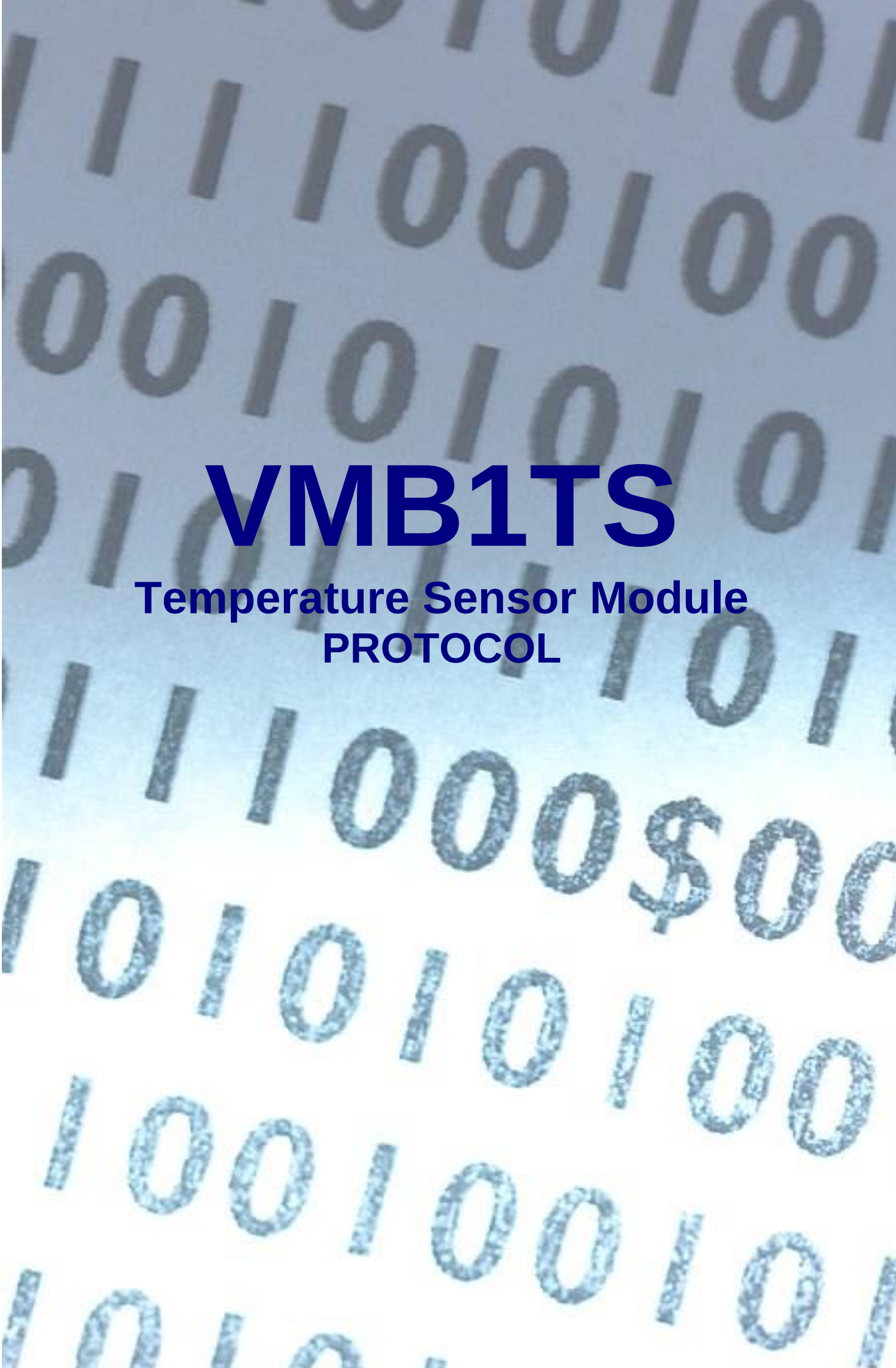

# VMB1TS

## Temperature Sensor Module

## PROTOCOL

## Binary 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 temperature sensor module can transmit the following messages:***

- Sensor output status
- Manual push buttons status
- Sensor status
- Sensor temperature (incl. minimum and maximum)
- Time statistics (heater/cooler operation time)
- First, second and third part of the sensor settings
- Sensor configuration data
- Module type
- Bus error counter status
- First, second and third part of the sensor name
- Memory data
- Memory data block (4 bytes)

***The temperature sensor module can transmit the following commands:***

- Updates LEDs on a push button module
- Clears LEDs on a push button module
- Sets LEDs on a push button module
- Blinks LEDs slowly on a push button module
- Blinks LEDs very fast on a push button module
- Set target temperature of the differential sensor

