BCM4-MBus

4-channel counter module with S0 inputs and M-Bus data interface

Documentation

Preface:

It is not the subject of this documentation to describe the M-Bus in its OSI properties Layer 1-6. The special features of this module on the application level (layer 7) are described under M-Bus specifications and programming.

Technical data:

Housing:	according to DIN 43880, material PPO self-extinguishing
Dimensions:	W: 53mm (3TE) H: 90mm (incl. connector) D: 58mm
Assembly:	on DIN profile rail according to EN 50022
Protection class:	IP20
Connections:	Supply: Screw terminals S0 inputs: 1 x 8-pole screw-type plug-in terminals Grid dimension 5.08 Bus: 2 x 2-pole screw-type plug-in terminals Spacing 3.81
Supply:	24 VDC +/- 5%
Power consumption:	max. 60 mA at 24VDC
Inputs:	4 x S0 Class B according to EN 62053-31
S0 voltage:	15.5 V idle
S0 line current:	4 x approx. 17mA max.
Active input:	$I>_{S0}$ 10mA
Inactive input:	$I<_{S0}$ 2mA
Debounce time:	approx. 8msec
Data transmission:	M-Bus according to EN1434
Baud rates:	300, 2400, 9600 bit/s (default: 2400 bit/s)
Busload:	1 Unit Load (approx. 1.5mA)
Number of logical M-Bus slaves:	4
Slave function:	4 x Counter, 32Bit dual
Max. Counting frequency:	50Hz

Connections:

Readable data:

Counter values of the counters 1-4, 4 bytes each, format DUAL

Configurable sizes:

Primary address
Baud rate
Medium per counter
Unit per counter
EEPROM write protection

Functional Description:

The BCM8-MBus module is a 4-channel counter or pulse collector for counting media with the aid of corresponding pulse generators and is thus used for recording consumption data.
Each counter has a width of 32Bit and counts dual. So the highest counter value is 4.294.967.295

The pulse inputs are designed as S0 interface class B according to EN 62053-31. An input is activated when the line resistance between the +/- terminals is in the range 0...1000 Ohm for at least 10msec. A pulse generator can be a contact or an open collector transistor (observe polarity). Each input is assigned a LED in the front, which indicates the state of a S0 input.

Optionally, a counter can also be programmed as a time counter for recording run times.
The corresponding S0 input has the property of enable (gate function). If the S0 input is activated in this operating mode of a counter, the counter is incremented by an internal 1sec pulse. In this case, the corresponding LED flashes in 1s intervals.

Data interface:

The data interface is designed for the M-Bus according to EN1434 and loads the bus with 1 standard load of approx. 1.5mA. The counter module is not supplied via the M-Bus.

M-Bus specifications:

As the counter module contains logical4 independently working M-Bus slaves with 4 primary addresses and secondary4 addresses, some special features have to be considered.

- In contrast to the standard, the BCM8-MBus module is not delivered with primary addresses 0, but with addresses 1-4.
- The secondary addresses cannot be changed.
- An SND - telegram from the master via the broadcast address 0xFE is answered only 1 time
- The configuration of a slave (medium, unit) takes place exclusively via the respective primary address
- The configuration of a slave via the broadcast address 0xFE is not permitted

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- On the M-Bus communication level the module operates exclusively in MODE 1 (LSB first)
  The Frame Count Bit (FCB) and the Frame Count Valid Bit (FCV) are not observed or handled in any way.

Programming:

The programming of a M-Bus slave of the counter module can be done e.g. with the program MBCONF. Before programming, it must be ensured that the write protection of the EEPROM is deactivated. The status of the write protection is communicated via the M-Bus status byte: 0x00 write protection off, 0x01 write protection activated.

Slave and module parameters for which no configuration telegram is provided in the standard are programmed with an SND-UD telegram containing a user-specific 3-byte configuration string. The CI field is 0x51.

Slave specific configuration strings for units (all values hexadecimal):

01 7C 6E	HCA dimensionless
01 7C 10	Volume [ml]
01 7C 13	Volume [l]
01 7C 16	Volume [m^3]
01 7C 1B	Mass [10^0 Kg]
01 7C 18	Mass [10^-3 Kg]
01 7C 03	Energy [Wh]
01 7C 06	Energy [KWh]
01 7C 20	seconds, external clock
01 7C A0	seconds, internal clock, if S0 input activated

MBCONF additionally offers the possibility to select a medium from a table and to set it in a slave.

Special commands (all values hexadecimal):

01 0F 55	Resetting a counter via the primary address
01 0F 54	Reset all counters no matter via which primary address
01 0F E0	Cancel EEPROM write protection
01 0F E1	Set EEPROM write protection
01 0F A0	Autoprotect off
01 0F A1	Autoprotect on

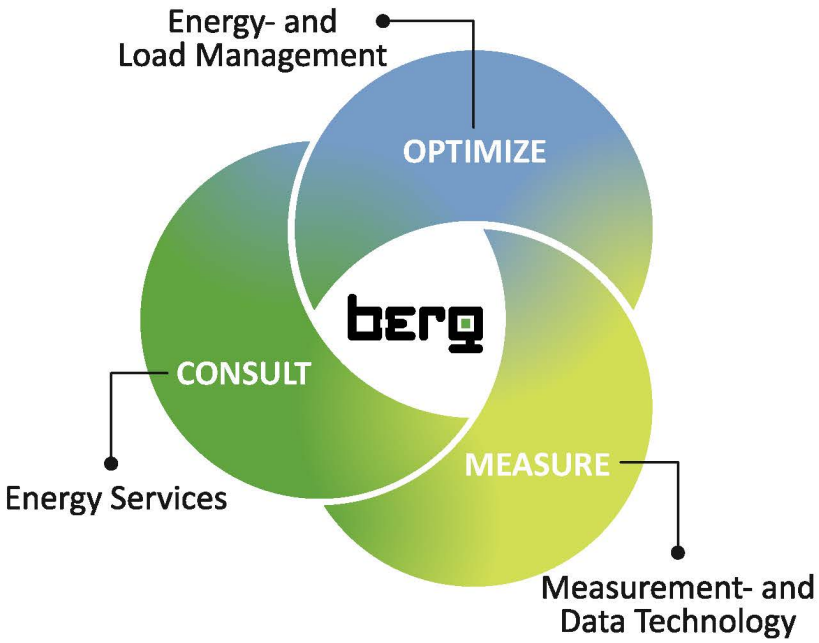
Autoprotect: If activated, the EEPROM write protection is set automatically at Power On.

Bus timing:

The module responds to a valid master telegram after 9..9.5 ms (Response Delay).

Operating hour counts:

Each input channel can be set up as an operating hours counter. For this purpose, the channel must be set to the unit "Seconds, internal clock, if S0 input activated" (see chapter Programming). In this operating mode, an internal clock continues to count a seconds counter reading every second when the S0 input is closed. The operating hours are calculated from the difference between the second counter readings in the period under consideration.
The counting up of the operating seconds is also indicated visually by the flashing LED "S0-INn" with n = channel 1 - 4.



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