calibration measures the discharging time of a capacitor. The accuracy of the measuring circuit is independent of the supply voltage.

2.2.6 Versions

Sontex 565:

- Heat cost allocator Sontex 565 with optical interface, standard device.

Sontex 566 Radio (433.82 MHz):

- Radio heat cost allocators with optical interface and bidirectional radio SONTEX (433.82 MHz).

Sontex 868 Radio wM-Bus (868.95 MHz):

- Radio heat cost allocators with optical interface and unidirectional w-MBus radio (868.95 MHz).

Sontex 565 x / 566 X / 868 X

- Heat cost allocators with the same characteristics as Sontex 565/566/868. X-types are to be used primarily for the replacement of Kundo devices 201/202.

A mixed assembly (old generation (555 / 556) and new generation (565 / 566)) on the same installation is permitted under certain conditions. Please contact us for further information

For each version of heat cost allocator, it is possible to plug the connector of the remote sensor to an interface inside the heat cost allocator. Refer to chapter **Error! Reference source not found.** **REF _Ref426545350 \h * MERGEFORMAT** Error! Reference source not found..
Once equipped with a remote sensor, the heat cost allocator will only work for an application with remote sensor. Remote sensor version with 2 m cable.

2.2.7 Optical Interface

With a standardised optical probe the consumption and configuration values can be transferred directly to a computer. With the radio heat cost allocator **566 / 868** all consumption values can be readout over the optical interface and over radio. The data are transmitted in M-bus-format acc. to EN136757-3. Authorised personnel can alter the configuration of the device over the optical interface with an optical probe.

2.2.8 Radio SONTEX (Sontex 566)

The radio heat cost allocator **566** features a transceiver circuit in the 433 MHz band with integrated antenna.
With the Sontex radio system, proven since more than 15 years; it is possible to readout the consumption values via a mobile radio modem or via a radio central installed directly from the office.
The Sontex radio system is a bidirectional system, i.e. the radio heat cost allocator is only called from a mobile modem or a radio central upon request to send its data.
It is a great advantage that this system allows the alteration of the parameters over radio.

- Please refer to chapter **0 Operation modeIf heat cost allocator is** removed from the aluminium back plate during the installation mode, the heat cost allocator switches to the sleeping mode.
- for the radio reading range.

2.2.9 Radio Wireless M-Bus (Sontex 868)

The radio heat cost allocator **868** features a transmitter circuit in the 868 MHz band with integrated antenna.
This radio module comprises a unidirectional radio transmitter which is used to transfer data according to the wM-Bus (EN 13757-4) radio communication protocol and in compliance with the OMS (Open Metering System) Release V3.0.1.

- Please refer to chapter **Error! Reference source not found. Operation mode**Error! Reference source not found. for the radio reading range.

2.3 Technical data

Optional measuring systems:	**Single sensor device with start sensor** for heating systems with $tm_{min} \geq 55$ °C Calculation with set reference temperature 20 °C Necessary rating factors: KQ, KC, (KA, KT) **Double sensor device** for heating systems with $tm_{min} \geq 35$ °C Calculation with variable ref. temperature T-air sensor Necessary rating factors: KQ, KC, (KA, KT)
Optional scales:	Unit scale or product scale
Current supply:	3 V-Lithium-battery
Life-span with 1 battery:	> 10 years
Display:	Liquid crystal display (LCD-display)
No. of displayed digits:	6 digits (000000 ... 999999)
Sensor temperature range:	0 °C ... 120 °C
Exponent:	n = 1.33
Radiator – performance range:	4 Watt ... 16.000 Watt
Design temperature range: (tm_{min} ... tm_{max})	Single sensor device with start sensor 55 °C ... 105°C / 120 °C (compact- / remote sensor) Double sensor system 35 °C ... 105°C / 120 °C (compact- / remote sensor)
(tm_{min} ... tm_{max})	
K_C-values:	Rating factors see digital K_C-data base
Models:	Compact device or remote sensor device
Set day:	Freely programmable
Data storage:	144 monthly values and 18 half monthly values for cumulated heat consumption, 18 monthly values for the maximum radiator temperature. Maximum temperature of the current and previous year, all relevant consumption values

Self-test:	Before every measuring
Start of counting:	Heating period 25°C – 40°C (programmable) Off-heating period 25°C – 40°C (programmable)
Satndard version :	**EN 834:2013**
Homologation according to :	**HKVO: A1.02.2015**
Conformity :	CE
Standard mounting height:	At 75% of the overall height of the radiator. If the height of the radiator is less than (<) 470 mm, the heat cost allocator must be installed at 50% BH.

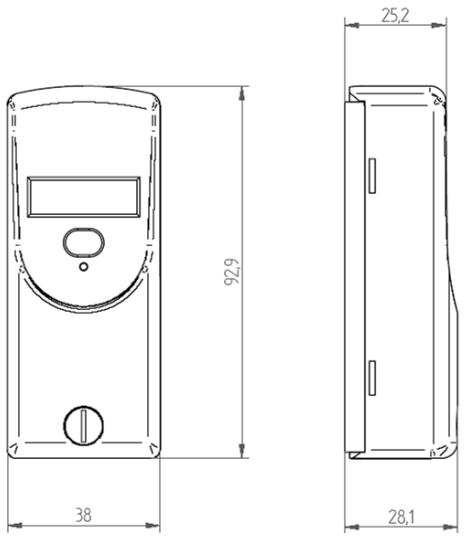
SONTEX radio communication

Frequency:	433.82 MHz
Communication:	Bidirectional
Protocol:	Radian 0
Encryption:	AES-128

Wireless M-Bus radio communication

Frequency:	868.95 MHz
Communication:	Unidirectional
Protocol:	Wireless M-Bus
Encryption:	AES-128
Transmission standard:	EN 13757-4, mode T1
Broadcasting interval:	Short telegram (OMS): ≥ 120 s Long telegram (walk-by): ≥ 120 s
Data transmission periods:	Short telegram (OMS): 24 h/d, 7 days a week Long telegram (walk-by): ≤ 12 h/d, 7 days a week

Dimension



3. Settings

3.1 Article Coding System

Sontex gives each customer the option of defining the different configuration settings as well as a personalised logo (for a one-off initial fee) in place of the Sontex logo.
To distinguish between configurations, a unique article number will be assigned to each of the configurations.
The article number includes 11 characters (e.g.: 0868R20S000).

The article number is comprised of:

- 4 numbers corresponding to the model type:
  Sontex 565 = 0565
  Sontex 566 – SONTEX Radio = 0566
  Sontex 868 – Wireless M-Bus radio = 0868
- 1 letter designating the type of aluminium plate:
  Sontex aluminium plate = R
  Kundo aluminium plate = X
- 6 characters designating the specifics for the customer. These 6 characters are defined by Sontex:
  C specifics = 20S000 (example of a code)
  Characters 1-2: Reserved for Sontex.
  Characters 3-4: Sontex Representative / Customer.
  Characters 5-6: End customer, logo, language and settings.

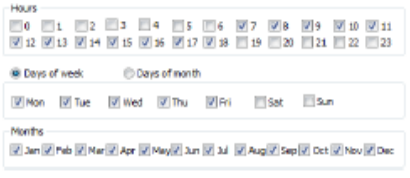
Article		*0868*	*R*	*2*	*0*	*S*	*0*	*0*	*0*
Model type									
	Sontex 565	0565							
	Sontex 566 Radio SONTEX	0566							
	Sontex 868 Radio wM-Bus	0868							
Aluminium plate									
	Sontex aluminium plate		R						
	Kundo aluminium plate		X						
Reserved for Sontex									
				0 0					
	2 characters reserved for Sontex			F F					
Representative									
	2 characters for the Sontex representative or customer. Defined by Sontex					0 0 F F			
Client final, Logo, Langue et paramètres									
								0 0	
	2 characters reserved for Sontex							F F	

For each heat cost allocator model, it is possible to plug the remote sensor's connector into an interface inside the allocator. As such, there is no article number for a heat cost allocator equipped with a remote sensor.

3.2 Settings

The following table can be used to determine the configuration of the heat cost allocator by combining the different settings options that follow.
Due to distinctive technical features, not all possible combinations are necessarily achievable.

Configuration sheet for **Sontex 868**:

Pos.	Function	Sontex's Representations / Customer xyz	Remarks
1	Customer Specific Label (Private Label)	Sontex 868 / Customer xyz	Logo: According to drawing to be established and subject to the technical possibilities Colour : Pantone 424 (Dark grey). Logo *N°_Dessin (drawing number)*
2	Date & Time	UTC + 1 (CET)	Display: hh.mm.ss & dd.mm.yy
3	Set Day	01.06	dd.mm.
4	Distinction of Winter and Heating Period	Yes	Yes or NO
5	Beginning summer period (Non-heating period)	15.05	dd.mm.
6	Beginning winter period (Heating period)	15.10	dd.mm.
7	Unit scale or Product scale	Unit Scale	2 possibilities: - Unit Scale - Product Scale (Kc=1 et Kq=1)
8	Reset to zero of the consumption values	Never	2 possibilities: - Never; - Set day
9	Mode: 1 sensor with start sensor or 2 sensors	2 sensors	2 possibilities: - 1 sensor with start sensor - 2 sensors
10	Suppresion of summer counting	Yes	If this function is activated and if the heat cost allocator is in the period of summer counting suppression, consumption measuring is deactivated.
11	Heatsink temperature T_B beginning of counting summer period	37°C	
12	Heatsink temperature T_B beginning of counting winter period	30°C	
13	Max. ambient temperature T_A activating of heat accumulation mode summer period	37°C	
14	Max. ambient temperature T_A activating of heat accumulation mode winter period	30°C	
15	Minimum temperatur difference summer period	5 K	Acc. standard 834, TR - TA ≤ 5 K applies
16	Minimum temperatur difference winter period	4 K	Acc. standard 834, TR - TA ≤ 5 K applies
17	Default ambient temperature T_A summer period	20°C	Acc. Standard EN 834, T_A = 20°C applies
18	Default ambient temperature T_A winter period	20°C	Acc. Standard EN 834, T_A = 20°C applies
19	Measuring cycle summer	4 min	1.....15 minutes
20	Measuring cycle winter	4 min	1.....15 minutes
21	Commissioning during the installation, automatic or by puch button	Automatic	2 possibilities: - Automatic commissioning during the mounting on the aluminium back plate. - Commissioning by pressing push button once heat cost allocator is fixed wit/against aluminium back plate.
22	Permanent display 24h / 24h	Yes	2 possibilities: - Yes - No
23	Rolling displayed Menu	Yes	2 possibilities: - Yes, rolling menu up to 15 positions displayed15 positions displayed. - No
24	*Menu: Position 0*	*Error (X_0=3sec)*	*Position 0 is blocked, only showed if an error occured.*
25	Menu: Position 1	* Current consumption value (X_1=3sec)	Up to 15 menu sequences available from the list below: - ** Current consumption value with 36 monthly values. **Must appear on the LCD-display.*** - *15 half monthly values for cumulated consumption.* - *Maximum radiator temperature of the current period with 18 monthly values for the maximum radiator temperature.* - *Time.* - *Date.* - *Set Day.* - *Set Day value.* - *Check code.* - *Current radiator temperature.* - *Current ambiant temperature.* - *Identification number.* - *Maximum radiator temperature of the current heating period (since the Set Day).* - *Maximum radiator temperature of the previous heating period (before the Set Day).* - *Electronic fraud detection: Date of the last opening, Fraud duration, Fraud counter.* - *Fraud duration.* - *Fraud counter.* - *Segment test: Segment test, Software version, Running hours, Comminssioning date, Mea-suring principle, wM-Bus mode.* - *Software version.* - *Running hours.* - *Commissioning date.* - *Measuring principle (single sensor or double sensor; compact sensor or remote sensor).* - *Operation mode for radio wM-Bus: short telgram or long telegram.* All values can be checked manually over the button, independent of the configuration,
26	Menu: Position 2	Half Monthly value (X_2=3sec)	
27	Menu: Position 3	Time (X_3=3sec)	
28	Menu: Position 4	Date (X_4=3sec)	
29	Menu: Position 5	Set day value (X_5=3sec)	
30	Menu: Position 6	Ambient Temperature (X_6=1sec)	
31	Menu: Position 7	Radiator Temperature (X_7=1sec)	
32	Menu: Position 8	-	
33	Menu: Position 9	-	
34	Menu: Position 10	-	
35	Menu: Position 11	-	
36	Menu: Position 12	-	
37	Menu: Position 13	-	
38	Menu: Position 14	-	
39	Menu: Position 15	-	
40	In case of permanent LCD-Dispaly with autoroll: Pos 0..15: X_0 - X_{15}: Individual duration 1..30 [s] for each position.	(X_0) - (X_{15})	1..30 seconds. Duration of the display of the values can be chosen individually for each position.
41	Option mode for radio wM-Bus	Walk-by	2 possibilities: - Short telegram (OMS compliant). - Long telegram (Walk-by reading).
42	Radio transmission interval for radio wM-Bus	2 min	2..255 minutes. Minimum interval = 2 minutes
43	Operation mode for radio wM-Bus: - Short telegram (OMS): 24h / 24h. - Long telegram (Walk-by): 12h per day (programmable), 5 days / 7 days.	Mon-Tue-Wed-Thu-Fri from 7:00 until 18:00 o'clock.	
44	AES 128 bits encryption key activated at the factory	No	2 possibilities: - Yes - No
45	AES encryption key value		Defined by the customer.
46	Default "Installer" password ex-factory	0000'1234	Defined by the customer.
47	Removable label stuck on the heat cost allocator	Yes	2 possibilities: - Yes - No
48	Information contained on the removable label	12345678	Identification number of the EHCA coded with 8 digits (ex: 12345678)