***The temperature sensor module can receive the following message:***

- Push button status

***The temperature sensor module can receive the following commands:***

- Update output LED
- Clear output LED
- Set output LED
- Blink output LED slowly
- Blink output LED fast
- Blink output LED very fast
- Clear Push button Led
- Module type request
- Bus error counter status request
- Sensor temperature request
- Reset min/max temperature
- Sensor status request
- Sensor settings request
- Sensor configuration data request
- Sensor name request
- Time statistics request
- Enable/disable anti block heating valve and pump
- Reset time statistics
- Lock local control
- Unlock local control
- Sensor zone number
- Set heating mode
- Set cooling mode
- Set temperature
- Switch to comfort mode
- Switch to day mode
- Switch to night mode
- Switch to safe temperature mode
- Set default sleep time
- Read memory data
- Read memory data block (4 bytes)
- Memory dump request
- Write memory data
- Write memory data block (4 bytes)
- Program availability

***Transmits the sensor output status:***

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_OUTPUT_STATUS (H'00')
DATABYTE2 = Output channel just activated (1 = just activated)

| Contents | Output channel |
|---|---|
| 0xx1xxx1 | Heater just activated |
| 0xxxxx1x | Turbo heater/cooler just activated |
| 0xxxx1xx | Comfort or day mode just activated |
| 0xxx1xxx | Cooler just activated |
| 0x1xxxxx | Low temperature alarm activated |
| 01xxxxxx | High temperature alarm activated |

DATABYTE3 = Outputs just deactivated (1 = just deactivated)

| Contents | Output channel |
|---|---|
| 0xx1xxx1 | Heater just deactivated |
| 0xxxxx1x | Turbo heater/cooler just deactivated |
| 0xxxx1xx | Comfort or day mode just deactivated |
| 0xxx1xxx | Cooler just deactivated |
| 0x0xxxxx | Low temperature alarm deactivated |
| 00xxxxxx | High temperature alarm deactivated |

DATABYTE4 = always zero

***Transmits the manual push button status:***

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_PUSHBUTTON_STATUS (H'00')
DATABYTE2 = Push buttons just pressed (1 = just pressed)

| Contents | Manual push button channel |
|---|---|
| xxxxxxx1 | Heater push button just pressed |
| xxxxxx1x | Turbo heater/cooler push button just pressed |
| xxxxx1xx | Day mode push button just pressed |
| xxxx1xxx | Cooler push button just pressed |
| xxx1xxxx | Mode & heater (pump) button just pressed |
| xx1xxxxx | Mode & turbo (low alarm) button just pressed |
| x1xxxxxx | Mode & day (high alarm) button just pressed |

DATABYTE3 = Push buttons just released (1 = just released)

| Contents | Manual push button channel |
|---|---|
| xxxxxxx1 | Heater push button just released |
| xxxxxx1x | Turbo heater/cooler push button just released |
| xxxxx1xx | Day mode push button just released |
| Xxxx1xxx | Cooler push button just released |
| xxx1xxxx | Mode & heater (pump) button just released |
| xx1xxxxx | Mode & turbo (low alarm) button just released |
| x1xxxxxx | Mode & day (high alarm) button just released |

DATABYTE4 = Push buttons long pressed (1 = longer than 0.85s pressed)

| Contents | Manual push button channel |
|---|---|
| xxxxxxx1 | Heater push button long pressed |
| xxxxxx1x | Turbo heater/cooler push button long pressed |
| xxxxx1xx | Day mode push button long pressed |
| Xxxx1xxx | Cooler push button long pressed |
| xxx1xxxx | Mode & heater (pump) button long pressed |
| xx1xxxxx | Mode & turbo (low alarm) button long pressed |
| x1xxxxxx | Mode & day (high alarm) button long pressed |

***Transmit the sensor status (Build 0949):***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_STATUS (H'EA')
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) |
| 1000xxxx | Cooler mode |
| 0xxxxxxx | Heater mode |

DATABYTE3 = Program step mode

| Contents | Program step mode |
|---|---|
| xxxxx0xx | No sensor program |
| xxxxx1xx | Sensor program available |
| xxxx0xxx | No zone program |
| xxxx1xxx | Zone program available |
| 0xxxxxxx | No all rooms program |
| 1xxxxxxx | All rooms program 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 |
|---|---|
| 0xx0xxx0 | Heater/pump off |
| 0xx1xxx1 | Heater/pump on |
| 0xxxxx0x | Boost heater/cooler off |
| 0xxxxx1x | Boost heater/cooler on |
| 0xxxx0xx | Comfort and day mode off |
| 0xxxx1xx | Comfort or day mode on |
| 0xxx0xxx | Cooler off |
| 0xxx1xxx | Cooler on |
| 0x0xxxxx | Low alarm off |
| 0x1xxxxx | Low alarm on |
| 00xxxxxx | High alarm off |
| 01xxxxxx | High alarm 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 H'FFFF', the sensor is in manual mode.

