

## USONIC II

### M-Bus frames

### Calculators: CF-Echo II – CF51 – CF55


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## 1. Introduction

### 1.1. Purpose

This document describes all the M-Bus frames treated by USONIC II products.

### 1.2. Scope

This document applies to the following challenger products :

CF ECHO II : from version 19-22

CF-STANDARD : from version 11-13

CF-ADVANCED : from version 10-10

### 1.3. References.

[1] The M-Bus : A Documentation

### 1.4. Definitions


VIF	Value information field
DIF	Data information field
FDR	Fixed date reading

### 1.5. Document overview

This document is organized as follows :

- Chapter 2 describes the M-Bus parameters managed by USONIC II products.
- Chapter 3 describes the command M-Bus frames managed by USONIC II products.
- Chapter 4 describes the parameters programming M-Bus frames.
- Chapter 5 describes the data M-Bus frames sent by USONIC II products.

The last chapter 6 logs the changes of the document

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## 2. M-Bus parameters

### 2.1. Primary address

The address field serves to address the recipient in the calling direction, and to identify the sender of information in the receiving direction. The size of this field is one Byte, and can therefore takes values from 0 to 255.

The primary address can be programmed with the "Primary Address programming frame (§4.1).

Address	Description
0	Unconfigured slave
1 - 250	Individual configured slave
251 -252	Reserved for future applications
253	Secondary addressing (See [1], § 7)
254	Broadcast with response of all slaves
255	Broadcast without response of the slaves

### 2.2. Customer number

The customer number is 8 BCD number.

This number is a product identification number used for secondary addressing (See [1], § 7) and can be programmed with the identification programming frames (§4.3 and §4.4).

### 2.3. Manufacturer number

The manufacturer number is 8 BCD number.


This number is set during product manufacturing and can not be changed. It can also be used for secondary addressing.

### 2.4. Baudrate

The USONIC II products manage four different communication speeds :

- 300 bd
- 1200 bd
- 2400 bd
- 9600 bd

A baudrate programming frame allows to modify the communication speed (§4.5).

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### 3. M-Bus command frames

#### 3.1. Data request

##### 3.1.1. Overview

The master requests data from the slave. The slave can either transfer its data with a response data frame, or give no response indicating that the request frame has not been received correctly or that the address contained in the request frame does not match.

The data sent in the response frame are the one selected by selection frames (3.5 and 3.6).

The different response data frames are described in section 5.

##### 3.1.2. Frame detail

10h	Start
4Bh/5Bh/7Bh	Request 4Bh : No FCB management 5Bh/7Bh : FCB management with FCB bit toggle (the FCB management is only used for Data-logging frames in CF-ADVANCED product)
XXh	Primary address
CS	Checksum
16h	Stop

#### Product response

Selected data frame.

#### 3.2. Slave initialization

##### 3.2.1. Overview

This frame is used to check the correct working of the communication.

It is also used in secondary addressing to deselect a product previously selected with secondary addressing (See [1], § 7)

##### 3.2.2. Frame detail

10h	Start
40h	Request
XXh	Primary address
CS	Checksum
16h	Stop

#### Product response

E5h	Single character response
-----	---------------------------

### 3.3. Secondary addressing

#### 3.3.1. Overview

All the USONIC products manage the secondary addressing.  
The secondary addressing is described in § 7 of [1].

#### 3.3.2. Frame detail

68h	Long frame starting code
0Bh	Frame Length
0Bh	Frame Length
68h	Long frame starting code
53h/73h	Send data
FDh	Secondary addressing primary address
52h	Selection of slave
XXh	Customer number (LSB)
XXh	Customer number
XXh	Customer number
XXh	Customer number (MSB)
77h	Actaris identification number (LSB)
04h	Actaris identification number (MSB)
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling
CS	Checksum
16h	Ending char

#### Product response

If product selected :

E5h	Single character response
-----	---------------------------

If product not selected : no response


### 3.4. Extended secondary addressing

#### 3.4.1. Overview

All the USONIC products manage the extended secondary addressing.  
The secondary addressing is described in § 7 of [1].

#### 3.4.2. Frame detail

68h	Long frame starting code
11h	Frame Length
11h	Frame Length
68h	Long frame starting code
53h/73h	Send data
FDh	Secondary addressing primary address

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52h	Selection of slave
XXh	Customer number (LSB)
XXh	Customer number
XXh	Customer number
XXh	Customer number (MSB)
77h	Actaris identification number (LSB)
04h	Actaris identification number (MSB)
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling
0Ch	8 digits BCD
78h	Manufacturer number M-Bus code
XXh	Manufacturer number (LSB)
XXh	Manufacturer number
XXh	Manufacturer number
XXh	Manufacturer number (MSB)
CS	Checksum
16h	Ending char

### Product response

If product selected :

E5h	Single character response
-----	---------------------------

If product not selected : no response

## 3.5. Data frame selection

### 3.5.1. Overview


This frame allows to select the data to be sent by the product after a request frame.

Note : If the product is configured in "CF50 Compatible mode", the "Default frame" and the "CF50 frame" are inverted. The product returns the "Default frame" with the selection "18" and the "CF50 frame" with the selection "0".

The following data frame can be selected :

Frame number	Name
00	Default frame or CF50 frame
01	Time Error Frame
02 - 14	FDR frames
15	Tariffs frame (CF_ADVANCED only)
16	Peaks frame
17	Bonus frame
18	CF50 frame or Default frame
19	Empty frame
20 - 23	Error log frames
24	Data-logging frame (CF_ADVANCED only)

All the data response frames are described in § 5.

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### 3.5.2. Frame detail

68h	Long frame starting code
04h	Frame Length
04h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
50h	Frame selection code
XXh	Frame number
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
-----	---------------------------

## 3.6. Default frame selection

### 3.6.1. Overview

This frame allows to select back the "Default frame".

Note : If the product is configured in "CF50 Compatible mode", the "Default frame" and the "CF50 frame" are inverted. The product returns the "CF50 frame" after a default frame selection.

### 3.6.2. Frame detail

68h	Long frame starting code
03h	Frame Length
03h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
50h	Frame selection code
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
-----	---------------------------

## 4. M-Bus programming frames

### 4.1. Primary address programming

#### 4.1.1. Overview

This frame allows to program a new primary address.

If the new address is different from 1 to 250, the primary address is not changed.

Note : The "0" address is reserved for unconfigured products and can not be programmed.

#### 4.1.2. Frame detail

68h	Long frame starting code
06h	Frame Length
06h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
01h	8 bits integer DIF code
7Ah	Bus address VIF code
XXh	New primary address
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
-----	---------------------------

### 4.2. Date and time programming

#### 4.2.1. Overview


This frame allows to program a new date and time.

If one of the value of the new date is not correct (minute, hour, day, month or year), the whole date and time is not changed.

M-Bus date and time format : type F M-Bus date and time.

#### 4.2.2. Frame detail

68h	Long frame starting code
09h	Frame Length
09h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
04h	32 bits integer DIF code
6Dh	Date and time type F

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XXh	New date and time (LSB)
XXh	New date and time
XXh	New date and time
XXh	New date and time (MSB)
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
-----	---------------------------

### 4.3. Complete identification programming

#### 4.3.1. Overview

This frame allows to program a new customer number.

If the new customer number is not in 8 digits BCD format, the customer number is not changed.


Note : All the other parameters sent in the frame (manufacturer identification number, generation, and medium) are not taken into account.

#### 4.3.2. Frame detail

68h	Long frame starting code
0Dh	Frame Length
0Dh	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
07h	64 bits integer DIF code
79h	Identification VIF code
XXh	New customer number (LSB)
XXh	New customer number
XXh	New customer number
XXh	New customer number (MSB)
77h	Manufacturer identification number (LSB)
04h	Manufacturer identification number (MSB)
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
-----	---------------------------

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#### 4.4. Partial identification programming

##### 4.4.1. Overview

This frame allows to program a new customer number.

If the new customer number is not in 8 digits BCD format, the customer number is not changed.

##### 4.4.2. Frame detail

68h	Long frame starting code
09h	Frame Length
09h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
0Ch	8 digits BCD DIF code
79h	Identification VIF code
XXh	New customer number (LSB)
XXh	New customer number
XXh	New customer number
XXh	New customer number (MSB)
CS	Checksum
16h	Ending char

##### Product response

E5h	Single character response
-----	---------------------------

#### 4.5. Baudrate programming

##### 4.5.1. Overview


This frame allows to program a new baudrate.

Note : the product responds with the old communication speed.

