VMBELO
VMBELO-20

Edge-lit touch panel with Oled display
for VELBUS system

Binairy format:

<SOF-SID10...SID0-RTR-IDE-r0-DLC3...0-DATABYTE1...DATABYTEn-CRC15...CRC1-CRCDEL-ACK-ACKDEL-EOF7...EOF1-IFS3...IFS1>

bits	***Description***
SOF	Start Of Frame (always 0)
SID10 & SID9	Priority (00: highest … 11: lowest priority)
SID8…SID1	Address
SID0	Always 0
RTR	Remote Transmit Request
IDE	Identifier Extension (always 0)
r0	reserved (always 0)
DLC3…DLC0	Data Length Code (0…8)
Databyte1	Command
Databyte2	Parameter
Databyte3	Parameter
Databyte4	Parameter
Databyte5	Parameter
Databyte6	Parameter
Databyte7	Parameter
Databyte8	Parameter
CRC15…CRC1	Cyclic Redundancy Checksum
CRCDEL	CRC Delimiter (always 1)
ACK	Acknowledge slot (transmit 1 readback 0 if received correctly)
ACKDEL	Acknowledge Delimiter (always 1)
EOF7...EOF1	End Of Frame (always 1111111)
IFS3...IFS1	InterFrame Space (always 111)

The module can transmit the following messages:

- Channel status
- Sensor output status
- Module status
- Sensor status
- Sensor temperature
- Sensor settings
- Module type and subtype
- Bus error counter status
- First, second and third part of the channel names
- Memory data
- Memory data block (4 bytes)
- Real-time clock status
- Date status
- Daylight savings status
- Program step
- Power up

The module can transmit the following commands:

- Real-time clock status request
- Clear linked push button led
- Set linked push button led
- Slow blink linked push button led
- Fast blink linked push button led
- Counter status request

- Remote sensor status request
- Remote sensor temperature request
- Remote sensor settings request
- Remote sensor set temperature settings
- Remote sensor set heating mode
- Remote sensor set cooling mode
- Remote sensor set comfort mode
- Remote sensor set day mode
- Remote sensor set night mode
- Remote sensor set safe mode
- Remote sensor set default sleep time
- Remote Analog Sensor readout request

The module can receive the following messages:

- Linked push button status
- Power up
- Module type request
- Module status request
- Channel name request
- Clear channel led
- Set channel led
- Slow blink channel led
- Fast blink channel led
- Very fast channel led
- Update channel leds
- Read memory data
- Read memory data block (4 bytes)
- Memory dump request
- Counter log dump request
- Counter status
- Write memory data
- Write memory data block (4 bytes)
- Bus error counter status request
- Real-time clock status request
- Set real-time clock
- Set date
- Set daylight savings
- Enable/disable global sunrise/sunset related actions
- Enable/disable local sunrise/sunset related actions
- Set local alarm clock
- Set global alarm clock
- Lock channel
- Unlock channel
- Disable channel program
- Enable channel program
- Select program
- Read program step
- Write program step
- Sensor temperature request
- Sensor settings request
- Set sensor zone
- Set heating mode
- Set cooling mode
- Set default sleep time
- Set thermostat default sleep time
- Set thermostat target, safe, night, day, comfort and alarm1 to alarm 4 temperature set
- Set thermostat hysteresis
- Set thermostat temperature difference for boost output
- Set temperature sensor calibration offset and gain
- Enable/disable valve and pump unjamming
- Reset minimum and maximum temperature

- Set thermostat temperature range
- Set thermostat minimum switching time
- Switch to comfort mode
- Switch to day mode
- Switch to night mode
- Switch to safe temperature mode
- Counter status
- Remote sensor module status
- Remote sensor status
- Remote Sensor temperature
- Remote sensor settings
- Readout of the remote analog sensor
- Memo text
- Switch the open collector output off or on
- Start a timer on the open collector output
- Set edge custom palette colors
- Set edge color

Transmits power up message:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 2 data byte to send
DATABYTE1 = COMMAND_POWER_UP (0xAB)
DATABYTE2 = module address

Transmits real time clock status request:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 1 data byte to send
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS_REQUEST (0xD7)

Transmits the global real time clock status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS (0xD8)
DATABYTE2 = Day

Contents	Day
0	Monday
1	Tuesday
2	Wednesday
3	Thursday
4	Friday
5	Saturday
6	Sunday

DATABYTE3 = Hour (0…23)
DATABYTE4 = Minute (0…59)

Transmits the global date status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 5 data bytes to send
DATABYTE1 = COMMAND_DATE_STATUS (0xB7)
DATABYTE2 = Day (1…31)
DATABYTE3 = Month (1…12)
DATABYTE4 = High byte of Year
DATABYTE5 = Low byte of Year

Transmits the real time clock status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS (0xD8)
DATABYTE2 = Day

Contents	Day
0	Monday
1	Tuesday
2	Wednesday
3	Thursday
4	Friday
5	Saturday
6	Sunday

DATABYTE3 = Hour (0…23)
DATABYTE4 = Minute (0…59)

Transmits the date status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes to send
DATABYTE1 = COMMAND_DATE_STATUS (0xB7)
DATABYTE2 = Day (1…31)
DATABYTE3 = Month (1…12)
DATABYTE4 = High byte of Year
DATABYTE5 = Low byte of Year

Transmits the daylight savings status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_DAYLIGHT_SAVING_STATUS (0xAF)
DATABYTE2 = 0 =disabled / 1 = enabled

Transmits the channel switch status:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address, sub-address1, sub-address2 or sub-address3
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_PUSH_BUTTON_STATUS (0x00)
DATABYTE2 = Channel just pressed
DATABYTE3 = Channel just released
DATABYTE4 = Channel long pressed

Transmits the sensor output switch status:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Sub-address 4
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_OUTPUT_STATUS (0x00)
DATABYTE2 = Output channel just activated (1 = just activated)

Contents	Output channel
xxxxxxx1	Heater just activated
xxxxxx1x	Boost heater/cooler just activated
xxxxx1xx	Pump just activated
xxxx1xxx	Cooler just activated
xxx1xxxx	Temperature alarm 1 just activated
xx1xxxxx	Temperature alarm 2 alarm activated
x1xxxxxx	Temperature alarm 3 just activated
1xxxxxxx	Temperature alarm 4 alarm activated

DATABYTE3 = Outputs just deactivated (1 = just deactivated)

Contents	Output channel
xxxxxxx1	Heater just deactivated
xxxxxx1x	Boost heater/cooler just deactivated
xxxxx1xx	Pump just deactivated
xxxx1xxx	Cooler just deactivated
xxx1xxxx	Temperature alarm 1 just deactivated
xx1xxxxx	Temperature alarm 2 alarm deactivated
x1xxxxxx	Temperature alarm 3 just deactivated
1xxxxxxx	Temperature alarm 4 alarm deactivated

DATABYTE4 = always zero

Transmits the module type:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_MODULE_TYPE (0xFF)
DATABYTE2 = type (0x37 = VMBELO / 0x52 = VMBELO-20)
DATABYTE3 = High byte of serial number
DATABYTE4 = Low byte of serial number
DATABYTE5 = Memory map version
DATABYTE6 = Build year
DATABYTE7 = Build week
DATABYTE8 = Properties

Contents	Output channel
B'xxxxxxx0'	Terminator open
B'xxxxxxx1'	Terminator closed
B'xxxx000x'	Hardware version number
B'xxx0xxxx'	Velbus connection type
B'xx0xxxxx'	Only standard CAN allowed
B'xx1xxxxx'	CAN FD support

Transmits the module subtype:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_SUBTYPE (0xB0)
DATABYTE2 = type (0x37 = VMBELO / 0x52 = VMBELO-20)
DATABYTE3 = High byte of serial number
DATABYTE4 = Low byte of serial number
DATABYTE5 = Subaddress1 (0xFF sub-address disabled)
DATABYTE6 = Subaddress2 (0xFF sub-address disabled)
DATABYTE7 = Subaddress3 (0xFF sub-address disabled)
DATABYTE8 = Subaddress4 (0xFF sub-address disabled)

Transmit: Bus error counter status

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_BUSERROR_COUNTER_STATUS (0xDA)
DATABYTE2 = Transmit error counter
DATABYTE3 = Receive error counter
DATABYTE4 = Bus off counter

Transmits the memory data:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_MEMORY_DATA (0xFE)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory data

Remark: address range: 0x0000 to 0x4FFF

Transmits memory data block (4 bytes):

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes to send
DATABYTE1 = COMMAND_MEMORY_DATA_BLOCK (0xCC)
DATABYTE2 = High start address of memory block
DATABYTE3 = LOW start address of memory block
DATABYTE4 = memory data1
DATABYTE5 = memory data2
DATABYTE6 = memory data3
DATABYTE7 = memory data4

Remark:
address range: 0x0000 to 0x4FFC = memory map

Transmits memory data block (5...60 bytes)(only allowed for CAN FD frames):

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = number of data bytes to send

Contents	*Number of data bytes*
0x09	12 data bytes
0x0A	16 data bytes
0x0B	20 data bytes
0x0C	24 data bytes
0x0D	32 data bytes
0x0E	48 data bytes
0x0F	64 data bytes

DATABYTE1 = COMMAND_MEMORY_DATA_BLOCK (0xCC)
DATABYTE2 = High start address of memory block
DATABYTE3 = LOW start address of memory block
DATABYTE4 = memory block length (5…60)
DATABYTE5 = memory data 1
…
DATABYTE12 = memory data 8 (end of data for DLC3...DLC0 = 0x09)
…
DATABYTE16 = memory data 12 (end of data for DLC3...DLC0 = 0x0A)
…
DATABYTE20 = memory data 16 (end of data for DLC3...DLC0 = 0x0B)
…
DATABYTE24 = memory data 20 (end of data for DLC3...DLC0 = 0x0C)
…
DATABYTE32 = memory data 28 (end of data for DLC3...DLC0 = 0x0D)
…
DATABYTE48 = memory data 44 (end of data for DLC3...DLC0 = 0x0E)
…
DATABYTE64 = memory data 60 (end of data for DLC3...DLC0 = 0x0F)

Remark:
Contents of unused data bytes = 0x55
Address range: 0x0000 to (0x5000 – memory block length)

Transmits the first part of channel name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART1 (0xF0)
DATABYTE2 = channel number 1…33 or 42 (channel 33 = temperature sensor name, 42 for output name)
DATABYTE3 = Character 1 of the channel name
DATABYTE4 = Character 2 of the channel name
DATABYTE5 = Character 3 of the channel name
DATABYTE6 = Character 4 of the channel name
DATABYTE7 = Character 5 of the channel name
DATABYTE8 = Character 6 of the channel name

Transmits the second part of the channel name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART2 (0xF1)
DATABYTE2 = Channel number 1…33 or 42 (channel 33 = temperature sensor name, 42 for output name)
DATABYTE3 = Character 7 of the channel name
DATABYTE4 = Character 8 of the channel name
DATABYTE5 = Character 9 of the channel name
DATABYTE6 = Character 10 of the channel name
DATABYTE7 = Character 11 of the channel name
DATABYTE8 = Character 12 of the channel name

Transmits the third part of the channel name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 6 data bytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART3 (0xF2)
DATABYTE2 = channel number 1…33 or 42 (channel 33 = temperature sensor name, 18 for output name)
DATABYTE3 = Character 13 of the channel name
DATABYTE4 = Character 14 of the channel name
DATABYTE5 = Character 15 of the channel name
DATABYTE6 = Character 16 of the channel name

Remarks:
Unused characters contain 0xFF.

Transmits the module status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, sub address1, sub address2 or sub address3
RTR = 0
DLC3...DLC0 = 8 data bytes to send for master address, 7 data bytes to send for sub addresses
DATABYTE1 = COMMAND_MODULE_STATUS (0xED)
DATABYTE2 = channel 1 to 8 status (1 = pressed / 0 = released)
DATABYTE3 = enabled/disable channel status (1 = enabled / 0 = disabled)
DATABYTE4 = open collector locked & temperature sensor

Contents	***Display status & open collector***
B'xxxx0xxx'	Edge color not inhibited
B'xxxx1xxx'	Edge color inhibited
B'xxx0xxxx'	Temperature sensor program enabled
B'xxx1xxxx'	Temperature sensor program disabled
B'xx0xxxxx'	Open collector output program enabled
B'xx1xxxxx'	Open collector output program disabled
B'x0xxxxxx'	Open collector output unlocked
B'x1xxxxxx'	Open collector output locked
B'0xxxxxxx'	Open collector output off
B'1xxxxxxx'	Open collector output on

DATABYTE5 = locked channel status (0 = unlocked / 1 = locked)

DATABYTE6 = disabled channel program status (0 = program enabled / 1 = program disabled)
DATABYTE7 = alarm & program selection

Contents	*Alarm /Selected program*
B'xxxxxx00'	None
B'xxxxxx01'	Program group 1 (summer)
B'xxxxxx10'	Program group 2 (winter)
B'xxxxxx11'	Program group 3 (holiday)
B'xxxxx0xx'	Alarm 1 off
B'xxxxx1xx'	Alarm 1 on
B'xxxx0xxx'	Local alarm 1
B'xxxx1xxx'	Global alarm 1
B'xxx0xxxx'	Alarm 2 off
B'xxx1xxxx'	Alarm 2 on
B'xx0xxxxx'	Local alarm 2
B'xx1xxxxx'	Global alarm 2
B'x0xxxxxx'	Sunrise disabled
B'x1xxxxxx'	Sunrise enabled
B'0xxxxxxx'	Sunset disabled
B'1xxxxxxx'	Sunset enabled

DATABYTE8 = oled display status (only for master address)

Contents	*Display status*
B'xx000000'	Button page 1
…	…
B'xx000111'	Button page 8
B'xx001000'	Counter 1 page
…	…
B'xx001111'	Counter 8 page
B'xx010000'	Local temperature page
B'xx010001'	Remote temperature 1 page
…	…
B'xx011100'	Remote temperature 12 page
B'xx011101'	Analog sensor 1 page
…	…
B'xx100000'	Analog sensor 4 page
B'xx100001'	Clock page
B'xx100010'	Menu pages
B'x0xxxxxx'	Screensaver off
B'x1xxxxxx'	Screensaver on
B'0xxxxxxx'	Display off
B'1xxxxxxx'	Display on

Transmit the sensor status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_STATUS (0xEA)
DATABYTE2 = Operating mode

Contents	Operating mode
xxxxxxx1	Mode push button locked (not used)
xxxxxxx0	Mode push button unlocked (not used)
xxxxx11x	Forced to safe mode (locked)
xxxxx01x	Manual mode
xxxxx10x	Sleep timer mode
xxxxx00x	Run mode
xxxx1xxx	Auto send sensor temperature enabled
xxxx0xxx	Auto send sensor temperature disabled
x100xxxx	Comfort mode
x010xxxx	Day mode
x001xxxx	Night mode
x000xxxx	Safe temp mode (anti frost)
1xxxxxxx	Cooler mode

0xxxxxxx	Heater mode

DATABYTE3 = Program step mode

Contents	Program step mode
xxxxx0xx	No sensor program group 1
xxxxx1xx	Sensor program group 1 available
xxxx0xxx	No sensor program group 2
xxxx1xxx	Sensor program group 2 available
0xxxxxxx	No sensor program group 3
1xxxxxxx	Sensor program group 3 available
x100xxxx	Comfort program step received
x010xxxx	Day program step received
x001xxxx	Night program step received
x000xxxx	Safe temperature program step received
xxxxxx1x	Enable unjamming heater valve
xxxxxx0x	Disable unjamming heater valve
xxxxxxx1	Enable unjamming pump
xxxxxxx0	Disable unjamming pump

DATABYTE4 = Output status (1 = activated)

Contents	Output channel
xxxxxxx0	Heater off
xxxxxxx1	Heater on
xxxxxx0x	Boost heater/cooler off
xxxxxx1x	Boost heater/cooler on
xxxxx0xx	Pump off
xxxxx1xx	Pump on
xxxx0xxx	Cooler off
xxxx1xxx	Cooler on
xxx0xxxx	Temperature alarm 1 off
xxx1xxxx	Temperature alarm 1 on
xx0xxxxx	Temperature alarm 2 off
xx1xxxxxx	Temperature alarm 2 on
x0xxxxxx	Temperature alarm 3 off
x1xxxxxx	Temperature alarm 3 on
0xxxxxxx	Temperature alarm 4 off
1xxxxxxx	Temperature alarm 4 on

DATABYTE5 = Current sensor temperature into two's complement format (resolution 0.5°)

Contents	Current sensor temperature
01111111	63.5°C
00000001	0.5°C
00000000	0°C
11111111	-0.5°C
10010010	-55°C

DATABYTE6 = Current temperature set (resolution 0.5°)

Contents	Current temperature set
01101100	54°C
00101000	20°C
00000010	1°C
00000001	0.5°C
00000000	0°C
11111111	-0.5°C
11000000	-32°C

DATABYTE7 = High byte of the sleep timer
DATABYTE8 = Low byte of the sleep timer into minutes

Remark:
[DATABYTE7][DATABYTE8] contains a 16-bit sleep timer into minutes (1 to 65.279min).

