SIKKERHEDSSTYRELSEN

TYPE APPROVAL CERTIFICATE

This document is a translation of the Danish type approval certificate. In case of any differences in meaning between the Danish and the English version, the Danish version is valid.

J.no: 573-03-00033

Edition: 3
(replaces 2. edition plus all earlier editions and supplements.

Date: 1 September 2016

Valid until: 31 May 2026

System name: TS 27.21 027

Type approval certificate and control provisions are issued pursuant to article 10 of Statutory Order of the Danish Safety Technology Authority No. 70 of 28 January 1997 on the control of heat cost allocators used as the basis for allocation of heat consumption, as amended.

The additional approval (edition 2 of 12 May 2016) is issued pursuant to article 6, section 1 of Statutory Order 1166 of the Danish Safety Technology Authority of 3 November 2014 on heat cost allocators used as the basis for allocating heating costs.

HEAT COST ALLOCATOR

Brunata Futura RME (Futura Heat)

Applicant: Brunata A/S, Vesterlundvej 14, DK-2730 Herlev
Manufacturer: Brunata A/S, Vesterlundvej 14, DK-2730 Herlev
Device: Heat cost allocator with electrical power supply
Type: Brunata Futura RME
Trade name: Futura Heat
Use: Registration of the heat consumption of radiators for the purpose of allocating heating costs

Type tested according to DS/EN 834:1995

Note: Measuring devices not completely identical with the approved device can only be used if a separate approval and revision of this certificate has been undertaken.

1 LEGAL DATA

DEVICE
Compact meter, two-sensor meter
The meter is also available in a version with radio communication.
Radio communication does not form part of the type approval.

MEASURING PRINCIPLE
Two-sensor measuring

BASIC STATE
Average radiator water temperature, t_m = 55 °C
Reference atmospheric temperature, t_l = 20 °C
Installation at 66.7 per cent of radiator height

INSTALLATION POINT
The meter is installed in such a way that the sensor facing the radiator sits horizontally half way along and 66.7 per cent up the radiator, measured from the floor.

Alternatively the meter can be installed so that the sensor facing the radiator sits horizontally half way along and 75 per cent up the radiator, measured from the floor.

It is thus optional whether the meter is placed at 66.7 or 75 per cent of the radiator height, provided all meters in an accounting unit are placed at either one or the other of the two points described.

For certain radiator types and designs, deviations from the stated installation height are possible. In such cases, the manufacturer guidelines, for which the manufacturer must have documentation, must be observed.

LIMITS FOR USE
t_{max} = 105 °C
t_{min} = 20 °C
t_{min} = the heating system's design temperature at an external temperature of 12 °C
$t_{m,A}$ = the heating system's average temperature in dimensioning states. The condition $t_{min} \geq t_{m,A} \geq t_{max}$ must be observed when determining t_{min}.

BATTERY
Replaceable Li/MN02 battery with a voltage of min. 3V (nominal voltage) and max. 3.2V of the AA type of the lengths 1/2 or 2/3, with the chosen battery providing a:

… nominal minimum capacity of:	… for a life of:	… with replacement after an operating period of:
0950 mAh	12 years	11 years
1350 mAh	16 years	15 years

SOFTWARE IDENTIFICATION
Software versions are uniquely identified in the meter memory by a number indication, which is contained in optically read data. Documentation for any later changes of software and their designations are available from the manufacturer.

SCALE
Product and unit scale

2 PROVISIONS FOR CONTROL

2.1 CONTROL UNDER OPERATION
According to DS/EN 834:1995 and the manufacturer guidelines

2.2 MARKING ON THE DEVICE
Type designation (Futura RME) is printed on the bottom of the device.

t_{max} and t_{min} plus TS number and CE mark are printed on the bottom of the device.

The serial number, which is a unique identification number, is programmed into the meter memory and shown at programmable fixed intervals on the meter display. The serial number is programmed into an EEPROM section, which cannot be changed by the programming equipment carried by technical personnel (installer and readers).

The year of the first installation or installation as a result of removal, repair or other interference with the meter, as well as the meter installer's identification information, are printed on label and meter.