##### 4.5.2. Frame detail

68h	Long frame starting code
03h	Frame Length
03h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
XXh	New baudrate : B8h : 300bd BAh : 1200bd BBh : 2400bd BDh : 9600bd
CS	Checksum
16h	Ending char

##### Product response

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E5h	Single character response
-----	---------------------------

## 4.6. External Water Meters parameters programming

### 4.6.1. Overview

This frame allows to program external water meters parameters :

- Water meter 1 pulse value
- Water meter 2 pulse value
- Water meter 1 index
- Water meter 2 index

#### Water meter pulse value:

Format : 1 byte

Value :

- 0 : 1 litre
- 1 : 2.5 litres
- 2 : 10 litres
- 3 : 25 litres
- 4 : 100 litres
- 5 : 250 litres

#### Water meter index:

Format : 8 digits BCD


Value and unit :

- if Pulse value  $\leq$  10 litres : unit = 10 litres
- if Pulse value  $>$  10 litres : unit = m<sup>3</sup>

Remark : the new Water meters parameters are not programmed if the primary address of the frame is the broadcast address without response (255).

### 4.6.2. Frame detail

68h	Long frame starting code
0Fh	Frame Length
0Fh	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
0Fh	Specific manufacturer DIF
01h	WM programming frame code
XXh	Pulse value water meter 1
XXh	Pulse value water meter 2
XXh	Index water meter 1 (LSB)
XXh	Index water meter 1
XXh	Index water meter 1
XXh	Index water meter 1 (MSB)
XXh	Index water meter 2 (LSB)
XXh	Index water meter 2
XXh	Index water meter 2

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XXh	Index water meter 2 (MSB)
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
-----	---------------------------

### 4.7. Peaks parameters programming

#### 4.7.1. Overview

This frame allows to program peaks parameter :

- Sampling period

#### Sampling period:

Format :16 bits integer

Unit : minute

Value : from 0 to 1441 ( 0 : peak function unavailable )

Remark : If a value higher than 1441 is programmed, the sampling period will be adjusted to 1441.

#### 4.7.2. Frame detail

68h	Long frame starting code
07h	Frame Length
07h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
0Fh	Specific manufacturer DIF
02h	Peaks programming frame code
XXh	Sampling period (LSB)
XXh	Sampling period (MSB)
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
-----	---------------------------


### 4.8. Tariffs parameters programming

#### 4.8.1. Overview

This frame is only available on CF\_ADVANCED products.

This frame allows to program tariffs parameters :

- Threshold 1 type
- Threshold 2 type
- Threshold 1 value
- Threshold 2 value

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**Threshold type :**

Format : 1 byte

Value :

- 0 : No threshold
- 1 : Inlet temperature
- 2 : Outlet temperature
- 3 : Temperature difference
- 4 : Flow
- 5 : Power

**Threshold value :**

Format : 32 bits real.

Unit :

- Inlet temperature, outlet temperature, temperature difference : °C
- Power : kW
- Flow : m<sup>3</sup>/h

**4.8.2. Frame detail**

68h	Long frame starting code
0Fh	Frame Length
0Fh	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
0Fh	Specific manufacturer DIF
03h	Tariffs programming frame code
XXh	Threshold 1 type
XXh	Threshold 2 type
XXh	Threshold 1 value (LSB)
XXh	Threshold 1 value
XXh	Threshold 1 value
XXh	Threshold 1 value (MSB)
XXh	Threshold 2 value (LSB)
XXh	Threshold 2 value
XXh	Threshold 2 value
XXh	Threshold 2 value (MSB)
CS	Checksum
16h	Ending char


**Product response**

E5h	Single character response
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**4.9. Modem parameters programming****4.9.1. Overview**

These frames allow to program modem parameters :

- Modem call status
- Modem call date and time
- Modem country code

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- Modem telephone number

#### Modem call status :

Format : 1 byte

Value :

0 : modem deactivated

1 : modem activated

#### Modem call date and time :

Format : 32 bits integer. M-Bus type F date and time

Note : If one of the value of the date is not correct (minute, hour, day, month or year), the whole date and time is not changed.

#### Modem country code :

Format : 3 ASCII bytes

#### Modem telephone number :

Format : 25 ASCII bytes

The different parameters are split into 3 frames.

### 4.9.2. Frame detail

First frame :


68h	Long frame starting code
0Ah	Frame Length
0Ah	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
0Fh	Specific manufacturer DIF
04h	Modem 1 programming frame code
XXh	Modem call status
XXh	Modem call date and time (LSB)
XXh	Modem call date and time
XXh	Modem call date and time
XXh	Modem call date and time (MSB)
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
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Second frame :

68h	Long frame starting code
15h	Frame Length
15h	Frame Length
68h	Long frame starting code
53h/73h	Send data

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XXh	Primary address
51h	Send data
0Fh	Specific manufacturer DIF
05h	Modem 2 programming frame code
XXh	Modem Country code (MSB)
XXh	Modem Country code
XXh	Modem Country code (LSB)
XXh	Modem telephone number (MSB)
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
CS	Checksum
16h	Ending char

### Product response

E5h	Single character response
-----	---------------------------

Third frame :

68h	Long frame starting code
11h	Frame Length
11h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
0Fh	Specific manufacturer DIF
06h	Modem 3 programming frame code
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number
XXh	Modem telephone number (LSB)
CS	Checksum
16h	Ending char

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## Product response

E5h	Single character response
-----	---------------------------

### 4.10. Reset parameters

#### 4.10.1. Overview

This frame allows to reset the following functionality:

- All FDR values
- Current peaks
- Error log
- Times in alarm
- Tariff (For CF\_ADVANCED only)
- Bonus
- Data-logging (For CF\_ADVANCED only)

#### Reset field :

Format : 1 byte

Value :

bit0 : FDR

bit1 : Current peaks

bit2 : Error logs

bit3 : Times in alarm

bit4 : Tariffs

bit5 : bonus

bit6 : Data-logging

bit7 : unused


Note : one or more value can be reset at the same time.

#### 4.10.2. Frame detail

68h	Long frame starting code
06h	Frame Length
06h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
0Fh	Specific manufacturer DIF
07h	Reset frame code
XXh	Reset bits field
CS	Checksum
16h	Ending char

## Product response

E5h	Single character response
-----	---------------------------

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## 4.11. Data-logging parameters programming

### 4.11.1. Overview

This frame is only available on CF\_ADVANCED products.

This frame allows to program data-logging parameters :

- Data-logging values selection
- Data-logging period

#### Data-logging value selection :

Format : 32 bits integer

Value :

bit0 : Power

bit1 : Flow

bit2 : Inlet temperature

bit3 : Outlet temperature

bit4 : Instantaneous bonus

bit5 : Heating energy index

bit6 : Cooling energy index

bit7 : Volume index

bit8 : External water meter 1 index

bit9 : External water meter 2 index

bit10 : Cumulated bonus

bit11 : Energy over threshold 1

bit12 : Volume over threshold 1

bit13 : Time over threshold 1

bit14 : Energy over threshold 2

bit15 : Volume over threshold 2

bit16 : Time over threshold 2

bit17 : Power peak value

bit18 : Power peak date and time

bit19 : Flow peak value

bit20 : Flow peak date and time

bit21 : Inlet temperature peak value

bit22 : Inlet temperature peak date and time

bit23 to bit31 : unused

#### Data-logging period :


Format : 16 bits integer

Unit : minute

Value : 0 to 10080 (0 : data-logging deactivated)

### 4.11.2. Frame detail

68h	Long frame starting code
0Bh	Frame Length
0Bh	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
0Fh	Specific manufacturer DIF
08h	Data-logging programming frame code

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XXh	Data-logging value selection (LSB)
XXh	Data-logging value selection
XXh	Data-logging value selection
XXh	Data-logging value selection (MSB)
XXh	Data-logging period (LSB)
XXh	Data-logging period (MSB)
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
-----	---------------------------

### 4.12. Data-logging reading programming

#### 4.12.1. Overview

This frame is only available on CF\_ADVANCED products.

This frame allows to program data-logging reading parameters :

- Data-logging reading number

#### Data-logging reading number :

Format : 16 bits integer

Value :

0 : Last data-logging

1-1008 : data-logging number

>1008 : oldest data-logging

#### 4.12.2. Frame detail

68h	Long frame starting code
07h	Frame Length
07h	Frame Length
68h	Long frame starting code
53h/73h	Send data
XXh	Primary address
51h	Send data
0Fh	Specific manufacturer DIF
09h	Data-logging reading programming frame code
XXh	Data-logging reading number (LSB)
XXh	Data-logging reading number (MSB)
CS	Checksum
16h	Ending char

#### Product response

E5h	Single character response
-----	---------------------------

## 5. M-Bus data frames

### 5.1. Default frame (0)

#### 5.1.1. Overview

Note : If the product is configured in "CF50 Compatible mode", the "Default frame" and the "CF50 frame" are inverted. The product returns the "Default frame" with the selection "18" and the "CF50 frame" with the selection "0".