If the sleep timer contains H'0000', the sleep timer is deactivated.
If the sleep timer contains a value between H'0001' and H'FEFF' (1 to 65.279min), the sleep timer is running for that time.
If the sleep timer contains 0xFFFF, manual mode is selected.

Transmit the sensor temperature:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes to send
DATABYTE1 = COMMAND_SENSOR_TEMPERATURE (0xE6)
DATABYTE2 = High byte current sensor temperature
DATABYTE3 = Low byte current sensor temperature into two's complement format (resolution 0.0625°)
DATABYTE4 = High byte minimum sensor temperature
DATABYTE5 = Low byte minimum sensor temperature into two's complement format (resolution 0.0625°)
DATABYTE6 = High byte maximum sensor temperature
DATABYTE7 = Low byte maximum sensor temperature into two's complement format (resolution 0.0625°)

High byte	Low byte	Current sensor temperature
01111111	111xxxxx	63.5°C
00000001	000xxxxx	0.5°C
00000000	100xxxxx	0.25°C
00000000	010xxxxx	0.125°C
00000000	001xxxxx	0.0625°C
00000000	000xxxxx	0°C
11111111	111xxxxx	-0.0625°C
11111111	110xxxxx	-0.125°C
11111111	100xxxxx	-0.25°C
11111110	000xxxxx	-0.5°C
10010010	000xxxxx	-55°C

Remark:
The 5 least significant bits of the low byte are don't care.

Transmit the first part of the sensor settings:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART1 (0xE8)
DATABYTE2 = Current temperature set (resolution 0.5°)
DATABYTE3 = Comfort temperature set for heating mode (resolution 0.5°)
DATABYTE4 = Day temperature set for heating mode (resolution 0.5°)
DATABYTE5 = Night temperature set for heating mode (resolution 0.5°)
DATABYTE6 = Anti frost temperature set for heating mode (resolution 0.5°)
DATABYTE7 = Boost temperature difference set (resolution 0.5°)
DATABYTE8 = Hysteresis temperature set

Contents	Hysteresis
xxx11111	15.5°C
Xxx00001	0.5°C
Xxx00000	0°C

Transmit the second part of the sensor settings:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART2 (0xE9)
DATABYTE2 = Comfort temperature set for cooling mode (resolution 0.5°)
DATABYTE3 = Day temperature set for cooling mode (resolution 0.5°)
DATABYTE4 = Night temperature set for cooling mode (resolution 0.5°)
DATABYTE5 = Safe temperature set for cooling mode (resolution 0.5°)

DATABYTE6 = High byte of the default sleep timer
DATABYTE7 = Low byte of the default sleep timer into minutes (1 to 65.279min)
DATABYTE8 = Default auto send temperature time interval into seconds
(Valid range: 10…255s)
(5…9 = auto send on temperature change with min interval 5…9s)
(<4 = auto send disabled)

Transmit the third part of the sensor settings:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART3 (0xC6)
DATABYTE2 = Temperature alarm 1 setting (resolution 0.5°)
DATABYTE3 = Temperature alarm 4 setting (resolution 0.5°)
DATABYTE4 = Lower temperature range cool mode (resolution 0.5°)
DATABYTE5 = Upper temperature range heat mode (resolution 0.5°)
DATABYTE6 = Calibration offset factor (resolution 0.5°)

Contents	Calibration factor
00001111	Calibration factor +7.5°C
00000001	Calibration factor +0.5°C
00000000	Calibration factor +0°C
11111111	Calibration factor -0.5°C
11110000	Calibration factor -8°C

DATABYTE7 = Zone number
DATABYTE8 = Calibration gain factor

Transmit the fourth part of the sensor settings:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART4 (0xB9)
DATABYTE2 = Minimum switching time (0…255s)
DATABYTE3 = Pump delayed on time (0…255s)
DATABYTE4 = Pump delayed off time (0…255s)
DATABYTE5 = Temperature alarm 2 setting (resolution 0.5°)
DATABYTE6 = Temperature alarm 3 setting (resolution 0.5°)
DATABYTE7 = Lower temperature range heat mode (resolution 0.5°)
DATABYTE8 = Upper temperature range cool mode (resolution 0.5°)

Transmit: Clears LEDs on a linked push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the linked push button module for clearing LEDs
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_CLEAR_LED (0xF5)
DATABYTE2 = LED bit numbers (1 = clear LED)

Transmit: Sets LEDs on a linked push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the linked push button module for setting LEDs on
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_SET_LED (0xF6)
DATABYTE2 = LED bit numbers (1 = set LED)

Transmit: Blinks LEDs slowly on a linked push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the linked push button module for slowly blinking LEDs
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_SLOW_BLINKING_LED (0xF7)
DATABYTE2 = LED bit numbers (1 = slow blink LED)

Transmit: Blinks LEDs fast on a linked push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the linked push button module for fast blinking LEDs
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_FAST_BLINKING_LED (0xF8)
DATABYTE2 = LED bit numbers (1 = fast blink LED)

Transmits program step info:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_PROGRAM_STEP_INFO (0xC1)
DATABYTE2 = Program step number (1…170 / 255 step not found)
DATABYTE3 = Program reference

Contents	***Description***
000xxxxx	Disable program step
001xxxxx	Absolute time
010xxxxx	Wake up time 1 + relative time
011xxxxx	Go to bed time 1 + relative time
100xxxxx	Wake up time 2 + relative time
101xxxxx	Go to bed time 2 + relative time
110xxxxx	Sunrise + relative time
111xxxxx	Sunset + relative time
xxx01111	Rel. time = 3h45min
…	
xxx00001	Rel. time = 15min
xxx00000	Rel. time = 0
xxx11111	Rel. time = -15min
…	
xxx10000	Rel. time = -4h

DATABYTE4 = Program step month & four least significant bits of day

Contents	***Description***
xxxx0000	Weekly program
xxxx0001	January
xxxx0010	February
xxxx0011	March
xxxx0100	April
xxxx0101	May
xxxx0110	June
xxxx0111	July
xxxx1000	August
xxxx1001	September
xxxx1010	October
xxxx1011	November
xxxx1100	December
xxxx1101	Monthly program
xxxx1110	Monthly program
xxxx1111	Monthly program

Contents byte6	***Contents byte4***	***Description***
00xxxxxx	0000xxxx	Never

00xxxxxx	0001xxxx	Day 1of the month
00xxxxxx	0010xxxx	Day 2of the month
…	...	…
01xxxxxx	1111xxxx	Day 31of the month
10xxxxxx	0000xxxx	Never
10xxxxxx	0001xxxx	Every Monday
10xxxxxx	0010xxxx	Every Tuesday
...	…	…
10xxxxxx	0111xxxx	Every Sunday
10xxxxxx	1000xxxx	Every weekend (sa & su)
10xxxxxx	1001xxxx	Every working day (mo…fr)
10xxxxxx	1010xxxx	Every day except Sunday
10xxxxxx	1011xxxx	Every day
10xxxxxx	1100xxxx	Never
…	…	…
11xxxxxx	1111xxxx	Never

DATABYTE5 = Program step hour & group number

Contents	***Description***
xxx00000	0h
xxx00001	1h
…	…
xxx10111	23h
xx1xxxxx	Program group 1 (Summer program)
x1xxxxxx	Program group 2 (Winter program)
1xxxxxxx	Program group 3 (Holiday program)

DATABYTE6 = Program step minute & every flag & msb of day

Contents	***Description***
xx000000	0min
xx000001	1min
…	…
xx111011	59min

Contents byte6	***Contents byte4***	***Description***
00xxxxxx	0000xxxx	Never
00xxxxxx	0001xxxx	Day 1of the month
00xxxxxx	0010xxxx	Day 2of the month
…	...	…
01xxxxxx	1111xxxx	Day 31of the month
10xxxxxx	0000xxxx	Never
10xxxxxx	0001xxxx	Every Monday
10xxxxxx	0010xxxx	Every Tuesday
...	…	…
10xxxxxx	0111xxxx	Every Sunday
10xxxxxx	1000xxxx	Every weekend (sa & su)
10xxxxxx	1001xxxx	Every working day (mo…fr)
10xxxxxx	1010xxxx	Every day except Sunday
10xxxxxx	1011xxxx	Every day
10xxxxxx	1100xxxx	Never
…	…	…
11xxxxxx	1111xxxx	Never

DATABYTE7 = Program step action

Contents	**Action**
0	0s25 Pulse
1	1s Pulse
2	2s Pulse
...	...
119	1min59s Pulse
120	2min Pulse

121	2min15s Pulse
...	...
131	4min45s Pulse
132	5min Pulse
133	5min30s Pulse
...	...
181	29min30s Pulse
182	30min Pulse
183	31min Pulse
...	...
211	59min Pulse
212	1h Pulse
213	1h15min Pulse
...	...
227	4h45min Pulse
228	5h Pulse
229	5h30min Pulse
...	...
237	9h30min Pulse
238	10h Pulse
239	11h Pulse
...	…
246	18h Pulse
247	Press
248	Long Press
249	Release
250	Lock
251	Unlock
252	Thermostat safe mode
253	Thermostat night mode
254	Thermostat day mode
255	Thermostat comfort mode

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
2	Channel 2
...	…
31	Channel 7
32	Channel 8
33	Temperature sensor
42	Open collector output

Transmit 'counter status request' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Counter address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_ENERGY_COUNTER_STATUS_RQ (0xBD)
DATABYTE2 = counter channel 1 to 8

Contents	***Description***
B'xxxxxxx1'	Channel 1
B'xxxxxx1x'	Channel 2
B'xxxxx1xx'	Channel 3
B'xxxx1xxx'	Channel 4
B'xxx1xxxx'	Channel 5
B'xx1xxxxx'	Channel 6
B'x1xxxxxx'	Channel 7
B'1xxxxxxx'	Channel 8

DATABYTE3 = auto send interval
10…255s fixed interval
5…9 = auto send on change with 5s as minimum interval
1…4 = auto send on change disabled
0 = no change on auto send interval

Remark: the auto send interval is common for all channels

Transmit 'Remote Sensor status request' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_MODULE_STATUS_REQUEST (0xFA)
DATABYTE2 = don't care

Transmit 'Remote Sensor temperature request' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_SENSOR_TEMP_REQUEST (0xE5)
DATABYTE2 = Auto send time interval into seconds
(valid range: 10…255s)
(5…9 = auto send on temperature change >=0.5°)
(1…4 = auto send disabled)
(0 = no change on auto send interval)

Transmit 'Remote Sensor settings request' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_REQUEST (0xE7)
DATABYTE2 = don't care

Transmit 'Remote Sensor Set temperature' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 3 data bytes to send
DATABYTE1 = COMMAND_SET_TEMP (0xE4)
DATABYTE2 = Pointer to temperature variable (0…20)

Contents	Temperature variable
0	Target temperature set
1	Comfort temperature set for heating
2	Day temperature set for heating
3	Night temperature set for heating

4	Safe temperature set for heating
7	Comfort temperature set for cooling
8	Day temperature set for cooling
9	Night temperature set for cooling
10	Safe temperature set for cooling

DATABYTE3 = Temperature set (resolution 0.5°)

Contents	Temperature set
01111111	63.5°C
00101000	20°C
00000010	1°C
00000001	0.5°C
00000000	0°C
11111111	-0.5°C
10010010	-55°C

Remark: Wait at least 100ms for sending a next command on the velbus.

Transmit 'Remote Sensor Set heating mode' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_SET_HEATING_MODE (0xE0)
DATABYTE2 = don't care

Transmit 'Remote Sensor Set cooling mode' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_SET_COOLING_MODE (0xDF)
DATABYTE2 = don't care

Transmit 'Remote Sensor Switch to comfort mode' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 3 data bytes to send
DATABYTE1 = COMMAND_SWITCH_TO_COMFORT_MODE (0xDB)
DATABYTE2 = High byte of the sleep time
DATABYTE3 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains 0xFF00, the command is a program step.
A sleep time between 0x0001 and 0xFEFF (1 to 65.279min) starts the sleep timer for that time and program steps will not be executed during that time.
A sleep time of 0xFFFF puts the sensor into manual mode. Program steps will not be executed anymore and local control is disabled.
A value of zero for the sleep time cancels the manual mode or sleep timer.

Transmit 'Remote Sensor Switch to day mode' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 3 data bytes to send
DATABYTE1 = COMMAND_SWITCH_TO_DAY_MODE (0xDC)
DATABYTE2 = High byte of the sleep time
DATABYTE3 = Low byte of the sleep time into minutes

Remark:

If the sleep time contains 0xFF00, the command is a program step.
A sleep time between 0x0001 and 0xFEFF (1 to 65.279min) starts the sleep timer for that time and program steps will not be executed during that time.
A sleep time of 0xFFFF puts the sensor into manual mode. Program steps will not be executed anymore and local control is disabled.
A value of zero for the sleep time cancels the manual mode or sleep timer.

Transmit 'Remote Sensor Switch to night mode' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 3 data bytes to send
DATABYTE1 = COMMAND_SWITCH_TO_NIGHT_MODE (0xDD)
DATABYTE2 = High byte of the sleep time
DATABYTE3 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains 0xFF00, the command is a program step.
A sleep time between 0x0001 and 0xFEFF (1 to 65.279min) starts the sleep timer for that time and program steps will not be executed during that time.
A sleep time of 0xFFFF puts the sensor into manual mode. Program steps will not be executed anymore and local control is disabled.
A value of zero for the sleep time cancels the manual mode or sleep timer.

Transmit 'Remote Sensor Switch to safe temperature mode' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master Address
RTR = 0
DLC3...DLC0 = 3 data bytes to send
DATABYTE1 = COMMAND_SWITCH_TO_SAFE_MODE (0xDE)
DATABYTE7 = High byte of the sleep time
DATABYTE8 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains 0xFF00, the command is a program step.
A sleep time between 0x0001 and 0xFEFF (1 to 65.279min) starts the sleep timer for that time and program steps will not be executed during that time.
A sleep time of 0xFFFF puts the sensor into manual mode. Program steps will not be executed anymore and local control is disabled.
A value of zero for the sleep time cancels the manual mode or sleep timer.

Transmit 'Set default sleep time' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master address
RTR = 0
DLC3...DLC0 = 3 data bytes to send
DATABYTE1 = COMMAND_SET_DEFAULT_SLEEP_TIME (0xE3)
DATABYTE2 = High byte of the default sleep time
DATABYTE3 = Low byte of the default sleep time into minutes
(valid range 0x0001 to 0xFEFF or 1min to 65.279min)

Remark: Wait at least 100ms for sending a next command on the velbus.