- **Position 1: Specific Branding, Customer or Sonex Logo:**
  If technical options allow it, it is possible to stamp or laser-engrave a specific logo on the front face of the allocator's housing.
- **Position 2: Allocator Date and Standard Time:**
  The UTC time zone will be programmed in accordance with the country where the allocator is installed.
- **Position 3: Set Day (yearly date):**
  It is possible to program an annual set day on which the cumulative consumption value to date is recorded.
- **Position 4: Setting Winter / Summer Periods:**
  2 options: yes / no.
  If the 'yes' option is chosen, two different specific heating periods (winter and summer) with different start temperatures settings depending on the current period can be distinguished.
- **Position 5: Set the Start of the Summer Period:**
  Choose the date on which the summer period will begin.
- **Position 6: Set the Start of the Winter Period:**
  Choose the date on which the winter period or the heating period will begin.
- **Position 7: Unit Scale and Product Scale:**
  2 options: unit scale / product scale.
  Set the type of scale used when calculating the display values.
  By default, the KC and KQ evaluation factors will be set to 1 for the product scale.
- **Position 8: Set Cumulative Values to Zero:**
  2 options: set day / never.
  Determine whether the units' consumption totaliser will be reset to zero on the set day or never.
- **Position 9: Single Sensor or Dual Sensor Mode:**
  Set the measuring method used by the allocator.
  2 options: single sensor / two sensors.
  Single sensor: determines the amount of heat emitted by a radiator by measuring and assessing the radiator's temperature with respect to that of the room temperature measured at the start and fixed at 20°C.
  Two sensors: determines the amount of heat emitted by a radiator based on the measured temperature of the radiator via the radiator temperature sensor and the ambient air sensor.
- **Position 10: Elimination of Summer Counting:**
  2 options: yes / no.
  If the 'yes' option is chosen, consumption will not be measured during the summer period.
- **Position 11: Radiator Temperature T_R, Start Counting Summer Period:**
  Set the threshold temperature for the start (counting) of the allocator. When this start temperature is reached, the allocator will begin to count the consumption units.
- **Position 12: Radiator Temperature T_R, Start Counting Winter Period:**
  Set the threshold temperature for the start (counting) of the allocator. When this start temperature is reached, the allocator will begin to count the consumption units.
- **Position 13: Max. room temperature T_A, Activation of Heat Accumulation Mode, Summer Period:**
  Set a reference temperature in order to avoid an incorrect measurement due to heat accumulation (e.g. if the radiator is hidden by panels, thermal accumulation). The allocator will automatically switch into single-sensor mode when the ambient temperature measurement surpasses the defined reference temperature. Following this, the calculation will use an ambient temperature set to 20°C rather than the temperature actually measured.
- **Position 14: Max. room temperature T_A, Activation of Heat Accumulation Mode, Winter Period:**
  Set a reference temperature in order to avoid an incorrect measurement due to heat accumulation (e.g. if the radiator is hidden by panels, thermal accumulation). The allocator will

automatically switch into single-sensor mode when the ambient temperature measurement surpasses the defined reference temperature. Following this, the calculation will use an ambient temperature set to 20°C rather than the temperature actually measured.

- **Position 15: Minimum Temperature Difference, Summer Period:**
  Set a reference value calculated using the temperature difference between the radiator and the ambient air. According to the standard EN 834: $T_R - T_A \leq 5$ K.
- **Position 16: Minimum Temperature Difference, Summer Period:**
  Set a reference value calculated using the temperature difference between the radiator and the ambient air. According to the standard EN 834: $T_R - T_A \leq 5$ K.
- **Position 17: Standard Ambient Temperature T_A, Summer Period:**
  Ambient temperature value used to calculate the unit's consumption. Set by the standard EN 834: $T_A = 20$°C.
- **Position 18: Standard Ambient Temperature T_A, Winter Period:**
  Ambient temperature value used to calculate the unit's consumption. Set by the standard EN 834: $T_A = 20$°C.
- **Position 19: Measuring Cycle, Summer Period:**
  Set a time interval to be used as an operations measuring cycle. The allocator will therefore usually be in sleep mode.
- **Position 20: Measuring Cycle, Winter Period:**
  Set a time interval to be used as an operations measuring cycle. The allocator will therefore usually be in sleep mode.
- **Position 21: Commissioning of the Allocator:**
  2 options: Automatic commissioning upon installation on the back plate / By pressing the push button after installation on the back plate.
  The allocator leaves the factory in sleep mode, meaning that it does not measure or calculate consumption. The transition from sleep to installation mode can be carried out in 2 different ways: automatically upon installation on the aluminium back plate or by pressing the push button after having installed it on the aluminium back plate.
- **Position 22: 24-hour Active Display:**
  2 options: yes / no.
  If the 'no' option is chosen, the display will always be switched off. By pressing the push button, the LCD screen will become active. After 3 minutes of inactivity, the screen will automatically return to deactivated mode.
  If the 'yes' option is chosen, the display will be active 24 hours a day.
- **Position 23: Scrolling Display Menu:**
  2 options: yes / no.
  If the 'no' option is chosen (static display), the menu can be changed by pressing the push button.
  If the 'yes' option is chosen, the display will automatically move from one menu to the next. The display duration can be configured individually for each duration.
- **Position 24: Error Information Display:**
  If an error occurs, the Err message will appear on the LCD screen. This information will appear at the top of the menu sequence.
- **Positions 25 to 39:** 15 values which can be displayed.
- **Position 40: Programmable Display Time for Each Value Shown.**
- **Position 41: Operation Mode for the Wireless M-Bus Radio:**
  2 options: short telegram (OMS) / long telegram (Walk-by).
- **Position 42: Transmission Interval for Wireless M-Bus Radio Telegram:**
  Set a transmission interval for sending Wireless M-Bus radio telegrams.
- **Position 43: Wireless M-Bus Radio Telegram Transmission Period.**
  Short telegram (OMS): 24 hours a day, 7 days a week.
  Long telegram (walk-by): 12 hours chosen per day (programmable), 7 days a week.

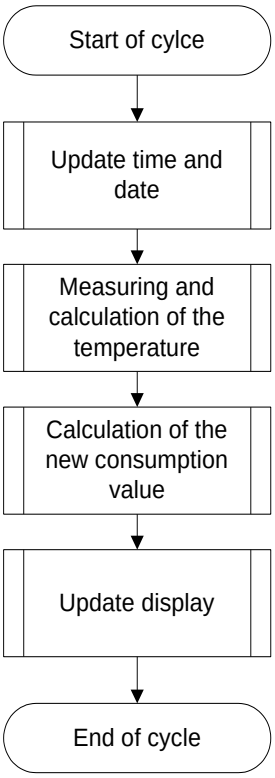
- **Position 44: AES-128 Encryption Activated at Factory:**
  2 options: yes / no.
  If the 'yes' option is chosen, the encryption key can be programmed according at the customer's request.
- **Position 45: Decryption Key:**
  This may be chosen by the customer.
- **Position 46: Installer Password:**
  Default password: 00001234
  This may be chosen by the customer.
- **Position 47: Detachable Label Attached to the Heat Cost Allocator:**
  2 options: yes / no.
  If the 'yes' option is chosen, a detachable label will be attached to the front face of the allocator.
- **Position 48: Information Contained on the Detachable Label:**
  The information contained on the detachable label may be chosen by the client.

For the **Sontex 565 / 566** heat cost allocators, positions **41, 42 and 43 do not exist**.

3.3 Operating mode

3.3.1 Cycle

The heat cost allocators **565 / 566 / 868** operate in a cycle of 4 minutes. Most of the time, the device is in sleeping mode. Every 4 minutes the device is set into operation and operates according to the adjoining diagram.



The clock-pulse generator is a counter which is completely independent from the rest of the program. This counter is designed in a way so that it is impossible to stall the cycle or to skip one or more cycles.

Each cycle follows the adjoining diagram. The measuring and calculating processes are explained in detail later.

The tasks carried out during one cycle are taking approx. 100 ms. This means that the device is in sleeping mode more than 99.8 % of the time. It can be set into operation between two cycles over the optical probe or by pushing the button. In this case it carries out the requested task and then returns to sleeping mode.

In case an optical probe is connected or the button is pushed during the course of the cycle, the respective value is readout at the end of the cycle.

The button can be pushed for an indefinite period of time and the optical probe can be left in its position since the normal function of the device is not impaired by an influence from outside.

3.3.2 Single Sensor Version with Start Sensor

The start sensor of the single sensor version serves as an ambient temperature sensor which mainly functions during the heating up period.
The start temperature is the threshold temperature of the radiator at which the device always starts to carry out energy ratings. For these ratings, the measured radiator temperature and an assumed ambient temperature of 20° C are used as calculation basis.

3.3.3 Dual Sensor Version

For the dual sensor version basically the same specifications apply as for the single sensor version with start sensor. However, for calculating the room temperature the real temperature, measured by the ambient temperature sensor (corrected via the corresponding radiator-dependent „K_{air}-value“), is used as the basis.

3.3.3.1 Heat Accumulation Mode

In order to avoid faulty measuring due to heat accumulation (e.g. in case the radiator is hidden by panels), the device switches from a defined ambient temperature (e.g. 28°C) to the one sensor mode and calculates with an ambient temperature of 20° C.

3.3.4 Comparison of the Measuring Principles

Single sensor device with start sensor measuring principle	**Double sensor measuring principle**
For heating systems with tm_{min} ≥ 55 °C	For heating systems with tm_{min} ≥ 35 °C
The heat cost allocator calculates with a set reference temperature of 20 °C	The heat cost allocator calculates with a variable reference temperature $T_{air\ temperature}$
Application: Single sensor devices with start sensor are used in areas where normal ambient temperatures are given. For low temperature heating systems the double sensor device is recommended.	Application: Double sensor devices are used in areas where precise measuring of the ambient temperature is necessary and/or in low temperature heating systems.
For radiators which are covered or blocked by fixtures, normally the single sensor devices are used because the double sensor device is not in a position to capture the current ambient temperature due to the heat accumulation.	Radiators which are covered or blocked by fixtures are detected automatically by the double sensor system which then switches over internally to the single sensor mode.

Within one billing unit, only one measuring principle (either single sensor measuring principle with start sensor or double sensor measuring principle) can be used. Mixed fitments or the use of different types of devices in the same billing unit is therefore also not allowed.

The processes for determining the K-value for the single sensor device with start sensor and the double sensor device are identical. It is only the measuring principle that is different.

3.3.5 Temperature Measurement and Calculation

The temperature is measured with an NTC – resistor. For the resistance measurement the discharging time of the capacitor is measured. The measurement is carried out as follows:

3.3.5.1 Measuring of a Resistor, Principle

1. Charging of the capacitor

2. Discharging of the capacitor through the resistance which is to be measured. At the same time a 16+1 bit-timer starts with the discharge to measure the discharging time

3. As soon as the voltage on the capacitor terminals reaches a certain value, an interrupt is induced and the timer stops. At the same time the discharging of the capacitor is stopped as well.

After the three mentioned stages, the timer provides a 16-bit-value which corresponds to the discharging time of the capacitor through the resistance which is to be measured. In case the resistance is known (reference resistance), the constant ratio between discharging time and resistance can be assessed.

3.3.5.2 Calculation of the Value of an Unknown Resistance (e.g. sensor resistance)

The capacitor C is loaded at constant current. The interrupt at the end of the discharge is triggered by the same threshold voltage (a fraction of the discharge voltage). If these two conditions are met, the discharge time is directly proportional to the resistance. With a reference resistance R_{ref} whose

exact value is known, it is now possible to calculate the unknown resistance value R_x with the following equation:

$$\frac{t_{ref}}{R_{ref}} = \frac{t_X}{R_X} \Rightarrow R_X = \frac{t_X}{t_{ref}} \cdot R_{ref}$$

From this equation the self-calibration of the converter can be derived, which is given by measuring the discharging time through the reference resistance.

3.3.5.3 Measuring of the Radiator and Ambient Temperature

The following measurements are carried out during one cycle:

1. Measuring of the reference resistance R_{ref}
2. Measuring of the ambient temperature sensor NTC_A
3. Measuring of the radiator temperature sensor NTC_R

The measuring values are calculated with the following formula:

$$NTC_A = \frac{t_{NTC_A}}{t_{ref}} \cdot R_{ref} \qquad NTC_R = \frac{t_{NTC_R}}{t_{ref}} \cdot R_{ref}$$

The reference resistance value is defined ex works with a tolerance of 0.5% with 50 ppm. The reference resistance features an excellent temperature and long-term stability.

The capacitor value and the threshold voltage have to remain stable over the whole cycle. However, they can vary at the medium- or long term without causing any failures because the self-calibration of the converter is repeated in every cycle while measuring the reference resistance.

