

Infocal 9 Energy calculator for heating and cooling applications





Infocal 9

Danfoss Danfoss A/S DK 6430 Nordborg Denmark CVR nr: 2016 5715 Telephone: 145 7488 2222 Fax: 145 7449 0949 EU DECLARATION OF CONFORMITY Danfoss A/S **Danfoss Energy Metering** declares under our sole responsibility that the product(s) Energy calculators Type(s): Infocal 9 EC type-examination certificate no.: LT-1621-MI004-028 (LEI Lithuanian energy institute) is in conformity with the relevant Union harmonisation legislation acts, as far as these apply to the product: MID Directive 2014/32/EU EMC Directive 2014/30/EU LVD Directive 2014/35/EU RED Directive 2014/53/EU RoHS Directive 2011/65/EU The product complies with the following used harmonised standards and normative documents, rules and technical guidelines (level as indicated): EN-61000-4-3 EN 1434:2007 WELMEC 7.2:2009 EN-61000-4-4 EN 61010-1:2010 EN-61000-4-5 EN 55022:2010 EN-61000-4-6 EN 300 220-2 v2.4.1:2012 EN-61000-4-8 EN-61000-4-2 EN-61000-4-11 The notified body LEI Lithuanian energy institute, number 1621, controls the quality system according module D / MID certificate no.: Module D: KS-1621-MP-002.16 Approved b Dat lin Signature BC 1.3.2017 1.3.2017 41 Signature 40 Bjarne Halkjar Sig Name Siniša Bogar Name Product Manager Product Portfolio Director Title Title Danfoss only vouches for the correctness of the English version of this declaration. In the event of the declaration being translated into any other language, the translator concerned shall be liable for the correctness of the translation ID No: VJSHQ102 Revision No: 02 Page 1 of 1 503N0014A06 1 issue 2017-01 Property of Danfoss Heating Segment Printed copy for reference only



1. Installation

1.1. Preparation

Only qualified personnel may install the equipment, following the requirements listed in this document. More detailed instructions can be found on www.heating.danfoss.com.

1.2. Identification of installation: Return or Supply pipe flow meter/sensor installation



Flow meter/sensor installed in return pipe



Flow meter/sensor installed in supply pipe



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1.3. Installation of temperature sensors

Handle the temperature sensors carefully! The sensor cables are fitted with coloured type labels:

- Red (TH): sensor in supply pipe
- Blue (TC): sensor in return pipe

Make sure the sensors are mounted symmetrically (both directly immersed, or both installed in a pocket). The maximum cable length is 10 m. The connecting cables must not be shortened or extended. The free temperature sensors can be installed in a ball valve or adapter or in a conformity tested pocket for this type of sensor. Ensure that the temperature sensors are permanently connected during operation.

For installation in a ball valve or adapter, a 4-piece coupling set is enclosed in a separate bag. See procedure under item 1...5 on the right. Insert an O-ring in the sensor hole using the mounting pin supplied. If the sensor is installed in a pocket, it must be inserted as far as the bottom of the pocket and then secured. The pockets are best installed in T-pieces with a 45° or 90° angle. The tip of the pocket must point in the opposite direction to the direction of flow and must be located in the middle of the pipe. Temperature sensors must be sealed after installation in the pockets.



The operation of any violation of this guidance will result in immediate invalidation of the factory warranty and verification.



a) angled 45°



b) perpendicular

Installation recommendations for pocket temperature sensors with permanently connected signal leads.

