

# Data sheet

## INFOCAL 8

### Energy calculator

#### Description/Application

MID examination certificate  
no.: DE-10-MI004-PTB008



The INFOCAL 8 is an energy calculator e.g. for combination with SONO 1500 CT especially designed for heating, cooling or combined heating/cooling application in local and district energy systems.

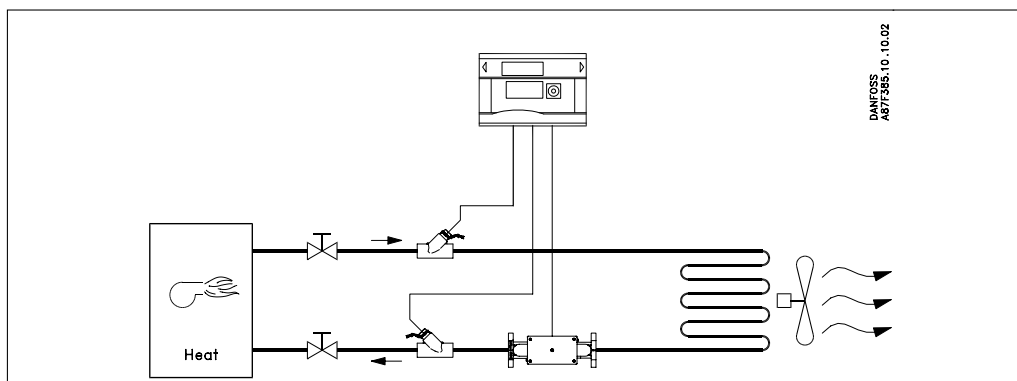
The INFOCAL 8 has been approved according to MID.

#### Features

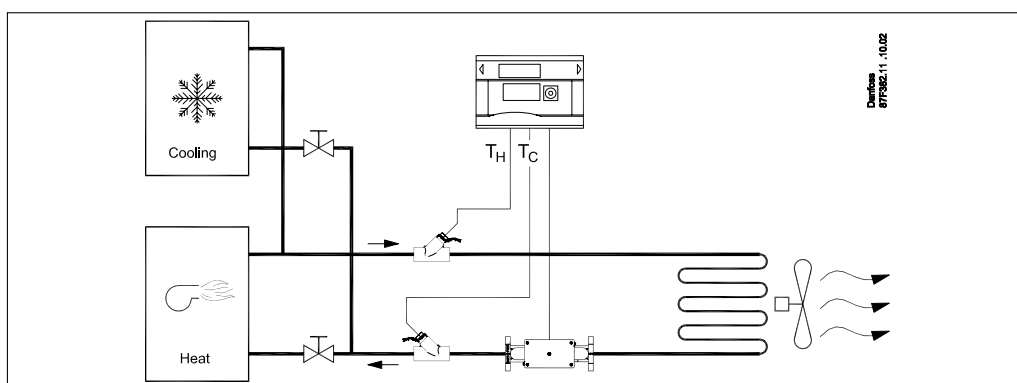
- Lithium battery with lifetime typical 11 years or 16 years optional (depending on selected functionality and connected flow sensor)
- Temperature range: -20 to +190 °C
- Power save mode
- NOWA test capability
- connection possibility of 2- and 4-wire temperature sensor pairs
- Remote reading via M-Bus, L-Bus, RS 232, RS 485, Radio or optical interface
- Integrated Radio 868 MHz, Open Metering Standard (OMS)
- Individual remote reading (Automatic Meter Reading) with add on modules Plug&Play
- 2 communication ports (e.g. M-Bus + pulse input)
- Improved radio performance
- Individual tariff functions
- History memory for 24 months
- Extensive diagnostic displays
- Dedicated district energy application telegram
- Suitable for Danfoss ECL Comfort controller and ECL 310 internet portal connection
- IZAR@SET parameterization software on Windows basis guarantees optimum adaptation to the user's specific needs