This frame returns the following values :

- Fabrication number

The fabrication number is transmitted in BCD 8 format

- Energy heating index

The energy heating index is transmitted in 32 bits integer format with a resolution equal to the last digit of the displayed energy index whatever the comma position.

The following table gives the resolution and unit of the transmitted energy according to the energy displayed format.

Energy unit (display)	Transmitted index	Transmitted unit	M-Bus VIF code
1 kWh	E displayed	1 kWh	06h
10 kWh	E displayed	10 kWh	07h
100 kWh	10 × E displayed	10 kWh	07h
1 MWh	100 × E displayed	10 kWh	07h
1 MJ	E displayed	1 MJ	0Eh
10 MJ	E displayed	10 MJ	0Fh
100 JM	10 × E displayed	10 MJ	0Fh
1 GJ	100 × E displayed	10 MJ	0Fh

- Volume

The volume index is transmitted in BCD 8 format with a resolution equal to the last digit of the displayed volume index whatever the comma position.


The following table gives the resolution and unit of the transmitted volume according to the volume displayed format.

Volume unit (display)	Transmitted index	Transmitted unit	M-Bus VIF code
1 m <sup>3</sup>	V displayed	1 m <sup>3</sup>	16h
100 litres	V displayed	100 litres	15h
10 litres	V displayed	10 litres	14h
1 litre	V displayed	1 litre	13h

- Power

Power is transmitted in BCD 6 format with a unit depending on its value.

The following table gives the transmitted unit according to the power value.

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Power	Transmitted value	Transmitted unit	M-Bus VIF code
$P \leq -100\text{MW}$	Abs(P)	1 kW	2Eh
$-100\text{ MW} < P < 0\text{ MW}$ (cooling)	Abs(P)	0.1 kW	2Dh
$0 < P < 100\text{ MW}$	P	0.1 kW	2Dh
$P \geq 100\text{ MW}$	P	1 kW	2Eh

When the power value is in error state, the transmitted value is set to 999999 kW and the function field of the DIF code of the power data bloc is set to "Value during error state".

- Flow

Flow is transmitted in BCD 6 format with the l/h unit .

When the flow value is in error state, the transmitted value is set to 999999 l/h and the function field of the DIF code of the flow data bloc is set to "Value during error state".

- Temperatures

The inlet and outlet temperatures are transmitted in BCD 4 format with the 0.1°C unit.

When the temperature values are in error state, the transmitted values are set to 99999.9 °C and the function field of the DIF code of the temperature data blocs is set to "Value during error state".

- Temperature difference

The temperature difference is transmitted in BCD 6 format with the 0.01°C unit.

When the temperature difference value is in error state, the transmitted value is set to 9999.99 °C and the function field of the DIF code of the temperature difference data bloc is set to "Value during error state".

- Date and time

The current date and time are transmitted in the M-Bus date and time format type F.

- Operating time

The number of days is transmitted in 16 bits integer format.

- Metrology version

The metrology version is transmitted in BCD 2 format

- Application version

The application version is transmitted in BCD 2 format

- Water Meter 1 index


The Water Meter 1 index is transmitted only if a Water meter option board is plugged.

The Water Meter index is transmitted in BCD 8 format with the unit of the least significant digit on the display.

The following table gives the resolution and unit of the transmitted WM according to the WM displayed format.

The number of the water meter is stored in the M-Bus DIF field "Device number".

WM pulse value	WM unit (display)	Transmitted index	Transmitted unit	M-Bus VIF code
250 l	1 m <sup>3</sup>	WM displayed	1 m <sup>3</sup>	16h
100 l	1 m <sup>3</sup>	WM displayed	1 m <sup>3</sup>	16h
25 l	1 m <sup>3</sup>	WM displayed	1 m <sup>3</sup>	16h
10 l	100 litres	WM displayed	100 litres	15h
2.5 l	100 litres	WM displayed	100 litres	15h
1 l	10 litres	WM displayed	10 litres	14h

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- Water Meter 2 index  
Idem Water Meter 1 index

- Energy cooling

The Energy cooling index is transmitted only if the product is in combined mode.

The energy cooling index is transmitted with the same format as the heating energy index.


- Alarms

The alarms bits field is transmitted in 16 bits integer format :

Bit	Alarm
0	T <sub>in</sub> error
1	T <sub>out</sub> error
2	Sensors inverted error
3	A/D converter error
4	Back-flow error : CF-ECHO II : always managed <del>CF51, CF55 : managed only if US-ECHO II connected to calculator</del>
5	<del>Air in pipe error</del> CF-ECHO II : always managed CF51, CF55 : managed only if US-ECHO II connected to calculator
6	<del>Overflow error</del> CF-ECHO II : always managed <del>CF51, CF55 : managed only if US-ECHO II connected to calculator</del>
7	US flow error CF-ECHO II : always managed CF51, CF55 : managed only if US-ECHO II connected to calculator
8	Dirty transducers CF-ECHO II : always managed CF51, CF55 : managed only if US-ECHO II connected to calculator
9	Very dirty transducers CF-ECHO II : always managed CF51, CF55 : managed only if US-ECHO II connected to calculator
10	MicroCom communication error CF-ECHO II : metrology alarm (communication error with flowmeter)
11	Flow meter tamper CF-ECHO II : always managed (wrong flowmeter connected) CF51, CF55 : warning : no US-ECHO II connected to calculator (calculator connected to another flowmeter than US-ECHO II)
12	No flow during 24 hours with Dt>15°C
13	No flow during 2 hours error
14	Options
15	Unused

### 5.1.2. Frame detail

68h	Long frame starting code	
-----	--------------------------	--

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XXh	Frame Length : 4Dh : No WM and no Combined mode 5Dh : WM and no combined mode 54h : No WM and Combined mode 64h : WM and Combined mode	
XXh	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	
00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
04h	32 bits integer	Energy heating index
06/07/0E/0Fh	Energy VIF	
XXh	Energy index (LSB)	
XXh	Energy index	
XXh	Energy index	
XXh	Energy index (MSB)	
0Ch	8 digits BCD	Volume index
13/14/15/16h	Volume VIF	
XXh	Volume index (LSB)	
XXh	Volume index	
XXh	Volume index	
XXh	Volume index (MSB)	
0Bh	6 digits BCD	Power
2D/2Eh	Power VIF	
XXh	Instantaneous Power (LSB)	
XXh	Instantaneous Power	
XXh	Instantaneous Power (MSB)	
0Bh	6 digits BCD	Flow
3Bh	Flow VIF : l/h	



XXh	Instantaneous flow (LSB)	
XXh	Instantaneous flow	
XXh	Instantaneous flow (MSB)	
0Ah	4 digits BCD	Inlet temperature
5Ah	Flow temperature VIF : 0,1°C	
XXh	Inlet temperature (LSB)	
XXh	Inlet temperature (MSB)	
0Ah	4 digits BCD	Outlet temperature
5Eh	Return temperature VIF : 0,1°C	
XXh	Outlet temperature (LSB)	
XXh	Outlet temperature (MSB)	
0Bh	6 digits BCD	Temperature difference
61h	Temperature difference VIF : 0,01K	
XXh	Temperature difference (LSB)	
XXh	Temperature difference	
XXh	Temperature difference (MSB)	

04h	32 bits integer	Date and time
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
02h	16 bits integer	Operating time
27h	Operating time VIF : days	
XXh	Operating time	
XXh	Operating time	
09h	2 Digits BCD	Metrology version
FDh	VIF special char	
0Eh	Firmware version VIF	
XX	Metrology version	
09h	2 digit BCD	Application version
FDh	VIF special char	
0Fh	Software version VIF	
XXh	Application version	
8Ch	8 digits BCD	Water meter 1 index
C0h	Device 1	
00h		
13/14/15/16h	Volume VIF	
XXh	Water meter 1 current index (LSB)	
XXh	Water meter 1 current index	
XXh	Water meter 1 current index	
XXh	Water meter 1 current index (MSB)	
8Ch	8 digits BCD	Water meter 2 index
80h	Device 2	
40h		
13/14/15/16h	Volume VIF	
XXh	Water meter 2 current index (LSB)	
XXh	Water meter 2 current index	
XXh	Water meter 2 current index	
XXh	Water meter 2 current index (MSB)	
04h	32 bits integer	Energy cooling index
86/87/8E/8Fh	Energy VIF	
3Ch	VIFE : Accumulation only if >0 contribution	
XXh	Energy cooling index (LSB)	
XXh	Energy cooling index	
XXh	Energy cooling index	
XXh	Energy cooling index (MSB)	
0Fh	Specific manufacturer DIF char	Alarms
XXh	Alarm code	
XXh	Alarm code	
CS	Check sum	
16	Ending char	