Calculator type	Sensor marking	Wiring 2-wire sensor	Wiring 4-wire sensor	Installation position
Heating or	Red	T _{Hot} (5-6)	T _{Hot} (1/5-6/2)	Supply pipe
Heating/cooling	Blue	T _{Cold} (7-8)	T _{Cold} (3/7-8/4)	Return pipe

Temperature sensor cables should be connected to terminals as shown in below table:

1.4. Mounting and sealing of calculator

On the wall:



On standard DIN-rail:





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1.5. Flow meter or flow sensor connection

For connection of flow meter/sensor to energy calculator Infocal 9 it is important to know in which pipe (supply -q1 or return -q2) this flow meter/sensor will be installed:

Flow sensor in return pipe	Infocal 9 terminal	Flow sensor in supply pipe	Infocal 9 terminal
External 3.6 V*	9(+U)	External 3.6 V*	9(+U)
Flow pulse	52 (q2+)	Flow pulse	10 (q1+)
Ground	11 (q2-)	Ground	11 (q1-)

*only if external supply for flow meter/sensor is needed.

Wiring to flow meter SONO 3500 CT:

SONO 3500 CT in supply pipe	Infocal 9 terminal
56 (flow pulse)	10 (q1+)
57 (ground)	11 (q1-)

SONO 3500 CT in return pipe	Infocal 9 terminal
56 (flow pulse)	52 (q2+)
57 (ground)	11 (q2-)

Wiring to flow sensor SonoSensor 30:

SonoSensor 30 in supply pipe	Infocal 9 terminal
18 (flow pulse)	10 (q1+)
19 (ground)	11 (q1-)

SonoSensor 30 in return pipe	Infocal 9 terminal
18 (flow pulse)	52 (q2+)
19 (ground)	11 (q2-)

Wiring to flow sensor SONO 1500 CT:

SONO 1500 CT in return pipe	Infocal 9 terminal
Vcc (brown)*	9 (+U)
Pulse (white)	52 (q2+)
GND (blue)	11 (q1-)







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SONO 1500 CT in supply pipe	Infocal 9 terminal
Vcc (brown)*	9 (+U)
Pulse (white)	10 (q1+)
GND (blue)	11 (q1-)

*connect only if SONO 1500 CT with external supply.

Maximum permissible pulse input frequency and minimal permissible pulse duration.

Number of Pulse inputs	2
Measurement unit	m³
Pulse value	Configurable by control buttons
Min. pulse duration	5ms 100ms for combination with SonoSensor 30
Max. permissible pulse frequency	60Hz 5Hz for combination with SonoSensor 30
Pulse type	Passive pulses
Sensor cable length	Max. 10m
Cable type	Shielded twisted pair cable

Note:

In order to avoid any noise interference keep safety distance of 5cm between mains and pulse cable on installation site

Note:

Recommendation is to use 0.75mm² shielded cables for pulse and mains power connection.

2. Electrical wiring



Electrical wiring diagram with 2-wire temperature sensors

q1 - pulse input signal from flow meter in supply pipe q2 - pulse input signal from flow meter in return pipe

q3, q4 - pulse inputs from water meters

T1 - temperature sensor in supply pipe

T2 - temperature sensor in return pipe

Note: Only required for selected calculator type should be connected



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Electrical wiring diagram with 4-wire temperature sensors

- q1 pulse input signal from flow meter in supply pipe q2 pulse input signal from flow meter in return pipe q3, q4 pulse inputs from water meters
- T1 temperature sensor in supply pipe
- T2 temperature sensor in return pipe
- Note: Only required for selected calculator type should be connected

Calculator

Terminal	Marking	Description
9	+U	+3,6V power supply (only if mains supply)
11	-q1	Ground for 1-st flow sensor (-)
10	+q1	Pulse input signal from flow meter in supply pipe
11	-q2	Ground for flow sensor
52	+q2	Pulse input signal from flow meter in return pipe
11	-q3	Ground for 3-rd flow sensor (-)
53	+q3	Pulse input signal from 3-rd flow sensor (+)
11	-q4	Ground for 4-th flow sensor (-)
54	+q4	Pulse input signal from 4-th flow sensor (+)
5	T1	Current terminal for 1-st temperature sensor "+I"
1	T1	Voltage terminal for 1-st temperature sensor "+U"
2	T1	Voltage terminal for 1-st temperature sensor "-U"
6	T1	Current terminal for 1-st temperature sensor "-I"
50	1	Shield terminal (for 1-st temperature sensor etc.)
7	T2	Current terminal for 2-nd temperature sensor "+I"
3	T2	Voltage terminal for 2-nd temperature sensor "+U"
4	T2	Voltage terminal for 2-nd temperature sensor "-U"
8	T2	Current terminal for 2-nd temperature sensor "-I"
50	1	Shield terminal (for 2-nd temperature sensor etc.)