**Description/Application,  
continued**

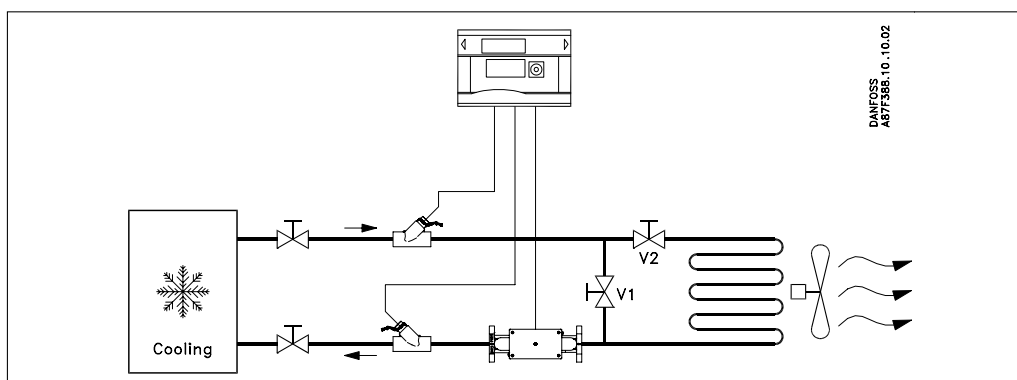
The INFOCAL 8 is able to handle 3 types of applications:



District heating/boiler application



### Combined heating/cooling application



### Chilled water application

**Ordering:**

The standard codes are used for ordering.

Heating application INFOCAL 8 standard codes <sup>1)</sup>:

Code no.	Norminal flow rate range of flow sensor	Pulse value	Installation	Module	Energy unit	Temperature sensor cable length
087G6220	qp 0.6 - 2.5 m <sup>3</sup> /h	1 liter / pulse	low temperature	Pulse output	kWh (without digit after comma)	2m
087G6221	qp 3.5 - 25 m <sup>3</sup> /h	10 liter / pulse	low temperature	Pulse output	MWh (with 2 digit after comma)	2m
087G6222	qp 40 - 60 m <sup>3</sup> /h	100 liter / pulse	low temperature	Pulse output	MWh (with 1 digit after comma)	2m
087G1307	qp 60 - 200 m <sup>3</sup> /h	2.5 liter / pulse	low temperature	M-Bus	MWh (with 1 digit after comma)	5m
087G1308	qp 150 - 800 m <sup>3</sup> /h	10 liter / pulse	low temperature	M-Bus	MWh (with 1 digit after comma)	5m
087G1311	qp 560 -1900 m <sup>3</sup> /h	50 liter / pulse	low temperature	M-Bus	MWh (with 1 digit after comma)	5m
087G1324	qp 1475 - 7600 m <sup>3</sup> /h	100 liter / pulse	low temperature	M-Bus	MWh (with 1 digit after comma)	5m

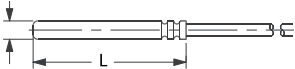
<sup>1)</sup>These codes are EN version with A-cell battery. For more characteristics of each code, please contact Danfoss local sales company.

More standard codes are available regarding cooling meter, combined heating/cooling meter, high temperature installation, power supply and modules.

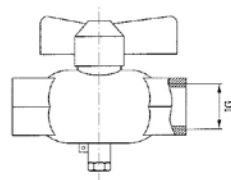
**Ordering continued**
**Modules**

	Designation	Code No.
Communication	M-Bus module	<b>087G6027</b>
	L-Bus module (use for external radio)	<b>087G6035</b>
	RS232 module	<b>087G6029</b>
	RS485 module	<b>087G6032</b>
Function	Analogue output module (4-20 mA)	<b>087G6034</b>
	Combined module (2 pulse inputs/1 pulse output)	<b>087G6041</b>
	Pulse input module (2 inputs)	<b>087G6037</b>
	Pulse output module (2 outputs)	<b>087G6039</b>
Supply voltage	battery 3.6 V DC (A-cell)	<b>087G6020</b>
	battery 3.6 V DC (D-cell)	<b>087G6022</b>
	mains unit 230 V AC	<b>087G6024</b>
	mains unit 24 V AC	<b>087G6025</b>

