

Data Sheet

Electronic Heat Cost Allocator INDIV-X-10V

Application



The INDIV-X-10V is a visual electronic device for heat cost allocation based on measuring the proportionate heat output of radiators in consumer units.

The INDIV-X-10V is available in versions of compact and remote sensor.

Features

- Measuring by two temperature sensors - radiator and ambient temperature sensor (NTC resistor)
- Optional measuring principle: single-sensor mode with start sensor or two-sensor mode
- Safe operation and fraud detection
- Factory seal protecting against unauthorized manipulation
- Seal sticker as second seal for further protecting against manipulation
- Optical interface for the readout of the data and programming
- Display error messages
- Programmable individual settings
- Measuring mode inactive in sleep mode
- User-friendly operation by push button
- 6-digit and high-contrast LCD display
- Radiator (Heat sink) temperature on rolling display
- Recording of cumulated heat consumption on the annual set day
- Recording of 36 monthly values
- Zeroing on due date
- Check code for postcard mail-in method
- Standard aluminium back plate for nearly all existing bolts with common dimensions and installation
- Unit scale or product scale optional
- Snap-on blind to cover color shadows for increased aesthetics

The device operates either according to the single-sensor principle with start sensor or the two-sensor principle with unit or product scale. Values are measured by one radiator temperature sensor and one room air temperature 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. For the two sensor version, the actual difference between ambient and radiator temperature is determined and used for calculation of the consumption.

The main application area is in central heating systems or district heating connections where the heating energy is used individually by different consumers. The consumer units might be dwellings, office buildings, business or industrial premises. The heat cost allocator can be used for sectional radiators, panel radiators, ribbed radiators, tubular radiators, radiators with internal tube register and convectors.

The radio HCA device is on separate datasheet, which data is readout via a mobile radio modem or directly by the billing office over the radio central installed outside the unit.

Restrictions of use

Electronic heat cost allocators cannot be used with steam heating, floor heating, radiant ceiling heaters, flap-controlled radiators, radiators with ventilators and fan-assisted air heaters.

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 dismantled or shut down 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 dismantled or shut down.

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 not allowed.

Ordering

Device	Description	Code no.
INDIV-X-10V	Compact version, single-sensor with start sensor, unit scale, summer switch-off between 06/01 and 08/31, set day 01/01	088H2343
INDIV-X-10VT	Remote sensor version with cable length 1.5m, single-sensor with start sensor, unit scale, summer switch-off between 06/01 and 08/31, set day 01/01	088H2344

Devices with other configurations are available on request. Please contact your local Danfoss sales company for further information.

Accessories

	Description	Code no.
Installation Parts	Aluminium back plate	088H2345
	Cover for sensor	088H2404
	Safety plate	088H2405
	Protection plate white radiator with sections	088H2406
	Protection plate white corrugated radiator	088H2407
	Angle bracket	088H2408
	Aluminium plate case support for corrugated radiator	088H2409
	Aluminium plate case support for sectional radiator	088H2410
	Aluminium plate case support for front plate radiator	088H2425
	Pins	088H2414
	Tensioning nut	088H2415
	Slotted nut M3 DIN546	088H2416
	Angle spreader	088H2421
	Headless pins M3 x 8	088H2422
	Heat conductor aluminium plate 60mm	088H2427
	Angle bracket 50mm	088H2428
Standard Parts	Raised head screw M4 x 30	088H2411
	Pan head screw M4 x 40	088H2412
	Hexagon nut B M4 DIN934	088H2413
	Two-nuts M3	088H2417
	Washers B3 DIN137	088H2418
	Tapping screws 2.9 x 9.5	088H2419
	Washers	088H2420
	Crosshead wood screw 3 x 35	088H2423
	Plastic screw plug Ø5mm 3.25	088H2424
	Cylinder screw M3 x 10	088H2429
	Nut M3	088H2430
Other Accessory	Optical head USB	088H2402
	Bracket for Opto-probe	088H2403
	Plastic blind cover	088H2401
	Spare seals 1000 pieces	088H2400