## 5.2. Time in Error frame (1)

### 5.2.1. Overview

The Time in Error frame returns the following values :

- Fabrication number

The fabrication number is transmitted in BCD 8 format

- Metrology error time

The number of hours is transmitted in BCD 6 format

- Overflow error time


The number of hours is transmitted in BCD 6 format

- Powerfailed error time

The number of hours is transmitted in BCD 6 format

### 5.2.2. Frame detail

68h	Long frame starting code	
21h	Frame Length :	
21h	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code :10h : Metrology error	
00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
3B	6 digits BCD in error state	Metrology error time
FD	VIF special char	

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75	Times the meter was stopped	
XX	Metrology time in error	
XX	Metrology time in error	
XX	Metrology time in error	Overflow error time
3B	6 digits BCD in error state	
A6	Operating time VIF : hours	
6D	Overflow values	
XX	Overflow time in error	
XX	Overflow time in error	
XX	Overflow time in error	
3B	6 digits BCD in error state	Powerfailed error time
FD	VIF special char	
6C	Operating time battery : hours	
XX	Powerfailed time in error	
XX	Powerfailed time in error	
XX	Powerfailed time in error	
CS	Check sum	
16h	Ending char	

### 5.3. FDR frames (2-14)

#### 5.3.1. Overview

If the FDR requested in the FDR frame has not been already done the meter answers with the empty frame.

The first FDR frame corresponds to the eldest reading.

The FDR frames return the following values :

- Fabrication number

The fabrication number is transmitted in BCD 8 format

- Date and time

Date and time of the elder energy FDR in the M-Bus date and time format type G.

- FDR Energy heating index

Each FDR energy heating index is transmitted with the same format as the current energy index.

- FDR volume index

Each FDR volume index is transmitted with the same format as the current volume index.

- FDR power peak occurrence date and time


Each FDR power peak occurrence date and time are transmitted in the M-Bus date and time format type F.

- FDR power peak

Each FDR power peak is transmitted in 32 bits float format with the kW unit.

- FDR flow peak occurrence date and time

Each FDR flow peak occurrence date and time are transmitted in the M-Bus date and time format type F.

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- FDR flow peak

Each FDR flow peak is transmitted in 32 bits float format with the kW unit.

- FDR  $T_{in}^{\circ}$  peak occurrence date and time

Each FDR  $T_{in}^{\circ}$  peak occurrence date and time are transmitted in the M-Bus date and time format type F.

- FDR  $T_{in}^{\circ}$  peak

Each FDR  $T_{in}^{\circ}$  peak is transmitted in 32 bits float format with the kW unit.

- FDR WM 1 index

Each FDR WM 1 index is transmitted with the same format as the current WM index.

Note : The index is transmitted only if a WM option board is plugged.

- FDR WM 2 index

Each FDR WM 2 index is transmitted with the same format as the current WM index.

Note : The index is transmitted only if a WM option board is plugged.

- FDR Energy cooling index

Each FDR energy cooling index is transmitted with the same format as the current energy index.


Note : The index is transmitted only if the product is in combined mode

The following table gives the DIF and DIFE codes for the different values and different storage numbers :

	n	1	2	3	4	5	6	7	8	9	10	11	12	13
Date of the reading	DIF	C2	82	C2	82	C2	82	C2	82	C2	82	C2	82	C2
	DIFE	00	01	01	02	02	03	03	04	04	05	05	06	06
Energy heating, cooling, volume index	DIF	C4	84	C4	84	C4	84	C4	84	C4	84	C4	84	C4
	DIFE	00	01	01	02	02	03	03	04	04	05	05	06	06
Volume index	DIF	CC	8C	CC	8C	CC	8C	CC	8C	CC	8C	CC	8C	CC
	DIFE	00	01	01	02	02	03	03	04	04	05	05	06	06
Peaks date and time	DIF	D4	94	D4	94	D4	94	D4	94	D4	94	D4	94	D4
	DIFE	00	01	01	02	02	03	03	04	04	05	05	06	06
Peaks value	DIF	D5	95	D5	95	D5	95	D5	95	D5	95	D5	95	D5
	DIFE	00	01	01	02	02	03	03	04	04	05	05	06	06
Water meter 1 index	DIF	CC	8C	CC	8C	CC	8C	CC	8C	CC	8C	CC	8C	CC
	DIFE	C0	C1	C1	C2	C2	C3	C3	C4	C4	C5	C5	C6	C6
	DIFE	00	00	00	00	00	00	00	00	00	00	00	00	00
Water meter 2 index	DIF	CC	8C	CC	8C	CC	8C	CC	8C	CC	8C	CC	8C	CC
	DIFE	80	81	81	82	82	83	83	84	84	85	85	86	86
	DIFE	40	40	40	40	40	40	40	40	40	40	40	40	40

### 5.3.2. Frame detail

68h	Long frame starting code
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XXh	Frame Length : 15h : empty frame 55h : No combined and no WM 5Dh : Combined but no WM 65h : WM but no combined 6Dh : Combined and WM	
XXh	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	
00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
X2h	16 bits integer, storage number : n	Reading date
XXh		
6Ch	Time point VIF : date type G	
XXh	Date of the reading (LSB)	
XXh	Date of the reading (MSB)	
X4h	32 bits integer, storage number : n	FDR Energy Heating
XXh		
06/07/0E/0Fh	Energy VIF	
XXh	FDR n Energy Heating Index (LSB)	
XXh	FDR n Energy Heating Index	
XXh	FDR n Energy Heating Index	
XXh	FDR n Energy Heating Index (MSB)	
XCh	8 digits BCD storage number : n	FDR volume
XXh		
13/14/15/16h	Volume VIF	
XXh	FDR n Volume Index (LSB)	
XXh	FDR n Volume Index	

XXh	FDR n Volume Index	
XXh	FDR n Volume Index (MSB)	
X4h	32 bits integer , storage number : n	FDR power peak date and time
XXh		
AEh	Max Power VIF	
4Fh	VIFE : date : end of last upper limit exceed	
XXh	Date/Time FDR power peak n (LSB)	
XXh	Date/Time FDR power peak n	
XXh	Date/Time FDR power peak n	
XXh	Date/Time FDR power peak n (MSB)	
X5h	32 bits float, storage number n	FDR power peak value
XXh		
2Eh	Max Power VIF in kW	
XXh	FDR Power peak n (LSB)	
XXh	FDR Power peak n (LSB)	
XXh	FDR Power peak n (LSB)	
XXh	FDR Power peak n (MSB)	
X4h	32 bits integer , storage number : n	
XXh		
BEh	Max Flow VIF	
4Fh	VIFE : date : end of last upper limit exceed	
XXh	Date/Time FDR Flow peak n (LSB)	
XXh	Date/Time FDR Flow peak n	
XXh	Date/Time FDR Flow peak n	
XXh	Date/Time FDR Flow peak n (MSB)	
X5h	32 bits float, storage number n	FDR flow peak value
XXh		
3Eh	Max Flow VIF in m <sup>3</sup> /h	
XXh	FDR Flow peak n (LSB)	
XXh	FDR Flow peak n	
XXh	FDR Flow peak n	
XXh	FDR Flow peak n (MSB)	
X4h	32 bits integer , storage number : n	
XXh		
DBh	Max T <sub>in</sub> VIF	
4Fh	VIFE : date : end of last upper limit exceed	
XXh	Date/Time FDR T <sub>in</sub> peak n (LSB)	
XXh	Date/Time FDR T <sub>in</sub> peak n	
XXh	Date/Time FDR T <sub>in</sub> peak n	
XXh	Date/Time FDR T <sub>in</sub> peak n (MSB)	
X5h	32 bits float, storage number n	FDR inlet temperature peak value
XXh		
5Bh	Max Flow temperature VIF in °C	
XXh	FDR T <sub>in</sub> peak n (LSB)	
XXh	FDR T <sub>in</sub> peak n	
XXh	FDR T <sub>in</sub> peak n	
XXh	FDR T <sub>in</sub> peak n (MSB)	
XCh	8 digits BCD, Device 1, storage number n	
CXh		
00h		

13/14/15/16h	Volume VIF	
XXh	Water meter 1 FDR n index (LSB)	
XXh	Water meter 1 FDR n index	
XXh	Water meter 1 FDR n index	
XXh	Water meter 1 FDR n index (MSB)	
XCh	8 digits BCD, Device 2, storage number n	FDR water meter 2
8Xh		
40h		
13/14/15/16h	Volume VIF	
XXh	Water meter 2 FDR n index (LSB)	
XXh	Water meter 2 FDR n index	
XXh	Water meter 2 FDR n index	FDR energy cooling
XXh	Water meter 2 FDR n index (MSB)	
X4h	32 bits integer, storage number : n	
XXh		
86/87/8E/8Fh	Energy coolingVIF	
3Ch	VIFE : Accumulation only if >0 contribution	
XXh	FDR n Energy cooling Index (LSB)	
XXh	FDR n Energy cooling Index	
XXh	FDR n Energy cooling Index	
XXh	FDR n Energy cooling Index (MSB)	
CS	Check sum	
16h	Ending char	

## 5.4. Tariff frame (15)

### 5.4.1. Overview

This frame is only available in CF\_ADVANCED product, the other products return the empty frame.