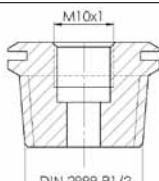
**Accessories**
**Temperature sensors**

	Temperature sensors (pair)	pair	<b>Code No.</b>
	Pt 500/ø 5.2 mm/10 m cable, MID	1	<b>087G6048</b>

**Ball valves**

	Dimension (IG)	Set	<b>Code No.</b>
	G ½"	12 pcs	<b>087G6068</b>
	G ¾"	12 pcs	<b>087G6069</b>
	G 1"	12 pcs	<b>087G6070</b>

**Adapter for mounting temperature sensors**

	Coupling thread	Sensor thread	Set	<b>Code No.</b>
	R ½"	M 10 x 1	32 pcs	<b>087G6076</b>

**Software**

The IZAR@SET parameterization software on windows basis is a convenient tool for handling the energy meter.

It is used for:

- commissioning
- reading out measured values
- printing out energy meter logs
- energy meter configuration
- application analysis
- print the meter protocol

## Technical data

### INFOCAL 8

Basic data	Ambient class		class E1 +M1
	Protection class		IP 54
Display indication	Display		LCD, 8-digit
	Units		MWh - kWh - GJ - Gcal - MBtu - gal - GMP - °C - °F - m <sup>3</sup> - m <sup>3</sup> /h
	Total values		99 999 999 - 9999 999.9 - 999 999.99 - 99 999.999
	Values displayed		Power - energy - flow rate - temperature - volume
Temperature	Ambient	°C	0 - 55
	Storage		-25 - +70
Input	Temperature sensors	Type	Pt 500 with 2-wire leads < 10 m
	Sensor current	mA	Pt 500 peak < 2; rms < 0.012
	Measuring cycle	T s	Mains unit supply: 1 A-cell battery: 16; D-cell battery: 4
	Max. temp. difference	$\Delta\theta_{\max}$ K	177
	Min. temp. difference	$\Delta\theta_{\min}$ K	3
	Starting temp. difference	$\Delta\theta$ K	0.125
	Absolute temp. measuring range	$\theta$ °C	-20...190
Battery supply	3.6 VDC, A cell, 11 years lifetime 3.6 VDC, D cell, 16 years lifetime		
Mains supply	24 VAC, 230 VAC/0.15 W		

## Design and function

The INFOCAL 8 is an ultrasonic energy meter especially designed for heating, cooling or combined heating/cooling application in local and district heating systems.

### Calculator

The calculator contains all the necessary circuits for recording the flow rate and temperature as well as for calculating, logging and displaying the data. The calculator housing can be mounted directly on the volume measuring component or on the wall. At application with medium temperature above 90 °C or at temperatures  $T_{\text{water}} < T_{\text{environment}}$  the calculator has to be removed from the flowmeter.

The calculator can be conveniently read from a single line 8-digit display with units and symbols. A push-button provides user-friendly control of the various display loops. All failures and faults are recorded automatically and shown on the LC display. To protect the reading data, all the relevant data are saved in a non-volatile memory (EEPROM). This memory saves the measured values, device parameters and types of error at regular intervals.

**Design and function,  
continued**
**Temperature Sensors**

Pairs of Pt 500  $\varnothing$ 5.2 mm temperature sensors with 2-wire or 4-wire leads are used. Cable length 2 m, 3 m, 5 m or 10 m are available.

**Integrated Radio**

Integrated Radio is an interface for communication with radio receiver.

- Frequency band: 868 MHz
- Type of radio telegram: Open Metering Standard (OMS)
- Transmission data updating: Online - no time delay between value measurement and data transmission
- Data transmission: Unidirectional
- Sending interval: 12...20 s; depending on length of telegram (duty cycle)