3.3.6 Calculation of the Displayed Consumption Value

The value displayed on the heat cost allocator is calculated as follows:

Single sensor device

$$Q = Kc * Kq \int \left(\frac{T_H - 20}{60} \right)^{1.33} dt$$

Double sensor device

$$Q = Kc * Kq \int \left(\frac{T_H - T_A}{60} \right)^{1.33} dt$$

Explanation:

	T_H	Temperature of the radiator surface in [°C]
	T_A	Ambient temperature in [°C]
	Q	Displayed consumption value, **without unit**
	Kc	Factor that carries back the ΔT measured at a normalized value
	Kq	Factor Kq is a numerical value of the nominal power of the radiator stated in [KW]

Unit scale: Kc = 1 and Kq = 1
Product scale: Kc <> 1 and Kq <> 1

3.3.7 Start of Counting

The updating (increment) of the consumption value is carried out under the following conditions:

During winter period (heating period):

$(T_R \geq 25\ °C)$

Or

$(T_R \geq 20\ °C)$ AND $(T_R - T_A \geq \triangle T_{MIN})$

During summer period (off heating period):

$(T_R \geq 35\ °C)$

Or

$(T_R \geq 20\ °C)$ AND $(T_R - T_A \geq \triangle T_{MIN})$

Explanation:
- T_R Radiator temperature
- T_A Ambient temperature
- $\triangle T_{MIN}$ Minimum temperature difference between radiator and room
  - 3K for standard device (winter heating period standard setting)
  - 4K for remote sensor device (summer heating period standard setting)

  4K pour l'appareil avec sonde à distance

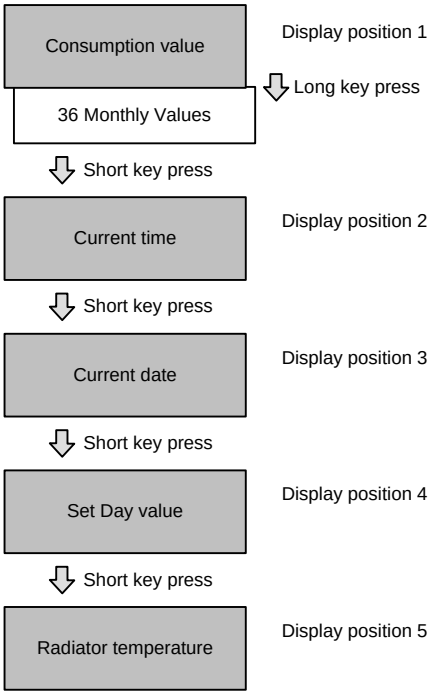
Note:
The thresholds of starting (25°C et 35°C) are indicative values. These temperatures of starting are adjusted according to the needs and specificities of the customer.

3.4 Display and Additional Functions

3.4.1 The Menu Sequences of the Digital Display

The menu sequences

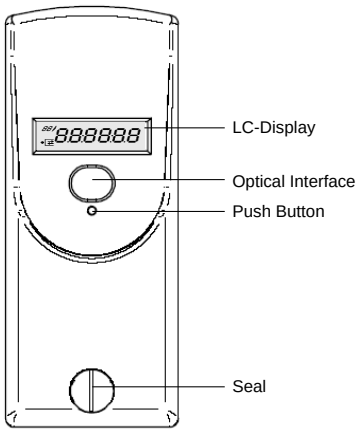
Ex-factory all menu sequences are activated. With the software **Prog6** the order of the menu sequences 1 - 15 can be changed in any order. However the order within the individual menu sequences 1 – 15 cannot be changed. It is also possible to hide individual menu sequences so that they are not visible to the end-user.
When reading out over the optical interface or via radio the complete set of data is always readout and transferred.



Operation of the Push Button

When pushing the button briefly the digital display always goes to the next menu sequence.

When pushing the button in one menu sequence for 2 seconds the individual values within the selected menu sequence can be accessed. When the last value within one menu sequence has been displayed, the 1st position will be displayed by pushing the button again.
If the button is not pushed for 2 minutes, the digital display returns to the cumulated consumption value.



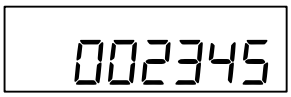
3.4.2 The Digital Display

During normal operation the display is deactivated and can be activated by pushing the button.
If the button is not pushed, the display will be active for 2 minutes only.
On request, the heat cost allocator is also available with permanent display 24h/24h or with a rolling menu displayed.

Consumption Value Unit Scale

On the display of the heat cost allocator with unit scale an index ***u*** for unit is shown on the left side. If the index ***u*** is not displayed, the heat cost allocator is equipped with the product scale.

Consumption Value Product Scale



When commissioning the device this value is 000000. When reaching the value 999999, the counting restarts automatically at 000000.

Display in Euro

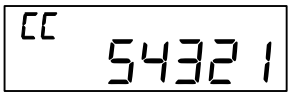
The heat cost allocators 6556/566/868 have the option to display the heating cost in Euro.
The cost in Euro indicated on the display is only approximate and is based on historical values from the previous year.
The displayed cost does not necessarily represent the charges to be paid.
Manufacturer and supplier decline any claims concerning the use and interpretation of the indicated values.
This option can be activated via the software **Prog6**.

Set day Value

With the index **Sd** the consumption value recorded at midnight of the set day is displayed.
The consumption value recorded can be in unit scale or in product scale. It's depending of the unit setting.

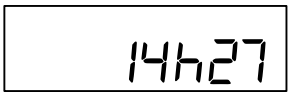
If a new device has not yet reached the programmed set day, 000000 is displayed.

Check code



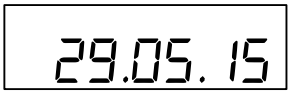
With the index **CC** the check code for the plausibility check of the manual readout is displayed.

Time



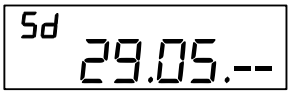
The current time (**always winter time**).

Date



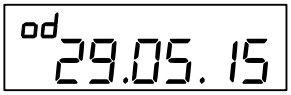
The current date of the heat cost allocator.

Set Day



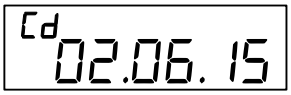
It is possible to program an annual set day on which the cumulated consumption value as well as the maximal radiator temperature are recorded.
With the index ***Sd*** the programmed annual set day is displayed.

Date of Opening of the Device



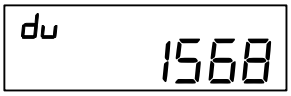
Each heat cost allocator is equipped with a manipulation protection which detects an unauthorised opening of the device after installation to the radiator. The date of the last opening of the device is recorded and displayed with the index ***od***.

Commissioning Date



With the index ***Cd*** the commissioning date is displayed, i.e. the date on which the device has been activated by pushing the button or during the mounting of the aluminium back plate if the function automatic commissioning is set.

Cumulated Duration of the Opening of the Device

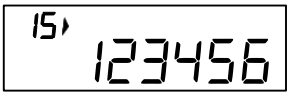


With the index **du**, the cumulated duration in minutes during which the device was opened is detected. This display turns up only after commissioning in case the heat cost allocator was opened or removed.

Fraud Counter

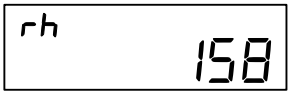
This value indicates how many times the fraud / manipulation was activated.

Identification Number



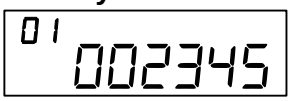
With the index an 8 digit identification number is displayed. Ex-factory the serial number is identical with the identification number. The first two digits of the identification number are the two small digits on the left upper side of the digital display.

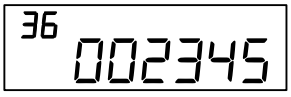
Running Hours



With the index **rh**, the running hours is displayed. This value can be compared to the battery use duration.

Monthly Values





The cumulated consumption values are recorded automatically at midnight on the last day of each month.

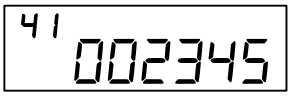
Number of monthly values: 36

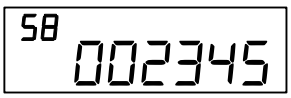
The small digits on the upper left side show the number of previous monthly values. Digit 01 stands for the recent full month and digit 36 stands for the least recent month. All monthly values are set to 000000 when the device is commissioned.

Note 566 radio :
The radio heat cost allocator 566 only transmits the first 18 monthly values via radio telegram.

Note 868 radio :
Short telegram, OMS compliant: no monthly values transmitted via radio telegram.
Long telegram for **Walk-by reading**, the first 18 monthly values transmitted via radio telegram.

Half Monthly Values





The cumulated consumption values are recorded automatically at midnight on the 16th of each month.

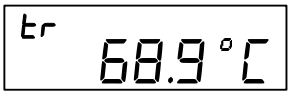
Number of monthly values: 18

The small digits on the upper left side indicate the number of half monthly values. Digit 41 stands for the recent half monthly value and digit 58 for the least recent half monthly value. All half monthly values are set to 000000 when the device is commissioned.

Note 566 radio :
No half monthly values transmitted via radio telegram.

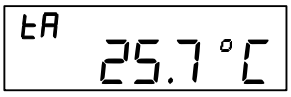
Note 868 radio :
Short telegram, OMS compliant and **long telegram** for **Walk-by reading:** no half monthly values transmitted via radio telegram.

Radiator Temperature



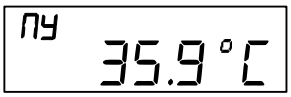
With the index ***tr*** the current radiator temperature is displayed.

Ambiant Temperature



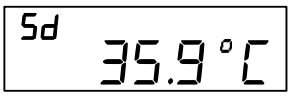
With the index ***tA*** the current ambient temperature is displayed.

Maximum Radiator Temperature of the Current Heating Period



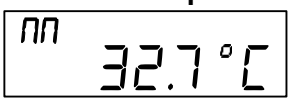
With the index **ПУ** the maximum radiator temperature of the current heating period (since the Set Day) is displayed.

Maximum Radiator Temperature of the Previous Heating Period



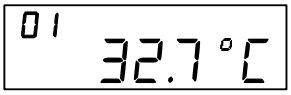
With the index ***Sd*** the maximum radiator temperature of the previous heating period (before the Set Day) is displayed.

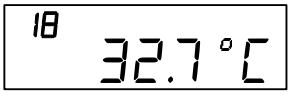
Monthly Value for Maximum Radiator Temperature



With the index **ПП** the maximum radiator temperature of the currently month is displayed.

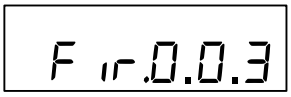
Number of monthly values: 18





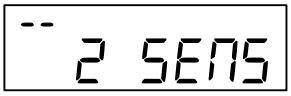
Recording of 18 monthly values for the maximum radiator temperature.
The small digits on the upper left side show the number of previous monthly values. Digit 01 stands for the recent full month and digit 18 stands for the least recent month.
All monthly values are set to 000000 when the device is commissioned.

Software Version



On the right side the software version x.x.x of the heat cost allocator is displayed.

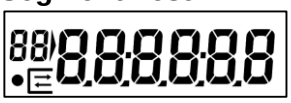
Measuring Principle



The index **--** or ***FF*** indicates the type of the radiator sensor:
-- = Standard device, compact sensor.
FF = Remote sensor device, remote sensor.

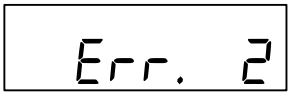
1 SENS = single sensor device with start sensor.
2 SENS = double sensor device.

Segment Test



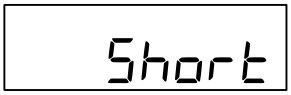
Segment test of the display.

Error Message



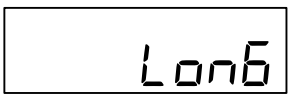
If an error is detected, ***Err*** is displayed in the first display sequence with the corresponding error message.

wM-Bus mode



Telegram defined into heat cost allocator.
Type of telegram must be defined when ordering.

Short telegram (**Short**) used.



Long telegram (**LonG**) used.

3.4.3 Rolling Display

The EHCA 565, 566 and 868 also feature the possibility of a rolling display 24h/24h.
With the software **Prog6** or **Sontex916/ Tools916** or **Tools Supercom**, it is possible to individualize the rolling display.
Up to 15 parameters can be chosen optionally from the list below. These parameters can be combined in any order and are then shown on the rolling display.

- Consumption value.
- Time.
- Date.
- Set Day.
- Set Day value.
- Monthly values.
- Half monthly values.
- Radiator temperature.
- Ambient temperature.
- Identification number.
- Maximum radiator temperature of the previous heating period.
- Maximum radiator temperature of the current heating period.
- 18 monthly values for the maximum radiator temperature.
- Error code.
- Manipulation protection: storing of the duration of the last manipulation with date and the accumulated duration of all manipulations in minutes.
- Fraud Counter.
- Segment test.
- Software version.
- Running hours.
- Commissioning date.
- Measuring principle, single sensor device with start sensor or double sensor device.
- Short or long telegram for radio wM-Bus.

The duration of the display of the values can be chosen individually between **1 - 30** seconds.

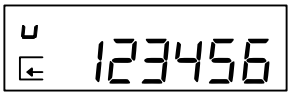
Example:
Order and duration of display

- Pos. 0 : Error (parameter ex factory, cannot be changed) [5 s]
  (only displayed in case of an error message)
- Pos 1 : Time [1 s]
- Pos 2 : Segment test [5 s]
- Pos 3 : Consumption value [10 s]
- Pos 4 : Set Day [1 s]
- Pos 5 : Set Day value [8 s]
- Pos 6 : Monthly value [5 s]
- Pos 7 : Blank (therefore no display).
- Pos 8 – Pos 15 : Blank (therefore no display. It is not necessary to occupy all positions).