***Transmit the sensor temperature:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 databytes to send
DATABYTE1 = COMMAND_SENSOR_TEMPERATURE (H'E6')
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 | 11100000 | 63.5°C |
| | | |
| 00000001 | 00000000 | 0.5°C |
| 00000000 | 10000000 | 0.25°C |
| 00000000 | 01000000 | 0.125°C |
| 00000000 | 00100000 | 0.0625°C |
| 00000000 | 00000000 | 0°C |
| 11111111 | 11100000 | -0.0625°C |
| 11111111 | 11000000 | -0.125°C |
| 11111111 | 10000000 | -0.25°C |
| 11111110 | 00000000 | -0.5°C |
| | | |
| 10010010 | 00000000 | -55°C |

Remark:
The 5 least significant bits of the low byte are always zero.
The low order bytes are not sending with the data length of 4 bytes (resolution 0.5°C)

***Transmit time statistics***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_TIME_STATISTICS (H'C8')
DATABYTE2 = statistics mode index

| Contents | Time statistics |
|---|---|
| 10000001 | Heating antifreeze mode time statistics |
| 10000010 | Heating night mode time statistics |
| 10000100 | Heating day mode time statistics |
| 10001000 | Heating comfort mode time statistics |
| 10010000 | Heating global time statistics |
| 01000001 | Cooling standby mode time statistics |
| 01000010 | Cooling night mode time statistics |
| 01000100 | Cooling day mode time statistics |
| 01001000 | Cooling comfort mode time statistics |
| 01010000 | Cooling global time statistics |

DATABYTE3 = 'ON' time (hours bcd digits 4 & 3)
DATABYTE4 = 'ON' time (hours bcd digits 2 & 1)
DATABYTE5 = 'ON' time (minutes bcd digits 2 & 1)
DATABYTE6 = Mode time (hours bcd digits 4 & 3)
DATABYTE7 = Mode time (hours bcd digits 2 & 1)
DATABYTE8 = Mode time (minutes bcd digits 2 & 1)

Remark:
The time is bcd formatted.
Databytes 3, 4 & 5 gives the total 'ON' time of the heater or cooler in the corresponding mode.
Databytes 6, 7 & 8 gives the total time of selected mode.

***Transmit the first part of the sensor settings (Build 0949):***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART1 (H'E8')
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 freeze temperature set for heating mode (resolution 0.5°)
DATABYTE7 = 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 databytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART2 (H'E9')
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)
(1…9 = autosend when temperature changed)
(0 = autosend disabled)

***Transmit the third part of the sensor settings:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 databytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART3 (H'C6')
DATABYTE2 = Low temperature alarm setting (resolution 0.5°)
DATABYTE3 = High temperature alarm setting (resolution 0.5°)
DATABYTE4 = Lower temperature range cool mode (resolution 0.5°)
DATABYTE5 = Upper temperature range heat mode (resolution 0.5°)
DATABYTE6 = Calibration 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 = Differential (slave) sensor address (H'FF': no slave sensor)

***Transmit the fourth part of the sensor settings (Build 0949):***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART4 (H'B9')
DATABYTE2 = Minimum switching time *(Build 0949)*:

| 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 |

***Transmit the sensor configuration data:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_SENSOR_CONFIG_DATA (H'BB')
DATABYTE2 = Sensor configuration byte

| Contents | Configuration |
|---|---|
| 0xxxxxxx | One shot disabled |
| 1xxxxxxx | One shot enabled |
| x00xxxxx | 9 bit adc resolution |
| x01xxxxx | 10 bit adc resolution |
| x10xxxxx | 11 bit adc resolution |
| x11xxxxx | 12 bit adc resolution |
| xxx00xxx | 1 fault queue |
| xxx01xxx | 2 fault queue |
| xxx10xxx | 4 fault queue |
| xxx11xxx | 6 fault queue |
| xxxxx0xx | Active low output |
| xxxxx1xx | Active high output |
| xxxxxx0x | Comparator mode |
| xxxxxx1x | Interrupt mode (pulse) |
| xxxxxxx0 | Shutdown disabled |
| xxxxxxx1 | Shutdown enabled |

DATABYTE3 = Sensor limit set high byte (bit 7 = sign bit)
DATABYTE4 = Sensor limit set low byte (bits 3…0 always zero)
DATABYTE5 = Sensor hysteresis set high byte (bit 7 = sign bit)
DATABYTE6 = Sensor hysteresis set low byte (bits 3…0 always zero)
DATABYTE7 = Sensor output status (0 = low / 1 = high)

DATABYTE8 = Output time-out timer (0 = timed out)

***Transmits the module type (Build 1001 or lower):***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 databytes to send
DATABYTE1 = COMMAND_MODULE_TYPE (H'FF')
DATABYTE2 = NODETYPE_TEMPERATURE_SENSOR (H'0C')
DATABYTE3 = Sensor zone number
DATABYTE4 = Build year
DATABYTE5 = Build week

***Transmits the module type (Build 1233 or higher):***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_MODULE_TYPE (H'FF')
DATABYTE2 = NODETYPE_TEMPERATURE_SENSOR (H'0C')
DATABYTE3 = Sensor zone number
DATABYTE4 = Memory map version
DATABYTE5 = Serial number high
DATABYTE6 = Serial number low
DATABYTE7 = Build year
DATABYTE8 = Build week

***Transmits the first part of the sensor name:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_SENSOR_NAME_PART1 (H'F0')
DATABYTE2 = Sensor bit number ('00000001' = Sensor 1)
DATABYTE3 = Character 1 of the sensor name
DATABYTE4 = Character 2 of the sensor name
DATABYTE5 = Character 3 of the sensor name
DATABYTE6 = Character 4 of the sensor name
DATABYTE7 = Character 5 of the sensor name
DATABYTE8 = Character 6 of the sensor name