The Tariff frame returns the following values :

- Fabrication number

The fabrication number is transmitted in BCD 8 format

- Energy over threshold 1 and 2

The energy over threshold index is transmitted with the same format as the current energy index.

- Volume over threshold 1 and 2


The volume over threshold index is transmitted with the same format as the current volume index.

- Threshold value 1 and 2

The threshold value is transmitted in 32 bits float format.

The VIF code indicates the nature of the threshold :

BEh	Volume flow, unit : 1litre
A Eh	Power, unit : 1 kW
E3h	Temperature difference, unit : K
DFh	Return temperature, unit : 1 °C
DBh	Flow temperature, unit : 1 °C

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- Time over threshold 1 and 2

The time over threshold is transmitted in 24 bits integer format with the hour unit.

#### 5.4.2. Frame detail

68h	Long frame starting code	
53h	Frame Length :	
53h	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	
00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
84h	32 bits integer	Energy over threshold 1
10h	Tariff 1	
86/87/8E/8Fh	Energy VIF	
6Ch	VIFE : Value during upper limit exceed	
XXh	Energy over threshold (LSB)	
XXh	Energy over threshold	
XXh	Energy over threshold	
XXh	Energy over threshold (MSB)	
8Ch	8 digits BCD	Volume over threshold 1
10h	Tariff 1	
93/94/95/96h	Volume VIF	
6Ch	VIFE : Value during upper limit exceed	
XXh	Volume over threshold (LSB)	
XXh	Volume over threshold	
XXh	Volume over threshold	

XXh	Volume over threshold (MSB)	
83h	24 bits integer	
10h	Tariff 1	
BE/AE/E3/DF/DBh	Threshold type VIF	
5Ah	VIFE : Duration of limit exceed	Time over threshold 1
XXh	Time over threshold (LSB)	
XXh	Time over threshold	
XXh	Time over threshold (MSB)	
85h	32 bits real	
10h	Tariff 1	
BE/AE/E3/DF/DBh	Threshold type VIF	
48h	VIFE : Upper limit value	Threshold 1 value
XXh	Threshold (LSB)	
XXh	Threshold	
XXh	Threshold (MSB)	
84h	32 bits integer	
20h	Tariff 2	
86/87/8E/8Fh	Energy VIF	
6Ch	VIFE : Value during upper limit exceed	Energy over threshold 2
XXh	Energy over threshold (LSB)	
XXh	Energy over threshold	
XXh	Energy over threshold (MSB)	
8Ch	8 digits BCD	
20h	Tariff 2	
93/94/95/96h	Volume VIF	
6Ch	VIFE : Value during upper limit exceed	Volume over threshold 2
XXh	Volume over threshold (LSB)	
XXh	Volume over threshold	
XXh	Volume over threshold (MSB)	
83h	24 bits integer	
20h	Tariff 2	
BE/AE/E3/DF/DBh	Threshold type VIF	
5Ah	VIFE : Duration of limit exceed	Time over threshold 2
XXh	Time over threshold (LSB)	
XXh	Time over threshold	
XXh	Time over threshold (MSB)	
85h	32 bits real	
20h	Tariff 2	
BE/AE/E3/DF/DBh	Threshold type VIF	
48h	VIFE : Upper limit value	Threshold 2 value
XXh	Threshold (LSB)	
XXh	Threshold	
XXh	Threshold (MSB)	

CS	Check sum	
16h	Ending char	

## 5.5. Peaks frame (16)

### 5.5.1. Overview

The peaks frame returns the following values :

- Fabrication number

The fabrication number is transmitted in BCD 8 format

- Sampling period

The sampling period is transmitted in 16 bits integer format with minute unit.

- Power peak occurrence date and time

The power peak occurrence date and time are transmitted in the M-Bus date and time format type F.

- Power peak

The power peak is transmitted in 32 bits float format with the kW unit.

- Flow peak occurrence date and time

The flow peak occurrence date and time are transmitted in the M-Bus date and time format type F.

- Flow peak

The flow peak is transmitted in 32 bits float format with the m<sup>3</sup>/h unit.

- T<sub>in</sub> peak occurrence date and time


The T<sub>in</sub> peak occurrence date and time are transmitted in the M-Bus date and time format type F.

- T<sub>in</sub> peak

The T<sub>in</sub> peak is transmitted in 32 bits float format with the °C unit.

### 5.5.2. Frame detail

68h	Long frame starting code	Fixed data header
41h	Frame Length :	
41h	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	

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XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	
00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
02h	16 bits integer	Sampling period
FDh	VIF special char	
25h	Storage interval : minutes	
XXh	Sampling period (16 bits integer) in minutes (LSB)	
XXh	Sampling period (16 bits integer) in minutes (MSB)	
14h	32 bits integer, max value	Power peak date and time
AEh	Max Power VIF	
4Fh	VIFE : date : end of last upper limit exceed	
XXh	Date/Time power peak (LSB)	
XXh	Date/Time power peak	
XXh	Date/Time power peak	Power peak value
XXh	Date/Time power peak (MSB)	
15h	32 bits float	
2Eh	Max Power VIF in kW	
XXh	Power peak (LSB)	
XXh	Power peak	Flow peak date and time
XXh	Power peak	
XXh	Power peak (MSB)	
14h	32 bits integer, max value	
BEh	Max Flow VIF	
4Fh	VIFE : date : end of last upper limit exceed	Flow peak value
XXh	Date/Time flow peak (LSB)	
XXh	Date/Time flow peak	
XXh	Date/Time flow peak	
XXh	Date/Time flow peak (MSB)	
15h	32 bits float	Inlet temperature peak date and time
3Eh	Max Flow VIF in m <sup>3</sup> /h	
XXh	Flow peak (LSB)	
XXh	Flow peak	
XXh	Flow peak (MSB)	
14h	32 bits integer, max value	
DBh	Max Flow temperature VIF	
4Fh	VIFE : date : end of last upper limit exceed	
XXh	Date/Time T <sub>in</sub> peak (LSB)	
XXh	Date/Time T <sub>in</sub> peak	

XXh	Date/Time T <sub>in</sub> peak	Inlet temperature peak value
XXh	Date/Time T <sub>in</sub> peak (MSB)	
15h	32 bits float	
5Bh	Max Flow temperature VIF in °C	
XXh	T <sub>in</sub> peak (LSB)	
XXh	T <sub>in</sub> peak	
XXh	T <sub>in</sub> peak	
XXh	T <sub>in</sub> peak (MSB)	
CS	Check sum	
16h	Ending char	

## 5.6. Bonus frame (17)

### 5.6.1. Overview

The bonus frame returns the following values :

- Fabrication number

The fabrication number is transmitted in BCD 8 format

- Instantaneous bonus value


The instantaneous bonus value is transmitted in 32 bits floating format with 0.1°C unit.

- Cumulated bonus value

The cumulated bonus value is transmitted in 32 bits floating format with 0.1°C unit.

### 5.6.2. Frame detail

68h	Long frame starting code	
23h	Frame Length :	
23h	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	
00h	Signature	

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00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
85	32 bits float	Instantaneous bonus
10	Tariff 1 for instantaneous	
5A	Flow temperature VIF in 0,1°C	
XX	Instantaneous bonus (LSB)	
XX	Instantaneous bonus	
XX	Instantaneous bonus	
XX	Instantaneous bonus (MSB)	
85	32 bits float	Cumulated bonus
20	Tariff 2 for cumulated	
5A	Flow temperature VIF in 0,1°C	
XX	Cumulated bonus (LSB)	
XX	Cumulated bonus	
XX	Cumulated bonus	
XX	Cumulated bonus (MSB)	
CS	Check sum	
16h	Ending char	

## 5.7. CF50 frame (18)

### 5.7.1. Overview

This frame is compatible with the CF50 communication protocol.