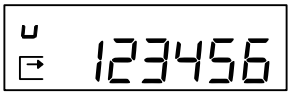
The rolling display can also be deactivated by the **Prog6**, i.e. the device operates as in standard menu mode except that only these values and the values of the corresponding sub-menus that have been defined in the rolling menu can be displayed by pushing the button. After 2 minutes during which the button has not been pushed, the display goes out.

3.4.4 Communication Indicator and Measuring Indicator ●

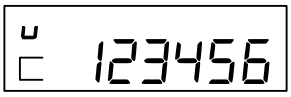
The communication indicator displays if the heat cost allocator is currently making a calculation and/or if it communicates internally or externally over the optical or wireless interface (only radio Supercom).



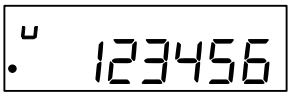
If the arrow of the communication indicator points inwardly internal communication takes place over the optical or wireless interface (only radio Supercom).



If the arrow of the communication indicator points outwards external communication takes place over the optical or wireless interface (only radio Supercom).



If the frame of the communication indicator appears the heat cost allocator has detected a wake-up signal (optical or radio Supercom)



If the point indicator appears the heat cost allocator is carrying out a measuring or a calculation.

3.4.5 Real Time Clock and Calendar

The device has a 24 h real time clock and a calendar. However, the change from summer to winter time is not taken into account. The calendar is programmed until December 31 2099, including all leap years. The real time clock as well as the date of the heat cost allocator can be readout over the optical interface or via radio and if necessary be updated.

If the current date and time have to be updated over the optical interface or via radio, it is necessary to check the date of the computer first. Date and time of the device aim at those of the computer. If the reading/programming device (computer/PDA/ Smart Phone) has a wrong time, this time will be programmed into the heat cost allocator and suddenly no longer be reached at the usual time, because the time of the heat cost allocator possibly is shifted by several hours.

Important : The time on your readout / programming interface must always be set to winter time

3.4.6 Check code

A special additional feature of the electronic heat cost allocator **565 / 565 / 868** is the check code function for the postcard mail-in method.
With especially developed algorithms a 5 digit check code is generated out of several device data. With this check code the values stated on the postcards mailed-in by tenants can be cross checked.

For this check, the following parameters are required:

- Identification number.
- The date.
- The current consumption value.
- The check code.

For the verification of the check code Sontex places all necessary tools (programs, formulas) at the disposal of the authorized personnel.

3.5 Special Functions

3.5.1 Suppression of Summer Counting

The period during which summer counting is suppressed can be programmed by the software.
If the heat cost allocator is in the period of summer counting suppression, consumption measuring is deactivated. If an automatic readout is carried out during this period the temperatures can be read anyway since the temperature measuring is still active.

3.5.2 Annual Reset of the Consumption Value

The function of the annual reset of the cumulated consumption value can be programmed by the software over the optical interface. One of the following options can be chosen for the reset:

- Set Day
- Never

Please note that only the cumulated consumption value is reset. All other values are not reset.

3.5.3 Unit Scale and Product Scale

For the heat cost allocators **Sontex** 5**65 / 566 / 868**, distinction is made between the unit scale and the product scale. See chapter **7.2 Table of Rating Factors**.

3.5.3.1 Advantages of the Unit Scale

If heat cost allocators are used with the same scale on all radiators, this scale is called unit scale. The display values are the same on the different radiators if the heat cost allocators are exposed to the same temperature for the same period of time.
The evaluation of the display values is carried out arithmetically with the rating factors of the calculation software to receive the final consumption values.

- Easy and quick installation of the heat cost allocator, no programming necessary.
- Possible errors by doing the scaling on site are avoided due to allocation by experts.

3.5.3.2 Advantages of the Product Scale

With the product scale, the radiator rating data are programmed in the heat cost allocator on site. The overall rating factor K is calculated directly in the heat cost allocator and thus the consumption value is displayed immediately.

- The actual consumption of each consuming point within one billing unit can be compared easily and quickly on site.

3.6 Parameterization

The software **Prog6** allows the parameterization over the optical interface.
To protect heat cost allocator against fraud, a password has been integrated into the **565 / 566 / 868** products, therefore also in the software. The default ‘’installer’’ password ex-factory of the heat cost allocator is "00001234", and may be changed by the user.

3.7 Error

The heat cost allocator displays an error message with the 3 letters “ Err. ” and a code. If several errors occur at the same time, the different codes are added together.
The error is displayed in the first position of the display menu. It will still be possible to select all the other display menus by pressing the navigation button. If the navigation button is no longer pressed for a period of 2 minutes, the error code will automatically appear again in the first position of a display menu.
Display of an error automatically disappears when the error is no longer present.

3.7.1 List of Errors

- Err. 1 Manipulation (fraud).
- Err. 2 Measuring error.
- Err. 32 Push button constantly pushed.
- Err. 64 Measured temperature not within temperature range (0...105°C ; 0...120°C remote sensor).

4. Installation

4.1 Introduction

To guarantee the proper functioning of the heat cost allocator **565 / 566 / 868**, it is of great importance that it is installed by an expert. On one hand, a constant heat transfer between radiator and heat cost allocator has to be guaranteed. On the other hand, the installation of the heat cost allocators on a large variety of radiator types should be as easy as possible.

The installation can be carried out in two different ways.

- The standard device is installed directly on the radiator.
- For the wall-mounted version the remote sensor is installed on the radiator and the heat cost allocator is wall-mounted.

For the installation of the heat cost allocators, special fastening-parts kits are available. To avoid faulty installation, we also recommend reading the Kc-data in the data base prior to the installation. (See chapter **7.2 Table of Rating Factors**).

The heat cost allocator is an electronic device which – like all other similar devices – has to be handled with care. It is sensible to electric discharge and contacting certain areas of the PCB. Electric discharge can destroy the device or – even worse - damage it in a way that it fails after an indefinite period of time.
For this reason it is essential in any case to avoid contact with the PCB.

4.2 DIN Standard Requirements for the Installation

- Heat cost allocators can be installed in heating systems where the mean temperature is between the upper operating temperature limit t_{max} and the lower operating temperature limit t_{min} (t_{max} and t_{min} are stated in the technical data, see chapter **2.3 Technical data**).
- The installation of the devices has to be durable and avoid manipulations.
- The devices have to be installed in a place where sufficient correlation between the displayed value and the heat output of the radiator is given over a maximum operating range.
- Within a billing unit (in case of pre-distribution of the energy consumption: within a users' group) only heat cost allocators of the same manufacturer and the same type with identical rating systems may be used. Each device type has to be identifiable as such.
- Combinations of radiators and heat cost allocators with a measured value of c > 0.3 in basic condition are not permitted. In exceptional cases c-values of up to 0.4 are permitted within a billing unit if the concerned heating surface does not exceed 25 % of the overall heated surface or if the mean ambient temperature is above 80°C. Heat cost allocators may only be installed to radiators where the c-value is known at the time of billing.
-

4.3 General Restrictions

Electronic heat cost allocators cannot be used with steam heating, floor heating, ceiling radiant heaters, flap-controlled radiators and electrical radiator.

In case of combined valve- and flap-controlled radiators, the installation of an electronic heat cost allocator is only permitted if the flap control is dismounted or maintained in position „open".

Convector heaters where the performance can be altered by an electric blower as well as heat towel racks with an electric heating cartridge may only be equipped with an electronic heat cost allocator if the additional electric attachments are dismounted or shut down.

A mixed assembly (old generation (555 / 556) and new generation (565 / 566)) on the same installation is permitted under certain conditions. Please contact us for further information.

4.4 Operating Range

The Sontex heat cost allocators can be used in heating systems with the following mean heating medium temperatures:

For single sensor devices with start sensor

- 55°C…105° C for standard heat cost allocator.
- 55°C…120°C for wall-mounted heat cost allocator (remote sensor).

For double sensor devices

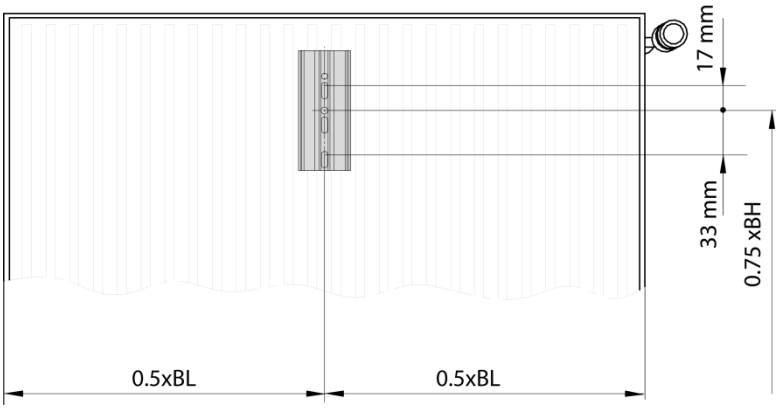
- 35°C…105° C for standard heat cost allocators.
- 55°C…120°C for wall-mounted heat cost allocators (remote sensor).

A heat cost allocator can be used in heating systems where the suitability of the system is in line with the operating conditions for which the heat cost allocator has been approved.

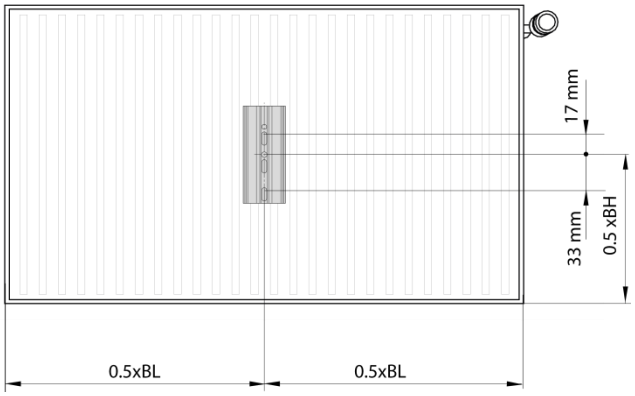
4.5 Allocator Installation Position – Standard Installation

The installation position on the radiator is directly related to the type of radiator, its heating power and the heat cost allocator. To guarantee the correct data collection, the heat cost allocators must be installed and used in a certain position in accordance with requirements.
The radiator's heat is transmitted directly via the installation back plate to the device's temperature sensor or to its remote sensor

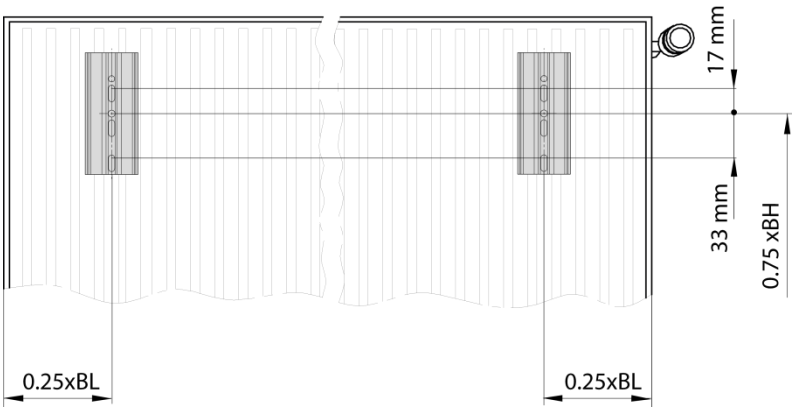
- The **Sontex** heat cost allocator is always installed in the centre of the overall length (0.5 x BL) of the radiator, at a height of ¾ of the overall height (0.75 x BH) measured from the bottom.



- If the height of the radiator is less than (<) 470 mm, the heat cost allocator must be installed at 50% BH.



- If the radiator has a length of more than 3 m, two heat cost allocators must be installed. These radiators are considered to be 2 radiators arranged next to each other.

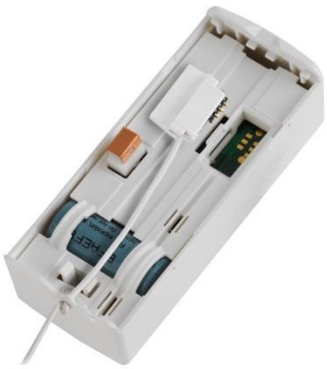


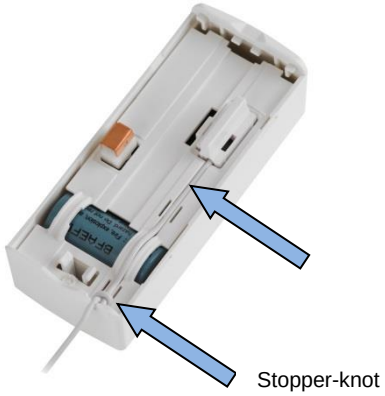
General notes:

- The spacing for welding the M3 threaded bolts must be 5 cm. Before welding, the lacquer has to be removed from the welding points. It must be ensured that the bolts are welded onto a water-bearing area or a flute.
- Only use **M3 bolts** with a **maximum length of 8 mm** or there is a risk that the device will be damaged.
- Welding to aluminium radiators is not permitted.
- If the radiator has an even number of sections the heat cost allocator should be installed between the middle sections.
- If the radiator has an uneven number of sections the device should be installed next to the valve-sided middle section.
- Mount the back plate through the 2 oval holes, adjusted to the top edge of the holes.