***Transmits the second part of the sensor name:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_SENSOR_NAME_PART2 (H'F1')
DATABYTE2 = Sensor bit number ('00000001' = Sensor 1)
DATABYTE3 = Character 7 of the sensor name
DATABYTE4 = Character 8 of the sensor name
DATABYTE5 = Character 9 of the sensor name
DATABYTE6 = Character 10 of the sensor name
DATABYTE7 = Character 11 of the sensor name
DATABYTE8 = Character 12 of the sensor name

***Transmits the third part of the sensor name:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 6 databytes to send
DATABYTE1 = COMMAND_SENSOR_NAME_PART3 (H'F2')
DATABYTE2 = Sensor bit number ('00000001' = Sensor 1)
DATABYTE3 = Character 13 of the sensor name
DATABYTE4 = Character 14 of the sensor name
DATABYTE5 = Character 15 of the sensor name
DATABYTE6 = Character 16 of the sensor name

Remarks:
Unused characters contain H'FF'.

***Transmits the memory data:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_MEMORY_DATA (H'FE')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'7F')
DATABYTE4 = memory data

***Transmits memory data block (4 bytes):***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the module
RTR = 0
DLC3...DLC0 = 7 databytes to send
DATABYTE1 = COMMAND_MEMORY_DATA_BLOCK (H'CC')
DATABYTE2 = High start address of memory block (must be H'00')
DATABYTE3 = LOW start address of memory block (H'00'...H'FF')
DATABYTE4 = memory data1
DATABYTE5 = memory data2
DATABYTE6 = memory data3
DATABYTE7 = memory data4

***Transmit: Updates LEDs on a push button module:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module for updating the LEDs
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_UPDATE_LED (H'F4')
DATABYTE2 = LED continuous on status (1 = LED on)
DATABYTE3 = LED slow blinking status (1 = LED slow blinking)
DATABYTE4 = LED fast blinking status (1 = LED fast blinking)

Remarks: The continuous on bit overrides the blinking modes.
If the slow and fast blinking bits for a LED are both on, the LED blinks very fast.

***Transmit: Clears LEDs on a push button module:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module for clearing LEDs
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_CLEAR_LED (H'F5')
DATABYTE2 = LED bit numbers (1 = clear LED)

***Transmit: Sets LEDs on a push button module:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module for setting LEDs on
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_SET_LED (H'F6')
DATABYTE2 = LED bit numbers (1 = set LED)

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

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module for slowly blinking LEDs
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_SLOW_BLINKING_LED (H'F7')
DATABYTE2 = LED bit numbers (1 = slow blink LED)

***Transmit: Blinks LEDs very fast on a push button module:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module for very fast blinking LEDs
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_VERYFAST_BLINKING_LED (H'F9')
DATABYTE2 = LED bit numbers (1 = very fast blink LED)

***Transmit: Bus error counter status***

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

***Transmit: Set target temperature of the differential sensor***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Differential sensor address
RTR = 0
DLC3...DLC0 = 3 databytes to send
DATABYTE1 = COMMAND_SET_TEMP (H'E4')
DATABYTE2 = 20 (index for current temperature set)
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 |
| | |
| 11000000 | -32°C |

***'Push button status' received:***

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

***'Clear Push button LED' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_CLEAR_LED (H'F5')
DATABYTE2 = LEDs to clear (a one clears the corresponding LED)

***'Update output LED status' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 databytes received
DATABYTE1 = COMMAND_UPDATE_LED_STATUS (H'F4')
DATABYTE2 = LED continuous on status (1 = LED on)
DATABYTE3 = LED slow blinking status (1 = LED slow blinking)
DATABYTE4 = LED fast blinking status (1 = LED fast blinking)

| Contents | Output LED |
|---|---|
| xxxxxxx1 | Heater |
| xxxxxx1x | Turbo heater/cooler |
| xxxxx1xx | Comfort or day mode |
| xxxx1xxx | Cooler |
| xxx1xxxx | Pump |
| xx1xxxxx | Low temperature alarm |
| x1xxxxxx | High temperature alarm |

Remarks:
The continuous on bit overrides the blinking modes.
If the slow and fast blinking bits for a LED are both on, the LED blinks very fast.

***'Clear output LED' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_CLEAR_LED (H'F5')
DATABYTE2 = LEDs to clear (a one clears the corresponding LED)

| Contents | Output LED |
|---|---|
| xxxxxxx1 | Heater |
| xxxxxx1x | Turbo heater/cooler |
| xxxxx1xx | Comfort or day mode |
| xxxx1xxx | Cooler |
| xxx1xxxx | Pump |
| xx1xxxxx | Low temperature alarm |
| x1xxxxxx | High temperature alarm |

***'Set output LED' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_SET_LED (H'F6')
DATABYTE2 = LEDs to set (a one sets the corresponding LED)

| Contents | Output LED |
|---|---|
| xxxxxxx1 | Heater |
| xxxxxx1x | Turbo heater/cooler |
| xxxxx1xx | Comfort or day mode |
| xxxx1xxx | Cooler |
| xxx1xxxx | Pump |
| xx1xxxxx | Low temperature alarm |
| x1xxxxxx | High temperature alarm |