**Interfaces**

- Optical: ZVEI interface as standard, for communication and testing, M-Bus protocol.
- M-Bus: Configurable telegram, according to EN13757-3. Data reading and parametrization are via two wires with polarity reversal protection.
- L-Bus: Adapter for external radio module; configurable telegram, according to EN13757-3. Data reading and parametrization are via two wires with polarity reversal protection. M-Bus protocol.
- RS232: Serial interface for communication with external devices. A special data cable is required. M-Bus protocol.
- RS485: Serial interface for communication with external devices. Power supply with 12V  $\pm$  5V. M-Bus protocol.
- Pulse output: Module with 2 Open Collector pulse outputs (potential-free), 4 Hz (pulse width 125ms), 100 Hz (pulse width  $\geq$ 5ms), ratio: pulse duration / pulse break  $\sim$  1:1. Configurable via IZAR@SET software. Possible pulse output values are Energy, Volume, Tariff energy 1, Tariff energy 2, Tariff condition 1, Tariff condition 2, Energy error and Volume error.
- Pulse input: Module with 2 pulse inputs, max. 20 Hz with minimum pulse duration of 10 msec, input resistance 2.2 M Ohms, terminal voltage 3V DC, cable length up to maximum 10m. The pulse value and the unit is configurable for energy, water, gas or electrical meter by IZAR@SET. Data can be transferred remotely. Also two accounting day's are available for both inputs.
- Combined pulse input / output: Module with 2 pulse inputs and 1 pulse output. Configurable via IZAR@SET software.
- Analogue output: Module for 4...20 mA with 2 programmable passive outputs, programmable value in case of error. Output values can be power, flow rate, temperatures. Configurable via IZAR@SET software.

**Slot 1**

- Analogue output module (4-20mA)
- Combined module (2 pulse inputs/1 pulse output)
- Pulse input module (2 inputs)
- M-Bus module
- L-Bus module (use for external radio)
- RS232 module
- RS485 module

**Slot 2**

- Pulse output module
- Combined module (2 pulse inputs/1 pulse output)
- Pulse input module (2 inputs)
- M-Bus module
- L-Bus module (use for external radio)
- RS232 module
- RS485 module

**Event Memory**

Events such as changes and faults are stored in a non-volatile memory with a capacity of up to 127 entries. The following events are recorded:

- Checksum error
- Temperature measurement error
- Start and end of test mode
- Changing of the main configuration

**Monthly Memory**

The INFOCAL 8 has a history memory of 24 months. The following values are stored in the EEPROM on the programmable interval (daily, weekly, monthly):

- Date/ Time
- Cumulated energy
- Tariff energy 1
- Tariff energy 2
- Tariff definition 1
- Tariff definition 2
- Cumulated volume
- Error hour counter
- Value of max. flow
- Time max. flow
- Date max. flow
- Value of max. power
- Time max. power
- Date max. power
- Pulse input counter 1
- Pulse input counter 2
- Pulse 1 definition
- Pulse 2 definition
- Operating days
- Max. forward temperature
- Time max. forward temperature
- Date max. forward temperature
- Max. return temperature
- Time max. return temperature
- Date max. return temperature

**Design and function,  
continued**
**Log Memory**

The large two log memory blocks are used to store consumption values. The storage frequency can be selected from various storage intervals (1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 minutes or the default setting of 24 hours, Day in the month, Day of the week, (1024 seconds), 15th or end of month).

The data saved in the log memory can be used for the following analyses:

- Reading the calculator on a certain day.  
Example: If the day for reading is 01.10, the calculator reading is displayed for the period from 01.10 of the previous year to 30.09 of the current year.
- Comparison of the last consumption period with the preceding period

Extract of possible log memory settings

Memory block	Storage interval	Values	Date block size example	Number of data records	Recording period
area 1	1 hour	Error status, overload time temperature, overload time flow rate, supply temperature, return temperature, date and time, energy, tariff energy 1, tariff energy 2, tariff definition 1, tariff definition 2, volume, error day counter	16 byte	556	23 days
area 2	24 hours		16 byte	299	299 days
area 1	1 hour		8 byte	1113	46 days
area 2	24 hours		8 byte	599	599 days

**Accounting date**

The calculator includes two independent memories in which the accumulated energy at two programmable dates is stored.

- Last Accounting Date;
- Last but one Accounting Date;
- Values stored:
- Energy;
- Volume;
- Tariff counter 1;
- Tariff counter 2;
- Pulse counter 1;
- Pulse counter 2;
- Date.