4.6 Mounting the Remote Sensor

For each version of heat cost allocator, it is possible to plug the connector of the remote sensor into an interface inside the heat cost allocator.
The remote sensor will be automatically detected by the heat cost allocator.
Once equipped with a remote sensor, the heat cost allocator will only work for an application with remote sensor.
Remote sensor version with 2 m cable. The cable includes a stopper-knot.





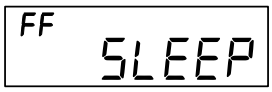
Return the heat cost allocator and plug the connector of the remote sensor into the interface inside the heat cost allocator.

Insert the remote sensor cable into the groove provided up to the slot of housing.

Place the stopper-knot inside the housing. The knot will avoid any traction on the connector.

Proceed to the commissioning of the heat cost allocator on the aluminium back plate. **Take care not to stick the cable.**

Remark concerning the recognition of the remote sensor:
Once heat cost allocator is fixed with/against the aluminium back plate, the LCD-display will show the following message during few seconds:



- The index **FF** indicates that the heat cost allocator has recognized the remote sensor.
- If the remote sensor is not detected by the device, the index **--** will be displayed. The index **--** indicates also a standard device with a compact sensor. If the remote sensor is not recognized, check the plug connector in the heat cost allocator.

Once heat cost allocator has recognized the remote sensor, push the seal pre-installed by Sontex in the slot of the housing. Then press until the seal clicks into the aluminium back plate.

Respect the color code of the radiator sensor and the remote sensor:

- ***Heat cost allocator Sontex 565 X, Sontex 566 X and Sontex 868 X***: the radiator sensor and the remote sensor are manufactured with a yellow color.
- ***Heat cost allocator Sontex 565, Sontex 566 and Sontex 868:*** the radiator sensor and the remote sensor are manufactured with a white color.

Once equipped with a remote sensor, the heat cost allocator will only work for an application with remote sensor.
If the remote sensor is disconnected from the heat cost allocator, an error message will be displayed.

During the commissioning of the heat cost allocator on the aluminium back plate, there are 2 possibilities to turn on the heat cost allocator:

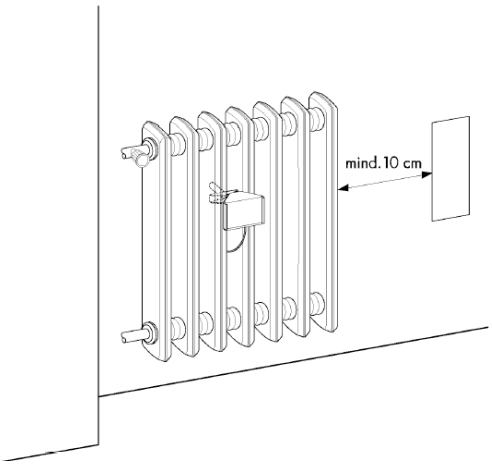
1. By an automatic commissioning during the mounting on the aluminium back plate.
   See chapter **5.1 Automatic commissioning during the installation**

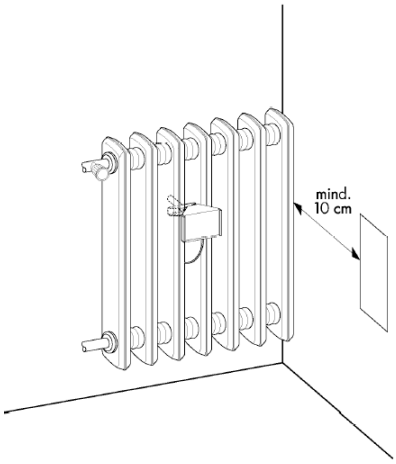
By pushing the push button. See chapter **Error! Reference source not found. Commisoning by pressing push button**

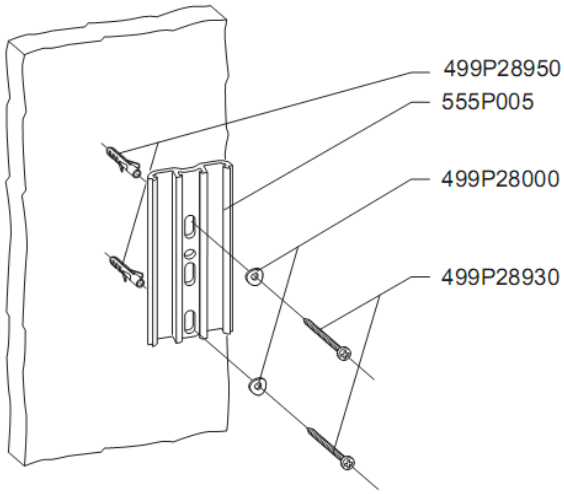
4.7 Wall Mounting

The heat cost allocator has to be wall-mounted if the overall height of the radiator is less than 250 mm or if, for aesthetical reasons, the heat cost allocator cannot be mounted directly onto the radiator.

In this case, the heat cost allocator is wall-mounted on the side opposite to the valve and at a minimum distance from the radiator of 10 cm.





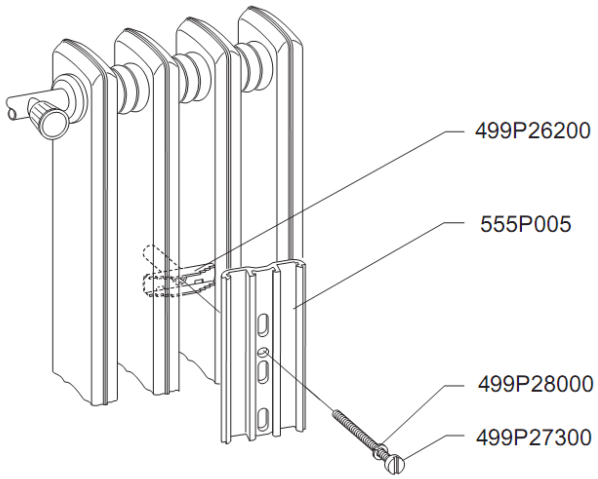


- After marking and drilling the holes, the aluminium profile is fastened with 2 metal screws and 2 spring washer.
- The parts necessary for the wall-mounting are included in the corresponding fastening-parts kits for the installation of the remote sensor.
- After installation of the device to the wall and the sensor to the radiator, the sensor cable is laid in a cable duct.
- Mount the back plate through the 2 oval holes adjusted to the top edge of the 2 oval holes.

Mounting Accessories	**Part. No.**
2 plastic dowels ∅ 5 mm 3.25	499P28950
1 aluminium back plate (supplied with EHCA)	555P005
2 spring washers	499P28000
2 oval head wood screws 3 x 35	499P28930

4.8 Installation of Fastening Parts Kits

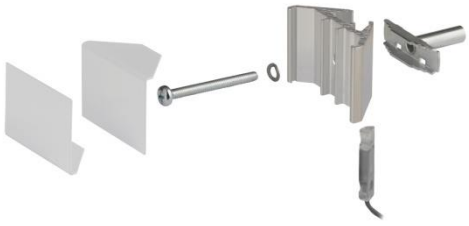
4.8.1 Installation to Sectional Radiator, direct mounting

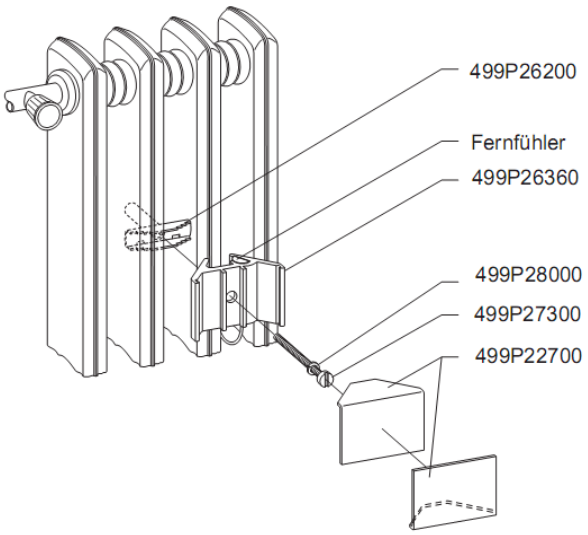


- For radiators made from cast iron it is necessary to apply heat transfer compound **(Electrolube HTS)** onto the contact surfaces of the aluminium profile before installation. Mount the back plate through the little hole in the middle.

Mounting Accessories	Part. No.
1 tensioning bracket	499P26200
1 aluminium back plate (supplied with EHCA)	555P005
1 cylinder head screw M4 x 40	499P27300
1 spring washer B 4	499P28000

4.8.2 Sectional Radiator, wall mounting

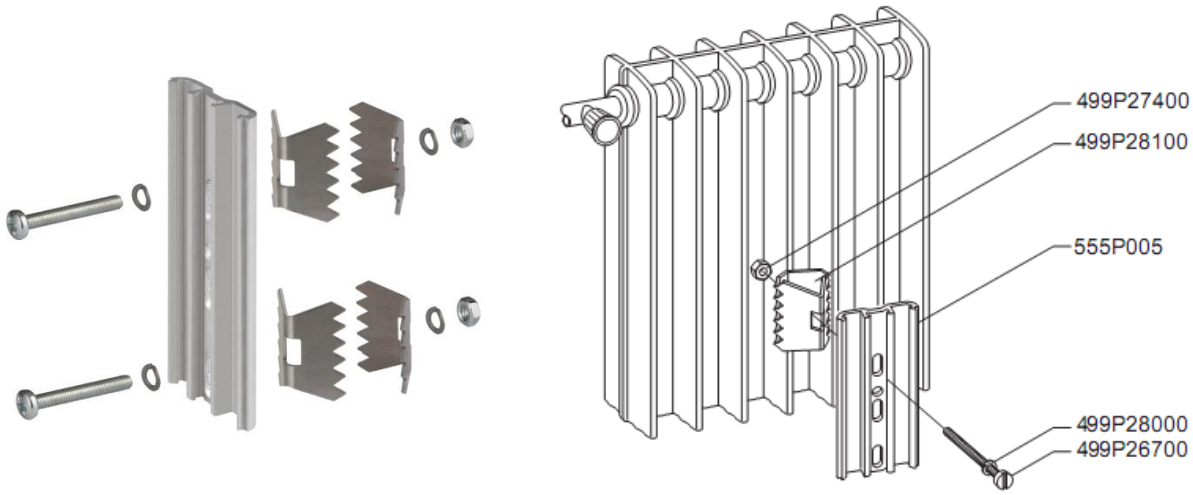




- The remote sensor has to be fixed in the receiver housing with adhesive to avoid loosening.
- The contact surfaces of the cover angles have to be coated with adhesive before bringing them together.

Mounting Accessories	Part. No.
1 tensioning bracket	499P26200
1 aluminium profile „receiver housing“	499P26360
1 spring washer B 4, DIN 128	499P28000
1 cylinder head screw M4 x 40 (with crosshead)	499P27300
2 cover angles, white	499P22700
2 plastic dowels ∅ 5 mm 3.25 (wall)	499P28950
2 oval head wood screws 3 x 35 (wall)	499P28930

4.8.3 Installation on Folded Radiator



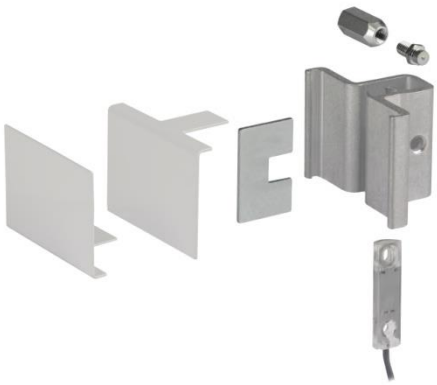
- Mount the aluminium back plate through the small round hole

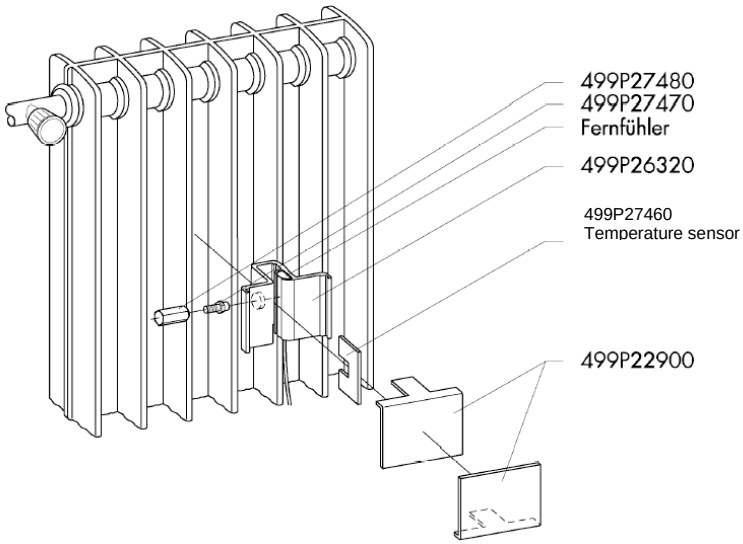
Mounting Accessories	Part. No.
1 hexagon nut B M4, DIN 934	499P27400
2 bracing angles	499P28100
2 spring washers B4, DIN 128	499P28000
1 oval head screw M4 x 30	499P26700
1 aluminium back plate (supplied with EHCA)	555P005

- If necessary use 2 x 2 bracing angles to improve more stability (photo) and, if needed, short the screw

Mounting Accessories	Part. No.
2 hexagon nut B M4, DIN 934	499P27400
2 x 2 bracing angles	499P28100
4 spring washers B4, DIN 128	499P28000
2 oval head screw M4 x 30	499P26700
1 aluminium back plate (supplied with EHCA)	555P005

4.8.4 Folded Radiator, wall mounting

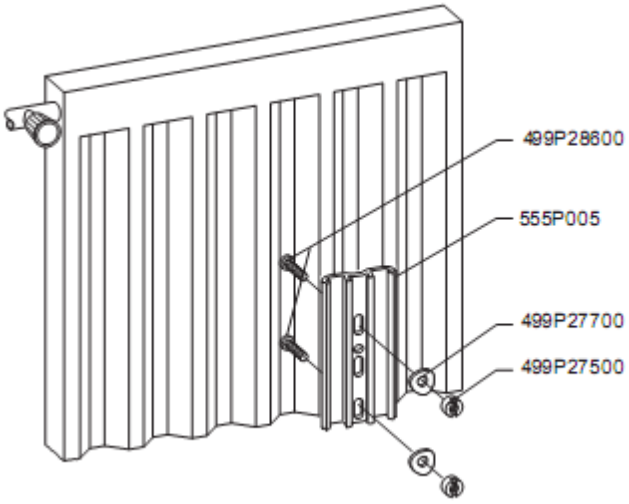




- The remote sensor has to be fixed in the receiver housing with adhesive to avoid loosening.
- The contact surfaces of the cover angles have to be coated with adhesive before bringing them together.