***'Slow blinking output LED' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_SLOW_BLINKING_LED (H'F7')
DATABYTE2 = LEDs to blink slow (1 = slow blinking)

| Contents | Output LED |
|---|---|
| xxxxxxx1 | Heater |
| xxxxxx1x | Turbo heater/cooler |
| xxxxx1xx | Comfort or day mode |
| xxxx1xxx | Cooler |
| xxx1xxxx | Pump |
| xx1xxxxx | Low temperature alarm |
| x1xxxxxx | High temperature alarm |

***'Fast blinking output LED' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_FAST_BLINKING_LED (H'F8')
DATABYTE2 = LEDs to blink fast (1 = fast blinking)

| Contents | Output LED |
|---|---|
| xxxxxxx1 | Heater |
| xxxxxx1x | Turbo heater/cooler |
| xxxxx1xx | Comfort or day mode |
| xxxx1xxx | Cooler |
| xxx1xxxx | Pump |
| xx1xxxxx | Low temperature alarm |
| x1xxxxxx | High temperature alarm |

***'Very fast blinking output LED' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_VERYFAST_BLINKING_LED (H'F9')
DATABYTE2 = LEDs to clear (1 = very fast blinking)

| Contents | Output LED |
|---|---|
| xxxxxxx1 | Heater |
| xxxxxx1x | Turbo heater/cooler |
| xxxxx1xx | Comfort or day mode |
| xxxx1xxx | Cooler |
| xxx1xxxx | Pump |
| xx1xxxxx | Low temperature alarm |
| x1xxxxxx | High temperature alarm |

***'Module type request' command received:***

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

***'Bus error counter status request' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 databytes to send
DATABYTE1 = COMMAND_BUS_ERROR_CONTER_STATUS_REQUEST (H'D9')

***'Sensor temperature request' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_SENSOR_TEMP_REQUEST (H'E5')
DATABYTE2 = Autosend time interval into seconds
(valid range: 10…255s)
(1…9 = autosend when temperature changed)
(0 = autosend disabled)

***'Sensor status request' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_MODULE_STATUS_REQUEST (H'FA')
DATABYTE2 = don't care

***'Sensor settings request' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_REQUEST (H'E7')
DATABYTE2 = don't care

***'Sensor configuration data request' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_SENSOR_CONFIG_DATA _REQUEST (H'BA')
DATABYTE2 = don't care

***'Sensor name request' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_SENSOR_NAME_REQUEST (H'EF')
DATABYTE2 = don't care

***'Time statistics request' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_TIME_STATISTICS_REQUEST (H'C7')
DATABYTE2 = statistics mode index

| Contents | Time statistics request |
|---|---|
| 10000001 | Heating antifreeze mode time statistics |
| 10000010 | Heating night mode time statistics |
| 10000100 | Heating day mode time statistics |
| 10001000 | Heating comfort mode time statistics |
| 10010000 | Heating global time statistics |
| 01000001 | Cooling standby mode time statistics |
| 01000010 | Cooling night mode time statistics |
| 01000100 | Cooling day mode time statistics |
| 01001000 | Cooling comfort mode time statistics |
| 01010000 | Cooling global time statistics |

***'Lock local control' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_LOCK_LOCAL_CONTROL (H'E1')
DATABYTE2 = don't care

***'Unlock local control' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_UNLOCK_LOCAL_CONTROL (H'E2')
DATABYTE2 = don't care

***'Set heating mode' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_SET_HEATING_MODE (H'E0')
DATABYTE2 = don't care

***'Set cooling mode' command received:***

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

***'Read data from memory' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 databytes received
DATABYTE1 = COMMAND_READ_DATA_FROM_MEMORY (H'FD')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'7F')

***'Read data block from memory' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 databytes received
DATABYTE1 = COMMAND_READ_MEMORY_BLOCK (H'C9')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'FC')

***'Memory dump request' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the module
RTR = 0
DLC3...DLC0 = 1 databytes received
DATABYTE1 = COMMAND_MEMORY_DUMP_REQUEST (H'CB')

***'Set sensor zone number' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_SET_SENSOR_ZONE_NUMBER (H'C5')
DATABYTE2 = Zone number (0= no zone / 1…7 = valid zone)

Remark: The module answers with his type

***'Write data to memory' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 databytes received
DATABYTE1 = COMMAND_WRITE_DATA_TO_MEMORY (H'FC')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'FF')
DATABYTE4 = memory data to write

Remark:
Wait for 'memory data' feedback before sending a next command on the velbus.

***'Write memory block' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 databytes received
DATABYTE1 = COMMAND_WRITE_MEMORY_BLOCK (H'CA')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'FC')
DATABYTE4 = memory databyte1 to write
DATABYTE5 = memory databyte2 to write
DATABYTE6 = memory databyte3 to write
DATABYTE7 = memory databyte4 to write

Remark:
Wait for 'memory data block' feedback before sending a next command on the velbus.