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Terminal	Marking	Description
76	1	Current output ground (-)
77	lout1	1-st current output (+)
78	lout2	2-st current output (+)
79	T	Pulse output ground (-)
80	Puls1	1-st pulse output (+)
81	Puls2	2-st pulse output (+)
24, (73)	BUS	M-Bus interface L1 signal (M-Bus , CL – -CL or RS232 – Rx (input))
25, (74)	BUS	M-Bus interface L2 signal (M-Bus , CL – +CL or RS232 – Tx (output))
75	BUS	Ground for RS-232 interface "GND"

Communication modules

Power supply



To ensure constant pulse read out, recommended is connecting ground terminal 26 of 230V AC module with terminal 11 of Infocal 9. Infocal 9 with battery is not affected.

Terminal	Marking	Description
26	⊥	Main ground
27	0	Neutral
28	L	Mains power supply (230V AC)

3. Commissioning

3.1. Bleeding

- 1. Bleed the system until the flow rate display is steady.
- 2. Make sure no error codes are displayed.
- 3. Check the display for a plausible indication of flow rate and temperatures.



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4. Display function overview

4.1. Display symbols description



4.2. Menu structure

Parameters shown	Identification symbols				
Integral values	▼ L1	L2	L3	L4	L5
Instantaneous parameters values (L2)	L1	▼ L2	L3	L4	L5
Set day parameters and archive data values (L3)	L1	L2	▼ L3	L4	L5
Printing reports by standard printer (L4)	L1	L2	L3	▼ L4	L5
Configuration settings parameters (L5)	L1	L2	L3	L4	▼ L5
Parametrization (configuration) mode (SET)	L1	L2	TEST L3	L4	L5
Test mode (TEST)	L1	L2	TEST L3	L4	L5

Note: More detailed display description is available for download from www.danfoss.com.



General errors:

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4.3. Error codes check

The calculator continuously analyzes operational modes, diagnoses and informs of errors in system.



Error display	Error description
ErΣ: 0	No error. Normal mode.
ErΣ: 1	Warning! Estimated battery lifetime less than 6 months.
ErΣ: 5	Flow rate outside designated limits or temperature difference is under programmed minimum allowed value (only when energy calculation algorithm "2 – special" is applied).
ErΣ: 8	Flow or temperature sensor error.

Status of flow sensors:



Status of flow sensor q1

Status of flow sensor q2

Display	Description
Er1:0	No error. Normal mode.
Er1: 2	Flow rate is under programmed minimum allowed value
Er1:4	Flow rate exceeds programmed maximum allowed value.
Er1:8	Sensor failure (broken connection or disconnected power supply.

Status of flow temperature sensors:



Status of sensor $\Theta\mathbf{1}$

Status of sensor $\Theta 2$

Display	Description
Er2: 0	No error. Normal mode.
Er2: 1	Temperature difference is under programmed minimum allowed value.
Er2: 8	Sensor failure (open circuit or short circuit).



5. Disposal



This symbol on the product indicates that it will not be treated as household waste. It must be handed over to the applicable take-back scheme for the recycling of electrical and electronic equipment. For more detailed information about the recycling of this product, please contact your local municipal office.

ltem	Material	Disposal
Battery	D-cell lithium/thionyl chloride 3.5 g lithium	Approved deposit for lithium batteries
PCBA with display	Coppered epoxy laminate components soldered on, PC, TPE	Electronic waste
Other plastic parts	PC, PPS, PEI, TPE	Plastic recovery

6. Local Importer name and address

For goods delivered to UK, importer name and address is: Danfoss Ltd. Oxford Road UB9 4LH Denham UK



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