Transmit 'Remote Analog Sensor readout request' command:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Analog Sensor Address
RTR = 0
DLC3...DLC0 = 3 data bytes to send
DATABYTE1 = COMMAND_SENSOR_TEMP_REQUEST (0xE5)
DATABYTE2 = VMB4AN remote analog sensor channel
(9 = analog sensor 1)
(10 = analog sensor 2)
(11 = analog sensor 3)
(12 = analog sensor 4)
VMBMETEO sensor channel
(2 = rain sensor 1)
(4 = light sensor 2)
(8 = wind sensor 3)
DATABYTE3 = Auto send time interval into seconds
(valid range: 10…255s)
(5…9 = auto send on temperature change)
(1…4 = auto send disabled)
(0 = no change on auto send interval)

'Linked push button status' received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address of the linked push button module
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_PUSH_BUTTON_STATUS (0x00)
DATABYTE2 = Linked push buttons just pressed (1 = just pressed)
DATABYTE3 = Linked push buttons just released (1 = just released)
DATABYTE4 = linked push buttons long pressed (1 = longer than 0.85s pressed)

'Power up message' received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_POWER_UP (0xAB)
DATABYTE2 = module address

'CAN FD enable command' received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 2 data byte received
DATABYTE1 = COMMAND_SET_CLR_LEARN_RF_CODE (0xB5)
DATABYTE2 = enable/disable (0 = disable CAN FD / 1 = enable CAN FD)

'Real time clock status request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 1 data byte received
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS_REQUEST (0xD7)

'Local real time clock status request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 data byte to send
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS_REQUEST (0xD7)

'Set real time clock' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_SET_REALTIME_CLOCK (0xD8)
DATABYTE2 = Day of week

Contents day of week'	***Description***
H'00'	Monday
H'01'	Tuesday
H'02'	Wednesday
H'03'	Thursday
H'04'	Friday
H'05'	Saterday
H'06'	Sunday

DATABYTE3 = Hours (0…23)
DATABYTE4 = Minutes (0…59)

'Set date' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_SET_REALTIME_DATE (0xB7)
DATABYTE2 = Day (1…31)
DATABYTE3 = Month (1…12)
DATABYTE4 = High byte of Year
DATABYTE5 = Low byte of Year

'Set daylight savings' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SET_DAYLIGHT_SAVING (0xAF)
DATABYTE2 = 0 =disabled / 1 = enabled

'Enable/disable global sunrise/sunset related actions' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_ENA_DIS_SUNRISE_SUNSET (0xAE)
DATABYTE2 = Channel (0xFF)
DATABYTE3 = enable/disable flags

Contents	***Description***
B'xxxxxxx0'	Disable sunrise related actions
B'xxxxxxx1'	Enable sunrise related actions
B'xxxxxx0x'	Disable sunset related actions
B'xxxxxx1x'	Enable sunset related actions

'Enable/disable local sunrise/sunset related actions' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_ENA_DIS_SUNRISE_SUNSET (0xAE)
DATABYTE2 = Channel (0xFF)
DATABYTE3 = enable/disable flags

Contents	***Description***
B'xxxxxxx0'	Disable sunrise related actions
B'xxxxxxx1'	Enable sunrise related actions
B'xxxxxx0x'	Disable sunset related actions
B'xxxxxx1x'	Enable sunset related actions

'Set global clock alarm' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_SET_ALARM_CLOCK (0xC3)
DATABYTE2 = Alarm number (1 or 2)
DATABYTE3 = Wake up hour (0…23)
DATABYTE4 = Wake up minute (0…59)
DATABYTE5 = Go to bed hour (0…23)
DATABYTE6 = Go to bed minute (0…59)
DATABYTE7 = Clock alarm enable flag (0 = disabled / 1 = enabled)

'Set local clock alarm' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_SET_ALARM_CLOCK (0xC3)
DATABYTE2 = Alarm number (1 or 2)
DATABYTE3 = Wake up hour (0…23)
DATABYTE4 = Wake up minute (0…59)
DATABYTE5 = Go to bed hour (0…23)
DATABYTE6 = Go to bed minute (0…59)
DATABYTE7 = Clock alarm enable flag (0 = disabled / 1 = enabled)

'Module type request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 1
DLC3...DLC0 = 0 data bytes received

'Module status request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_MODULE_STATUS_REQUEST (0xFA)
DATABYTE2 = don't care

'Channel name request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CHANNEL_NAME_REQUEST (0xEF)
DATABYTE2 = channel number 1…33 or 42 (channel 33 = temperature sensor name, 42 for output name)

Remark: channel = 0xFF for all 32 channel names, temperature sensor name & output channel name

'Set or Clear test mode' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SET_CLR_LEARN_MODE (H'B5')
DATABYTE2 = Operating mode

Contents	***Operating mode***
0x00	Normal
0x01	Touch test mode
0x02	Not valid
0x03	Oled test mode

Remark:
After changing the operating mode, the module sends his status.
There is a timeout of 30 minutes for the test mode.

'Clear channel LED' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Linked module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CLEAR_LED (0xF5)
DATABYTE2 = LEDs to clear (a one clears the corresponding LED of channel 1 to 8)

'Clear channel LED' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CLEAR_LED (0xF5)
DATABYTE2 = LEDs to clear (a one clears the corresponding LED of the channel)

'Set channel LED' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SET_LED (0xF6)
DATABYTE2 = LEDs to set (a one sets the corresponding LED of the channel)

'Slow blink channel LED' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SLOW_BLINK_LED (0xF7)
DATABYTE2 = LEDs to blink slow (a one blinks slow the corresponding LED of the channel)

'Fast blink channel LED' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_FAST_BLINK_LED (0xF8)
DATABYTE2 = LEDs to blink fast (a one blinks fast the corresponding LED of the channel)

'Very fast blink channel LED' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_VERY_FAST_BLINK_LED (0xF9)
DATABYTE2 = LEDs to blink very fast (a one blinks very fast the corresponding LED of the channel)

'Update channel LEDs' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_UPDATE_LED_STATUS (0xF4)
DATABYTE2 = LEDs to set (a one sets the corresponding LED of the channel)
DATABYTE3 = LEDs to blink slow (a one blinks slow the corresponding LED of the channel)
DATABYTE4 = LEDs to blink fast (a one blinks very fast the corresponding LED of the channel)

Remark:
The 'LEDs to set' status overrides the blinking modes.
Very fast blinking if slow & fast blinking are set.

'Read data from memory' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_READ_DATA_FROM_MEMORY (0xFD)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address

Remark: address range: 0x0000 to 0x4FFF

'Read data block from memory' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received / 4 data bytes for CAN FD response
DATABYTE1 = COMMAND_READ_MEMORY_BLOCK (0xC9)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory block length (5…60)

Remark:
address range: 0x0000 to 0x4FFC
address range: 0x0000 to (0x5000 – memory block length) for CAN FD response

'Memory dump request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 data bytes received
DATABYTE1 = COMMAND_MEMORY_DUMP_REQUEST (0xCB)

'Write data to memory' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_WRITE_DATA_TO_MEMORY (0xFC)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory data to write

Remark:
Wait for 'data memory byte' feedback before sending a next command on the velbus.
Address range: 0x0000 to 0x4FFF
Terminate always with a write command at the last memory location .

'Write memory block' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_WRITE_MEMORY_BLOCK (0xCA)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory data byte1 to write
DATABYTE5 = memory data byte2 to write
DATABYTE6 = memory data byte3 to write
DATABYTE7 = memory data byte4 to write

Or

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the module
RTR = 0
DLC3...DLC0 = number of data bytes to send

Contents	*Number of data bytes*
0x09	12 data bytes
0x0A	16 data bytes
0x0B	20 data bytes
0x0C	24 data bytes
0x0D	32 data bytes
0x0E	48 data bytes
0x0F	64 data bytes

DATABYTE1 = COMMAND_WRITE_MEMORY_BLOCK (0xCA)
DATABYTE2 = High memory address

DATABYTE3 = LOW memory address
DATABYTE4 = memory block length (5…60)
DATABYTE5 = memory data 1 to write
…
DATABYTE12 = memory data 8 to write (end of data for DLC3...DLC0 = 0x09)
…
DATABYTE16 = memory data 12 to write (end of data for DLC3...DLC0 = 0x0A)
…
DATABYTE20 = memory data 16 to write (end of data for DLC3...DLC0 = 0x0B)
…
DATABYTE24 = memory data 20 to write (end of data for DLC3...DLC0 = 0x0C)
…
DATABYTE32 = memory data 28 to write (end of data for DLC3...DLC0 = 0x0D)
…
DATABYTE48 = memory data 44 to write (end of data for DLC3...DLC0 = 0x0E)
…
DATABYTE64 = memory data 60 to write (end of data for DLC3...DLC0 = 0x0F)

Remark:
Wait for 'memory data block' feedback before sending a next command on the velbus.
address range: 0x0000 to 0x4FFC for standard CAN response
address range: 0x0000 to (0x5000 – memory block length) for CAN FD response
Contents of unused data bytes = 0x55
Terminate always with a write command at the last memory location.

'Bus error counter status request' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 data bytes received
DATABYTE1 = COMMAND_BUS_ERROR_COUNTER_STATUS_REQUEST (0xD9)

'Unlock channel' command received:
SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CANCEL_FORCED_OFF (0x13)
DATABYTE2 = Channel number 1…32, 33 or 42 (33 for temperature sensor, 42 for open collector output

Remark: channel number = 0xFF for all channels

'Lock channel' command received:
SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_FORCED_OFF (0x12)
DATABYTE2 = Channel number 1…32, 33 or 42 (33 for temperature sensor, 42 for open collector output)
DATABYTE3 = high byte of delay time
DATABYTE4 = mid byte of delay time
DATABYTE5 = low byte of delay time

Remark:
Channel number = 0xFF for all channels
[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
The command will be skipped when the time parameter contains zero.
When the time parameter contains 0xFFFFFF then the channel will be permanently locked.

'Enable Channel Program' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_ENABLE_PROGRAM (0xB2)
DATABYTE2 = Channel number 1…32, 33 or 42 (33 for temperature sensor, 42 for open collector output)

Remark: channel number = 0xFF for all channels

'Disable Channel Program' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_DISABLE_PROGRAM (0xB1)
DATABYTE2 = Channel number 1…32, 33 or 42 (33 for temperature sensor, 42 for open collector output)
DATABYTE3 = high byte of delay time
DATABYTE4 = mid byte of delay time
DATABYTE5 = low byte of delay time

Remark:
Channel number = 0xFF for all channels
[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
The command will be skipped when the time parameter contains zero.
When the time parameter contains 0xFFFFFF then the channel program will be permanently disabled.

'Select Program' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SELECT_PROGRAM (0xB3)
DATABYTE2 = Program mode

Contents	*Selected program*
0	None
1	Group 1 (Summer)
2	Group 2 (Winter)
3	Group 3 (Holiday)

'Sensor temperature request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SENSOR_TEMP_REQUEST (0xE5)
DATABYTE2 = Auto send time interval into seconds
(valid range: 10…255s)
(5…9 = auto send on temperature change >= 0.5°)
(1…4 = auto send disabled)
(0 = no change on auto send interval)

'Sensor settings request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_REQUEST (0xE7)
DATABYTE2 = don't care

'Set heating mode' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SET_HEATING_MODE (0xE0)
DATABYTE2 = don't care

'Set cooling mode' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SET_COOLING_MODE (0xDF)
DATABYTE2 = don't care

'Set sensor zone number' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SET_SENSOR_ZONE_NUMBER (0xC5)
DATABYTE2 = Zone number (0= no zone / 1…7 = valid zone)

'Set default sleep time' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_SET_DEFAULT_SLEEP_TIME (H'E3')
DATABYTE2 = High byte of the default sleep time
DATABYTE3 = Low byte of the default sleep time into minutes
(valid range H'0001' to H'FEFF' or 1min to 65.279min)

Remark: Wait at least 20ms for sending a next command on the velbus

'Set temperature' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_SET_TEMP (0xE4)
DATABYTE2 = Pointer to temperature variable (0…20)

Contents	Temperature variable
0	Target temperature set
1	Comfort temperature set for heating
2	Day temperature set for heating
3	Night temperature set for heating
4	Safe temperature set for heating
5	Temperature difference for turbo output
6	Hysteresis (0°…15.5°C)
7	Comfort temperature set for cooling
8	Day temperature set for cooling
9	Night temperature set for cooling
10	Safe temperature set for cooling
11	Calibration offset factor (-8°…+7.5°C)
12	Reset minimum/maximum temperature
14	enable/disable anti-block valve/pump
15	Temperature alarm 1 set
16	Temperature alarm 4 set
17	Lower temperature range cool mode
18	Upper temperature range heat mode
21	Minimum switching time
22	Pump delayed on time

23	Pump delayed off time
24	Temperature alarm 2 set
25	Temperature alarm 3 set
26	Lower temperature range heat mode
27	Upper temperature range cool mode
28	Calibration gain factor

DATABYTE3 = Temperature set (resolution 0.5°)

Contents	Temperature set
01111111	63.5°C
00101000	20°C
00000010	1°C
00000001	0.5°C
00000000	0°C
11111111	-0.5°C
10010010	-55°C

DATABYTE3 = Reset minimum/maximum temperature

Contents	Reset temperature
xxxxxxx1	Reset minimum temperature
xxxxxx1x	Reset maximum temperature

DATABYTE3 = Enable/disable unjamming heater valve & pump

Contents	Enable/disable unjamming valve and pump
xxxxxx00	Disable unjamming heater valve & pump
xxxxxx01	Disable unjamming heater valve & enable unjamming pump
xxxxxx10	Enable unjamming heater valve & disable unjamming pump
xxxxxx11	Enable unjamming heater valve & pump

DATABYTE3 = Minimum switching time:

Contents	Operating mode
00000000	No switching time protection
00000001	1 minute switching time protection
00000010	2 minute switching time protection
…	…
11111110	254 minute switching time protection
11111111	Default 1 minute switching time protection

Remark:
Valid hysteresis range = 0 …15.5°C
Valid calibration factor range = -8 …7.5°C
Wait at least 10ms for sending a next command on the velbus.

'Switch to comfort mode' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_SWITCH_TO_COMFORT_MODE (0xDB)
DATABYTE2 = High byte of the sleep time
DATABYTE3 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains 0xFF00, the command is a program step.
A sleep time between 0x0001 and 0xFEFF (1 to 65.279min) starts the sleep timer for that time and program steps will not be executed during that time.
A sleep time of 0xFFFF puts the sensor into manual mode. Program steps will not be executed anymore and local control is disabled.
A value of zero for the sleep time cancels the manual mode or sleep timer.

'Switch to day mode' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_SWITCH_TO_DAY_MODE (0xDC)
DATABYTE2 = High byte of the sleep time
DATABYTE3 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains 0xFF00, the command is a program step.
A sleep time between 0x0001 and 0xFEFF (1 to 65.279min) starts the sleep timer for that time and program steps will not be executed during that time.
A sleep time of 0xFFFF puts the sensor into manual mode. Program steps will not be executed anymore and local control is disabled.
A value of zero for the sleep time cancels the manual mode or sleep timer.

'Switch to night mode' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_SWITCH_TO_NIGHT_MODE (0xDD)
DATABYTE2 = High byte of the sleep time
DATABYTE3 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains 0xFF00, the command is a program step.
A sleep time between 0x0001 and 0xFEFF (1 to 65.279min) starts the sleep timer for that time and program steps will not be executed during that time.
A sleep time of 0xFFFF puts the sensor into manual mode. Program steps will not be executed anymore and local control is disabled.
A value of zero for the sleep time cancels the manual mode or sleep timer.

'Switch to safe temperature mode' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_SWITCH_TO_SAFE_MODE (0xDE)
DATABYTE7 = High byte of the sleep time
DATABYTE8 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains 0xFF00, the command is a program step.
A sleep time between 0x0001 and 0xFEFF (1 to 65.279min) starts the sleep timer for that time and program steps will not be executed during that time.
A sleep time of 0xFFFF puts the sensor into manual mode. Program steps will not be executed anymore and local control is disabled.
A value of zero for the sleep time cancels the manual mode or sleep timer.