Note : If the product is configured in "CF50 Compatible mode", the "Default frame" and the "CF50 frame" are inverted. The product returns the "Default frame" with the selection "18" and the "CF50 frame" with the selection "0".

The CF50 frame return the following values :

- Energy index

The energy index is transmitted with the same format as in the default frame.

- Volume

The volume is transmitted with the same format as in the default frame.

- Power

Power is transmitted with the same format as in the default frame.


- Flow

Flow is transmitted with the same format as in the default frame.

- Temperatures

The inlet and outlet temperatures are transmitted with the same format as in the default frame.

- Temperature difference

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The temperature difference is transmitted with the same format as in the default frame.

- Date and time

The current date and time are transmitted in the M-Bus date and time format type G.

- Operating time

The number of days is transmitted with the same format as in the default frame.

- Alarms

The alarms bits field is transmitted with the same format as in the default frame.

### 5.7.2. Frame detail

68h	Long frame starting code	
3Dh	Frame Length	
3Dh	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	Fixed data header
XXh	Customer number (8 digits BCD) (LSB)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
82h	Manufacturer identification number (Actaris)	
4Dh	Manufacturer identification number (Actaris)	
02h	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55, 02=CF50)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	
00h	Signature	
00h	Signature	
04h	32 bits integer	Energy heating index
06/07/0E/0Fh	Energy VIF	
XXh	Energy index (LSB)	
XXh	Energy index	
XXh	Energy index	
XXh	Energy index (MSB)	
0Ch	8 digits BCD	Volume index
13/14/15/16h	Volume VIF	
XXh	Volume index (LSB)	
XXh	Volume index	
XXh	Volume index	
XXh	Volume index (MSB)	
0Bh	6 digits BCD	Power
2D/2Eh	Power VIF	

XXh	Instantaneous Power (LSB)	
XXh	Instantaneous Power	
XXh	Instantaneous Power (MSB)	
0Bh	6 digits BCD	Flow
3Bh	Flow VIF : l/h	
XXh	Instantaneous flow (LSB)	
XXh	Instantaneous flow	
XXh	Instantaneous flow (MSB)	
0Ah	4 digits BCD	Inlet temperature
5Ah	Flow temperature VIF : 0,1°C	
XXh	Inlet temperature (LSB)	
XXh	Inlet temperature (MSB)	
0Ah	4 digits BCD	Outlet temperature
5Eh	Return temperature VIF : 0,1°C	
XXh	Outlet temperature (LSB)	
XXh	Outlet temperature (MSB)	
0Bh	6 digits BCD	Temperature difference
61h	Temperature difference VIF : 0,01K	
XXh	Temperature difference (LSB)	
XXh	Temperature difference	
XXh	Temperature difference (MSB)	
04h	32 bits integer	Date and time
6Dh	Date point type G VIF	
XXh	Date (LSB)	
XXh	Date (MSB)	
02h	16 bits integer	Operating time
27h	Operating time VIF : days	
XXh	Operating time	
XXh	Operating time	
0Fh	Specific manufacturer DIF char	Alarms
XXh	Alarm code	
XXh	Alarm code	
CS	Check sum	
16	Ending char	

## 5.8. Empty frame (19)


### 5.8.1. Overview

This frame is sent when the 19<sup>th</sup> frame is selected, but also when:

- A FDR frame is selected and the corresponding FDR has not been already done.
- Tariff frame is selected and product is not a CF\_ADVANCED
- Tariff frame is selected, product is a CF\_ADVANCED and no threshold is programmed
- Data-logging frame is selected and product is not a CF\_ADVANCED
- Data-logging frame is selected, product is a CF\_ADVANCED and no data-logging value is selected or the data-logging period is 0
- Data-logging frame is selected, product is a CF\_ADVANCED and no data-logging has been already done.

The empty frame return the following values :

- Fabrication number

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The fabrication number is transmitted in BCD 8 format

### 5.8.2. Frame detail

68h	Long frame starting code	
15h	Frame Length :	
15h	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code :10h : Metrology error	
00h	Signature	
00h	Signature	Manufacturer number
0Ch	8 digits BCD	
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
CS	Check sum	
16h	Ending char	

## 5.9. Error log frames (20-23)

### 5.9.1. Overview

The first error log frame contains the last five errors log. The 3 following error log frames contain the 15 older errors log.


The error log frames return the following values :

- Fabrication number

The fabrication number is transmitted in BCD 8 format

- Errors flag and error states

The error flag and errors states are transmitted in 16 bits integer format :

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Bit	Alarm
0	T <sub>in</sub> error
1	T <sub>out</sub> error
2	Sensors inverted error
3	A/D converter error
4	Back-flow error
5	Air in pipe error
6	Overflow error
7	US flow error
8	Dirty transducers
9	Very dirty transducers
10	MicroCom communication error
11	Flow meter tamper
12	No flow during 24 hours
13	No flow during 2 hours error
14	Options
15	Unused

The error state value indicates which errors are considered. And the error flag value indicates if the errors are set or reset

Bit = 1 : error set.

Bit = 0 : error reset.


- Date and Time

The errors date and time are transmitted in the M-Bus date and time format type F.

### 5.9.2. Frame detail

First error log frame (20)

68h	Long frame starting code	
74h	Frame Length :	
74h	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	

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00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
C2h	16 bits integer, storage number 1	Error flag 1
00h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
C2h	16 bits integer, storage number 1	Error mask 1
00h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
C4h	32 bits integer, storage number 1	Date and time 1
00h		
6Dh		
XXh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
82h	16 bits integer, storage number 2	Error flag 2
01h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
82h	16 bits integer, storage number 2	Error mask 2
01h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
84h	32 bits integer, storage number 2	Date and time 2
01h		
6Dh		
XXh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
C2h	16 bits integer, storage number 3	Error flag 3
01h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	

C2h	16 bits integer, storage number 3	Error mask 3
01h		
FDh		
18h		
XXh		
XXh		
C4h	32 bits integer, storage number 3	Date and time 3
01h		
6Dh		
XXh		
XXh		
XXh		
XXh		
82h	16 bits integer, storage number 4	Error flag 4
02h		
FDh		
17h		
XXh		
XXh		
82h	16 bits integer, storage number 4	Error mask 4
02h		
FDh		
18h		
XXh		
XXh		
84h	32 bits integer, storage number 4	Date and time 4
02h		
6Dh		
XXh		
XXh		
XXh		
XXh		
C2h	16 bits integer, storage number 5	Error flag 5
02h		
FDh		
17h		
XXh		
XXh		
C2h	16 bits integer, storage number 5	Error mask 5
02h		
FDh		
18h		
XXh		
XXh		
C4h	32 bits integer, storage number 5	Date and time 5
02h		
6Dh		
XXh		
XXh		
XXh		
XXh		
CS	Check sum	

16h	Ending char	
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Second error log frame (21)

68h	Long frame starting code	
74h	Frame Length :	
74h	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	
00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
82h	16 bits integer, storage number 6	Error flag 6
03h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
82h	16 bits integer, storage number 6	Error mask 6
03h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
84h	32 bits integer, storage number 6	Date and time 6
03h		
6Dh		
XXh		
XXh		
XXh		
XXh		


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XXh	Date (MSB)	
C2h	16 bits integer, storage number 7	Error flag 7
03h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
C2h	16 bits integer, storage number 7	Error mask 7
03h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
C4h	32 bits integer, storage number 7	Date and time 7
03h		
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
82h	16 bits integer, storage number 8	Error flag 8
04h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
82h	16 bits integer, storage number 8	Error mask 8
04h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
84h	32 bits integer, storage number 8	Date and time 8
04h		
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
C2h	16 bits integer, storage number 9	Error flag 9
04h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
C2h	16 bits integer, storage number 9	Error mask 9
04h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
C4h	32 bits integer, storage number 9	Date and time 9

04h		
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
82h	16 bits integer, storage number 10	Error flag 10
05h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
82h	16 bits integer, storage number 10	Error mask 10
05h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
84h	32 bits integer, storage number 10	Date and time 10
05h		
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
CS	Check sum	
16h	Ending char	

### Third error log frame (22)

68h	Long frame starting code	
74h	Frame Length :	
74h	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	

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00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
C2h	16 bits integer, storage number 11	Error flag 11
05h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
C2h	16 bits integer, storage number 11	Error mask 11
05h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
C4h	32 bits integer, storage number 11	Date and time 11
05h		
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
82h	16 bits integer, storage number 12	Error flag 12
06h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
82h	16 bits integer, storage number 12	Error mask 12
06h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
84h	32 bits integer, storage number 12	Date and time 12
06h		
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
C2h	16 bits integer, storage number 13	Error flag 13
06h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	