**Tariff Function**

The calculator offers four optional tariff memories for monitoring plant load states for limit tariffs. Here it concerns threshold value tariffs. Extensive tariff conditions make it possible to adapt the calculator individually to the required customer-specific applications.

The tariffs are separately configurable and independent from each other. Energy or time can be measured alternatively per tariff register dependent on the tariff mode adjusted in each case.

With the "time triggered tariff function" (type Z) the switch-on time and the switch-off time are adjustable independent from each other for each day of the week in steps of 15 minutes.

The following limit types are possible:  
(This example applies to the display at 3 digit after volume comma)

**Max. Actual Values Memories**

The calculator creates maximum values for power, flow rate and temperatures based on consumption time, which are stored in the EEPROM. The integration intervals are adjustable to 6, 15, 30 or 60 minutes, 24 hours (and 1024 seconds). Default setting is 60 minutes.

Type	Description	LIMIT	LIMIT resolution
$\Delta T$	Temperature difference	1 ... 255 °C	1 °C
$-\Delta T$	Negative temperature difference	1 ... 255 °C	1 °C
$T_R$	Low temperature (low)	1 ... 255 °C	1 °C
$T_F$	High temperature (high)	1 ... 255 °C	1 °C
P	Power	1 ... 255 kW	1 kW
Q	Flow	100 ... 25 500 l/h	100 l/h
FE	"Theoretically Supply Energy" with return temperature of 0 °C	-	-
Z	"Time triggered" counting energy	-	-
E	"External" counting energy	-	-

More detailed description concerning tariff functions on request.

**Display Control**

The readings are displayed on the calculator by a 8-digit LCD with units and symbols.

**Design and function,  
continued**

**Loop Structure**

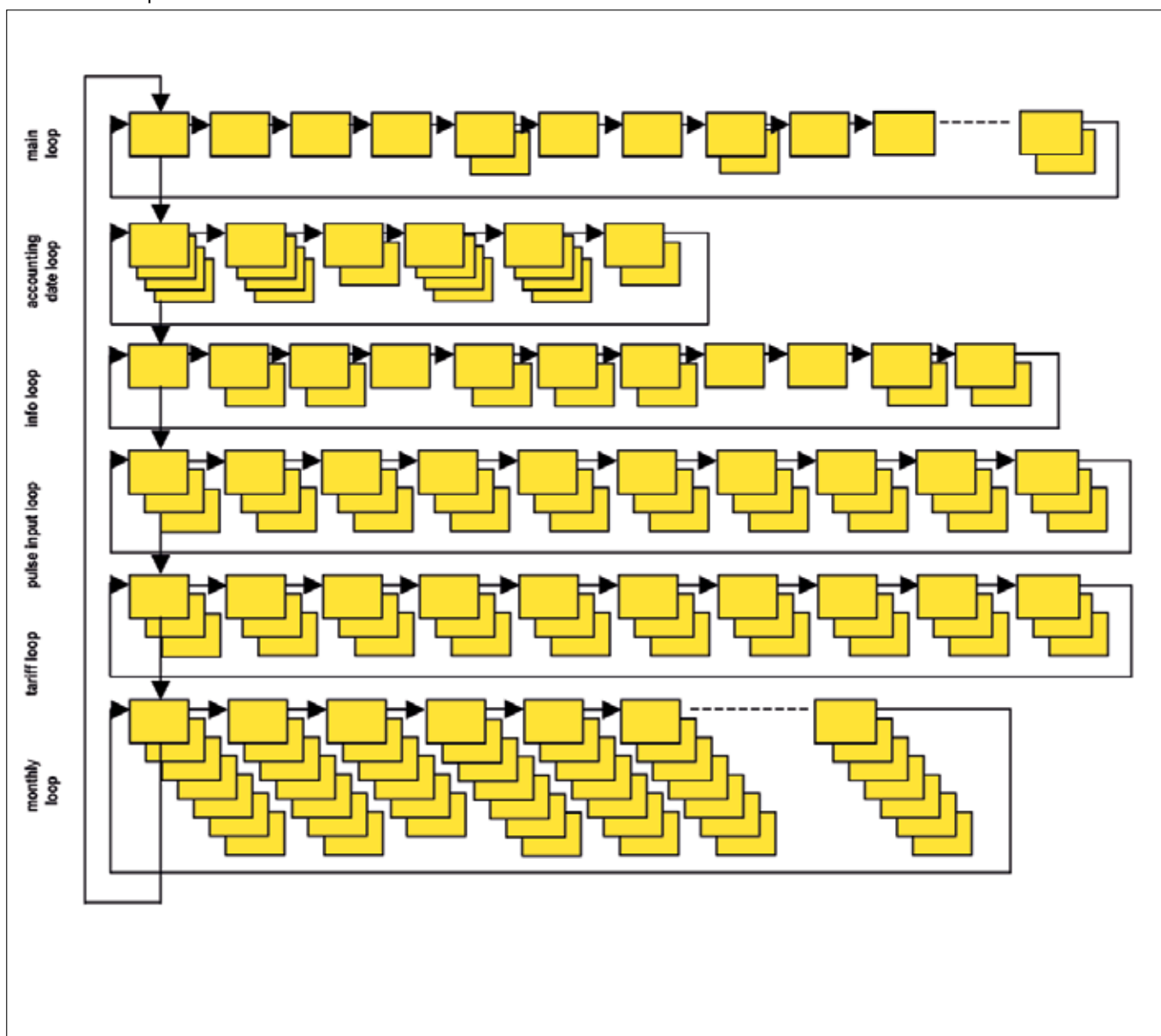
The INFOCAL 8 display has six loops. Some display windows consist of two (to maximum seven) displays that are shown alternately at 4-second intervals. Some pictures in loops or a complete loop can be deactivated separately.