Mounting Accessories	Part. No.
1 tensioning nut	499P27480
1 tensioning bolt	499P27460
1 aluminium profile « receiver housing»	499P26320
1 safety plate	499P22500
2 cover angles, white	499P22900
2 plastic dowels ∅ 5 mm 3.25 (wall)	499P28950
2 oval head wood screws 3 x 35 (wall)	499P28930

4.8.5 Installation to Panel Type Radiator



- Mount the back plate through the 2 oval holes adjusted to the top edge of the 2 oval holes.

Mounting Accessories	Part. No.
2 threaded bolts M3 x 8 (see page 33!)	499P28600
2 spring washers B3, DIN 137	499P27700
2 slotted nuts M3, DIN 546	499P27500
1 aluminium back plate (supplied with EHCA)	555P005
Tool: Screw driver size 5 for M3	555P032

or

Mounting Accessories	Part. No.
2 threaded bolts M3 x 8 (see page 33!)	499P28600
2 Nuts M3 6-kant size 5.5 with flange	555P033
1 aluminium back plate (supplied with EHCA)	555P005
Tool: Socket wrench hexagonal size 5.5	555P034

or

Mounting Accessories	Part. No.
2 threaded bolts M3 x 8 (see page 33!)	499P28600
2 Nuts M3 mit 6-kant size 5.5	555P035
1 aluminium back plate (supplied with EHCA)	555P005
Tool: Socket wrench hexagonal size 5.5	555P034

or

Mounting Accessories	Part. No.
Silicone glue Pactan 6010, (Vendor*: Tremco Illbruck GmbH & Co. KG* *D-92439 Bodenwöhr, T +49 (0) 9434 208 0)* 1 aluminium back plate (supplied with EHCA)	555P036 555P005
Tool: Acetone, Cotton wool	

4.8.6 Mounting of heat cost allocators with glue

Of using glue for the mounting of heat cost allocator, please refer to the Standard EN834.

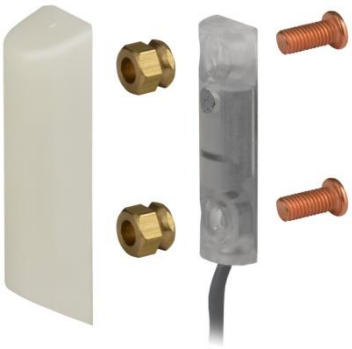
Mounting Accessories	Part. No.
Silicone glue Pactan 6010, (Vendor*: Tremco Illbruck GmbH & Co. KG* *D-92439 Bodenwöhr, T +49 (0) 9434 208 0)* 1 aluminium back plate (supplied with EHCA)	555P036 555P005
Tool: Aceton, Cotton wool	

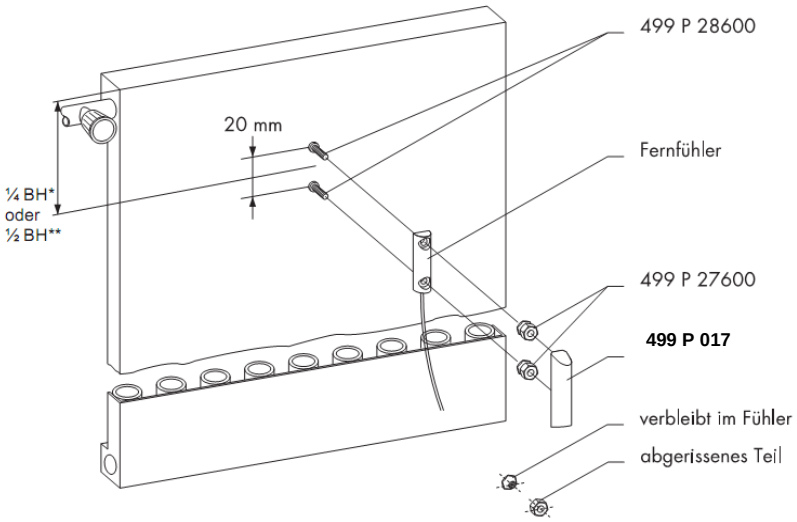
- Clean the aluminum back plate with Acetone soaked cotton wool
- Clean the gluing spot on the radiator with Acetone soaked cotton wool.
- Before and after the gluing, trash the first and last 10 cm of glue from the cartridge
- Assemble the heat cost allocator: Aluminum back plate to body and seal it.
- Apply 2 tracks of Pactan glue to the aluminum back plate, left and right of the channel
- Press the heat cost allocator to dedicated spot on the radiator and sway the heat cost allocator to dispense the glue evenly.
- Press firmly and align. Wait 2-3 minutes check, align and press. Make sure the heat cost allocator is mounted straight. The heat cost allocator must hold by itself. After 10 hours the heat cost allocator is firmly glued to radiator.
- Remove redundant glue with a screw driver. Clean the radiator with paper towels.

Removal of glued heat cost allocators

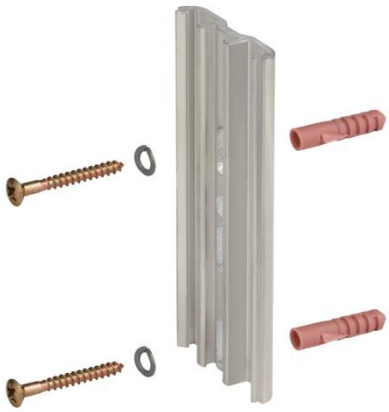
- Remove the aluminum back plate with a screw driver size 2 and a hammer: Position the screw driver carefully in the middle channel and hammer until the aluminum plate can be removed.
- Remove glue carefully with a carpet cutter and clean glued surface with Acetone.

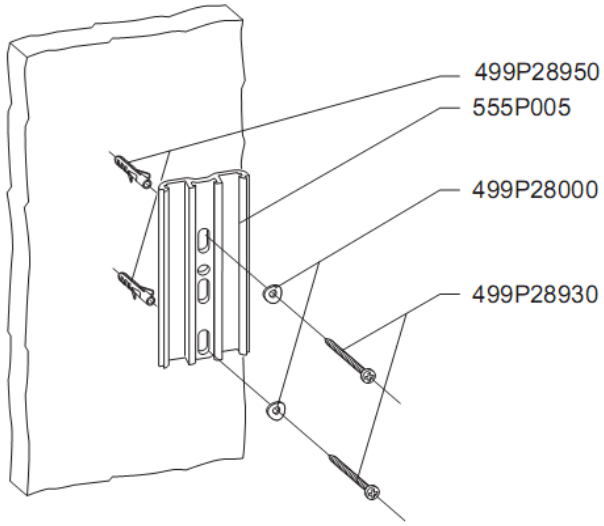
4.8.7 Panel Type Radiator, wall mounting





- The remote sensor has to be coated with heat transfer compound **(Electrolube HTS)** on the contact surface.
- Turn on the pull-off nuts 499P27600 till it breaks. After put on the HK-sensor cover to ensure the manipulation protection

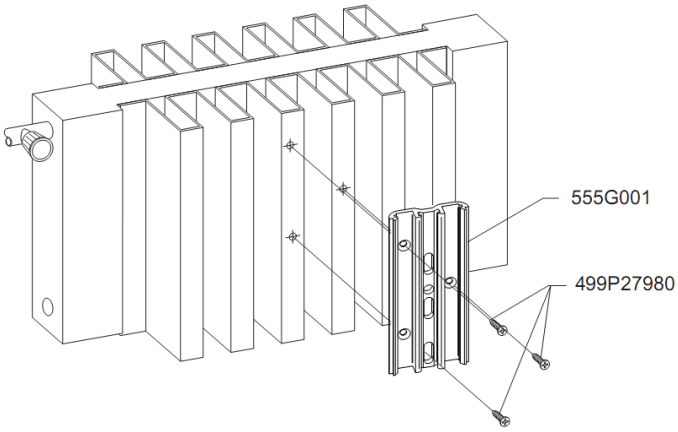




- Mount the back plate through the 2 oval holes adjusted to the top edge of the 2 oval holes

Mounting Accessories	Part. No.
2 threaded bolts M3 x 8 2 pull-off nuts M3 1 HK-sensor cover	499P28600 499P27600 499P017
2 plastic dowels ∅ 5 mm 3.25 (wall) 2 oval head wood screws 3 x 35 (wall)	499P28950 499P28930

4.8.8 Installation to Panel-Type Radiator with Front Convection Plate



- The contact surfaces of the aluminium screws have to be coated with heat transfer compound **(Electrolube HTS)**.
- The aluminium screws have to be fastened with adhesive to avoid loosening

Mounting Accessories	**Part. No.**
3 sheet-metal screws 2.9 x 9.5	499P27980
1 aluminium back plate	555G001

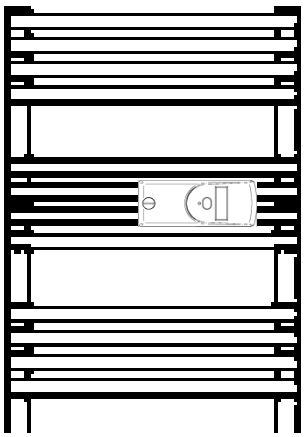
4.8.9 Bathroom radiator – Towel rails

Heat cost allocator mounted verticaly on distributor or collector part

- Assembly with 2 threaded bolts welded on 75% BH +50mm on the side or front of the flow distributor or return collector

Mounting Accessories	Part. No.
2 threaded bolts M3 x 8 (see page 33!)	499P28600
2 spring washers B3, DIN 137	499P27700
2 slotted nuts M3, DIN 546	499P27500
1 aluminium back plate (supplied with EHCA)	555P005
Tool: Screw driver size 5 for M3	555P032

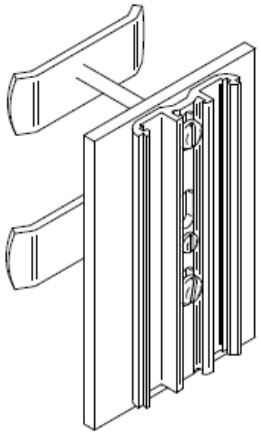
Heat cost allocator mounted horizontally on cross tubes

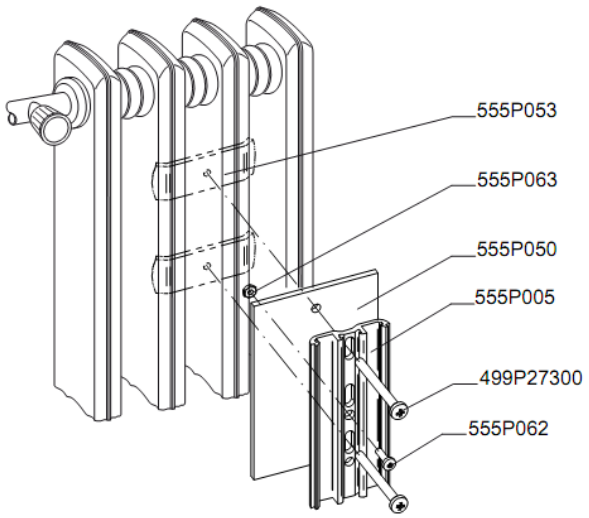


- Assembly to the nearest possible place to the flow place or return place on the cross tubes on 75% BH with 2 tensioning brackets

Accessoires de fixation	Art. Nr.
2 Equerre de fixation	499P26200
1 Profil aluminium (livré avec le répartiteur)	555P005
2 Vis cylindrique M4 x 40	499P27300
2 Rondelles B 4, DIN128	499P28000

4.8.10 Sectional Radiator wide

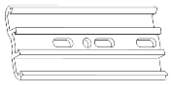
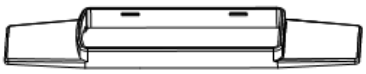




- Mount the back plate through the 2 oval holes adjusted to the top edge of the 2 oval holes