C2h	16 bits integer, storage number 13	Error mask 13
06h		
FDh		
18h		
XXh		
XXh		
C4h	32 bits integer, storage number 13	Date and time 13
06h		
6Dh		
XXh		
XXh		
XXh		
XXh		
82h	16 bits integer, storage number 14	Error flag 14
07h		
FDh		
17h		
XXh		
XXh		
82h	16 bits integer, storage number 14	Error mask 14
07h		
FDh		
18h		
XXh		
XXh		
84h	32 bits integer, storage number 14	Date and time 14
07h		
6Dh		
XXh		
XXh		
XXh		
XXh		
C2h	16 bits integer, storage number 15	Error flag 15
07h		
FDh		
17h		
XXh		
XXh		
C2h	16 bits integer, storage number 15	Error mask 15
07h		
FDh		
18h		
XXh		
XXh		
C4h	32 bits integer, storage number 15	Date and time 15
07h		
6Dh		
XXh		
XXh		
XXh		
XXh		
CS	Check sum	

16h	Ending char	
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Fourth error log frame (23)

68h	Long frame starting code	
74h	Frame Length :	
74h	Frame Length (bis)	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	
00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	
XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
82h	16 bits integer, storage number 16	Error flag 16
08h		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
82h	16 bits integer, storage number 16	Error mask 16
08h		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
84h	32 bits integer, storage number 16	Date and time 16
08h		
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date	

XXh	Date (MSB)		
C2h	16 bits integer, storage number 17	Error flag 17	
08h			
FDh			
17h			Error flags
XXh	Error flag (LSB)		
XXh	Error flag (MSB)		
C2h	16 bits integer, storage number 17	Error mask 17	
08h			
FDh			
18h			Error mask
XXh	Error status (LSB)		
XXh	Error status (MSB)		
C4h	32 bits integer, storage number 17	Date and time 17	
08h			
6Dh			Date point type F VIF
XXh			Date (LSB)
XXh	Date		
XXh	Date		
XXh	Date (MSB)		
82h	16 bits integer, storage number 18	Error flag 18	
09h			
FDh			
17h			Error flags
XXh	Error flag (LSB)		
XXh	Error flag (MSB)		
82h	16 bits integer, storage number 18	Error mask 18	
09h			
FDh			
18h			Error mask
XXh	Error status (LSB)		
XXh	Error status (MSB)		
84h	32 bits integer, storage number 18	Date and time 18	
09h			
6Dh			Date point type F VIF
XXh			Date (LSB)
XXh	Date		
XXh	Date		
XXh	Date (MSB)		
C2h	16 bits integer, storage number 19	Error flag 19	
09h			
FDh			
17h			Error flags
XXh	Error flag (LSB)		
XXh	Error flag (MSB)		
C2h	16 bits integer, storage number 19	Error mask 19	
09h			
FDh			
18h			Error mask
XXh	Error status (LSB)		
XXh	Error status (MSB)		
C4h	32 bits integer, storage number 19	Date and time 19	

09h		
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
82h	16 bits integer, storage number 20	Error flag 20
0Ah		
FDh		
17h	Error flags	
XXh	Error flag (LSB)	
XXh	Error flag (MSB)	
82h	16 bits integer, storage number 20	Error mask 20
0Ah		
FDh		
18h	Error mask	
XXh	Error status (LSB)	
XXh	Error status (MSB)	
84h	32 bits integer, storage number 20	Date and time 20
0Ah		
6Dh	Date point type F VIF	
XXh	Date (LSB)	
XXh	Date	
XXh	Date	
XXh	Date (MSB)	
CS	Check sum	
16h	Ending char	

## 5.10. Data-logging frame (24)

### 5.10.1. Overview


This frame is only available in CF\_ADVANCED product, the other products return the empty frame.

The reading of data-logging values uses the M-Bus FCB-mechanism (see [1]).

Due to the quantity of data to read, data-logging reading requires the exchange of several frames. The data-logging reading index (1 – 1008) programming frame allows to indicate the first data-logging to read. The first frame contains the 6 values of the data-logging to read. The frame data ends with the 0x1Fh M-Bus code indicating that more data are to follow. The second frame contains the 6 values of the following data-logging. The last frame contains the data of the most recent data-logging, the frame data ends with the 0Fh M-Bus code indicating that no more data are to follow.

The programming of the index 0 sets the first data-logging frame to the oldest data-logging. The programming of the index 1009 sets the first data-logging frame to the more recent data-logging. (In that case, only one frame is sent)

Remark : In case of less than 1008 data-logging have been stored, if a data-logging reading index is programmed with a number higher than the number of data-logging stored, the reading index will be set on the most recent reading.

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If no data-logging has been already done or if no value has been selected, product answers with an empty frame.

The data selected by the datalog\_selection configuration parameter are sent in the M-Bus frame formatted in the following way :

A maximum of 6 data can be selected.

Note : For each of the following values, DIFE M-Bus codes are added to indicate the number of the data-logging.

- Fabrication number

The fabrication number is transmitted in BCD 8 format

- Power

Power is transmitted with the same format as in the default frame.

If the power value was in error state when the data-logging has been save, the transmitted value is set to 999999 kW and the function field of the DIF code of the power data bloc is set to "Value during error state".

- Flow

Flow is transmitted with the same format as in the default frame.

If the flow value was in error state when the data-logging has been save, the transmitted value is set to 999999 l/h and the function field of the DIF code of the flow data bloc is set to "Value during error state".

- Temperatures (Tin and Tout)

The inlet and outlet temperatures are transmitted with the same format as in the default frame.

If the temperature values were in error state when the data-logging has been save, the transmitted values are set to 99999.9 °C and the function field of the DIF code of the temperature data bloc is set to "Value during error state".

- Instantaneous bonus value

The instantaneous bonus value is transmitted with the same format as in the bonus frame.

If the instantaneous bonus values was in error state when the data-logging has been save, the transmitted value is set to 99999.9 °C and the function field of the DIF code of the bonus data bloc is set to "Value during error state".

- Energy heating index

The energy heating index is transmitted with the same format as in the default frame.

- Energy cooling

The energy cooling index is transmitted with the same format as in the default frame.

- Volume

The volume index is transmitted with the same format as in the default frame.

- Energy over threshold 1 and 2


The energy over threshold index is transmitted with the same format as in the tariff frame.

- Volume over threshold 1 and 2

The volume over threshold index is transmitted with the same format as in the tariff frame.

- Time over threshold 1 and 2

The time over threshold is transmitted with the same format as in the tariff frame.

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- Power peak occurrence date and time

The power peak occurrence date and time are transmitted with the same format as in the peaks frame.

- Power peak

The power peak is transmitted with the same format as in the peaks frame.

- Flow peak occurrence date and time

The flow peak occurrence date and time are transmitted with the same format as in the peaks frame.

- Flow peak

The flow peak is transmitted with the same format as in the peaks frame.

- $T^{\circ}_{in}$  peak occurrence date and time

The  $T^{\circ}_{in}$  peak occurrence date and time are transmitted with the same format as in the peaks frame.

- $T^{\circ}_{in}$  peak

The  $T^{\circ}_{in}$  peak is transmitted with the same format as in the peaks frame.


### 5.10.2. Frame detail

The Manufacturer number data bloc is always sent.

Then the frame contains only the data blocs selected by the datalog\_Selection parameter.

Remark : the following frame shows all the data blocs.