'Switch open collector output off' command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SWITCH_RELAY_OFF (0x01)
DATABYTE2 = channel bit = don't care

'Switch open collector output on' command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SWITCH_RELAY_ON (0x02)
DATABYTE2 = channel bit = don't care

'Start open collector timer' command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_START_RELAY_TIMER (0x03)
DATABYTE2 = channel bit = don't care
DATABYTE3 = high byte of delay time
DATABYTE4 = mid byte of delay time
DATABYTE5 = low byte of delay time

Remark:
[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
The command will be skipped when the time parameter contains zero.
When the time parameter contains 0xFFFFFF then the open collector output are permanently switched on.

'Set Custom Color' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 6 data bytes received
DATABYTE1 = COMMAND_SET_PB_BACKLIGHT (0xD4)
DATABYTE2 = custom palette index (0…31)
DATABYTE3 = white/saturation

Contents	***Description***
0xxxxxxx	RGB-color
1xxxxxxx	White (r=g=b)
x0000000	Minimum saturation
...	…
x1111111	Maximum saturation

DATABYTE4 = red value (0…255)
DATABYTE5 = green value (0…255)
DATABYTE6 = blue value (0…255)

'Set Edge Color' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_SET_PB_BACKLIGHT (0xD4)
DATABYTE2 = background/feedback color

Contents	***Description***
xxxxxxx0	do not apply to background color
xxxxxxx1	apply to background color
xxxxxx0x	do not apply to continuous feedback color
xxxxxx1x	apply to continuous feedback color
xxxxx0xx	do not apply to slow blinking feedback color
xxxxx1xx	apply to slow blinking feedback color
xxxx0xxx	do not apply to fast blinking feedback color
xxxx1xxx	apply to fast blinking feedback color
0xxxxxxx	Default color palette
1xxxxxxx	Custom color palette

DATABYTE3 = Page/edge

Contents	***Description***

xxxxxxx0	do not apply to left edge
xxxxxxx1	apply to left edge
xxxxxx0x	do not apply to top edge
xxxxxx1x	apply to top edge
xxxxx0xx	do not apply to right edge
xxxxx1xx	apply to right edge
xxxx0xxx	do not apply to bottom edge
xxxx1xxx	apply to bottom edge
0000xxxx	apply to button page 1 (only for feedback light)
0001xxxx	apply to button page 2 (only for feedback light)
0010xxxx	apply to button page 3 (only for feedback light)
0011xxxx	apply to button page 4 (only for feedback light)
0100xxxx	apply to button page 5 (only for feedback light)
0101xxxx	apply to button page 6 (only for feedback light)
0110xxxx	apply to button page 7 (only for feedback light)
0111xxxx	apply to button page 8 (only for feedback light)
1000xxxx	Apply to all button pages (only for feedback light)
...	…
1111xxxx	Apply to all button pages (only for feedback light)

DATABYTE4 = blink/priority/color palette index

Contents	***Description***
0xxxxxxx	Background not blinking/Feedback blinking disabled
1xxxxxxx	Background blinking/Feedback blinking enabled
x00xxxxx	Default color palette & feedback blinking mode
x01xxxxx	Custom color with lowest priority
x10xxxxx	Custom color with mid priority
x11xxxxx	Custom color with highest priority
xxx00000	Color palette index 0
xxx00001	Color palette index 1
…	…1
xxx11111	Color palette index 31

'Read program step' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_READ_PROGRAM_STEP (0xC0)
DATABYTE2 = Start program step number (1…170)
DATABYTE3 = Program group number (1…3)
DATABYTE4 = Channel number1…32,33 or 42 (33 for temperature sensor name, 42 for open collector output)
DATABYTE5 = Search direction (1 = search for next matched step / 0 = search for previous matched program step)

'Write program step' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes received
DATABYTE1 = COMMAND_WRITE_PROGRAM_STEP (0xC2)
DATABYTE2 = Program step number (1…170)
DATABYTE3 = Program reference

Contents	***Description***
000xxxxx	Disable program step
001xxxxx	Absolute time
010xxxxx	Wake up time 1 + relative time
011xxxxx	Go to bed time 1 + relative time
100xxxxx	Wake up time 2 + relative time
101xxxxx	Go to bed time 2 + relative time
110xxxxx	Sunrise + relative time
111xxxxx	Sunset + relative time
xxx01111	Rel. time = 3h45min

…	
xxx00001	Rel. time = 15min
xxx00000	Rel. time = 0
xxx11111	Rel. time = -15min
…	
xxx10000	Rel. time = -4h

DATABYTE4 = Program step month & four least significant bits of day

Contents	***Description***
xxxx0000	Weekly program
xxxx0001	January
xxxx0010	February
xxxx0011	March
xxxx0100	April
xxxx0101	May
xxxx0110	June
xxxx0111	July
xxxx1000	August
xxxx1001	September
xxxx1010	October
xxxx1011	November
xxxx1100	December
xxxx1101	Monthly program
xxxx1110	Monthly program
xxxx1111	Monthly program

Contents byte6	***Contents byte4***	***Description***
00xxxxxx	0000xxxx	Never
00xxxxxx	0001xxxx	Day 1of the month
00xxxxxx	0010xxxx	Day 2of the month
…	...	…
01xxxxxx	1111xxxx	Day 31of the month
10xxxxxx	0000xxxx	Never
10xxxxxx	0001xxxx	Every Monday
10xxxxxx	0010xxxx	Every Tuesday
...	…	…
10xxxxxx	0111xxxx	Every Sunday
10xxxxxx	1000xxxx	Every weekend (sa & su)
10xxxxxx	1001xxxx	Every working day (mo…fr)
10xxxxxx	1010xxxx	Every day except Sunday
10xxxxxx	1011xxxx	Every day
10xxxxxx	1100xxxx	Never
…	…	…
11xxxxxx	1111xxxx	Never

DATABYTE5 = Program step hour & group number

Contents	***Description***
xxx00000	0h
xxx00001	1h
…	…
xxx10111	23h
xx1xxxxx	Program group 1 (Summer program)
x1xxxxxx	Program group 2 (Winter program)
1xxxxxxx	Program group 3 (Holiday program)

DATABYTE6 = Program step minute & msb of day & every flag

Contents	***Description***
xx000000	0min
xx000001	1min
…	…
xx111011	59min

Contents byte6	*Contents byte4*	*Description*
00xxxxxx	0000xxxx	Never
00xxxxxx	0001xxxx	Day 1of the month
00xxxxxx	0010xxxx	Day 2of the month
…	...	…
01xxxxxx	1111xxxx	Day 31of the month
10xxxxxx	0000xxxx	Never
10xxxxxx	0001xxxx	Every Monday
10xxxxxx	0010xxxx	Every Tuesday
...	…	…
10xxxxxx	0111xxxx	Every Sunday
10xxxxxx	1000xxxx	Every weekend (sa & su)
10xxxxxx	1001xxxx	Every working day (mo…fr)
10xxxxxx	1010xxxx	Every day except Sunday
10xxxxxx	1011xxxx	Every day
10xxxxxx	1100xxxx	Never
…	…	…
11xxxxxx	1111xxxx	Never

DATABYTE7 = Program step action

Contents	**Action**
0	0s25 Pulse
1	1s Pulse
2	2s Pulse
...	...
119	1min59s Pulse
120	2min Pulse
121	2min15s Pulse
...	...
131	4min45s Pulse
132	5min Pulse
133	5min30s Pulse
...	...
181	29min30s Pulse
182	30min Pulse
183	31min Pulse
...	...
211	59min Pulse
212	1h Pulse
213	1h15min Pulse
...	...
227	4h45min Pulse
228	5h Pulse
229	5h30min Pulse
...	...
237	9h30min Pulse
238	10h Pulse
239	11h Pulse
...	…
246	18h Pulse
247	Press
248	Long Press
249	Release
250	Lock
251	Unlock
252	Thermostat safe mode
253	Thermostat night mode
254	Thermostat day mode
255	Thermostat comfort mode

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
2	Channel 2
...	…
7	Channel 7
8	Channel 8
9	Temperature sensor
18	Open collector output

Remark:
Erase program step if channel parameter is equal with zero.

'Counter status' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Counter Module address
RTR = 0
DLC3...DLC0 = 8 data bytes received
DATABYTE1 = COMMAND_ENERGY_COUNTER_STATUS (0xBE)
DATABYTE2 = counter channel 1 to 4 & number of pulses/Unit (kWh-l-m^3) divide by 100

Contents	***Description***
B'xxxxxx00'	Channel 1
B'xxxxxx01'	Channel 2
B'xxxxxx10'	Channel 3
B'xxxxxx11'	Channel 4
B'000001xx'	100 pulses/Unit
B'000010xx'	200 pulses/Unit
…	…
B'001000xx'	800 pulses/Unit
…	…
B'001010xx'	1000 pulses/Unit
…	…
B'010100xx'	2000 pulses/Unit
…	…
B'111111xx'	6300 pulses/Unit

DATABYTE3 = most significant byte of pulse counter
DATABYTE4 = upper byte of pulse counter
DATABYTE5 = high byte of pulse counter
DATABYTE6 = low byte of pulse counter
DATABYTE7 = high byte of period in ms between 2 pulses
DATABYTE8 = low byte of period in ms between 2 pulses

Remark: a period counter contents of 0xFFFF means overflow
Counter pulses in Units (kWh-l-m^3) = DATABYTE[3…6] / (DATABYTE2[pulses/Unit factor] * Multiplier)
Power in W = 1000 * 1000 * 3600 / (DATABYTE[7..8] * DATABYTE2[pulses/Unit factor] * Multiplier)

'Counter value' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_COUNTER_VALUE (0xA4)
DATABYTE2 = counter channel 1 to 8 & value index

Contents	***Description***
B'0000xxxx'	Counter channel 1
…	
B'0111xxxx'	Counter channel 8
B'xxxxbbbb'	Highest nibble (bits 19…16) of Power

DATABYTE3 = high byte of power
DATABYTE4 = low byte of power
DATABYTE5 = most significant byte of energy counter
DATABYTE6 = upper byte of energy counter
DATABYTE7 = high byte of energy counter
DATABYTE8 = low byte of energy counter

'Counter status request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Counter address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_ENERGY_COUNTER_STATUS_RQ (0xBD)
DATABYTE2 = counter channel 1 to 8

Contents	***Description***
B'xxxxxxx1'	Channel 1
B'xxxxxx1x'	Channel 2
B'xxxxx1xx'	Channel 3
B'xxxx1xxx'	Channel 4
B'xxx1xxxx'	Channel 5
B'xx1xxxxx'	Channel 6
B'x1xxxxxx'	Channel 7
B'1xxxxxxx'	Channel 8

DATABYTE3 = auto send interval
10…255s fixed interval
5…9 = auto send on change with 5s as minimum interval
1…4 = auto send on change disabled
0 = no change on auto send interval

Remark: the auto send interval is common for all channels

'Load counter' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Counter address
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_RESET_COUNTER (0xAD)
DATABYTE2 = counter channel 1 to 8

Contents	*Description*
0	Counter 1
1	Counter 2
2	Counter 3
3	Counter 4
4	Counter 5
5	Counter 6
6	Counter 7
7	Counter 8

DATABYTE3 = don't care
DATABYTE4 = highest byte of 32-bit counter value
DATABYTE5 = third byte of 32-bit counter value
DATABYTE6 = second byte of 32-bit counter value
DATABYTE7 = lowest byte of 32-bit counter value

Remote sensor module status received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master address
RTR = 0
DLC3...DLC0 = 7 data bytes to send or 8 data bytes received
DATABYTE1 = COMMAND_MODULE_STATUS (0xED)
DATABYTE2 = channel 1 to 8 status (1 = pressed / 0 = released)
DATABYTE3 = enabled/disable channel status (1 = enabled / 0 = disabled)
DATABYTE4 = normal or inverted mode for VMBGPx
DATABYTE4 = open collector locked & temperature sensor for VMBELx

Contents	*open collector & temperature sensor*
B'xxx0xxxx'	Temperature sensor program enabled
B'xxx1xxxx'	Temperature sensor program disabled
B'xx0xxxxx'	Open collector output program enabled
B'xx1xxxxx'	Open collector output program disabled
B'x0xxxxxx'	Open collector output unlocked
B'x1xxxxxx'	Open collector output locked
B'0xxxxxxx'	Open collector output off
B'1xxxxxxx'	Open collector output on

DATABYTE5 = locked channel status (0 = unlocked / 1 = locked)
DATABYTE6 = disabled channel program status (0 = program enabled / 1 = program disabled)
DATABYTE7 = alarm & program selection

Contents	*Selected program*
B'xxxxxx00'	None
B'xxxxxx01'	Program group 1 (Summer)
B'xxxxxx10'	Program group 2 (Winter)
B'xxxxxx11'	Program group 3 (Holiday)
B'xxxxx0xx'	Clock alarm 1 off
B'xxxxx1xx'	Clock alarm 1 on
B'xxxx0xxx'	Local clock alarm 1
B'xxxx1xxx'	Global clock alarm 1
B'xxx0xxxx'	Clock alarm 2 off
B'xxx1xxxx'	Clock alarm 2 on
B'xx0xxxxx'	Local clock alarm 2
B'xx1xxxxx'	Global clock alarm 2
B'x0xxxxxx'	Sunrise disabled
B'x1xxxxxx'	Sunrise enabled
B'0xxxxxxx'	Sunset disabled
B'1xxxxxxx'	Sunset enabled

DATABYTE8 = oled display status for VMBELO

Contents	*Display status*
B'xx000000'	Button page 1
…	…
B'xx000111'	Button page 8
B'xx001000'	Counter 1 page
…	…
B'xx001011'	Counter 4 page
B'xx001100'	Local temperature page
B'xx001101'	Remote temperature 1 page
…	…
B'xx011000'	Remote temperature 12 page
B'xx011001'	Analog sensor 1 page
…	…
B'xx011100'	Analog sensor 4 page
B'xx011101'	Clock page
B'xx1xxxxx'	Menu pages
B'x0xxxxxx'	Screensaver off
B'x1xxxxxx'	Screensaver on
B'0xxxxxxx'	Display off
B'1xxxxxxx'	Display on

Remote Sensor status received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master address
RTR = 0
DLC3...DLC0 = 8 data bytes received
DATABYTE1 = COMMAND_TEMP_SENSOR_STATUS (0xEA)
DATABYTE2 = Operating mode

Contents	Operating mode
xxxxxxx1	Mode push button locked
xxxxxxx0	Mode push button unlocked
Xxxxx11x	Disable mode
xxxxx01x	Manual mode
xxxxx10x	Sleep timer mode
xxxxx00x	Run mode
xxxx1xxx	Auto send sensor temperature enabled
xxxx0xxx	Auto send sensor temperature disabled
x100xxxx	Comfort mode
x010xxxx	Day mode
x001xxxx	Night mode
x000xxxx	Safe temp mode (anti frost)
1xxxxxxx	Cooler mode
0xxxxxxx	Heater mode

DATABYTE3 = Program step mode

Contents	Program step mode
xxxxx0xx	No sensor program group 1
xxxxx1xx	Sensor program group 1available
xxxx0xxx	No sensor program group 2
0xxxx1xxx	Sensor program group 2 available
0xxxxxxx	No sensor program group 3
1xxxxxxx	Sensor program group 3 available
x100xxxx	Comfort program step received
x010xxxx	Day program step received
x001xxxx	Night program step received
X000xxxx	Safe temperature program step received
xxxxxx1x	Enable unjamming heater valve
xxxxxx0x	Disable unjamming heater valve
xxxxxxx1	Enable unjamming pump
xxxxxxx0	Disable unjamming pump

DATABYTE4 = Output status (1 = activated)

Contents	Output channel

xxxxxxx0	Heater off
xxxxxxx1	Heater on
xxxxxx0x	Boost heater/cooler off
xxxxxx1x	Boost heater/cooler on
xxxxx0xx	Pump off
xxxxx1xx	Pump on
xxxx0xxx	Cooler off
xxxx1xxx	Cooler on
xxx0xxxx	Temperature alarm 1 off
xxx1xxxx	Temperature alarm 1 on
xx0xxxxx	Temperature alarm 2 off
xx1xxxxxx	Temperature alarm 2 on
x0xxxxxx	Temperature alarm 3 off
x1xxxxxx	Temperature alarm 3 on
0xxxxxxx	Temperature alarm 4 off
1xxxxxxx	Temperature alarm 4 on

DATABYTE5 = Current sensor temperature into two's complement format (resolution 0.5°)

Contents	Current sensor temperature
01111111	63.5°C
00000001	0.5°C
00000000	0°C
11111111	-0.5°C
10010010	-55°C

DATABYTE6 = target temperature set (resolution 0.5°)

Contents	Current temperature set
01101100	54°C
00101000	20°C
00000010	1°C
00000001	0.5°C
00000000	0°C
11111111	-0.5°C
11000000	-32°C

DATABYTE7 = High byte of the sleep timer
DATABYTE8 = Low byte of the sleep timer into minutes

Remark:
[DATABYTE7][DATABYTE8] contains a 16-bit sleep timer into minutes (1 to 65.279min).
If the sleep timer contains 0x0000, the sleep timer is deactivated.
If the sleep timer contains a value between 0x0001 and 0xFEFF (1 to 65.279min), the sleep timer is running for that time.
If the sleep timer contains 0xFFFF, the sensor is in manual mode.