Mounting Accessories	Part. No.
2 tensioning bracket 50mm	555P053
2 tensioning bracket 65 mm	555P054
1 aluminium back plate (supplied with EHCA)	555P005
1 heat conductor aluminium plate 60mm	555P050
1 heat conductor aluminium plate 70mm	555P051
2 cylinder head screw M4 x 40	499P27300
1 cylinder head screw M3 x 10	555P062
1 Nut M3	555P063

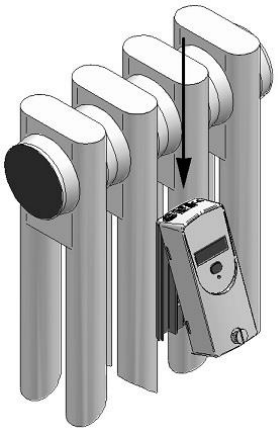
4.9 Overview mounting accessories

Parts No	Designation	
0555P004	Replacement seal 1000 pieces	
0555P005	Aluminium back plate	
0555P006	Plastic cover	
0522P001	Optical head RS-232	
0522P002	Optical head USB	
0555P056	Optical head holder	
0499P017	HK-Sensor-cover	
0499P22500	Safety plate	
0499P22700	Cover angles, white , Sectional radiator	
0499P22900	Cover angles, white , Folded radiator	
0499P26200	Tensioning bracket	
0499P26320	Aluminium profile « receiver housing»	
0499P26700	Oval head screw M4 x 30	
0499P27300	Cylinder head screw 4 x 40	
0499P27400	Nut B M4, DIN 934	
0499P27460	Tensioning bolt	
0499P27480	Tensioning nut	
0499P27500	Slotted nuts M3, DIN 546	
0499P27600	Pull-off nuts M3	
0499P27700	Spring washers B3, DIN 137	
0499P27980	Metal sheet screw 2,9 x 9,5	
0499P28000	Spring washers	
0499P28100	Bracing angles	
0499P28600	Threaded bolts M3 x 8	
0499P28930	Oval head wood screws 3 x 35	
0499P28950	Plastic dowels ∅ 5 mm 3.25	
0555G001	Aluminium back plate for front convection plate	
0555P036	Glue Pactan 6010, 310 ml (Tremco Illbruck)	
0555P050	Heat conductor aluminium plate 60mm	
0555P053	Tensioning bracket 50mm	
555P062	Cylinder screw M3 x 10	
555P063	Nut M3	
0555P024	Adapter plate für 555X and 556X	

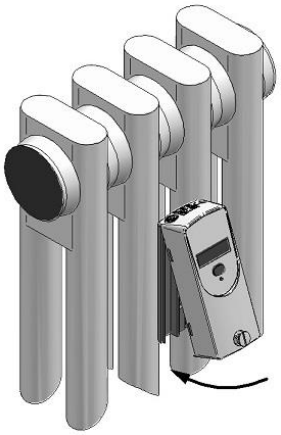
4.10 Mounting and Sealing

After installation of the respective fastening-parts kit to the radiator, the heat cost allocator can be mounted and sealed by the installer as described below:

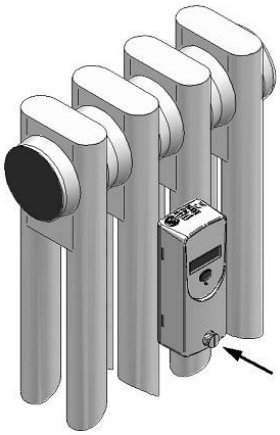
The heat cost allocator is placed at the upper end of the aluminium back plate. Move the heat cost allocator down so that the hooks in the housing fit in the aluminium back plate.



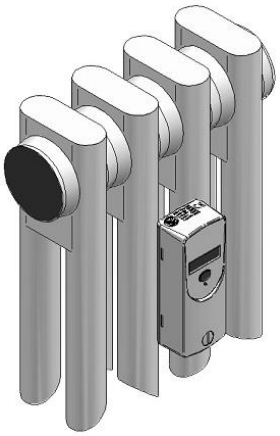
The heat cost allocator is placed on the aluminium back plate in the direction of the arrow.



Push the seal pre-installed by Sontex in the slot of the housing, then press until the seal clicks into the aluminium back plate.
.



Now the heat cost allocator can only be opened by destroying the seal.



5. Commissioning

Ex-factory the heat cost allocators **565** / **566** / **868** are in the so-called sleeping mode. In this mode no measuring is carried out and thus no consumption values are calculated. Furthermore the digital display, the radio communication options as well as the device opening detection are deactivated. Only the optical communication interface is available.

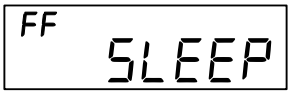
The date and time are running in the background.

Transition from sleeping to installation mode is achieved by pushing the button once when the heat cost allocator is mounted on the aluminium back plate or by an automatic commissioning during the mounting on the aluminium back plate.

After the commissioning and before leaving a new site, we recommend to perform a radio read out test and to create an installation protocol, to ensure that all the radio communication between the heat cost allocators and the radio central or radio modem was successful.

5.1 Automatic commissioning during the installation

Once heat cost allocator is fixed with/against the aluminium back plate, the LCD-display will show the following message:

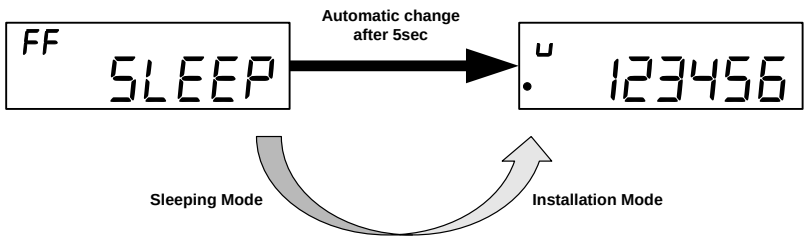


The index ***FF*** indicates that the heat cost allocator has recognized the remote sensor.
If the remote sensor is not detected by the device, the index **--** will be displayed.

The index **--** indicates also a standard device with a compact sensor.

This message will be displayed during **5 seconds** and after that, the transition from sleeping mode to installation mode will be done automatically.

Transition from sleeping to installation mode is achieved automatically after 5 seconds:

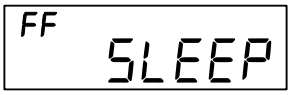


The ● symbol indicates that the heat cost allocator is in installation mode.

Once installed on the back plate or the wall, the heat cost allocator switches automatically from the installation mode into the operating mode at the second transition of midnight.

5.2 Commissioning by pressing push button

Once heat cost allocator is fixed with/against the aluminium back plate, the LCD-display will show the following message:

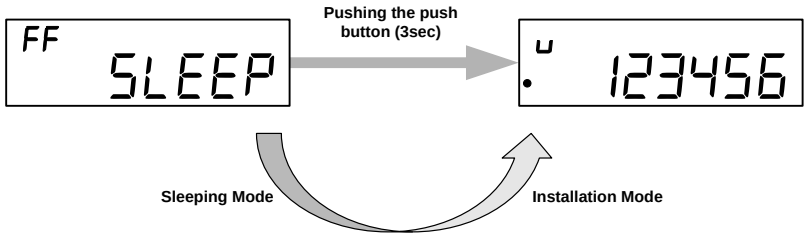


The index ***FF*** indicates that the heat cost allocator has recognized the remote sensor.
If the remote sensor is not detected by the device, the index **--** will be displayed.

The index **--** indicates also a standard device with a compact sensor.

This message will be displayed during **2 minutes** before the LCD-display will switch off.

Transition from sleeping to installation mode is achieved by pushing the push button during **3 seconds**:

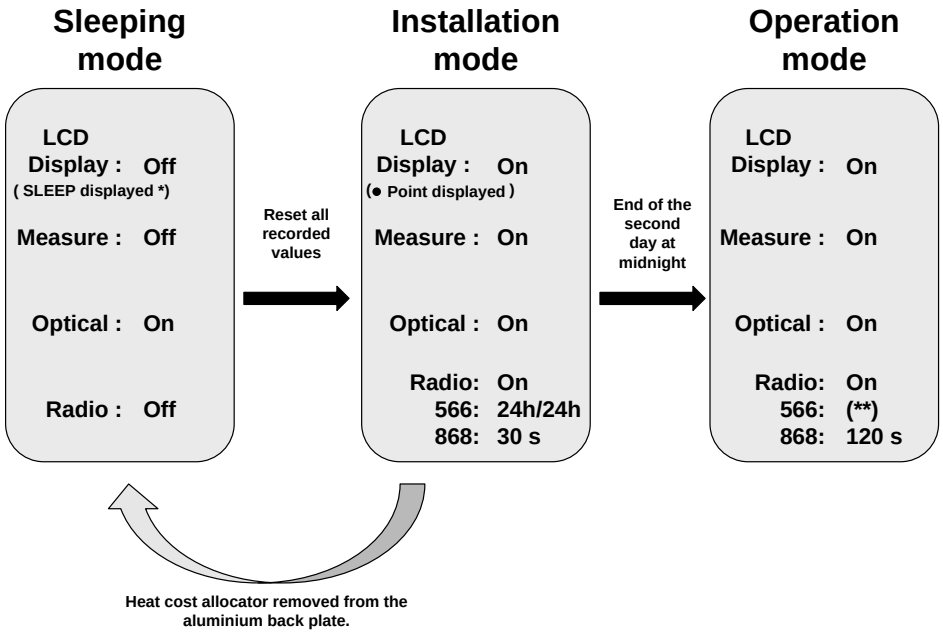


The ● symbol indicates that the heat cost allocator is in installation mode.

Once installed on the back plate or the wall, the heat cost allocator switches automatically into operating mode at the second transition of midnight.

5.3 Radio Standby – Radio-HCA 566 / 868

In order to achieve a user-friendly and power-saving radio standby, the radio heat cost allocator features the following different operating modes:



* : SLEEP information will be displayed by pushing the push button.
: See also in chapter **0 Operating modelf heat cost allocator is removed from the aluminium back plate during the installation mode, the heat cost allocator switches to the sleeping mode.

Transition from sleeping mode to installation mode is achieved by two different ways:

- Pushing the push button once the heat cost allocator is mounted on the aluminium back plate.
- An automatic detection during the mounting on the aluminium back plate. This function must be specified at the order.

5.3.1 Sleeping Mode

Ex-factory the radio heat cost allocator is in sleeping mode, but the internal clock and the date are running.

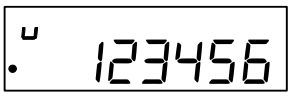
Current consumption is reduced to a minimum since no measuring and no calculations are carried out. Only the optical communication interface is available.

Transition from sleeping to installation mode is achieved by pushing the button once the heat cost allocator is mounted on the aluminium back plate or by an automatic commissioning during the mounting on the aluminium back plate (must be specified when ordering).

When the device switches from sleep mode to installation mode, the following counters are automatically reset to zero:

- Current totaliser, totaliser at set day, historical totaliser values.
- Max. radiator temperature.

5.3.2 Installation Mode



The ● symbol indicates that the heat cost allocator is in installation mode.

During the installation mode all functions of the radio heat cost allocator **566 / 868** are carried out.

- For heat cost allocator **566**, the radio transmission is possible 24h/24h till at the end of the second day at midnight. This guarantees an optimal availability of the radio heat cost allocator for test purposes during installation.

- For heat cost allocator **868**, an installation telegram is activated during the installation phase. Data are transmitted each 30 seconds (short and long telegram) till at the end of the second day at midnight.

The radio heat cost allocator **566 / 868** switches automatically into operating mode at the end of the second day at midnight.

If heat cost allocator is removed from the aluminium back plate during the installation mode, the heat cost allocator switches to the sleeping mode.

5.3.3 Operation Mode for Radio Sontex (Sontex 566 Radio)

5.3.3.1 Walk-by Radio Remote Readout

A walk-by remote readout of the data of the heat cost allocator 566 is possible **every day** from 6.00 to 17.59 (winter time).
No readout possible between 18.00 and 19.59 (winter time)

5.3.3.2 Readout over Radio Central (installed directly in the building)

For the readout over a radio central installed in the building, the following applies (see table below):

The device with the corresponding final numeral of the serial number is ready for radio transmission during the time stated in the table below.

Time	Serial Number
20 : 00 - 20 :59	XXXXXXX0
21 : 00 - 21 :59	XXXXXXX1
22 : 00 - 22 :59	XXXXXXX2
23 : 00 - 23 :59	XXXXXXX3
00 : 00 - 00 :59	XXXXXXX4
01 : 00 - 01 :59	XXXXXXX5
02 : 00 - 02 :59	XXXXXXX6
03 : 00 - 03 :59	XXXXXXX7
04 : 00 - 04 :59	XXXXXXX8
05 : 00 - 05 :59	XXXXXXX9

After readout of the data from the radio heat cost allocator, the radio availability is deactivated again.

5.3.4 Operation Mode for Radio wM-Bus (Sontex 868 Radio)

The choice of the telegram is done when ordering. It is not possible to select the telegram type on the device itself.

5.3.4.1 Readout over the **short telegram** (OMS compliant)

With this operating mode, the heat cost allocator Sontex 868 Radio transmits data:

- Transmission interval each **120 seconds** (minimum).
- Radio reading, **24h/24h**.

5.3.4.2 Readout over the **long telegram** for Walk-by reading

With this operating mode, the heat cost allocator Sontex 868 Radio transmits data:

- Transmission interval each **120 seconds** (minimum).
- Radio reading and periods, **12h per day (programmable)**, **7days/7days**.