68h	Long frame starting code	
XXh	Frame Length : depending on data selected	
XXh	Frame Length (bis) : depending on data selected	
68h	Long frame starting code	
08h	Respond data	
XXh	Slave Primary address	
72h	Respond data	
XXh	Customer number (8 digits BCD) (LSB)	Fixed data header
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD)	
XXh	Customer number (8 digits BCD) (MSB)	
77h	Manufacturer identification number (Actaris)	
04h	Manufacturer identification number (Actaris)	
xxh	Product generation (09=CF Echo2, 0A=CF 51, 0B=CF 55)	
XXh	Medium : 04h : heat, volume measured at return temperature 0Ch : heat, volume measured at supply temperature 0Dh : heat/cooling	
XXh	Number of reading	
00h/10h	Error code : 10h : Metrology error	
00h	Signature	
00h	Signature	
0Ch	8 digits BCD	Manufacturer number
78h	Manufacturer number VIF	

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XXh	Manufacturer number (LSB)	
XXh	Manufacturer number	
XXh	Manufacturer number	
XXh	Manufacturer number (MSB)	
8B/CBh	6 digits BCD + Storage number	Instantaneous power
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
2D/2Eh	Power VIF	
XXh	Instantaneous Power (LSB)	
XXh	Instantaneous Power	
XXh	Instantaneous Power (MSB)	
8B/CBh	6 digits BCD + Storage number	Instantaneous flow
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
3Bh	Flow VIF : l/h	
XXh	Instantaneous flow (LSB)	
XXh	Instantaneous flow	
XXh	Instantaneous flow (MSB)	
8A/CAh	4 digits BCD + Storage number	Instantaneous Inlet temperature
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
5Ah	Flow temperature VIF : 0,1°C	
XXh	Inlet temperature (LSB)	
XXh	Inlet temperature (MSB)	
8A/CAh	4 digits BCD	Instantaneous Outlet temperature
XXh	Storage number	
XXh	Storage number	
XXh	Storage number + Storage number	
5Eh	Return temperature VIF : 0,1°C	
XXh	Outlet temperature (LSB)	
XXh	Outlet temperature (MSB)	
85/C5h	32 bits float + Storage number	Instantaneous bonus
1Xh	Storage number + tariff 1 for instantaneous bonus	
XXh	Storage number	
XXh	Storage number	
5Ah	Flow temperature VIF in 0,1°C	
XXh	Instantaneous bonus (LSB)	
XXh	Instantaneous bonus	
XXh	Instantaneous bonus	
XXh	Instantaneous bonus (MSB)	
84/C4h	32 bits integer + Storage number	Energy heating index
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
06/07/0E/0Fh	Energy VIF	
XXh	Energy index (LSB)	
XXh	Energy index	

XXh	Energy index	Energy cooling index
XXh	Energy index (MSB)	
84/C4h	32 bits integer + Storage number	
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
86/87/8E/8Fh	Energy VIF <sup>5</sup>	
3Ch	VIFE : Accumulation only if >0 contribution	
XXh	Energy index (LSB)	
XXh	Energy index	
XXh	Energy index	
XXh	Energy index (MSB)	
8C/CCh	8 digits BCD + Storage number	Volume index
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
13/14/15/16h	Volume VIF	
XXh	Volume index (LSB)	
XXh	Volume index	
XXh	Volume index (MSB)	
8C/CCh	8 digits BCD + Storage number	Water meter 1 index
CXh	Device 1 + Storage number	
0Xh	Device 1 + Storage number	
XXh	Storage number	
13/14/15/16h	Volume VIF	
XXh	Water meter 1 current index (LSB)	
XXh	Water meter 1 current index	
XXh	Water meter 1 current index (MSB)	
8C/CCh	8 digits BCD + Storage number	Water meter 2 index
8Xh	Device 2 + Storage number	
4Xh	Device 2 + Storage number	
XXh	Storage Number	
13/14/15/16h	Volume VIF <sup>6</sup>	
XXh	Water meter 2 current index (LSB)	
XXh	Water meter 2 current index	
XXh	Water meter 2 current index (MSB)	
85/C5h	32 bits float + Storage number	Cumulated bonus
2Xh	Storage number + Tariff 2 for cumulated bonus	
XXh	Storage number	
XXh	Storage number	
5Ah	Flow temperature VIF in 0,1°C	
XXh	Cumulated bonus (LSB)	
XXh	Cumulated bonus	
XXh	Cumulated bonus (MSB)	
84/C4h	32 bits integer + Storage number	Energy over threshold 1
1Xh	Storage number +Tariff 1	




XXh	Storage number	
XXh	Storage number	
86/87/8E/8Fh	Energy VIF <sup>1</sup>	
6Ch	VIFE : Value during upper limit exceed	
XXh	Energy over threshold (LSB)	
XXh	Energy over threshold	
XXh	Energy over threshold	
XXh	Energy over threshold (MSB)	
8C/CCh	8 digits BCD + Storage number	Volume over threshold 1
1Xh	Storage number +Tariff 1	
XXh	Storage number	
XXh	Storage number	
93/94/95/96h	Volume VIF	
6Ch	VIFE : Value during upper limit exceed	
XXh	Volume over threshold (LSB)	
XXh	Volume over threshold	
XXh	Volume over threshold	Time over threshold 1
XXh	Volume over threshold	
XXh	Volume over threshold (MSB)	
83h	24 bits integer + Storage number	
10h	Storage number +Tariff 1	
XXh	Storage number	
XXh	Storage number	
BE/AE/E3/DF/DBh	Threshold type VIF <sup>3</sup>	
5Ah	VIFE : Duration of limit exceed	Energy over threshold 2
XXh	Time over threshold (LSB)	
XXh	Time over threshold	
XXh	Time over threshold (MSB)	
84/C4h	32 bits integer + Storage number	
2Xh	Storage number +Tariff 2	
XXh	Storage number	
XXh	Storage number	
86/87/8E/8Fh	Energy VIF	Volume over threshold 2
6Ch	VIFE : Value during upper limit exceed	
XXh	Energy over threshold (LSB)	
XXh	Energy over threshold	
XXh	Energy over threshold	
XXh	Energy over threshold (MSB)	
8C/CCh	8 digits BCD + Storage number	
2Xh	Storage number +Tariff 2	
XXh	Storage number	Time over threshold 2
XXh	Storage number	
93/94/95/96h	Volume VIF	
6Ch	VIFE : Value during upper limit exceed	
XXh	Volume over threshold (LSB)	
XXh	Volume over threshold	
XXh	Volume over threshold	
XXh	Volume over threshold (MSB)	
83h	24 bits integer + Storage number	
20h	Storage number +Tariff 2	

XXh	Storage number	
XXh	Storage number	
BE/AE/E3/DF/DBh	Threshold type VIF	
5Ah	VIFE : Duration of limit exceed	
XXh	Time over threshold (LSB)	
XXh	Time over threshold	
XXh	Time over threshold (MSB)	
95/D5h	32 bits float + Storage number	Power peak
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
2Eh	Max Power VIF in kW	
XXh	Power peak (LSB)	
XXh	Power peak	
XXh	Power peak	Date/Time power peak
XXh	Power peak (MSB)	
94/D4h	32 bits integer, max value + Storage number	
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
AEh	Max Power VIF	
4Eh	VIFE : date : begin of last upper limit exceed	
XXh	Date/Time power peak (LSB)	
XXh	Date/Time power peak	Power peak
XXh	Date/Time power peak	
XXh	Date/Time power peak (MSB)	
95/D5h	32 bits float + Storage number	
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
3Eh	Max Flow VIF in m <sup>3</sup> /h	
XXh	Power peak (LSB)	
XXh	Power peak	Date/Time flow peak
XXh	Power peak	
XXh	Power peak (MSB)	
94/D4h	32 bits integer, max value + Storage number	
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
BEh	Max Flow VIF	
4Eh	VIFE : date : begin of last upper limit exceed	
XXh	Date/Time flow peak (LSB)	T <sub>in</sub> peak
XXh	Date/Time flow peak	
XXh	Date/Time flow peak	
XXh	Date/Time flow peak (MSB)	
95/D5h	32 bits float + Storage number	
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	

5Bh	Max Flow temperature VIF in °C	
XXh	T <sub>in</sub> peak (LSB)	
XXh	T <sub>in</sub> peak	
XXh	T <sub>in</sub> peak	
XXh	T <sub>in</sub> peak (MSB)	
94/D4h	32 bits integer, max value + Storage number	Date/Time T <sub>in</sub> peak
XXh	Storage number	
XXh	Storage number	
XXh	Storage number	
DBh	Max Flow temperature VIF	
4Eh	VIFE : date : begin of last upper limit exceed	
XXh	Date/Time T <sub>in</sub> peak (LSB)	
XXh	Date/Time T <sub>in</sub> peak	
XXh	Date/Time T <sub>in</sub> peak	
XXh	Date/Time T <sub>in</sub> peak (MSB)	
0F/1Fh	Manufacturer specific 0F : no more data 1F : more data	
CS	Check sum	
16h	Ending char	

## 6. Revision Sheet

Date	Author	Revision	Description
23/04/04	CV	02	Energy cooling index sent in "Default frame" (§5.1) "Energy cooling frame" replaced by "Empty frame" (§5.2)
02/06/04	CV	03	Product generation = 09,0A & 0B instead of 07
26/10/04	TG	04	"Empty frame" replaced by "Time in error frame" (§5.2)
15/11/04	TG	05	Update data type of "Time in error frame" (§5.2)
15/11/05	PHR	06	CF50 manufacturer code and medium (5.7.2)
09/05/06	CV	07	Errors Field description (§ 5.1.1)
16/09/09	CV	08	Volume VIF codes (§5.1.2)

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