



COMAC CAL

**CZECH PRODUCER
AND DEVELOPER
OF MEASUREMENT
AND SENSOR TECHNOLOGY**

CALOR 38 **(combined heat/cooling meter)**

Communication protocol specification **MODBUS RTU**

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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 and a stop bit. Default transmission speed is 9600Bd.

Addresses

The addresses 1 to 255 are reserved for 255 secondary stations.

Request / Response

Public function code 03h – read holding registers

The master sends a public function code 03h (Read holding registers), starting address, no. of registers and the address of secondary station.

Basic address space:

0x00	unsigned long Fabrication No.
0x02	unsigned long energy plus
0x04	unsigned long energy plus under dTmin
0x06	unsigned long energy minus
0x08	unsigned long energy minus under dTmin
0x0A	unsigned long volume +
0x0C	signed long flow
0x0E	signed long power
0x10	signed long inlet teperature x100 (0.01°C)
0x12	signed long outlet teperature x100 (0.01°C)
0x14	signed long teperature diff. x100 (0.01°C)
0x16	unsigned int error code*

Diagnostic Function address space:

0x17	unsigned long flow raw ADC data
0x19	unsigned long inlet teperature raw ADC data
0x1B	unsigned long outlet teperature raw ADC data

***Error table code:** Hi Byte = 0
Lo Byte = error code:

bit 0	Add volume overflow(unreasonable increment)
bit 1	FRAM memory error
bit 2	Empty tube
bit 3	Imp1 out overflow
bit 4	Current coil
bit 5	Imp2 out overflow
bit 6	temperature measurement
bit 7	bad CRC

Request:

Address	1Byte
Function code (03h)	1Byte
Starting address	2Byte
No. of Registers	2Byte
CRC32	2Byte

Response:

Address	1Byte
Function code (03h)	1Byte
Byte count	1Byte 2 x N*
Register value	N* x 2Bytes
CRC32	2Byte

*N = Quantity of Registers

Error:

Address	1Byte
Error code (83h)	1Byte
Exception code	1Byte
CRC32	2Byte

Example of a request to read energy and volume registers 02h – 09h:

Request:

Address	01h
Function code	03h
Starting address Hi	00h
Starting address Lo	02h (energy plus)
No. of Registers Hi	00h
No. of Registers Lo	08h
CRC32 Hi	E5h

CRC32 Lo CCh

Response:

Address	01h	
Function code	03h	
Byte count	10h	
Register value Hi	xxh	(energy plus)
	xxh	
	xxh	
Register value Lo	xxh	
Register value Hi	xxh	(energy plus under dTmin)
	xxh	
	xxh	
Register value Lo	xxh	
Register value Hi	xxh	(energy minus)
	xxh	
	xxh	
Register value Lo	xxh	
Register value Hi	xxh	(energy minus under dTmin)
	xxh	
	xxh	
Register value Lo	xxh	
CRC32 Hi	xxh	
CRC32 Lo	xxh	

Resolution units in the registers is given from resolution of LCD display.

Example:	LCD	Register
	53.4 GJ	534
	689,89 L	68989
	5,6 m3/h	56

Illegal data address

Memory address spaces 0xFE00 through 0xFFFF are system registers, for the routine user are blocked.

Communication timing