***'Set default sleep time' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 databytes 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 (Build 0949):***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 databytes received
DATABYTE1 = COMMAND_SET_TEMP (H'E4')
DATABYTE2 = Pointer to temperature variable (0…20)

| Contents | Temperature variable |
|---|---|
| 0 | Current 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 factor (-8°…+7.5°C) |
| 12 | Reset minimum/maximum temperature |
| 13 | Reset time statistics |
| 14 | enable/disable anti-block valve/pump |
| 15 | Low temperature alarm set |
| 16 | High temperature alarm set |
| 17 | Lower temperature range cool mode |
| 18 | Upper temperature range heat mode |
| 19 | Differential sensor address (H'FF' = no diff. sensor) |
| 20 | Target temperature set for the differential sensor |
| 21 | Minimum switching time |

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 |
|---|---|
| 00000001 | Reset minimum temperature |
| 00000010 | Reset maximum temperature |

DATABYTE3 = Reset time statistics mode index

| Contents | Reset time statistics |
|---|---|
| 10000001 | Reset heating antifreeze mode time statistics |
| 10000010 | Reset heating night mode time statistics |
| 10000100 | Reset heating day mode time statistics |
| 10001000 | Reset heating comfort mode time statistics |
| 10010000 | Reset heating global time statistics |
| 01000001 | Reset cooling standby mode time statistics |
| 01000010 | Reset cooling night mode time statistics |
| 01000100 | Reset cooling day mode time statistics |
| 01001000 | Reset cooling comfort mode time statistics |
| 01010000 | Reset cooling global time statistics |

DATABYTE3 = Enable/disable unjamming heater valve & pump

| Contents | Enable/disable unjamming valve and pump |
|---|---|
| 00000000 | Disable unjamming heater valve & pump |
| 00000001 | Disable unjamming heater valve & enable unjamming pump |
| 00000010 | Enable unjamming heater valve & disable unjamming pump |
| 00000011 | Enable unjamming heater valve & pump |

DATABYTE3 = Minimum switching time *(Build 0949)*:

| 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 databytes received
DATABYTE1 = COMMAND_SWITCH_TO_COMFORT_MODE (H'DB')
DATABYTE2 = High byte of the sleep time
DATABYTE3 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains H'FF00', the command is a program step.
A sleep time between H'0001' and H'FEFF' (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 H'FFFF' puts the sensor into manual mode. Program steps will not be executed any more 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 databytes received
DATABYTE1 = COMMAND_SWITCH_TO_DAY_MODE (H'DC')
DATABYTE2 = High byte of the sleep time
DATABYTE3 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains H'FF00', the command is a program step.
A sleep time between H'0001' and H'FEFF' (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 H'FFFF' puts the sensor into manual mode. Program steps will not be executed any more 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 databytes received
DATABYTE1 = COMMAND_SWITCH_TO_NIGHT_MODE (H'DD')
DATABYTE2 = High byte of the sleep time
DATABYTE3 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains H'FF00', the command is a program step.
A sleep time between H'0001' and H'FEFF' (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 H'FFFF' 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 databytes received
DATABYTE1 = COMMAND_SWITCH_TO_SAFE_MODE (H'DE')
DATABYTE7 = High byte of the sleep time
DATABYTE8 = Low byte of the sleep time into minutes

Remark:
If the sleep time contains H'FF00', the command is a program step.
A sleep time between H'0001' and H'FEFF' (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 H'FFFF' 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.

***'Program availability' command received:***

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = H'00'
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_SENSOR_PROGRAM_AVAILABILITY (H'BC')
DATABYTE2 = Program availabitlity (0 = no program ; 1 = program available)
DATABYTE3 = Program type

| Contents | Day |
|---|---|
| 0…32 | Sensor program |
| 33 | All rooms program |
| 34 | Zone 1 program |
| 35 | Zone 2 program |
| 36 | Zone 3 program |
| 37 | Zone 4 program |
| 38 | Zone 5 program |
| 39 | Zone 6 program |
| 40 | Zone 7 program |
| 40…255 | Not valid |

DATABYTE4 = Sensor address

Remark:
This command will be received every time a program step is added, modified or deleted by the temperature controller VMB1TC.