Remote Sensor temperature received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master address
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_SENSOR_TEMPERATURE (0xE6)
DATABYTE2 = High byte current sensor temperature
DATABYTE3 = Low byte current sensor temperature into two's complement format (resolution 0.0625°)
DATABYTE4 = High byte minimum sensor temperature
DATABYTE5 = Low byte minimum sensor temperature into two's complement format (resolution 0.0625°)
DATABYTE6 = High byte maximum sensor temperature
DATABYTE7 = Low byte maximum sensor temperature into two's complement format (resolution 0.0625°)

High byte	Low byte	Current sensor temperature
01111111	111xxxxx	63.5°C
…	…	
00000001	000xxxxx	0.5°C
00000000	100xxxxx	0.25°C

00000000	010xxxxx	0.125°C
00000000	001xxxxx	0.0625°C
00000000	000xxxxx	0°C
11111111	111xxxxx	-0.0625°C
11111111	110xxxxx	-0.125°C
11111111	100xxxxx	-0.25°C
11111110	000xxxxx	-0.5°C
…	…	
10010010	000xxxxx	-55°C

Remark:
The 5 least significant bits are don't care

First part of the remote sensor settings received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master address
RTR = 0
DLC3...DLC0 = 8 data bytes received
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART1 (0xE8)
DATABYTE2 = Current temperature set (resolution 0.5°)
DATABYTE3 = Comfort temperature set for heating mode (resolution 0.5°)
DATABYTE4 = Day temperature set for heating mode (resolution 0.5°)
DATABYTE5 = Night temperature set for heating mode (resolution 0.5°)
DATABYTE6 = Anti frost temperature set for heating mode (resolution 0.5°)
DATABYTE7 = Boost temperature difference set (resolution 0.5°)
DATABYTE8 = Hysteresis temperature set

Contents	Hysteresis
xxx11111	15.5°C
Xxx00001	0.5°C
Xxx00000	0°C

Second part of the remote sensor settings received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master address
RTR = 0
DLC3...DLC0 = 8 data bytes received
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART2 (0xE9)
DATABYTE2 = Comfort temperature set for cooling mode (resolution 0.5°)
DATABYTE3 = Day temperature set for cooling mode (resolution 0.5°)
DATABYTE4 = Night temperature set for cooling mode (resolution 0.5°)
DATABYTE5 = Safe temperature set for cooling mode (resolution 0.5°)
DATABYTE6 = High byte of the default sleep timer
DATABYTE7 = Low byte of the default sleep timer into minutes (1 to 65.279min)
DATABYTE8 = Default auto send temperature time interval into seconds
(Valid range: 10…255s)
(5…9 = auto send on temperature change with min interval 5…9s)
(<4 = auto send disabled)

Third part of the remote sensor settings received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master address
RTR = 0
DLC3...DLC0 = 8 data bytes received
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART3 (0xC6)
DATABYTE2 = Temperature alarm 1 setting (resolution 0.5°)
DATABYTE3 = Temperature alarm 4 setting (resolution 0.5°)
DATABYTE4 = Lower temperature range cool mode (resolution 0.5°)
DATABYTE5 = Upper temperature range heat mode (resolution 0.5°)
DATABYTE6 = Calibration offset factor (resolution 0.5°)

Contents	Calibration factor
00001111	Calibration factor +7.5°C
00000001	Calibration factor +0.5°C

00000000	Calibration factor +0°C
11111111	Calibration factor -0.5°C
11110000	Calibration factor -8°C

DATABYTE7 = Zone number
DATABYTE8 = Calibration gain factor

Fourth part of the remote sensor settings received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Sensor Master address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART4 (0xB9)
DATABYTE2 = Minimum switching time (0…255s)
DATABYTE3 = Pump delayed on time (0…255s)
DATABYTE4 = Pump delayed off time (0…255s)
DATABYTE5 = Temperature alarm 2 setting (resolution 0.5°)
DATABYTE6 = Temperature alarm 3 setting (resolution 0.5°)
DATABYTE7 = Lower temperature range heat mode (resolution 0.5°)
DATABYTE8 = Upper temperature range cool mode (resolution 0.5°)

Readout of the remote analog sensor received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Remote Analog Sensor address
RTR = 0
DLC3...DLC0 = number of data bytes received
DATABYTE1 = COMMAND_TEXT (H'AC')
DATABYTE2 = remote analog sensor channel
DATABYTE3 = text start position
DATABYTE4 = character 1
DATABYTE5 = character 2
DATABYTE6 = character 3
DATABYTE7 = character 4
DATABYTE8 = character 5

Remark:
valid text start position: 0…15
maximum 15 characters are allowed
shorter text stings must be ended with a zero value

Memo text received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = number of data bytes received
DATABYTE1 = COMMAND_TEXT (H'AC')
DATABYTE2 = don't care
DATABYTE3 = text start position
DATABYTE4 = character 1
DATABYTE5 = character 2
DATABYTE6 = character 3
DATABYTE7 = character 4
DATABYTE8 = character 5

Remark:
valid text start position: 0…63
maximum 64 characters are allowed
The last character must be zero

Memory map version 4 (Build 2320 or higher)

Address	*Contents*	*Address*	*Contents*
0x0000	Touch init: main control	0x0001	Touch init: sensistivity
0x0002	Touch init: config 1	0x0003	Touch init: sensor enable
0x0004	Touch init: sensor config 1	0x0005	Touch init: sensor config 2
0x0006	Touch init: average sampling	0x0007	Touch init: interrupt enable
0x0008	Touch init: repeat enable	0x0009	Touch init: mtp config
0x000A	Touch init: mtp pattern config	0x000B	Touch init: mtp pattern
0x000C	Touch init: recal config	0x000D	Touch init: sensor 1 threshold
0x000E	Touch init: sensor 2 threshold	0x000F	Touch init: sensor 3 threshold
0x0010	Touch init: sensor 4 threshold	0x0011	Touch init: sensor 5 threshold
0x0012	Touch init: sensor 6 threshold	0x0013	Touch init: sensor 7 threshold
0x0014	Touch init: sensor 8 threshold	0x0015	Touch init: noise threshold
0x0016	Touch init: standby channel	0x0017	Touch init: standby config
0x0018	Touch init: standby sensitivity	0x0019	Touch init: standby threshold
0x001A	Touch init: config 2	0x001B	Touch init: not used
0x001C	Channel 1 name character 1	0x001D	Channel 1 name character 2
...	...	...	...
0x002A	Channel 1 name character 15	0x002B	Channel 1 name character 16
0x002C	Channel 1 reaction time	0x002D	Channel 1 start function
0x002E	Channel 1 end function	0x002F	Channel 1 mode
0x0030	Channel 2 name character 1	0x0031	Channel 2 name character 2
...	...	...	...
0x003E	Channel 2 name character 15	0x003F	Channel 2 name character 16
0x0040	Channel 2 reaction time	0x0041	Channel 2 start function
0x0042	Channel 2 end function	0x0043	Channel 2 mode
...	...	...	...
0x00A8	Channel 32 name character 1	0x00A9	Channel 32 name character 2
...	...	...	...
0x0296	Channel 32 name character 15	0x0297	Channel 32 name character 16
0x0298	Channel 32 reaction time	0x0299	Channel 32 start function
0x029A	Channel 32 end function	0x029B	Channel 32 mode
0x029C	Not used	0x029D	Not used
0x029E	Not used	0x029F	Not used
0x02A0	Long pressed delay	0x02A1	Dual function long pressed time
0x02A2	Key beep, edge-lit screensaver, memo text, navigation & wake-up direct action	0x02A3	Memo display pages
0x02A4	screensaver page	0x02A5	Screensaver activation time
0x02A6	screensaver animation	0x02A7	Startup page
0x02A8	Oled intensity	*0x02A9*	*Feedback led brightness for GPx series*
0x02AA	Language	0x02AB	Ambient edge-lit during screensaver
0x02AC	Not used	0x02AD	Not used
0x02AE	Not used	0x02AF	Not used
0x02B0	Display pages 0…7	0x02B1	Display pages 8…15
0x02B2	Display pages 16…23	0x02B3	Display pages 24…31
0x02B4	Display pages 32, 33 & menu	0x02B5	Not used
0x02B6	Not used	0x02B7	Not used
0x02B8	Color time (into seconds) byte 0	0x02B9	Color time byte 1
0x02BA	Color time low byte 2	0c02BB	Color time byte 3
0x02BC	Color palette color 0: saturation (0…127) - white (on/off)	0x02BD	Color palette color 0: red-value (0…255)
0x02BE	Color palette color 0: green-value (0…255)	0x02BF	Color palette color 0: blue-value (0…255)
0x02C0	Color palette 0 name character 1	0x02C1	Color palette 0 name character 2
...	…	…	…
0x02CE	Color palette 0 name character 15	0x02CF	Color palette 0 name character 16
...	...	…	…
0x0528	Color palette color 31: saturation (0…127) - white (on/off)	0x0529	Color palette color 31: red-value (0…255)
0x052A	Color palette color 31: green-value (0…255)	0x052B	Color palette color 31: blue-value (0…255)
0x052C	Color palette 31 name character 1	0x0529	Color palette 31 name character 2
...	…	…	…
0x053A	Color palette 31 name character 15	0x053B	Color palette 31 name character 16
0x053C	Left edge backlight color (palette 0…31)	0x053D	Top edge backlight color (palette 0…31)
0x053E	Right edge backlight color (palette 0…31)	0x053F	Bottom edge backlight color (palette 0…31)
0x0540	Left edge page 1 continuous feedback color (palette 0…31)	0x0541	Top edge page 1 cont. feedback color (palette 0…31)

0x0542	Right edge page 1 cont. feedback color (palette 0…31)	0x0543	Bottom edge p1 cont. feedback color (palette 0…31)
...	...	…	…
0x055C	Left edge page 8 continuous feedback color (palette 0…31)	0x055D	Top edge page 8 cont. feedback color (palette 0…31)
0x055E	Right edge page 8 cont. feedback color (palette 0…31)	0x055F	Bottom edge p8 cont. feedback color (palette 0…31)
0x0560	Left edge page 1 slow blink feedback color (palette 0…31)	0x0561	Top edge p1slow blink feedback color (palette 0…31)
0x0562	Right edge p1 slow blink feedback color (palette 0…31)	0x0563	Bottom edge p1 slow blinking feedback color (0…31)
...	...	…	…
0x057C	Left edge page 8 slow blink feedback color (palette 0…31)	0x057D	Top edge p8slow blink feedback color (palette 0…31)
0x057E	Right edge p8 slow blink feedback color (palette 0…31)	0x057F	Bottom edge p8 slow blinking feedback color (0…31)
0x0580	Left edge page 1 fast blink feedback color (palette 0…31)	0x0581	Top edge p1 fast blink feedback color (palette 0…31)
0x0582	Right edge page 1 fast blink feedback color (palette 0…31)	0x0583	Bottom edge p1 fast blink feedback color (0…31)
...	...	…	…
0x059C	Left edge page 8 fast blink feedback color (palette 0…31)	0x059D	Top edge p8 fast blink feedback color (palette 0…31)
0x059F	Right edge page 8 fast blink feedback color (palette 0…31)	0x059F	Bottom edge p8 fast blink feedback color (0…31)
0x05A0	Not used	0x05A1	Not used
0x05A2	Not used	0x05A3	Alarm clock configuration
0x05A4	Wake up 1 hour (0…23)	0x05A5	Wake up 1 minutes (0…59)
0x05A6	Go to bed 1 hour (0…23)	0x05A7	Go to bed 1 minutes (0…59)
0x05A8	Wake up 2 hour (0…23)	0x05A9	Wake up 2 minutes (0…59)
0x05AA	Go to bed 2 hour (0…23)	0x05AB	Go to bed 2 minutes (0…59)
0x05AC	Sunrise hour at 21 December (0…23)	0x05AD	Sunrise minutes at 21 December (0…59)
0x05AE	Sunrise 21 January – sunrise 5 January (-128'..127')	0x05AF	Sunrise 5 February – sunrise 21 January (-128'..127')
0x05B0	Sunrise 21 February – sunrise 5 February (-128'..127')	0x05B1	Sunrise 5 March – sunrise 21 February (-128'..127')
0x05B2	Sunrise 21 March – sunrise 5 March (-128'..127')	0x05B3	Sunrise 5 April – sunrise 21 March (-128'..127')
0x05B4	Sunrise 21 April – sunrise 5 April (-128'..127')	0x05B5	Sunrise 5 May – sunrise 21 April (-128'..127')
0x05B6	Sunrise 21 May – sunrise 5 May (-128'..127')	0x05B7	Sunrise 5 June – sunrise 21 May (-128'..127')
0x05B8	Sunrise 21 June – sunrise 5 June (-128'..127')	0x05B9	Sunrise 5 July – sunrise 21 June (-128'..127')
0x05BA	Sunrise 21 July – sunrise 5 July (-128'..127')	0x05BB	Sunrise 5 August – sunrise 21 July (-128'..127')
0x05BC	Sunrise 21 August – sunrise 5 August (-128'..127')	0x05BD	Sunrise 5 September – sunrise 21 August (-128'..127')
0x05BE	Sunrise 21 September – sunrise 5 September (-128..127')	0x05BF	Sunrise 5 October – sunrise 21 September (-128'..127')
0x05C0	Sunrise 21 October – sunrise 5 October (-128'..127')	0x05C1	Sunrise 5 November – sunrise 21 October (-128'..127')
0x05C2	Sunrise 21 November – sunrise 5 November (-128'..127')	0x05C3	Sunrise 5 December – sunrise 21 November (-128'..127')
0x05C4	Sunrise 21 December – sunrise 5 December (-128'..127')	0x05C5	Sunrise 5 January – sunrise 21 December (-128'..127')
0x05C6	Not used	0x05C7	Not used
0x05C8	Sunset hour at 21 December (0…23)	0x05C9	Sunset minutes at 21 December (0…59)
0x05CA	Sunset 21 January – sunset 5 January (-128'..127')	0x05CB	Sunset 5 February – sunset 21 January (-128'..127')
0x05CC	Sunset 21 February – sunset 5 February (-128'..127')	0x05CD	Sunset 5 March – sunset 21 February (-128'..127')
0x05CE	Sunset 21 March – sunset 5 March (-128'..127')	0x05CF	Sunset 5 April – sunset 21 March (-128'..127')
0x05D0	Sunset 21 April – sunset 5 April (-128'..127')	0x05D1	Sunset 5 May – sunset 21 April (-128'..127')
0x05D2	Sunset 21 May – sunset 5 May (-128'..127')	0x05D3	Sunset 5 June – sunset 21 May (-128'..127')
0x05D4	Sunset 21 June – sunset 5 June (-128'..127')	0x05D5	Sunset 5 July – sunset 21 June (-128'..127')
0x05D6	Sunset 21 July – sunset 5 July (-128'..127')	0x05D7	Sunset 5 August – sunset 21 July (-128'..127')
0x05D8	Sunset 21 August – sunset 5 August (-128'..127')	0x05D9	Sunset 5 September – sunset 21 August (-128'..127')
0x05DA	Sunset 21 September – sunset 5 September (-128'..127')	0x05DB	Sunset 5 October – sunset 21 September (-128'..127')
0x05DC	Sunset 21 October – sunset 5 October (-128'..127')	0x05DD	Sunset 5 November – sunset 21 October (-128'..127')
0x05DE	Sunset 21 November – sunset 5 November (-128'..127')	0x05DF	Sunset 5 December – sunset 21 November (-128'..127')
0x05E0	Sunset 21 December – sunset 5 December (-128'..127')	0x05E1	Sunset 5 January – sunset 21 December (-128'..127')
0x05E2	Not used	0x05E3	Not used
0x05E4	Sensor name character 1	0x05E5	Sensor name character 2
...	...	...	...
0x05F2	Sensor name character 15	0x05F3	Sensor name character 16
0x05F4	Temp. sensor: zone	0x05F5	Temp. sensor: calibration offset
0x05F6	Temp. sensor: calibration gain	0x05F7	Temp. sensor: hysteresis
0x05F8	Temp. sensor: boost difference	0x05F9	Temp. sensor: Pump delayed on
0x05FA	Temp. sensor: pump delayed off	0x05FB	Temp. sensor: min switching time
0x05FC	Temp. sensor: default sleep time byte 0 (low)	0x05FD	Temp. sensor: default sleep time byte 1 (high)
0x05FE	Temp. sensor: default sleep time byte 2	0x05FF	Temp. sensor: default sleep time byte 3 (msb)
0x0600	Temp. sensor: heater lower temperature range low byte	0x0601	Temp. sensor: heater lower temperature range high byte
0x0602	Temp. sensor: heater upper temperature range low byte	0x0603	Temp. sensor: heater lower temperature range high byte
0x0604	Temp. sensor: heater safe temperature set	0x0605	Temp. sensor: heater night temperature set
0x0606	Temp. sensor: heater day temperature set	0x0607	Temp. sensor: heater comfort temperature set
0x0608	Temp. sensor: cooler lower temperature range low byte	0x0609	Temp. sensor: cooler upper temperature range high byte
0x060A	Temp. sensor: cooler upper temperature range low byte	0x060B	Temp. sensor: cooler upper temperature range high byte
0x060C	Temp. sensor: cooler safe temperature set	0x060D	Temp. sensor: cooler night temperature set
0x060E	Temp. sensor: cooler day temperature set	0x060F	Temp. sensor: cooler comfort temperature set
0x0610	Temp. sensor: alarm 1 temperature set	0x0611	Temp. sensor: alarm 2 temperature set
0x0612	Temp. sensor: alarm 3 temperature set	0x0613	Temp. sensor: alarm 4 temperature set