The main loop with the current data, e.g. for energy, volume and flow rate, is programmed as default setting.  
In the standard setting the loop no. 5 (tariff loop) is not activated.



For quick visual guidance, the loops in the display are numbered from 1 to 6.

Overview of Loops





**Data Sheet**
**INFOCAL 8 – Energy calculator**
**Informative Displays (Standard)**

Loop	Sequence	Window 1	Window 2	Window 3	Window 4
"1" Main loop	1.1	Accumulated energy			
	1.2	Volume			
	1.3	Flow			
	1.4	Power			
	1.5	Forward/- return temperature			
	1.6	Difference temperature			
	1.7	Operating days			
	1.9	Error status			
	1.10	Display test			
Loop	Sequence	Window 1	Window 2	Window 3 [off]	Window 4
"2" Accounting date loop	2.1	Accounting date 1 date	Accounting date 1 energy	Accounting date 1 volume	,Accd 1A'
	2.2	Next accounting date 1 date	Next accounting date 1 energy	Next accounting date 1 volume	,Accd 1L'
	2.3	Previous accounting date 1 date	Previous accounting date 1 energy	Previous accounting date 1 volume	,Accd 1'
	2.4	,Accd 1'	Date of next accounting date 1		
	2.5	Accounting date 2 date	Accounting date 2 energy	Accounting date 2 volume	,Accd 2A'
	2.6	Next accounting date 2 date	Next accounting date 2 energy	Next accounting date 2 volume	,Accd 2L'
	2.7	Previous accounting date 2 date	Previous accounting date 2 energy	Previous accounting date 2 volume	,Accd 2'
	2.8	,Accd 2'	Date of next accounting date 2		
Loop	Sequence	Window 1	Window 2	Window 3	Window 4
"3" Info loop	3.1	Current date			
	3.2	,SEC_Adr'	Secondary address		
	3.3	,Pri_Adr 1'	Primary address 1		
	3.4	,Pri_Adr 2'	Primary address 2		
	3.5	Installation position			
	3.6	,In0'	Configuration (pulse value)		
	3.7	,Port 1'	No. of the mounted module at port 1		
	3.8	,Port 2'	No. of the mounted module at port 2		
	3.9	Status integrated radio	(Sequence will be shown only in meters with integrated radio)		
	3.10	No. of error hours			
	3.11	software version	Checksum		
Loop	Sequence	Window 1	Window 2	Window 3	Window 4
"4" Pulse input loop	4.1	,In1'	Accumulated values pulse input 1	,PPI' pulse value 1	
	4.2	,In2'	Accumulated values pulse input 2	,PPI' pulse value 2	