## Memory map Build 0927 or 0947:

| *Address* | *Contents* | *Address* | *Contents* |
|---|---|---|---|
| H'0000' | Push button module address | H'0001' | Comfort mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0018' | Push button module address | H'0019' | Comfort mode push button 13 bit numbers |
| H'001A' | Push button module address | H'001B' | Day mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0032' | Push button module address | H'0033' | Day mode push button 13 bit numbers |
| H'0034' | Push button module address | H'0035' | Night mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'004C' | Push button module address | H'004D' | Night mode push button 13 bit numbers |
| H'004E' | Push button module address | H'004F' | Safe mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0066' | Push button module address | H'0067' | Safe mode push button 13 bit numbers |
| H'0068' | Push button module address | H'0069' | Heating mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0080' | Push button module address | H'0081' | Heating mode push button 13 bit numbers |
| H'0082' | Push button module address | H'0083' | Cooling mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'009A' | Push button module address | H'009B' | Cooling mode push button 13 bit numbers |
| H'009C' | Push button module address | H'009D' | Lock local control push button 1 bit numbers |
| ... | ... | ... | ... |
| H'00B4' | Push button module address | H'00B5' | Lock local control push button 13 bit numbers |
| H'00B6' | Push button module address | H'00B7' | Unlock local control push button 1 bit numbers |
| ... | ... | ... | ... |
| H'00CE' | Push button module address | H'00CF' | Unlock local control push button 13 bit numbers |
| H'00D0' | Not used | H'00D1' | Not used |
| | … | | … |
| H'00D8' | Not used | H'00D9' | Differential sensor address |
| H'00DA' | Calibration factor | H'00DB' | Lower temperature range cool mode |
| H'00DC' | Upper temp range heat mode | H'00DD' | Sensor zone number |
| H'00DE' | Low temperature alarm | H'00DF' | High temperature alarm |
| H'00E0' | Current program mode | H'00E1' | Current mode |
| H'00E2' | Current temperature set | H'00E3' | Comfort temp set for heating |
| H'00E4' | Day temp set for heating | H'00E5' | Night temp set for heating |
| H'00E6' | Safe temp set for heating | H'00E7' | Temp. difference for boost output or diff. sensor |
| H'00E8' | Hysteresis | H'00E9' | Comfort temp set for cooling |
| H'00EA' | Day temp set for cooling | H'00EB' | Night temp set for cooling |
| H'00EC' | Safe temp set for cooling | H'00ED' | Default sleep time high byte |
| H'00EE' | Default sleep time low byte | H'00EF' | Auto send time interval |
| H'00F0' | Sensor name character 1 | H'00F1' | Sensor name character 2 |
| ... | ... | ... | ... |
| H'00FE' | Sensor name character 15 | H'00FF' | Sensor name character 16 |

Remark:
Unused locations in the push button location contain H'FF'.
Unused characters for the sensor name contain H'FF'.

## Memory map Build 0949 or Build 1001:

| *Address* | *Contents* | *Address* | *Contents* |
|---|---|---|---|
| H'0000' | Push button module address | H'0001' | Comfort mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0012' | Push button module address | H'0013' | Comfort mode push button 10 bit numbers |
| H'0014' | Push button module address | H'0015' | Day mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0026' | Push button module address | H'0027' | Day mode push button 10 bit numbers |
| H'0028' | Push button module address | H'0029' | Night mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'003A' | Push button module address | H'003B' | Night mode push button 10 bit numbers |
| H'003C' | Push button module address | H'003D' | Safe mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'004E' | Push button module address | H'004F' | Safe mode push button 10 bit numbers |
| H'0050' | Push button module address | H'0051' | Heating mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0062' | Push button module address | H'0063' | Heating mode push button 10 bit numbers |
| H'0064' | Push button module address | H'0065' | Cooling mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0076' | Push button module address | H'0077' | Cooling mode push button 10 bit numbers |
| H'0078' | Push button module address | H'0079' | Lock local control push button 1 bit numbers |
| ... | ... | ... | ... |
| H'008A' | Push button module address | H'008B' | Lock local control push button 10 bit numbers |
| H'008C' | Push button module address | H'008D' | Unlock local control push button 1 bit numbers |
| ... | ... | ... | ... |
| H'009E' | Push button module address | H'009F' | Unlock local control push button 10 bit numbers |
| H'00A0' | Push button module address | H'00A1' | Normal open disable switch 1 bit numbers |
| ... | ... | ... | ... |
| H'00B2' | Push button module address | H'00B3' | Normal open disable switch 10 bit numbers |
| H'00B4' | Push button module address | H'00B5' | Normal closed disable switch 1 bit numbers |
| ... | ... | ... | ... |
| H'00C6' | Push button module address | H'00C7' | Normal closed disable switch 10 bit numbers |
| H'00C8' | Not used | H'00C9' | Not used |
| | … | | … |
| H'00D6' | Not used | H'00D7' | Not used |
| H'00D8' | Min switching time | H'00D9' | Differential sensor address |
| H'00DA' | Calibration factor | H'00DB' | Lower temperature range cool mode |
| H'00DC' | Upper temp range heat mode | H'00DD' | Sensor zone number |
| H'00DE' | Low temperature alarm | H'00DF' | High temperature alarm |
| H'00E0' | Current program mode | H'00E1' | Current mode |
| H'00E2' | Current temperature set | H'00E3' | Comfort temp set for heating |
| H'00E4' | Day temp set for heating | H'00E5' | Night temp set for heating |
| H'00E6' | Safe temp set for heating | H'00E7' | Temp. difference for boost output or diff. sensor |
| H'00E8' | Hysteresis | H'00E9' | Comfort temp set for cooling |
| H'00EA' | Day temp set for cooling | H'00EB' | Night temp set for cooling |
| H'00EC' | Safe temp set for cooling | H'00ED' | Default sleep time high byte |
| H'00EE' | Default sleep time low byte | H'00EF' | Auto send time interval |
| H'00F0' | Sensor name character 1 | H'00F1' | Sensor name character 2 |
| ... | ... | ... | ... |
| H'00FE' | Sensor name character 15 | H'00FF' | Sensor name character 16 |