0x0614	Temp. sensor settings	0x0615	Temp. sensor alarm 1 & 2 settings
0x0616	Temp. sensor alarm 3 & 4 settings	0x0617	Not used
0x0618	Open collector output name character 1	0x0619	Open collector output name character 2
...	...	...	...
0x0626	Open collector output name character 15	0x0627	Open collector output name character 16
0x0628	Counter 1 Address	0x0629	Counter 1 channel
0x062A	Counter 1 multiply factor	0x062B	Counter 1 units
0x062C	Counter 1 name character 1	0x062D	Counter 1 name character 2
...	...	...	...
0x063A	Counter 1 name character 15	0x063B	Counter 1 name character 16
...	...	…	…
0x06B4	Counter 8 Address	0x06B5	Counter 8 channel
0x06B6	Counter 8 multiply factor	0x06B7	Counter 8 units
0x06B8	Counter 8 name character 1	0x06B9	Counter 8 name character 2
...	...	...	...
0x06C6	Counter 8 name character 15	0x06C7	Counter 8 name character 16
0x06C8	Remote Temperature sensor 1 master address	0x06C9	Remote Temperature sensor 1 sub address
0x06CA	Reserved	0x06CB	Reserved
0x06CC	Remote Temperature sensor 1 name character 1	0x06CD	Remote Temperature sensor 1 name character 2
B2	...	...	...
0x06DA	Remote Temperature sensor 1 name character 15	0x06DB	Remote Temperature sensor 1 name character 16
...	...		…
0x07A4	Remote Temperature sensor 12 master address	0x07A5	Remote Temperature sensor 12 sub address
0x07A6	Reserved	0x07A7	Reserved
0x07A8	Remote Temperature sensor 12 name character 1	0x07A9	Remote Temperature sensor 12 name character 2
...	...	...	...
0x07B6	Remote Temperature sensor 12 name character 15	0x07B7	Remote Temperature sensor 12 name character 16
0x07B8	Remote Analog sensor 1 address	0x07B9	Remote Analog sensor 1 channel
0x07BA	Reserved	0x07BB	Reserved
0x07BC	Remote Analog sensor 1 name character 1	0x07BD	Remote Analog sensor 1 name character 2
...	...	...	...
0x07CA	Remote Analog sensor 1 name character 15	0x07CB	Remote Analog sensor 1 name character 16
...	...		…
0x07F4	Remote Analog sensor 4 address	0x07F5	Remote Analog sensor 4 channel
0x07F6	Reserved	0x07F7	Reserved
0x07F8	Remote Analog sensor 4 name character 1	0x07F9	Remote Analog sensor 4 name character 2
...	...	...	...
0x0806	Remote Analog sensor 4 name character 15	0x0807	Remote Analog sensor 4 name character 16

Remark:
Unused locations contain H'FF'

Valid reaction times

Contents	*Reaction time*
0x01	immediatly (default)
0x1C	1s
0x38	2s
0x54	3s
0xFF	Channel disabled

Channel x start/end function

Contents	*Function*
1	Channel 1 (default)
2	Channel 2 (default)
3	Channel 3 (default)
4	Channel 4 (default)
5	Channel 5 (default)
...	...
31	Channel 31 (default)
32	Channel 32 (default)

Remark:
For a normal one function button, the start and end function channel are the same.
For a dual function button, the start function channel will be send at a short press or the end function will be send at a long press.

Channels mode

Contents	*Description*
B'xxxxxxx0'	Dual function disabled (default)
B'xxxxxxx1'	Dual function enabled
B'xxxxxx0x'	Multi-function auto reset disabled (default & write protected)
B'xxxxxx1x'	Multi-function auto reset enabled
B'xxxxx0xx'	Led backlight off (default)
B'xxxxx1xx'	Led backlight on
B'xxxx0xxx'	Led feedback off
B'xxxx1xxx'	Led feedback on (default)
B'xxx0xxxx'	Slow blinking led feedback off
B'xxx1xxxx'	Slow blinking led feedback on (default)
B'xx0xxxxx'	Fast blinking led feedback off
B'xx1xxxxx'	Fast blinking led feedback on (default)
B'x0xxxxxx'	Very fast blinking led feedback off
B'x1xxxxxx'	Very fast blinking led feedback on (default)

Remark:
When auto reset is enabled, the start function will be loaded again after 3 seconds inactivity of the channel.
For a dual function button, the start function channel will be send at a short press or the end function will be send at a long press.
The dual function overwrites the multi-function mode.

Valid long pressed delay

Contents	*Reaction time*
0x17	0.8s (default)
0x2E	1.6s

Valid dual function long pressed times

Contents	*Long pressed time*
0x1C	1s
0x38	2s (default)
0x54	3s

Key beep, edge-lit screensaver, navigation, custom edge-lit during screensaver, memo text & wake-up direct action

Contents	*Description*
B'xxxxxxx0'	Key beep off
B'xxxxxxx1'	Key beep enabled (default)
B'xxxxxx0x'	Edge-lit on during screensaver (default)
B'xxxxxx1x'	Edge-lit off during screensaver
B'xxxxx0xx'	Navigate through all pages (default)
B'xxxxx1xx'	Navigate only through pages of the same group
B'xxxx0xxx'	Low priority custom edge-lit color normal operation during screensaver (default)
B'xxxx1xxx'	Low priority custom edge-lit color always on even during screensaver
B'xxx0xxxx'	Mid priority custom edge-lit color normal operation during screensaver (default)
B'xxx1xxxx'	Mid priority custom edge-lit color always on even during screensaver
B'xx0xxxxx'	High priority custom edge-lit color normal operation during screensaver (default)
B'xx1xxxxx'	High priority custom edge-lit color always on even during screensaver
B'x0xxxxxx'	Memo text during screensaver on all pages (default)
B'x1xxxxxx'	Only memo text during screensaver on selected memo display pages
B'0xxxxxxx'	Wake-up display with no direct actions on the buttons
B'1xxxxxxx'	Wake-up with direct actions on buttons (default)

Ambient edge-lit during screensaver

Contents	*Description*
B'xxxxxxx0'	Ambient edge-lit color normal operation during screensaver (default)
B'xxxxxxx1'	Ambient edge-lit color always on during screensaver

Memo Display pages

Contents	*Description*
B'xxxxxxx0'	Memo text not displayed into button page 1 (default)
B'xxxxxxx1'	Memo text displayed into button page 1
B'xxxxxx0x'	Memo text not displayed into button page 2 (default)
B'0xxxxx1x'	Memo text displayed into button page 2
B'1xxxx0xx'	Memo text not displayed into button page 3 (default)
B'xxxxx1xx'	Memo text displayed into button page 3
B'xxxx0xxx'	Memo text not displayed into button page 4 (default)
B'xxxx1xxx'	Memo text displayed into button page 4
B'xxx0xxxx'	Memo text not displayed into button page 5 (default)
B'xxx1xxxx'	Memo text displayed into button page 5
B'xx0xxxxx'	Memo text not displayed into button page 6 (default)
B'xx1xxxxx'	Memo text displayed into button page 6
B'x0xxxxxx'	Memo text not displayed into button page 7 (default)
B'x1xxxxxx'	Memo text displayed into button page 7
B'0xxxxxxx'	Memo text not displayed into button page 8 (default)
B'1xxxxxxx'	Memo text displayed into button page 8

Screensaver page

Contents	*Description*
0	Screensaver page 0 (button page 1)
1	Screensaver page 1 (button page 2)
2	Screensaver page 2 (button page 3)
3	Screensaver page 3 (button page 4)
4	Screensaver page 4 (button page 5)
5	Screensaver page 5 (button page 6)
6	Screensaver page 6 (button page 7)
7	Screensaver page 7 (button page 8)
8	Screensaver page 8 (counter 1)
9	Screensaver page 9 (counter 2)
10	Screensaver page 10 (counter 3)
11	Screensaver page 11 (counter 4)
12	Screensaver page 12 (counter 5)
13	Screensaver page 13 (counter 6)
14	Screensaver page 14 (counter 7)
15	Screensaver page 15 (counter 8)
16	Screensaver page 16 (local temperature sensor)
17	Screensaver page 17 (remote temp. sensor 1)
18	Screensaver page 18 (remote temp. sensor 2)
19	Screensaver page 19 (remote temp. sensor 3)
20	Screensaver page 20 (remote temp. sensor 4)
21	Screensaver page 21 (remote temp. sensor 5)
22	Screensaver page 22 (remote temp. sensor 6)
23	Screensaver page 23 (remote temp. sensor 7)
24	Screensaver page 24 (remote temp. sensor 8)
25	Screensaver page 25 (remote temp. sensor 9)
26	Screensaver page 26 (remote temp. sensor 10)
27	Screensaver page 27 (remote temp. sensor 11)
28	Screensaver page 28 (remote temp. sensor 12)
29	Screensaver page 29 (analog sensor 1)
30	Screensaver page 30 (analog sensor 2)
31	Screensaver page 31 (analog sensor 3)
32	Screensaver page 32 (analog sensor 4)
33	Screensaver page 33 (clock)
127	Screensaver page = current page

Screensaver activation time

Contents	*Description*
15	Screensaver activation time = 15 s (default)
…	…

255	Screensaver activation time = 255 s

Screensaver animation

Contents	*Description*
0	Screensaver blank
1	Screensaver vertical scrolling
2	Screensaver square
3	Screensaver slats

Startup page

Contents	*Description*
0	Start-up page 0 (button page 1)
1	Start-up page 1 (button page 2)
2	Start-up page 2 (button page 3)
3	Start-up page 3 (button page 4)
4	Start-up page 4 (button page 5)
5	Start-up page 5 (button page 6)
6	Start-up page 6 (button page 7)
7	Start-up page 7 (button page 8)
8	Start-up page 8 (counter 1)
9	Start-up page 9 (counter 2)
10	Start-up page 10 (counter 3)
11	Start-up page 11 (counter 4)
12	Start-up page 12 (counter 5)
13	Start-up page 13 (counter 6)
14	Start-up page 14 (counter 7)
15	Start-up page 15 (counter 8)
16	Start-up page 16 (local temperature sensor)
17	Start-up page 17 (remote temp. sensor 1)
18	Start-up page 18 (remote temp. sensor 2)
19	Start-up page 19 (remote temp. sensor 3)
20	Start-up page 20 (remote temp. sensor 4)
21	Start-up page 21 (remote temp. sensor 5)
22	Start-up page 22 (remote temp. sensor 6)
23	Start-up page 23 (remote temp. sensor 7)
24	Start-up page 24 (remote temp. sensor 8)
25	Start-up page 25 (remote temp. sensor 9)
26	Start-up page 26 (remote temp. sensor 10)
27	Start-up page 27 (remote temp. sensor 11)
28	Start-up page 28 (remote temp. sensor 12)
29	Start-up page 29 (analog sensor 1)
30	Start-up page 30 (analog sensor 2)
31	Start-up page 31 (analog sensor 3)
32	Start-up page 32 (analog sensor 4)
33	Start-up page 33 (clock)
127	Start-up page = current page

Oled intensity

Contents	*Led intensity*
0x00	Minimum
…	...
0x9B	Mid (default)
…	...
0xFF	Maximum

Feedback led brightness for GPx series

Contents	*Brightness*
B'xxxx0000'	*0% Minimum brightness*
B'xxxx0001'	*7% Minimum brightness*
B'xxxx0010'	*9% Minimum brightness*

B'xxxx0011'	*11% Minimum brightness*
B'xxxx0100'	*14% Minimum brightness*
B'xxxx0101'	*17% Minimum brightness*
B'xxxx0110'	*20% Minimum brightness*
B'xxxx0111'	*23% Minimum brightness*
B'xxxx1000'	*26% Minimum brightness*
B'xxxx1001'	*30% Minimum brightness*
B'xxxx1010'	*35% Minimum brightness*
B'xxxx1011'	*40% Minimum brightness*
B'xxxx1100'	*46% Minimum brightness*
B'xxxx1101'	*53% Minimum brightness*
B'xxxx1110'	*63% Minimum brightness*
B'xxxx1111'	*77% Minimum brightness*
B'0000xxxx'	*7% Maximum brightness*
B'0001xxxx'	*9% Maximum brightness*
B'0010xxxx'	*11% Maximum brightness*
B'0011xxxx'	*14% Maximum brightness*
B'0100xxxx'	*17% Maximum brightness*
B'0101xxxx'	*20% Maximum brightness*
B'0110xxxx'	*23% Maximum brightness*
B'0111xxxx'	*26% Maximum brightness*
B'1000xxxx'	*30% Maximum brightness*
B'1001xxxx'	*35% Maximum brightness*
B'1010xxxx'	*40% Maximum brightness*
B'1011xxxx'	*46% Maximum brightness*
B'1100xxxx'	*53% Maximum brightness*
B'1101xxxx'	*63% Maximum brightness*
B'1110xxxx'	*77% Maximum brightness*
B'1111xxxx'	*100% Maximum brightness*

Language

Contents	***Description***
0	English (default)
1	Français
2	Nederlands
3	Espanõl
4	Deutsch
5	Italiano