[off] = not active

Loop	Sequence	Window 1	Window 2	Window 3	Window 4	Window 5	Window 6	Window 7
"5" Tariff loop	The tariff loop is switched off as a standard at the heat meter or meter for cooling.							
Loop	Sequence	Window 1	Window 2	Window 3 [off]	Window 4 [off]	Window 5	Window 6	Window 7
"6" Monthly value loop	6.1	,LOG'	date last month			energy	volume	
	6.2	,LOG'	date month - 1			energy	volume	
	6.3	,LOG'	date month - 2			energy	volume	
	...	...						
	6.24	,LOG'	date month - 23			energy	volume	

[off] = not active

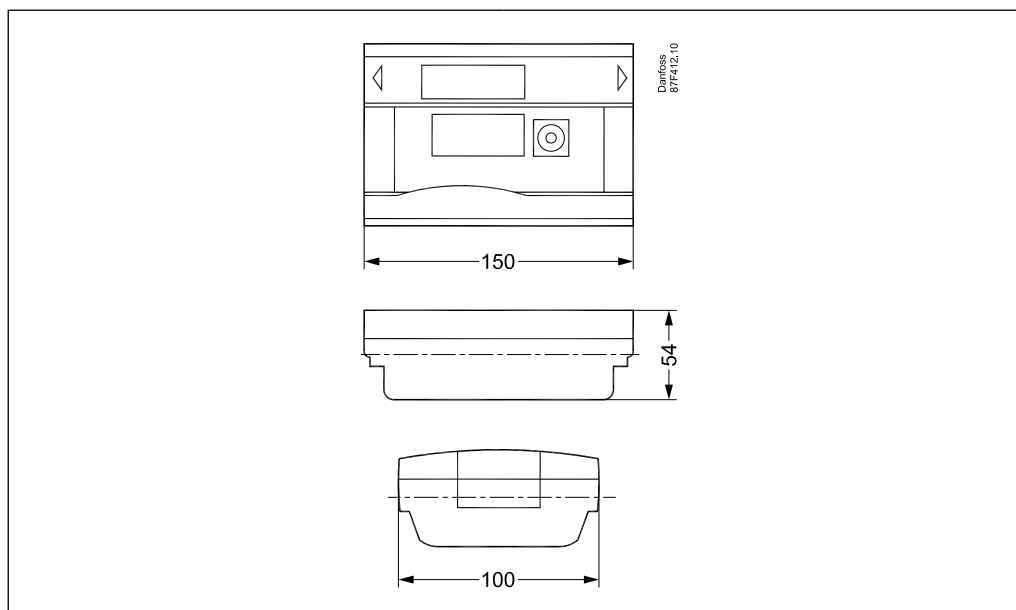
### Simple operation

A push-button mounted on the front of the calculator is used to switch to the various displays. The button can be pressed for a short or long time. A short press of the button (< 3 seconds) switches to the next display within a loop and a long press (> 3 seconds) switches to the next display loop. The "Energy" window (sequence 1.1) in the main loop is the basic display.

The calculator switches automatically to power save mode if the button is not pressed for approx. 4 minutes and returns to the basic display when the button is pressed again. The loop settings can be programmed to suit the customer's individual requirements using the IZAR@SET software.

## Dimensions

### INFOCAL 8



## Temperature sensors

	Designation	Type	Dimension D (mm)	L (mm)
	Direct mounted	Pt 500	ø 5.2	45
	Pocket sensor	Pt 500	ø 5.2	45

## Sensor pockets

	Type		Brass				Stainless steel			
	Sensor dimension	(mm)	ø 5.2				ø 5.2			
	Length		L1 (mm)				L (mm)			
			47	60	93	128	98	133	168	223
			35	52	85	120	85	120	155	210