Technology

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

Single sensor device

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

Double sensor device

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

Explanation: T_H Temperature of the radiator surface [°C]
 T_A Ambient temperature [°C]
 Q Displayed consumption value, without unit
 K Correction factor
 Unit scale: $K = 1$
 Product scale: $K = K_c * K_Q$
 K_c Rating factor for the c-value of the radiator temperature sensor
 K_Q Rating factor for the standard performance of the radiator

The K_c value is given in the form of a K_c -value database.

Unit scale refers to heat cost allocators used with the same scale on all radiators, i.e. 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.

Product scale means the radiator rating data are programmed in the heat cost allocator on site. The overall rating factor K_{total} is calculated directly in the heat cost allocator and thus the consumption value is displayed immediately.

Mounting

The heat cost allocators can be easily and quickly mounted on existing bolts with common dimensions. The existing heat cost allocator can

be easily replaced without additional work. With an additional blind, color shadows can be covered for a better look.

Easy readout

The consumption values are manually readout over the large 6 digit display, rolling or by pressing the push button through the menu or electronically over the optical interface. Post card

mail-in method of the set day value is also possible in combination with an automatically created check code. Check code is used for the plausibility check of the readout value.

Optical interface

All recorded data and parameters can be readout and parameterized over the optical interface with

free software INDIV-X-VISUAL-CONF.