6. Readout

The current and monthly values recorded by the heat cost allocator **565 / 566 / 868** as well as several other parameters can be readout over the optical interface or also over radio.

The following parameters are transmitted:

Optical Interface (Sontex 565 / 566 / 868) :

- Identification number (information in header).
- Date and time.
- Consumption value.
- Set Day.
- Set Day value.
- Maximum radiator temperature of previous heating period.
- 36 monthly values and 18 half monthly values for cumulated consumption.
- 18 monthly values for the maximum radiator temperature.
- Rating factor K_C.
- Rating factor K_Q.
- Current radiator temperature.
- Current ambient temperature.
- Maximum radiator temperature of the current heating period.
- Manipulation protection:
  - Duration of the manipulations.
  - Date of the last manipulation.
  - Manipulation counter.
- Error code.
- Firmware version.
- Commissioning date.
- State of parameters.
- 36 half monthly values for the average ambient temperature.

Radio SONTEX (Sontex 566) :

- Identification number (information in header).
- Date and time.
- Consumption value.
- Set Day.
- Set Day value.
- Maximum radiator temperature of previous heating period.
- 18 monthly values for cumulated consumption.
- Rating factor K_C.
- Rating factor K_Q.
- Current radiator temperature.
- Current ambient temperature.
- Maximum radiator temperature of the current heating period.
- Manipulation protection:
  - Duration of the manipulations.
  - Date of the last manipulation.
  - Manipulation counter.
- Error code.
- Firmware version.
- Commissioning date.
- State of parameters.
- 36 half monthly values for the average ambient temperature.
- Cost per unit totalized.
- Parameter for Auto-reset totalizer.
- Statistics counters for Radio.

The following parameters are transmitted by **Sontex 868 Radio wM-Bus**:

Short telegram, OMS compliant :

- Identification number (information in header).
- Date and time.
- Consumption value.
- Set Day.
- Set Day value.
- Error code.
- Current radiator temperature.
- Current ambient temperature
- State of parameters.

Long telegram for Walk-by reading :

- Identification number (information in header).
- Date and time.
- Consumption value.
- Set Day.
- Set Day value.
- 18 monthly values for the cumulated consumption.
- Rating factor K_C.
- Rating factor K_Q.
- Current radiator temperature.
- Current ambient temperature.
- Maximum radiator temperature of the current heating period.
- Maximum radiator temperature of the previous heating period.
- Manipulation protection:
  - Duration of the manipulations.
  - Date of the last manipulation.
  - Manipulation counter.
- Error code.
- Firmware version.
- Commissioning date
- State of parameters.

AES 128 bits encryption is available for all radio versions.

Short or long telegram radio wM-Bus (868)

The choice of the telegram is done when ordering. It is not possible to select the telegram type in the device itself.

6.1 Remote Radio Reading

6.1.1 General Information about the Remote Radio Readout

The transmission of radio data depends on the technical specifications of the buildings and their surroundings. Due to these external factors, a readout may not be possible at certain times and in certain locations. It is solely incumbent on the user to check the radio propagation conditions at the planned installation point.

6.1.2 Radio Mobile Readout SONTEX (Sontex 566)

The mobile radio readout of the **Sontex 566** heat cost allocator is accomplished via the **Supercom 636 radio modem** which is equipped with a transceiver including antenna for radio transmission. The radio modem operates at a frequency of 433.82 MHz and works in combination with a laptop computer, a touchscreen tablet or a Pocket PC (PDA).

Sontex916 software with **radio modem 636**

Tools Supercom with **radio modem 636**

The **Sontex916 / Tools916** or **Tools Supercom** readout and configuration program features the following options:

- Readout and display of an individual radio heat cost allocator.
- Readout and display of a group of radio heat cost allocators.
- Addition of devices in a router file.
- Removal of devices in a router file.
- Configuration of an individual or a group of heat cost allocators via radio.

6.1.3 Wireless M-Bus Remote Radio Readout (Sontex 868)

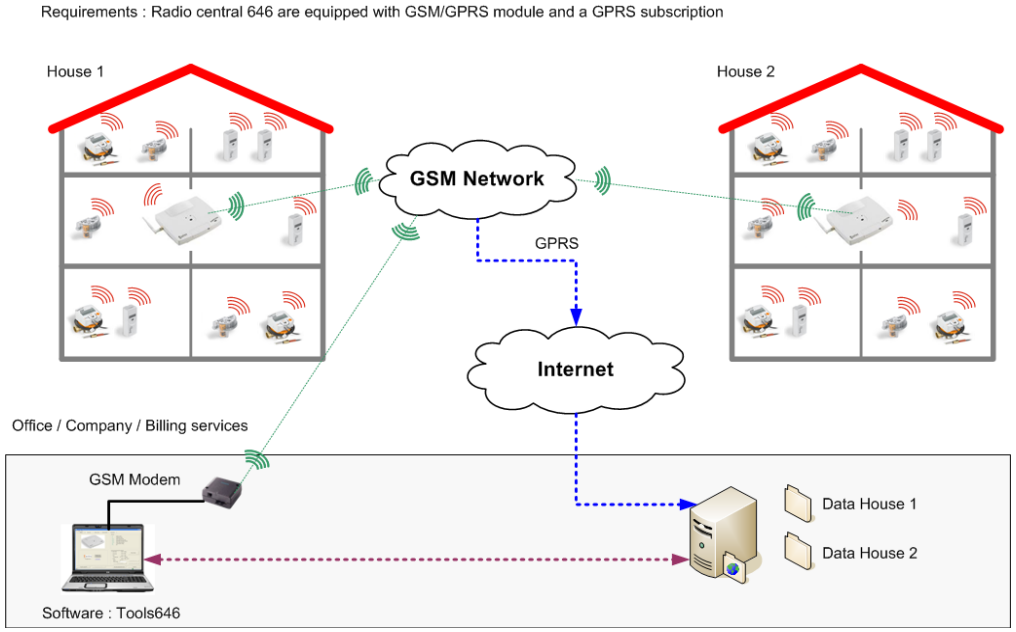
The Wireless M-Bus radio communication interface enables data to be relayed using Wireless M-Bus radio protocol (EN 13757-4) and complies with open metering system (OMS) specifications version V3.0.1.
The **Sontex 868** uses one-way radio technology and transmits the consumption data and saved settings every 120 seconds for short (OMS) or long (walk-by) telegrams. Since the **Sontex 868** radio heat cost allocator uses one-way radio technology, it must be used with a **Supercom 637 radio modem** mobile data receiver and a laptop computer or touchscreen tablet with the corresponding software program.

6.1.4 Readout using the Radio Central Supercom 646 (Sontex 566)

The radio central Supercom 646 receives radio data from the **Sontex 566** heat cost allocators or from other SONTEX devices which are equipped with radio.
The data recorded in the concentrator can be read by different interfaces.
The remote readout interfaces for the SONTEX concentrator are:

- Optical interface.
- USB.
- RS-232.
- M-Bus.
- GSM / GPRS.

Example with a Supercom 646 Concentrator equipped with a GSM / GPRS module:



6.1.5 Readout using the Radio Central Supercom 647 (Sontex 868)

The radio central Wireless M-Bus Supercom 647 receives radio data from the Sontex 868 heat cost allocators or from other Wireless M-Bus devices.
As the **Sontex 868** radio heat cost allocator uses one-way radio technology, it must be used with a **Supercom 647** Wireless M-Bus and a PC (or touchscreen tablet) with the corresponding software program.

7. Rating factors

7.1 Taking Measurements

The value displayed by the heat cost allocator has to be converted to the value of the actual heat output of each radiator. Thereby the design and the performance of the radiator as well as the mode of installation have to be taken into account.

Therefore each radiator has to be identified precisely by taking measurements. The following data have to be established:

- Design and make of radiator
- Overall length
- Overall height
- Overall depth
- Number of sections
- Pitch
- In-line configuration

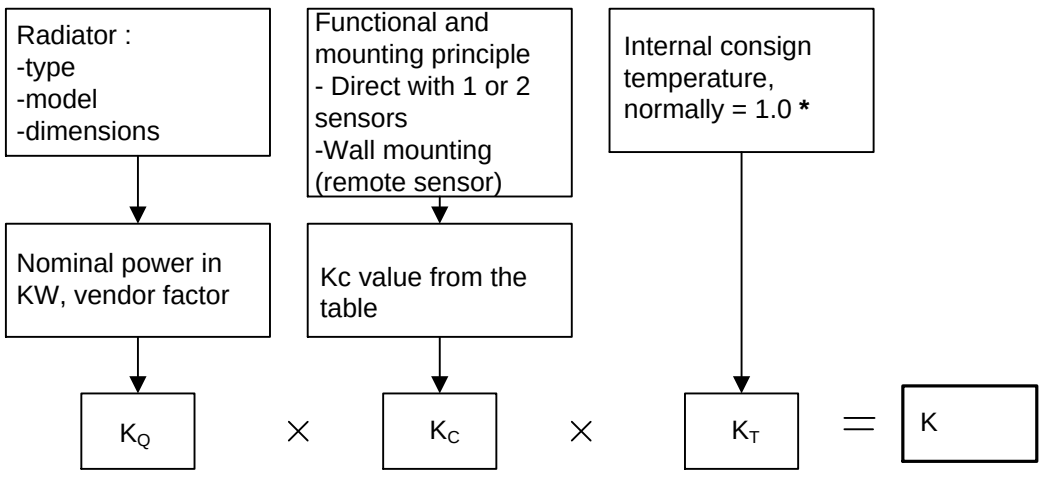
7.1.1 Rating of Radiators with Over Length or High Nominal Power

If the radiator has an overall length of approx. 3 m we strongly recommend installing two heat cost allocators.
Under certain circumstances minimal flows might not be noticed on these radiators. The same applies for radiators with an extremely high nominal output of more than 10.0000 watt = 10kW.
At least two heat cost allocators should be installed to these radiators. The standard performance of each radiator is divided by the number of heat cost allocators installed.

Example: Standard performance K_Q= 16.000 W = 16
Number of heat cost allocators installed to the radiator = 2
K_Q individual = 16 / 2 = 8

7.1.2 Rating of Radiator

For each radiator type the K-value is calculated according to the following diagram:



* if not, take the vendor factors

The heat cost allocator determines the heat output of the radiator, displays the consumption and records the consumption values on the set day.
The heating medium temperature is captured by the temperature sensor installed to the radiator. Thus the heat output of the radiator is calculated in consideration of the radiator performance. These calculations are started as soon as the temperature difference between ambient temperature and heating medium temperature is bigger than the parameterised value.

Out of this functional principle the necessity arises to rate the display of the heat cost allocator. For the calculation of the heat output of the radiator it is not sufficient to measure the heating medium temperature. Radiators with different performances also feature different heat output quantities even if the heating medium temperature is the same. Furthermore different designs lead to different measuring conditions for the temperature sensor installed to the radiator.

K : Rating factor total

K_Q : Rating factor for the standard performance of the radiator, stated in KW. This value is calculated with the data received by taking measurements and the manufacturer's data.

K_C: Rating of the C-value of the radiator temperature sensor. For each type of radiator this value is measured on the test rig. The respective K_C-value can be taken from the table with the rating factors.

K_T: Rating of the design ambient temperature. Normally $K_T = 1$.

For the definition of the rating factors according to EN 834, please see chapter 9.3

7.2 Table of Rating Factors

A detailed summary of Kc values in Excel / PDF format is available upon request.
There is also a PC software program available at the following website:
http://www.thermosoft2000.de/eng/

7.3 Rating Factor according EN 834:2013

Excerpt

Rating factor (Chapter 3.36) :

With the following rating factors the display values of each heat cost allocator can be converted into consumption values which are suitable to be used for billing the heating costs according to consumption.

Rating factor K_Q for the heat output of the radiator (Chapter 3.37 and 5.3.1) :

The rating factor K_Q is the (non-dimensional) numerical value of the standard performance of the radiator stated in watts or kilowatts.

The thermal output of a radiator in a thermally stable test booth at flow, return and air temperatures of 90 °C, 70 °C and 20 °C, the air temperature being measured at a height of 0,75 m above the floor and a distance of 1,5 m in front of the heating surface, is the reference output relevant for the rating factor *K*Q (reference system *Q*(60 K)).

Rating factor K_c for the thermal coupling of the sensors (Chapitre 3.38 et 5.3.2)

The rating factor K_c takes into account the different thermal couplings to the temperature sensors and the different designs of the effective heating surfaces.

K_c is calculated as the quotient of the basic counting rate R_B and the counting rate R_E at the temperatures of the sensors on the radiator to be rated operated at base condition:

$$Kc = \frac{R_{Base}}{R_{Evaluation}}$$

Rating factor K_T for rooms with low design ambient temperatures which deviate from the basic reference air temperature (Chapter 3.39)

For heat cost allocators with the single sensor measuring system, the rating factor K_T takes into account the change in performance and the change in temperature of the sensors at design ambient temperatures which are lower than the reference temperature.

Resulting Rating Factor K (Chapter 5.3.3)

The overall rating factor *K* is received by multiplying the individual rating factors:

$$K = K_Q \times K_C \times K_T$$

Support Technique :
Pour un support technique, contacter l'agent local Sontex ou directement l'entreprise Sontex SA.

Sous réserve de modifications techniques

Hotline Sontex :
sontex@sontex.ch
+41 32 488 30 04