2.3 SEALING
The housing for compact meter and remote sensor in both short and long version is sealed by putting on the meter's front cover, which also acts as seal.

The seal label indicates the year of sealing and identifies the meter installer.

3 CONSTRUCTION

3.1 CONSTRUCTION
Brunata Futura RME is an electronic heat cost allocator based on the two-sensor meter principle in compact format. It is available in two identically functioning versions: one with short and one with long internal fitting housing, which allows a radio transmitter to be incorporated for remote reading purposes.

The NTC type temperature sensors are included in the device's sealable meter housing together with the other meter electronics and LCD display unit. One of the meter's temperature sensors measures the radiator temperature through embedment in a heat-conducting back piece and the meter's other temperature sensor – thermally separated from the first – measures the room temperature.

After connection, the meter carries out an auto-function test and then starts cyclical measuring of radiator and atmospheric temperature. It also carries out controls, calculations and recordings of counter status as required. These measurements, together with a series of pre-programmed meter data and technical function parameters, are stored in an EEPROM type memory to prevent data loss in case of power cuts.

Brunata Futura RME measures the heat supplied to the room from the radiators via the heating system as the difference between the heat supplied to the room from the radiator and the heat supplied to the radiator by the room.

On the basis of the meter principle applied, calculation processing of temperature measurements occurs when the difference between radiator temperature sensor and room temperature sensor (Δt) is different from zero, i.e. assumes either a positive or a negative value in calculation terms. This function principle is described in Section 3 of DS/EN 834:1995.

In addition, Section 5.3 in Δt allows start of meter registration of heating consumption on the basis of a start temperature (t_z pursuant to Section 4.8), where the start temperature minus the atmospheric temperature must be less than or equal to 5 K (t_z-$t_l \leq 5K$). Brunata Futura RME complies with this standard requirement, but does not work with such a start Δt. When Δt becomes negative, the meter changes to registering the heat transport from room to radiator and from radiator to room over a period of 24 hours.

Brunata Futura RME is also furnished with a calendar, where the billing period can be programmed. The meter will then continuously show registration since the start of the billing period and save readings/consumption and operating status data for 52 fortnightly periods in arrears.

A LCD display shows the current and previous measuring periods' consumption units as well as identification number and scalar quantity in a programmable cycle.

Via an optical connection on the front of the device, all data in Brunata Futura RME can be read with a special reading device, which is also used for programming the meter's scalar quantity and other technical function parameters.

3.2 INSTALLATION

In special cases, it is possible to deviate from the rules concerning the choice of installation point (as described in the section 'Installation point', paragraph 1). This is done according to the manufacturer's special guidelines, with use of corrective recalculation (pursuant to EN 834:2013, ref. 5) as required, for which the manufacturer must have documentation. Such special cases allows the meter to be used in the entire installation area defined in section 7.3 of DS/EN 834:2013.

3.3 ALLOCATION ACCURACY

On the basis of meter tests pursuant to annex 6 of EN 834:2013 by the Danish Technological Institute, a system-related annual allocation accuracy above -9 per cent to +0 per cent has been calculated for the meter's unit registration.

The percentage covers both installation points, which are tested and calculated for a representative selection of radiator types with the following two assumptions:

(1) That the meter is used in a billing unit with an annual consumption variation of between -50 and + 25 per cent of the average annual consumption.
(2) That the meter works without use of start Δt or start differential value between the meter's radiator-facing and room-facing temperature sensors.

The above-mentioned results are demonstrated by testing of radiators with predominantly vertical flow.

3.4 REMARKS

Optical reading equipment and any radio are not covered by the type approval.

4 DOCUMENTATION

WTP test report no. 05144 (“Konformitätsbestätigung”, 19.03.2006)

Edition/supplement	Issue date	Remarks
Edition 1, j.no. 08-3575	5 September 2006	Original certificate
Supplement to edition 1, j.no. 08-3761	13 November 2008	Validity extension
Edition 2, j.no. 573-03-00035	31 May 2016	Supplementary approval with extension of installation point and choice of battery
Edition 3	1 September 2016	Addition of the trade name Futura Heat

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