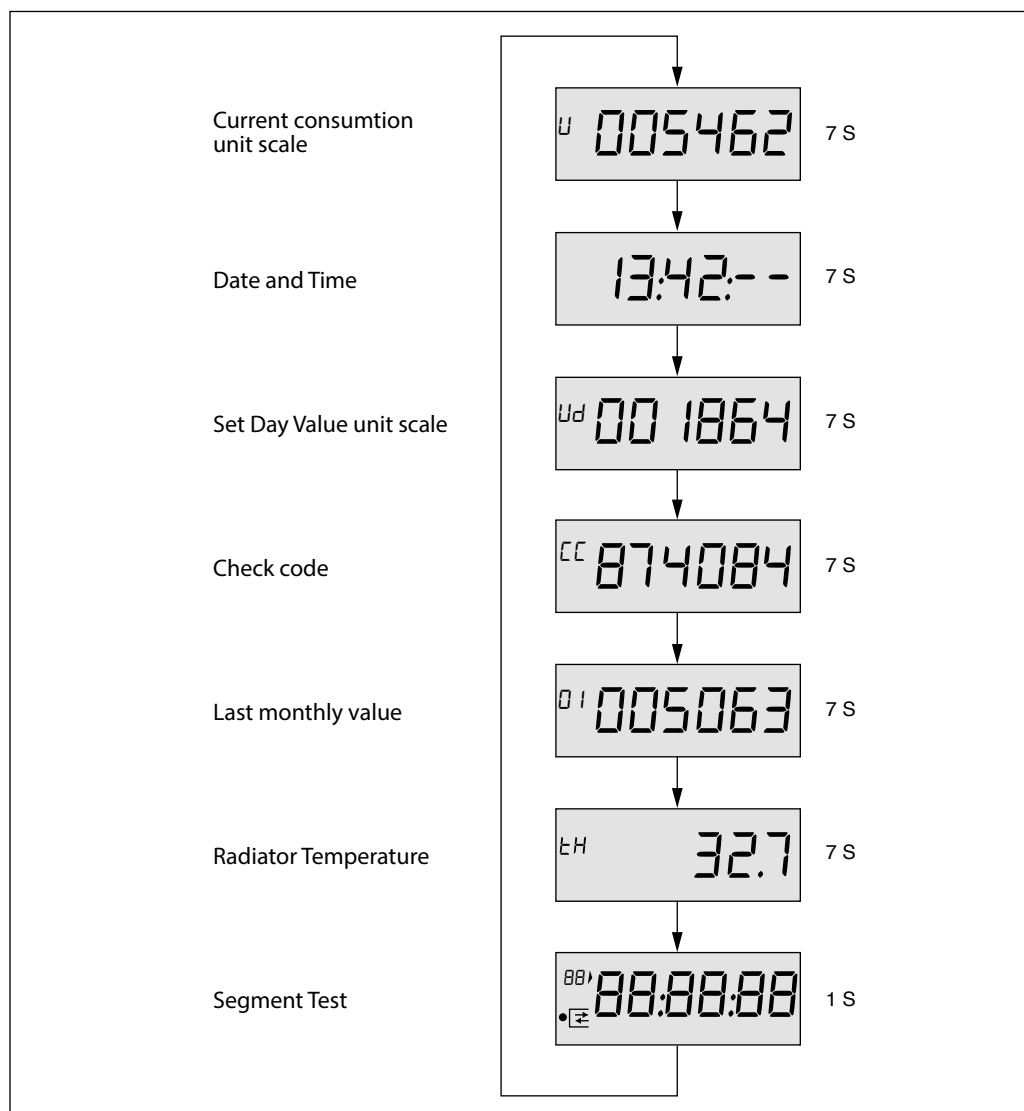
Display loops, Normal Mode

Ex-factory all menu sequences are activated. The permanent display is 24 hours/day on.

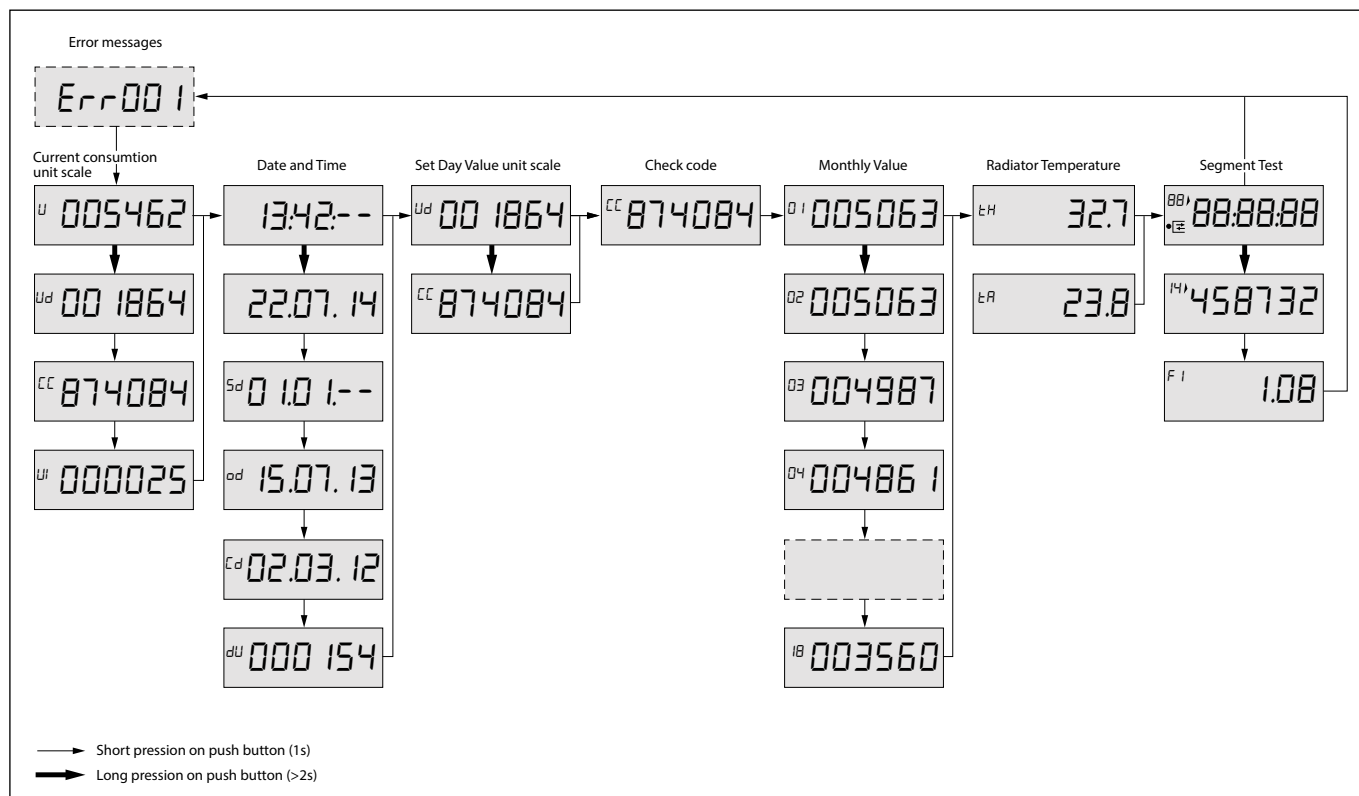
When pushing the button briefly the digital display always goes to the next menu sequence. When pushing the button in one menu sequence for 2 seconds the individual values within the selected menu sequence can be accessed. When