Display pages 0…7

Contents	***Description***
B'xxxxxxx0'	Display button page 0 not allowed
B'xxxxxxx1'	Display button page 0 allowed (default)
B'xxxxxx0x'	Display button page 1 not allowed (default)
B'0xxxxx1x'	Display button page 1 allowed
B'1xxxx0xx'	Display button page 2 not allowed (default)
B'xxxxx1xx'	Display button page 2 allowed
B'xxxx0xxx'	Display button page 3 not allowed (default)
B'xxxx1xxx'	Display button page 3 allowed
B'xxx0xxxx'	Display button page 4 not allowed (default)
B'xxx1xxxx'	Display button page 4 allowed
B'xx0xxxxx'	Display button page 5 not allowed (default)
B'xx1xxxxx'	Display button page 5 allowed
B'x0xxxxxx'	Display button page 6 not allowed (default)
B'x1xxxxxx'	Display button page 6 allowed
B'0xxxxxxx'	Display button page 7 not allowed (default)
B'1xxxxxxx'	Display button page 7 allowed

Display pages 8…15

Contents	***Description***
B'xxxxxxx0'	Display counter 1 disabled (default)

B’xxxxxxx1’	Display counter 1 enabled
B’xxxxxx0x’	Display counter 2 disabled (default)
B’xxxxxx1x’	Display counter 2 enabled
B’xxxxx0xx’	Display counter 3 disabled (default)
B’xxxxx1xx’	Display counter 3 enabled
B’xxxx0xxx’	Display counter 4 disabled (default)
B’xxxx1xxx’	Display counter 4 enabled
B’xxx0xxxx’	Display counter 5 disabled (default)
B’xxx1xxxx’	Display counter 5 enabled
B’xx0xxxxx’	Display counter 6 disabled (default)
B’xx1xxxxx’	Display counter 6 enabled
B’x0xxxxxx’	Display counter 7 disabled (default)
B’x1xxxxxx’	Display counter 7 enabled
B’0xxxxxxx’	Display counter 8 disabled (default)
B’1xxxxxxx’	Display counter 8 enabled

Display pages 16…23

Contents	*Description*
B’xxxxxxx0’	Display local temperature disabled (default)
B’xxxxxxx1’	Display local temperature enabled
B’xxxxxx0x’	Display remote temperature 1 disabled (default)
B’xxxxxx1x’	Display remote temperature 1 enabled
B’xxxxx0xx’	Display remote temperature 2 disabled (default)
B’xxxxx1xx’	Display remote temperature 2 enabled
B’xxxx0xxx’	Display remote temperature 3 disabled (default)
B’xxxx1xxx’	Display remote temperature 3 enabled
B’xxx0xxxx’	Display remote temperature 4 disabled (default)
B’xxx1xxxx’	Display remote temperature 4 enabled
B’xx0xxxxx’	Display remote temperature 5 disabled (default)
B’xx1xxxxx’	Display remote temperature 5 enabled
B’x0xxxxxx’	Display remote temperature 6 disabled (default)
B’x1xxxxxx’	Display remote temperature 6 enabled
B’0xxxxxxx’	Display remote temperature 7 disabled (default)
B’1xxxxxxx’	Display remote temperature 7 enabled

Display pages 24…31

Contents	*Description*
B’xxxxxxx0’	Display remote temperature 8 disabled (default)
B’xxxxxxx1’	Display remote temperature 8 enabled
B’xxxxxx0x’	Display remote temperature 9 disabled (default)
B’xxxxxx1x’	Display remote temperature 9 enabled
B’xxxxx0xx’	Display remote temperature 10 disabled (default)
B’xxxxx1xx’	Display remote temperature 10 enabled
B’xxxx0xxx’	Display remote temperature 11 disabled (default)
B’xxxx1xxx’	Display remote temperature 11 enabled
B’xxx0xxxx’	Display remote temperature 12 disabled (default)
B’xxx1xxxx’	Display remote temperature 12 enabled
B’xx0xxxxx’	Display analog sensor 1 disabled (default)
B’xx1xxxxx’	Display analog sensor 1 enabled
B’x0xxxxxx’	Display analog sensor 2 disabled (default)
B’x1xxxxxx’	Display analog sensor 2 enabled
B’0xxxxxxx’	Display analog sensor 3 disabled (default)
B’1xxxxxxx’	Display analog sensor 3 enabled

Display pages 32, 33 & menu

Contents	*Description*
B’xxxxxxx0’	Display analog sensor 4 disabled (default)
B’xxxxxxx1’	Display analog sensor 4 enabled
B’xxxxxx0x’	Display clock disabled (default)
B’xxxxxx1x’	Display clock enabled
B’xxxxx0xx’	Display menu disabled

B’xxxxx1xx’	Display menu enabled (default)

Color palette saturation - white

Contents	*Description*
B’x0000000’	Minimum saturation (no light)
	…
B’x1111111’	Maximum saturation
B’0xxxxxxx’	RGB-color
B’1xxxxxxx’	White (R-value = G-value = B-value)

Color palette Red – Green – Blue values

Contents	*Description*
0	Minimum color value
…	…
255	Maximum color value

Remark:
Color palette index 0 is always black (saturation = R = G = B = 0)
Color palette index 31 is same as ambient (saturation = R = G = B = don’t care)
The RGB values must be equal for white

Alarm clock configuration

Contents	*Channel locked/unlocked*
B’xxxxxxx0’	Alarm 1 disabled (default)
B’xxxxxxx1’	Alarm 1 enabled
B’0xxxxx0x’	Local alarm 1 (default)
B’1xxxxx1x’	Global alarm 1
B’xxxxx0xx’	Alarm 2 disabled (default)
B’xxxxx1xx’	Alarm 2 enabled
B’xxxx0xxx’	Local alarm 2 (default)
B’xxxx1xxx’	Global alarm 2
B’xxx0xxxx’	Sunrise disabled
B’xxx1xxxx’	Sunrise enabled (default)
B’xx0xxxxx’	Sunset disabled
B’xx1xxxxx’	Sunset enabled (default)
B’x0xxxxxx’	Day light savings disabled
B’x1xxxxxx’	Day light savings enabled (default)

Temp. sensor zone

Contents	*Zone*
0’	No zone
1.	Zone 1...
...	...
7	Zone 7

Temp. sensor calibration offset (resolution 0.5°):

Contents	Calibration offset
00001111	Calibration offset +7.5°C
…	…
00000001	Calibration offset +0.5°C
00000000	Calibration offset +0°C (default)
11111111	Calibration offset -0.5°C
…	…
11110000	Calibration offset -8°C

Temp. sensor calibration gain:

Contents	Calibration gain
0	Calibration gain
…	…
128	Calibration gain (default)
…	…

255	Calibration gain

Calibrated Temperature = (gain/128) * sensortemperature + offset

Temp. sensor hysteresis (resolution 0.5°):

Contents	Hysteresis
00011111	15.5°C
00000001	0.5°C
00000000	0°C

Temp. sensor boost difference (resolution 0.5°):

Contents	Temperature difference
00010100	+10°C
00000001	+0.5°C
00000000	0°C
11111111	-0.5°C
11101100	-10°C

Temp. sensor pump delayed on, pump delayed off & valve minimum switching time:

Contents	Time
00000000	0
00000001	1 sec
00000010	2 sec
…	…
11111110	254 sec
11111111	255 sec

Temp. sensor default sleep time into minutes

valid range H'0001' to H'FEFF' or 1min to 65.279min

Temp. sensor lower, upper, safe, night, day, comfort or alarm set (resolution 0.5°):

Contents	Temperature set
01111000	60°C
00101000	20°C
00000010	1°C
00000001	0.5°C
00000000	0°C
11111111	-0.5°C
11000000	-32°C

Temperature sensor flags

Contents	***Description***
B'xxxxxxx0'	Pump unjamming disabled (default)
B'xxxxxxx1'	Pump unjamming enabled
B'xxxxxx0x'	Heater valve unjamming disabled (default)
B'xxxxxx1x'	Heater valve unjamming enabled
B'xxxxx0xx'	Independent temperature alarms (default)
B'xxxxx1xx'	Dependent temperature alarms
B'xxxx0xxx'	Local control thermostat do not starts sleep timer (default)
B'xxxx1xxx'	Local control thermostat control starts sleep timer
B'xxx0xxxx'	Local control of thermostat unlocked (default)
B'xxx1xxxx'	Local control of thermostat locked
B'xx0xxxxx'	Local control thermostat at short key press (default)
B'xx1xxxxx'	Local control thermostat at long key press
B'x0xxxxxx'	Show local control thermostat
B'x1xxxxxx'	Hide local control thermostat

Temp. sensor Alarm1 & 2 modes

Contents	*Description*
B'xxxxx000'	Low temperature alarm 1
B'xxxxx001'	High temperature alarm 1 (default)
B'xxxxx010'	Anti-frost mode alarm 1
B'xxxxx011'	Night mode alarm 1
B'xxxxx100'	Day mode alarm 1
B'xxxxx101'	Comfort mode alarm 1
B'xxxxx110'	Night, Day or Comfort mode alarm 1
B'xxxxx111'	Day or Comfort mode alarm 1
B'xxxx0xxx'	Temperature alarms 1 absolute (default)
B'xxxx1xxx'	Temperature alarms 1 relative
B'x000xxxx'	Low temperature alarm 2
B'x001xxxx'	High temperature alarm 2 (default)
B'x010xxxx'	Anti-frost mode alarm 2
B'x011xxxx'	Night mode alarm 2
B'x100xxxx'	Day mode alarm 2
B'x101xxxx'	Comfort mode alarm 2
B'x110xxxx'	Night, Day or Comfort mode alarm 2
B'x111xxxx'	Day or Comfort mode alarm 2
B'0xxxxxxx'	Temperature alarms 2 absolute (default)
B'1xxxxxxx'	Temperature alarms 2 relative

Temp. sensor Alarm3 & 4 modes

Contents	*Description*
B'xxxxx000'	Low temperature alarm 3
B'xxxxx001'	High temperature alarm 3 (default)
B'xxxxx010'	Anti-frost mode alarm 3
B'xxxxx011'	Night mode alarm 3
B'xxxxx100'	Day mode alarm 3
B'xxxxx101'	Comfort mode alarm 3
B'xxxxx110'	Night, Day or Comfort mode alarm 3
B'xxxxx111'	Day or Comfort mode alarm 3
B'xxxx0xxx'	Temperature alarms 3 absolute (default)
B'xxxx1xxx'	Temperature alarms 3 relative
B'x000xxxx'	Low temperature alarm 4
B'x001xxxx'	High temperature alarm 4 (default)
B'x010xxxx'	Anti-frost mode alarm 4
B'x011xxxx'	Night mode alarm 4
B'x100xxxx'	Day mode alarm 4
B'x101xxxx'	Comfort mode alarm 4
B'x110xxxx'	Night, Day or Comfort mode alarm 4
B'x111xxxx'	Day or Comfort mode alarm 4
B'0xxxxxxx'	Temperature alarms 4 absolute (default)
B'1xxxxxxx'	Temperature alarms 4 relative

Counter channel

Contents	*Description*
B'00000001'	Counter channel 1
B'00000010'	Counter channel 2
B'00000100'	Counter channel 3
B'00001000'	Counter channel 4
B'00010000'	Counter channel 5
B'00100000'	Counter channel 6
B'01000000'	Counter channel 7
B'10000000'	Counter channel 8

Counter multiply factor

Contents	*Description*
B'xxxxxx00'	Multiply factor x 1 (default)
B'xxxxxx01'	Multiply factor x 2.5
B'xxxxxx10'	Multiply factor x 0.05
B'xxxxxx11'	Multiply factor x 0.01

Counter units

Contents	*Counter unit*
0	reserved
1	liter
2	m^3
3	kWh (default)

Analog channel

Contents	*Channel*
2	VMBMETEO rain channel
4	VMBMETEO light channel
8	VMBMETEO wind channel
9	VMB4AN analog sensor 1
10	VMB4AN analog sensor 2
11	VMB4AN analog sensor 3
12	VMB4AN analog sensor 4

Address	*Contents*	*Address*	*Contents*
0x0808	Links in use byte 0 (LSB)	0x0809	Links in use high byte1
0x080A	Links in use low byte 2	0x080B	Links in use low byte 3 (MSB)
0x080C	Linked Push button 1 module address	0x080D	Linked Push button 1 bit number
0x080E	Linked Push button 1 action	0x080F	Linked Push button 1 parameter 1
0x0810	Linked Push button 1 parameter 2	0x0811	…
...	...	...	...
0x0B9E	…	0x0B9F	Linked Push button 184 module address
0x0BA0	Linked Push button 184 bit number	0x0BA1	Linked Push button 184 action
0x0BA2	Linked Push button 184 parameter 1	0x0BA3	Linked Push button 184 parameter 2

Remark: Unused locations contain H'FF'

Action

Action number	**Action**	**Parameter 1**	**Parameter 2**
0	Switch status led indication	-	Channel 1...32
1	Lock channel at closed switch	-	Channel 1...32, 33 or 42
2	Lock channel at opened switch	-	Channel 1...32, 33 or 42
3	Lock channel	Timeout	Channel 1...32, 33 or 42
4	Lock/unlock channel	Timeout	Channel 1...32, 33 or 42
5	Unlock channel	-	Channel 1...32, 33 or 42
6	Disable channel program at closed switch	-	Channel 1...32, 33 or 42
7	Disable channel program at opened switch	-	Channel 1...32, 33 or 42
8	Disable channel program channel	Timeout	Channel 1...32, 33 or 42
9	Disable/enable channel program	Timeout	Channel 1...32, 33 or 42
10	Enable channel program	-	Channel 1...32, 33 or 42
11	Select no programs	-	-
12	Select program group 1	-	-
13	Toggle program group 1	-	-
14	Select program group 2	-	-
15	Toggle program group 2	-	-
16	Select program group 3	-	-
17	Toggle program group 3	-	-
18	Enable Alarm 1 at closed switch	-	-
19	Enable Alarm 1 at open switch	-	-
20	Disable Alarm 1 at closed switch	-	-
21	Disable Alarm 1 at open switch	-	-
22	Enable Alarm 1	-	-
23	Enable/Disable Alarm 1	-	-
24	Disable Alarm 1	-	-
25	Enable Alarm 2 at closed switch	-	-
26	Enable Alarm 2 at open switch	-	-
27	Disable Alarm 2 at closed switch	-	-
28	Disable Alarm 2 at open switch	-	-
29	Enable Alarm 2	-	-
30	Enable/Disable Alarm 2	-	-
31	Disable Alarm 2	-	-
32	Enable Sunrise at closed switch	-	-
33	Enable Sunrise at open switch	-	-
34	Disable Sunrise at closed switch	-	-
35	Disable Sunrise at open switch	-	-
36	Enable Sunrise	-	-
37	Enable/Disable Sunrise	-	-
38	Disable Sunrise	-	-
39	Enable Sunset at closed switch	-	-
40	Enable Sunset at open switch	-	-
41	Disable Sunset at closed switch	-	-
42	Disable Sunset at open switch	-	-
43	Enable Sunset	-	-
44	Enable/Disable Sunset	-	-
45	Disable Sunset	-	-
46	Open collector momentary	-	-
47	Open collector off	-	-
48	Open collector on	-	-
49	Open collector toggle	-	-
50	Open collector start/stop timer	timeout	-

