COMAC CAL

CALOR 38
(v1.x)
(combined heat/cooling meter)

M-Bus communication protocol specification

Transmission service used

The master is the primary station which initiates all the messages transfers, the satellites stations are secondary stations which only transmit when they are asked for.

Transmission SPEED

The transmission speed can be 1200, 2400, 4800, 9600 baud.
The transmission is asynchronous RS485 with a start bit, 8 data bits, an even parity and a stop bit. Default transmission speed is 2400Bd.

Addresses

The addresses 1 to 250 are reserved for 250 secondary stations.
The address 254 (FEh) is used for point to point links with only one secondary station.

Initialization of Slave (SND_NKE)

EN 1434-3 compatibility (redundand) command. The secondary station answers ACK (E5h) if the reception is correct.

Request:	**10h**	
	40h	Initialization of slave
	A	Address
	CS	Checksum
	16h	Stop
Response:	**E5h**	

Request / Response (REQ_UD2)

The master sends a short frame with the data request code 5Bh or 7Bh and the address of secondary station.

Request:	**10h**	
	5Bh/7Bh	Data request instruction code
	A	Address
	CS	Checksum
	16h	Stop

Response:

The meter answers a frame composed with the following parametrers:

Identification numer
Energy plus
Energy plus under dt_{min}
Energy minus
Energy minus under dt_{min}
Volume
Flow
Power
Inlet temperature
Outlet temperature
Temperature difference
Software version
Error code

Energy (plus, minus, under dT_{min})

The energy is transmitted (coded on 32 Bit Integer) with the unit of the significant digit on the display. The following table gives the possibly VIF value:

transmitted unit	VIF	VIFE
1 MJ	0Eh	
10 MJ	0Fh	
100 MJ	FBh	08h

Volume

The volume is transmitted (coded on 32 Bit Integer) with the unit of the significant digit on the display. The following table gives the possibly VIF value:

transmitted unit	VIF
1 m3	16h
100 litre	15h
10 litre	14h
1 litre	13h

Flow

The flow is transmitted on 4 binary bytes (coded on 32 Bit Integer).
The following table gives the possibly VIF value:

transmitted unit	VIF
1 m3/hour	3Eh
100 litre/hour	3Dh
10 litre/hour	3Ch
1 litre/hour	3Bh
0,1 litre/hour	3Ah
0,01 litre/hour	39h
0,001 litre/hour	38h
1 litre/min	44h
0,1 litre/min	43h
0,01 litre/min	42h
0,001 litre/min	41h
1 litre/sec	4Eh
0,1 litre/sec	4Dh
0,01 litre/sec	4Ch
0,001 litre/sec	4Bh

Power

The power is transmitted on 4 binary bytes (coded on 32 Bit Integer).
The following table gives the possibly VIF value:

transmitted unit	VIF
1 kW	2Eh
100 W	2Dh
10 W	2Ch
1 W	2Bh

Temperatures

The inlet and outlet temperatures are transmitted on 32 Bit Integer values with a resolution 0.1°C.

Temperature diference

The inlet and outlet temperatures are transmitted on 32 Bit Integer values with a resolution 0.1°C.

Software version

8 bit integer format

Alarms

8 bit integer

bit 0	Add volume overflow (unreasonable incremetn)
bit 1	FRAM error
bit 2	Empty tube
bit 3	Imp1 out overflow
bit 4	Current coil fault
bit 5	Imp2 out overflow
bit 6	Temperatures error
bit 7	CRC error

total length of the frame : 91-93 bytes

Meter response frame:

0	68h	start
	55h	(total length of the frame) - 6
	55h	(total length of the frame) - 6
	68h	start
	08h	
5	xxh	address
	72h	CI (mode 1)
	xxh	identification numer (LSB)
	xxh	„
	xxh	„
10	xxh	„ (MSB)
	43h	manufacturer identification
	4Dh	„
	xxh	Dimension code
	04h	heat meter

15	xxh	numer of access
	xxh	error code
	00h	signature
	00h	„
	0Ch	DIF : 8digit BCD
20	78h	VIF : Fabrication No.
	xxh	SN (LSB)
	xxh	„
	xxh	„
	xxh	„ (MSB)
25	04h	DIF : 4 bytes binary coded
	0Eh - 0Fh (FBh, 08h)	VIF : plus energy depending on comma position
	xxh	energy (LSB)
	xxh	„
	xxh	„
30	xxh	„ (MSB)
	84h	DIF : 4 bytes binary coded / UNIT1
	40h	DIFE
	0Eh -0Fh (FBh, 08h)	VIF : plus energy under dt_{min}, depending on comma position
	xxh	energy (LSB)
35	xxh	„
	xxh	„
	xxh	„ (MSB)
	84h	DIF : 4 bytes binary coded / UNIT2
	80h	DIFE
40	40h	DIFE
	0Eh -0Fh (FBh, 08h)	VIF : minus energy depending on comma position
	xxh	energy (LSB)
	xxh	„
	xxh	„
45	xxh	„ (MSB)
	84h	DIF : 4 bytes binary coded / UNIT3
	C0h	DIFE
	40h	DIFE
	0Eh -0Fh (FBh, 08h)	VIF : minus energy under dt_{min}, depending on comma position
50	xxh	energy (LSB)
	xxh	„
	xxh	„
	xxh	„ (MSB)
	04h	DIF : 4 bytes binary coded
55	13h - 16h	VIF : volume -, depending on comma position
	xxh	volume (LSB)
	xxh	„
	xxh	„
	xxh	„ (MSB)
60	04h	DIF : 4 bytes binary coded
	38h – 4Eh	VIF : flow, depending on comma position
	xxh	flow – (LSB)
	xxh	„
	xxh	„

65	xxh	„ (MSB)
	04h	DIF : 4 bytes binary coded
	2Bh – 2Eh	VIF : power in 1 W - 1 kW
	xxh	instantaneous power (LSB)
	xxh	„
70	xxh	„
	xxh	„ (MSB)
	04h	DIF : 4 bytes binary coded
	5Ah	VIF : flow temperature in 0.1°C
	xxh	temperature (LSB)
75	xxh	„
	xxh	„
	xxh	„ (MSB)
	04h	DIF : 4 bytes binary coded
	5Eh	VIF : return temperature in 0.1°C
80	xxh	temperature (LSB)
	xxh	„
	xxh	„
	xxh	„ (MSB)
	04h	DIF : 4 bytes binary coded
85	62h	VIF : temperature diference in 0.1°C
	xxh	temperature (LSB)
	xxh	„
	xxh	„
	xxh	„ (MSB)
90	01h	DIF : 1 bytes binary coded
	FDh	VIF : extenion of VIF code
	0Fh	VIFE : software version
	xxh	software version value
	01h	DIF : 1 bytes binary coded
95	FDh	VIF : extenion of VIF code
	17h	VIFE : alarm
	xxh	error code
	CS	checksum
	16h	stop