the last value within one menu sequence has been displayed, the next menu sequence can be reached by pushing the button again.

If the button is not pushed for 2 minutes, the digital display returns to the cumulated consumption value. The display loops are customized, for instance, the rolling display:



Display menu sequences



Display explanations

Error messages

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

Err001

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

U 005462

Set Day Value unit scale

With the index **ud** the consumption value in unit scale recorded at midnight of the set day is displayed.
If the index **u** is not displayed, the heat cost allocator is equipped with the product scale.
If a new device has not yet reached the programmed set day, 000000 is displayed.

Ud 001864

Check Code

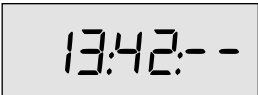
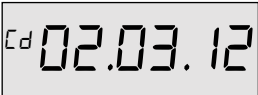
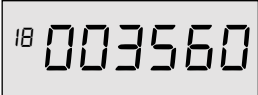
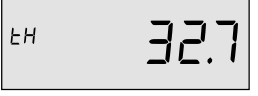
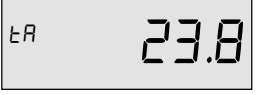
With the index **cc** the check code for the plausibility check of the manual readout is displayed.

Cc 874084

Consumption Value of the Previous Heating Period

With the index **uj** the consumption value is displayed which was recorded on December 31st or before the reset to zero. 000000 is displayed on a new device as long as a reset has not been carried out.

Uj 000025

Time The current time.	
Date The current date.	
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 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 the date of commissioning programmed ex-factory.	
Cumulated Duration of the Opening of the Device 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.	
Monthly Values The cumulated consumption values are recorded automatically at midnight on the last day of each month. 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. Monthly values 19-36 can be readout via optical interface. All monthly values are set to 000000 when the device is commissioned.	 
Radiator Temperature With the index th the current radiator temperature is displayed.	
Ambient Temperature With the index ta the current ambient temperature is displayed.	
Segment Test Segment test of the display.	

Identification Number With the index I 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.	
Measuring Principle and Software Version With the index F1 or F2 the measuring principle is displayed. F1 = single-sensor device with start sensor F2 = two-sensor device On the right side the software version x.xx of the heat cost allocator is displayed.	