51	Open collector restartable timer	timeout	-
52	Open collector non retriggerable timer	timeout	-
53	Open collector trigger on release timer	timeout	-
54	Sensor: Comfort mode	Short press sleep time	Long press sleep time
55	Sensor: Day mode	Short press sleep time	Short press sleep time
56	Sensor: Night mode	Short press sleep time	Short press sleep time
57	Sensor: Safe mode	Short press sleep time	Short press sleep time
58	Sensor: Heating mode	-	-
59	Sensor: Cooling mode	-	-
60	Set color at closed switch	Edge	Color number/priority/blink
61	Set color at open switch	Edge	Color number/priority/blink
62	Set color	Edge	Color number/priority/blink
63	Set color timer	Edge	Color number/priority/blink
64	Set default color	Edge	-
65	Set background color at closed switch	Edge	Color number/priority/blink
66	Set background color at open switch	Edge	Color number/priority/blink
67	Set background color	Edge	Color number/priority/blink
68	Set background color timer	Edge	Color number/priority/blink
69	Set background default color	Edge	-
70	Set feedback color at closed switch	Page/Edge	Color number/priority/blink
71	Set feedback color at open switch	Page/Edge	Color number/priority/blink
72	Set feedback color	Page/Edge	Color number/priority/blink
73	Set feedback color timer	Page/Edge	Color number/priority/blink
74	Set feedback default color	Page/Edge	-
75	Set continuous feedback color at closed switch	Page/Edge	Color number/priority/blink
76	Set continuous feedback color at open switch	Page/Edge	Color number/priority/blink
77	Set continuous feedback color	Page/Edge	Color number/priority/blink
78	Set continuous feedback color timer	Page/Edge	Color number/priority/blink
79	Set continuous feedback default color	Page/Edge	-
80	Set slow blink feedback color at closed switch	Page/Edge	Color number/priority/blink
81	Set slow blink feedback color at open switch	Page/Edge	Color number/priority/blink
82	Set slow blink feedback color	Page/Edge	Color number/priority/blink
83	Set slow blink feedback color timer	Page/Edge	Color number/priority/blink
84	Set slow blink feedback default color	Page/Edge	-
85	Set fast blink feedback color at closed switch	Page/Edge	Color number/priority/blink
86	Set fast blink feedback color at open switch	Page/Edge	Color number/priority/blink
87	Set fast blink feedback color	Page/Edge	Color number/priority/blink
88	Set fast blink feedback color timer	Page/Edge	Color number/priority/blink
89	Set fast blink feedback default color	Page/Edge	-
90	Force screensaver to blank screen	-	-
91	Cancel force screensaver to blank screen	-	-
92	Lock page	timeout	Unlock at keypress / Page
93	Unlock page	-	-
94	Unlock page at release	-	-
95	Sensor: Forced Safe mode at closed switch	-	-
96	Sensor: Forced Safe mode at open switch	-	-
97	Sensor: Forced Safe mode	Timeout	-
98	Sensor: Forced or Cancel Forced Safe mode	Timeout	-
99	Sensor: Cancel Forced Safe mode	-	-
100	Toggle override color	Edge	Color number/priority/blink
101	Inhibit side leds at closed switch	-	-
102	Inhibit side leds mode at open switch	-	-
103	Inhibit side leds	Timeout	-
104	Inhibit side leds or cancel inhibit side leds	Timeout	-
105	Cancel inhibit side leds	-	-
106	Output pulse (Build1927 or higher)	Timeout (multiple of 10ms)	-
107	Output logical OR (Build1927 or higher)		
108	Output logical NOR (Build1927 or higher)		
109	Output logical AND (Build1927 or higher)		
110	Output logical NAND (Build1927 or higher)		
111	Output logical XOR (Build1927 or higher)		
112	Output logical XNOR (Build1927 or higher)		
113	Output pulse interval at closed switch (Build1927 or higher)	Pulse time (multiple of 10ms)	Pause time (multiple of 10ms)

Time parameter

Time parameter	Timeout

Sleep time parameter	action

0	0s (no timer)
1	1s
2	2s
3	3s
...	
119	1min59s
120	2min
121	2min15s
...	
131	4min45s
132	5min
133	5min30s
...	
181	29min30s
182	30min
183	31min
...	
211	59min
212	1h
213	1h15min
...	
227	4h45min
228	5h
229	5h30min
...	...
237	9h30min
238	10h
239	11h
...	
251	23h
252	1d
253	2d
254	3d
255	Infinite

0	No action
1	Select until next program step execution
2	Select for default sleep time (see sensor config.)
3	Select for 15 min (auto return to program)
4	Select for 30 min (auto return to program)
...	...
17	Select for 3h45 min (auto return to program)
18	Select for 4h min (auto return to program)
19	Select for 4h30 min (auto return to program)
...	...
33	Select for 11h30 min (auto return to program)
34	Select for 12h (auto return to program)
35	Select for 13h (auto return to program)
...	...
45	Select for 23h (auto return to program)
46	Select for 1 day (auto return to program)
47	Select for 1 day 12h (auto return to program)
...	...
57	Select for 6 days 12h (auto return to program)
58	Select for 7 days (auto return to program)
59	Select for 8 days (auto return to program)
...	...
96	Select for 45 days (auto return to program)
97	Select and ignore all program steps

Page/Edge parameter

Contents	***Page/edge***
xxxx0001	Left edge
xxxx0010	Top edge
xxxx0100	Right edge
xxxx1000	bottom edge
0000xxxx	apply to button page 1 (only for feedback light)
0001xxxx	apply to button page 2 (only for feedback light)
0010xxxx	apply to button page 3 (only for feedback light)
0011xxxx	apply to button page 4 (only for feedback light)
0100xxxx	apply to button page 5 (only for feedback light)
0101xxxx	apply to button page 6 (only for feedback light)
0110xxxx	apply to button page 7 (only for feedback light)
0111xxxx	apply to button page 8 (only for feedback light)
1000xxxx	Apply to all button pages (only for feedback light)
...	…
1111xxxx	Apply to all button pages (only for feedback light)

Blinking/Priority/color palette index

Contents	***Blinking/priority/color***
0xxxxxxx	Background no blinking/feedback blinking disabled
1xxxxxxx	Background blinking/feedback blinking enabled
x00xxxxx	Default color palette &feedback blinking mode
x01xxxxx	Custom color lowest priority
x10xxxxx	Custom color mid priority
x11xxxxx	Custom color highest priority

xxx00000	Color palette index 0
xxx00001	Color palette index 1
...	...
xxx11111	Color palette index 31

Unlock page at keypress/lock page

Contents	*Description*
B’0xxxxxxx’	Unlock page at keypress disabled
B’1xxxxxxx’	Unlock page at keypress enabled
B’x0000000’	Lock page 0 (button page 1)
B’x0000001’	Lock page 1 (button page 2)
B’x0000010’	Lock page 2 (button page 3)
B’x0000011’	Lock page 3 (button page 4)
B’x0000100’	Lock page 4 (button page 5)
B’x0000101’	Lock page 5 (button page 6)
B’x0000110’	Lock page 6 (button page 7)
B’x0000111	Lock page 7 (button page 8)
B’x0001000’	Lock page 8 (counter 1)
B’x0001001’	Lock page 9 (counter 2)
B’x0001010’	Lock page 10 (counter 3)
B’x0001011’	Lock page 11 (counter 4)
B’x0001100’	Lock page 12 (counter 5)
B’x0001101’	Lock page 13 (counter 6)
B’x0001110’	Lock page 14 (counter 7)
B’x0001111’	Lock page 15 (counter 8)
B’x0010000’	Lock page 16 (local temperature sensor)
B’x0010001’	Lock page 17 (remote temp. sensor 1)
B’x0010010’	Lock page 18 (remote temp. sensor 2)
B’x0010011’	Lock page 19 (remote temp. sensor 3)
B’x0010100’	Lock page 20 (remote temp. sensor 4)
B’x0010101’	Lock page 21 (remote temp. sensor 5)
B’x0010110’	Lock page 22 (remote temp. sensor 6)
B’x0010111’	Lock page 23 (remote temp. sensor 7)
B’x0011000’	Lock page 24 (remote temp. sensor 8)
B’x0011001’	Lock page 25 (remote temp. sensor 9)
B’x0011010’	Lock page 26 (remote temp. sensor 10)
B’x0011011’	Lock page 27 (remote temp. sensor 11)
B’x0011100’	Lock page 28 (remote temp. sensor 12)
B’x0011101’	Lock page 29 (analog sensor 1)
B’x0011110’	Lock page 30 (analog sensor 2)
B’x0011111’	Lock page 31 (analog sensor 3)
B’x0100000’	Lock page 32 (analog sensor 4)
B’x0100001’	Lock page 33 (clock)
B’x1111111’	Lock current page

Address	*Contents*	*Address*	*Contents*
0x0BA4	Program steps used byte 0 (LSB)	0x0BA5	Program steps used byte 1
0x0BA6	Program steps used byte 2	0x0BA7	Program steps used byte 3 (MSB)
0x0BA8	Program step 1 byte1	0x0BA9	Program step 1 byte2
0x0BAA	Program step 1 byte3	0x0BAB	Program step 1 byte4
0x0BAC	Program step 1 byte5	0x0BAD	Program step 1 byte6
…	..	..	..
0x0F9E	Program step 170 byte1	0x0F9F	Program step 170 byte2
0x0FA0	Program step 170 byte3	0x0FA1	Program step 170 byte4
0x0FA2	Program step 170 byte5	0x0FA3	Program step 170 byte6

Contents program byte1	*Description*
B’000xxxxx’	Disable program step
B’001xxxxx’	Absolute time
B’010xxxxx’	Wake up time 1 + relative time
B’011xxxxx’	Go to bed time 1 + relative time
B’100xxxxx’	Wake up time 2 + relative time
B’101xxxxx’	Go to bed time 2 + relative time
B’110xxxxx’	Sunrise + relative time
B’111xxxxx’	Sunset + relative time
B’xxx01111’	Rel. time = 3h45min
…	
B’xxx00001’	Rel. time = 15min
B’xxx00000’	Rel. time = 0
B’xxx11111’	Rel. time = -15min
…	
B’xxx10000’	Rel. time = -4h

Remark: Wake up, Go to bed, sunrise & sunset time are only allowed for weekly programs

Contents program byte2	*Description*
B’xxxx0000’	Weekly program
B’xxxx0001’	January
B’xxxx0010’	February
B’xxxx0011’	March
B’xxxx0100’	April
B’xxxx0101’	May
B’xxxx0110’	June
B’xxxx0111’	July
B’xxxx1000’	August
B’xxxx1001’	September
B’xxxx1010’	October
B’xxxx1011’	November
B’xxxx1100’	December
B’xxxx1101’	Monthly program
B’xxxx1110’	Monthly program
B’xxxx1111’	Monthly program

Contents program byte3	*Description*
B’xxx00000’	0h
B’xxx00001’	1h
…	…
B’xxx10111’	23h
B’xx1xxxxx’	Program group 1 (Summer program)
B’x1xxxxxx’	Program group 2 (Winter program)
B’1xxxxxxx’	Program group 3 (Holiday program)

Contents program byte4	*Description*
B’xx000000’	0min
B’xx000001’	1min
…	…
B’xx111011’	59min

Contents program byte4	*Contents program byte2*	*Description*
B’00xxxxxx’	B’0000xxxx’	Never
B’00xxxxxx’	B’0001xxxx’	Day 1of the month
B’00xxxxxx’	B’0010xxxx’	Day 2of the month
…	…	…
B’01xxxxxx’	B’1111xxxx’	Day 31of the month
B’10xxxxxx’	B’0000xxxx’	Never
B’10xxxxxx’	B’0001xxxx’	Every Monday
B’10xxxxxx’	B’0010xxxx’	Every Tuesday
…	…	…
B’10xxxxxx’	B’0111xxxx’	Every Sunday
B’10xxxxxx’	B’1000xxxx’	Every weekend (sa & su)
B’10xxxxxx’	B’1001xxxx’	Every working day (mo…fr)
B’10xxxxxx’	B’1010xxxx’	Every day except Sunday
B’10xxxxxx’	B’1011xxxx’	Every day
B’10xxxxxx’	B’1100xxxx’	Never
…	…	…
B’11xxxxxx’	B’1111xxxx’	Never

Contents program byte5	**Action**
0	0s25 Pulse (only allowed for button channels)
1	1s Pulse (only allowed for button channels)
2	2s Pulse (only allowed for button channels)
...	...
119	1min59s Pulse (only allowed for button channels)
120	2min Pulse (only allowed for button channels)
121	2min15s Pulse (only allowed for button channels)
...	...
131	4min45s Pulse (only allowed for button channels)
132	5min Pulse (only allowed for button channels)
133	5min30s Pulse (only allowed for button channels)
...	...
181	29min30s Pulse (only allowed for button channels)
182	30min Pulse (only allowed for button channels)
183	31min Pulse (only allowed for button channels)
...	...
211	59min Pulse (only allowed for button channels)
212	1h Pulse (only allowed for button channels)
213	1h15min Pulse (only allowed for button channels)
...	...
227	4h45min Pulse (only allowed for button channels)
228	5h Pulse (only allowed for button channels)
229	5h30min Pulse (only allowed for button channels)
...	...
237	9h30min Pulse (only allowed for button channels)
238	10h Pulse (only allowed for button channels)
239	11h Pulse (only allowed for button channels)
...	…
246	18h Pulse (only allowed for button channels)
247	Press (only allowed for button channels)
248	Long Press (only allowed for button channels)
249	Release (only allowed for button channels)
250	Lock
251	Unlock
252	Thermostat Safe mode (only allowed for temperature sensor channel)
253	Thermostat Night mode (only allowed for temperature sensor channel)
254	Thermostat Day mode (only allowed for temperature sensor channel)
255	Thermostat Comfort mode (only allowed for temperature sensor channel)

Contents program byte6	**Channel**
1	Channel 1
2	Channel 2
..	…
31	Channel 31
32	Channel 32
33	Thermostat
42	Open collector output

Address	*Contents*	*Address*	*Contents*
0x0FA4	Location id low byte	0x0FA5	Location id high byte
0x0FA6	Group id low byte	0x0FA7	Group id high byte
0x0FA8	Module name character 1	0x0FA9	Module name character 2
…	..	..	..
0x0FE6	Module name character 63	0x0FE7	Module name character 64

Address	*Contents*	*Address*	*Contents*
0x0FE8	Size of page 1 bitmap low byte	0x0FE9	Size of page 1 bitmap high byte
...	…	…	…
0x0FF6	Size of page 8 bitmap low byte	0x0FF7	Size of page 8 bitmap high byte
0x0FF8	Page 1 bitmap data byte 1	0x0FF9	Page 1 bitmap data byte 2
…	…	...	…
0x17F6	Page 1 bitmap data 2047	0x17F7	Page 1 bitmap data byte 2048
0x17F8	Page 2 bitmap data byte 1	0x17F9	Page 2 bitmap data byte 2
…	…	...	…
0x1FF6	Page 2 bitmap data 2047	0x1FF7	Page 2 bitmap data byte 2048
0x1FF8	Page 3 bitmap data byte 1	0x1FF9	Page 3 bitmap data byte 2
…	…	...	…
0x27F6	Page 3 bitmap data 2047	0x27F7	Page 3 bitmap data byte 2048
0x27F8	Page 4 bitmap data byte 1	0x27F9	Page 4 bitmap data byte 2
…	…	...	…
0x2FF6	Page 4 bitmap data 2047	0x2FF7	Page 4 bitmap data byte 2048
0x2FF8	Page 5 bitmap data byte 1	0x2FF9	Page 5 bitmap data byte 2
…	…	...	…
0x37F6	Page 5 bitmap data 2047	0x37F7	Page 5 bitmap data byte 2048
0x37F8	Page 6 bitmap data byte 1	0x37F9	Page 6 bitmap data byte 2
…	…	...	…
0x3FF6	Page 6 bitmap data 2047	0x3FF7	Page 6 bitmap data byte 2048
0x3FF8	Page 7 bitmap data byte 1	0x3FF9	Page 7 bitmap data byte 2
…	…	...	…
0x47F6	Page 7 bitmap data 2047	0x47F7	Page 7 bitmap data byte 2048
0x47F8	Page 8 bitmap data byte 1	0x47F9	Page 8 bitmap data byte 2
…	…	...	…
0x4FF6	Page 8 bitmap data 2047	0x4FF7	Page 8 bitmap data byte 2048
0x4FF8	Not used	0x4FF9	Not used
0x4FFE	Not used	0x4FFF	Used for flash writing