## Memory map Build 1233 & 1234:

| *Address* | *Contents* | *Address* | *Contents* |
|---|---|---|---|
| H'0000' | Push button module address | H'0001' | Comfort mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0012' | Push button module address | H'0013' | Comfort mode push button 10 bit numbers |
| H'0014' | Push button module address | H'0015' | Day mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0026' | Push button module address | H'0027' | Day mode push button 10 bit numbers |
| H'0028' | Push button module address | H'0029' | Night mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'003A' | Push button module address | H'003B' | Night mode push button 10 bit numbers |
| H'003C' | Push button module address | H'003D' | Safe mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'004E' | Push button module address | H'004F' | Safe mode push button 10 bit numbers |
| H'0050' | Push button module address | H'0051' | Heating mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0062' | Push button module address | H'0063' | Heating mode push button 10 bit numbers |
| H'0064' | Push button module address | H'0065' | Cooling mode push button 1 bit numbers |
| ... | ... | ... | ... |
| H'0076' | Push button module address | H'0077' | Cooling mode push button 10 bit numbers |
| H'0078' | Push button module address | H'0079' | Lock local control push button 1 bit numbers |
| ... | ... | ... | ... |
| H'008A' | Push button module address | H'008B' | Lock local control push button 10 bit numbers |
| H'008C' | Push button module address | H'008D' | Unlock local control push button 1 bit numbers |
| ... | ... | ... | ... |
| H'009E' | Push button module address | H'009F' | Unlock local control push button 10 bit numbers |
| H'00A0' | Push button module address | H'00A1' | Normal open disable switch 1 bit numbers |
| ... | ... | ... | ... |
| H'00B2' | Push button module address | H'00B3' | Normal open disable switch 10 bit numbers |
| H'00B4' | Push button module address | H'00B5' | Normal closed disable switch 1 bit numbers |
| ... | ... | ... | ... |
| H'00C6' | Push button module address | H'00C7' | Normal closed disable switch 10 bit numbers |
| H'00C8' | Not used | H'00C9' | Not used |
| H'00CA' | Not used | H'00CB' | Not used |
| H'00CC' | Zone address | H'00CD' | Module address |
| H'00CE' | Serial number high | H'00CF' | Serial number low |
| H'00D0' | Not used | H'00D1' | Not used |
| | … | | … |
| H'00D6' | Not used | H'00D7' | Not used |
| H'00D8' | Min switching time | H'00D9' | Differential sensor address |
| H'00DA' | Calibration factor | H'00DB' | Lower temperature range cool mode |
| H'00DC' | Upper temp range heat mode | H'00DD' | Sensor zone number |
| H'00DE' | Low temperature alarm | H'00DF' | High temperature alarm |
| H'00E0' | Current program mode | H'00E1' | Current mode |
| H'00E2' | Current temperature set | H'00E3' | Comfort temp set for heating |
| H'00E4' | Day temp set for heating | H'00E5' | Night temp set for heating |
| H'00E6' | Safe temp set for heating | H'00E7' | Temp. difference for boost output or diff. sensor |
| H'00E8' | Hysteresis | H'00E9' | Comfort temp set for cooling |
| H'00EA' | Day temp set for cooling | H'00EB' | Night temp set for cooling |
| H'00EC' | Safe temp set for cooling | H'00ED' | Default sleep time high byte |
| H'00EE' | Default sleep time low byte | H'00EF' | Auto send time interval |
| H'00F0' | Sensor name character 1 | H'00F1' | Sensor name character 2 |
| ... | ... | ... | ... |
| H'00FE' | Sensor name character 15 | H'00FF' | Sensor name character 16 |

Remark:
Addresses 0xCC … 0xCF are write protected

Unused locations in the push button location contain H'FF'.
Unused characters for the sensor name contain H'FF'.

Differential sensor address:
Contains the address of the slave sensor to make a differential thermostat. The target temperature of the slave sensor follows the measured temperature of the current sensor plus or minus the value definied by the temperature difference for boost output.
The default is no differential thermostat (address set to H'FF').

Minimum switching time *(Build 0949)*:

| 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 |

Current program mode:

| Contents | Operating mode |
|---|---|
| xxxxx0xx | No sensor program |
| xxxxx1xx | Sensor program available |
| xxxx0xxx | No zone program |
| xxxx1xxx | Zone program available |
| 0xxxxxxx | No all rooms program |
| 1xxxxxxx | All rooms program 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 |

Current mode:

| Contents | Operating mode |
|---|---|
| xxxxxxx1 | Mode push button locked |
| xxxxxxx0 | Mode push button unlocked |
| 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) |
| 1000xxxx | Cooler mode |
| 0xxxxxxx | Heater mode |

Current, comfort, day, night, safe, low alarm, high alarm, lower cool, upper heat temperature set (resolution 0.5°) *(Build 1001)*:

| 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 |

Hysteresis (resolution 0.5°) *(Build 0949)*:

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

Temperature difference (resolution 0.5°):

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

Calibration 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 |

Default sleep time into minutes: valid range H'0001' to H'FEFF' or 1min to 65.279min
Auto send temperature time interval into seconds: valid range: 10…255s
1…9 = send if temperature is changed
0 = auto send disabled