Available data

Serial number	The 8-digit serial number is printed on the top of the device housing, and a bar code sticker is put on the front of it.
Rolling display	Up to 7 parameters can be combined in any order and are then shown on the rolling display: • Consumption value • Time • Date • Set day • Set day value • Last monthly value • Last half monthly value • Radiator temperature • Ambient temperature • Maximum radiator temperature of the current heating period or since the last reset • Check code • Segment test
Readout	The parameters can be readout over the optical interface: • Identification number (information in header) • Error • Software version • Date and time • Consumption value • Kc-value x K_q-value • Current radiator temperature • Current ambient temperature • Date of the opening of the housing • Cumulated duration of the opening of the housing in minutes • Date of commissioning • Set day • Set day value • Value of previous heating period • Maximum radiator temperature of current heating period • Maximum radiator temperature of previous heating period • Monthly values • Half monthly values • Serial number

Technical features

Function control	After hardware reset and before each measuring, the device carries out a self-test every 4 minutes. In case an error is detected, the corresponding error is registered and the respective error message is displayed. After 4 minutes a reset is carried out (before the next measuring) and the recorded error is deleted automatically. If the error is detected again after the reset, the corresponding error is also set and the respective error message is displayed.
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Technical data

Measuring system	Single-sensor with start sensor measuring system, for heating system with $t_{min} \geq 55\text{ }^{\circ}\text{C}$ Two-sensor measuring system, for heating system with $t_{min} \geq 35\text{ }^{\circ}\text{C}$			
Device versions	Compact device Remote sensor device with 1.5m cable length			
Optional scales	Unit scale or product scale			
Power supply	3 V lithium battery, typical lifetime > 10 years			
Display	Liquid crystal display (LCD) with 6 digits (000000 - 999999)			
Radiator power range	4 - 16,000 W			
Sensor temperature range	0 °C - 120 °C			
Temperature sensor	NTC, prematurely aged			
Measuring principle	Area of application ¹⁾	Single-sensor with start sensor	Compact	$t_{min} = 55\text{ }^{\circ}\text{C}$, $t_{max} = 105\text{ }^{\circ}\text{C}$
			Remote sensor	$t_{min} = 55\text{ }^{\circ}\text{C}$, $t_{max} = 120\text{ }^{\circ}\text{C}$
		Two-sensor	Compact	$t_{min} = 35\text{ }^{\circ}\text{C}$, $t_{max} = 105\text{ }^{\circ}\text{C}$
			Remote sensor	$t_{min} = 35\text{ }^{\circ}\text{C}$, $t_{max} = 120\text{ }^{\circ}\text{C}$
	Start of counting	Heating period	25 °C - 40 °C (programmable)	
		Off-heating period	25 °C - 40 °C (programmable)	
Protection data	Protection class	IP52 acc. to EN60529		
Ambient conditions		Operation	Transport	Storage
	Temperature	5...70 °C	-25...70 °C	-25...70 °C
Norms and standards	CE Conformity according to EMC guideline - Interference resistance, emissions		EN 301 489-1, 489-3; EN 300 220-1, 220-2 EN 61000-6-3	
	Low-voltage guideline - Electrical safety		EN 60950-1	
	Heat cost allocators for the determination of the consumption of room heating radiators		EN 834	
Environmental compatibility	Product environment declaration contains		ISO 9001 (quality)	
			Directive (EC) 1907/2006 (REACH)	
Dimensions	(W x H x D)	38 x 90.5 x 28 mm		
Remote sensor cable length	1.5m			
Weight	Compact device without back plate: Ca. 42 g			
	Remote sensor device without back plate: Ca. 49 g			
	Aluminium back plate: Ca. 28 g			
Housing material	PC-ABS			
Housing colours	RAL 9010 White			

¹⁾ Definitions according to EN 834:

t_{max} Upper temperature limit. Maximum mean design heating medium temperature $t_{m,A}$ of the heating system heating surfaces equipped with heat cost allocators at which the heat cost allocator can be used.

t_{min} Lower temperature limit. Minimum mean design heating medium temperature $t_{m,A}$ of the heating system at which the heat cost allocator can be used. For single-pipe systems, the $t_{m,A}$ of the heating system is replaced by the $t_{m,A}$ of the last radiator in the string.

$t_{m,A}$ Mean design heating medium temperature. Mean value of the design flow temperature and the design return temperature.

Dimensions

