



EP5000-M air quality probe Modbus protocol

Ver	Date	Update
V1	25/05/2018	Initial version
V2	26/05/2018	Remove ASCII traces
V3	06/06/2018	CRC in detail
V4	09/06/2018	Details
V5	27/06/2018	Status code extended
V6	22/11/2018	PM added + registration for POE
V7	29/01/2019	New sensors data (Pressure, Sound) and sensors presence
V8	24/08/2019	Updates
V9	29/10/2019	Lux and light color T° sensor data added
V10	07/11/2019	Flickering, absolute humidity, FRU and physio added + reorganization
V11	08/02/2020	LEDs dimming & management added
V12	15/04/2020	Bus speed updated to 19200 bauds
V13	07/05/2020	Atmospheric pressure unit in mbar
V14	19/05/2020	FRU update
V15	05/06/2020	Remote LEDs control
V16	07/07/2020	Change in remote LED control, Move dimming register. Add command register (register 27)
V17	17/09/2020	Extend command register for flushing opportunity for better ABC
V18	15/10/2020	Outdoor air quality probe data + risk of virus diffusion index

Summary

Summary	2
Modbus Protocol.....	3
RTU communication	3
Function Field "Function"	3
Number of data Field	4
Data Field: "Data Field"	4
Request from the master:.....	4
Read access: Function = 4 (0x04)	4
Description of read records:	5
Write access: Function = 16 (0x10)	16
Response to master when using function 16 (0x10)	16
CRC16 calculation	17

Modbus Protocol

The Modbus protocol allows a master unit to access up to 255 slave units connected on a single bus. Each slave is assigned an address that distinguishes it from other slaves connected to the bus.

By default, the bus address is 1 and shall be changed via NFC. The baud rate can also be changed by NFC.

The bus address is settable by NFC. By default, the address is 1.

Transactions can be only initiated by the master and are of two types:

- Question / answer One slave is addressed
- Broadcast / no answer All slaves are addressed, but they shall not reply

Characteristics used for communication with Modbus protocol:

Characteristics	RTU (8 bits)
coding System	Binary
Number of bits par character	10
Start bits	1
data bits (least significant first)	8
Parity (optional)	No parity
Stop bits	1
Error Checking	CRC16
Default baud rate (settable via NFC)	19200

RTU communication

RTU mode transmission is in binary. Termination of the frame is determined by a time of silence of about 3.5 bytes (about 30ms at 9600 bauds)

MASTER

ADDRESS	FUNCTION	DATA	ERROR CHECK
8-BITS	8BITS	N X 16-BITS	CRC 16 BITS

SLAVE

ADDRESS	FUNCTION	NUMBER OF DATA BYTES	DATA	ERROR CHECK
8-BITS	8BITS	8BITS	N X 16-BITS	CRC 16 16 BITS

Function Field "Function"

The function code tells the recipient slave which function to address.

CODE	MEANING	ACTION
01	READ COIL STATUS	Obtains current status, (ON/OFF), of a group of logic coils.
02	READ INPUT STATUS	Obtains current status, (ON/OFF), of a group of discrete inputs.
03	READ HOLDING REGISTER	Obtains current binary value in one or more holding registers.
04	READ INPUT REGISTER	Obtains current binary value in one or more input registers.
05	FORCE SINGLE COIL	Force logic coil to a state of ON or OFF.
06	PRESET SINGLE REGISTER	Place a specific binary value into a holding register.
15	WRITE MULTIPLE COILS	Force a group of logic coils to a defined state.
16	PRESET MULTIPLE REGISTERS	Place specific binary values into a group of holding registers.

Number of data Field

This field contains a number indicating the number of bytes in the Data fields.

Data Field: "Data Field"

Data field contains information necessary for the slave to process the command sent by the master, or contains information that is sent in response by the slave to the master.

Request from the master:

INPUT MODE: Function = 4

FIRST REGISTER	NUMBER OF REGISTERS TO READ
16-BIT	16-BIT

WRITE MULTIPLE REGISTERS: Function = 16

REGISTER'S ADDRESS	NUMBER OF REGISTERS TO WRITE	BYTE COUNT	VALUE(S) TO WRITE
16-BIT	16-BIT	8-BIT	16-BIT

The address of the first register is 0

Read access: Function = 4 (0x04)

REGISTER # 1: PRODUCT CODE	REGISTER # 2: FIRMWARE VERSION	REGISTER #3: SENSORS PRESENCE	REGISTER #4: BIT STATUS	REGISTER # 5: BUILT IN TEST EQUIPMENT / FRU
16-BITS	4-CHAR = 16-BITS	16-BITS	16-BITS	16-BITS

REGISTER # 6: CO2 CONCENTRATION	REGISTER # 7: VOC CONCENTRATION	REGISTER # 8: TEMPERATURE	REGISTER # 9: RELATIVE HUMIDITY	REGISTER # 10: ABSOLUTE HUMIDITY
16-BITS	16-BITS	16-BITS	16-BITS	16-BITS

REGISTER #11: ATMOS. PRESSURE	REGISTER # 12: PM10	REGISTER # 12: PM2.5	REGISTER # 14: PM1	REGISTER #15: AVERAGE NOISE LEVEL
	16-BITS	16-BITS	16-BITS	16-BITS

REGISTER # 16: PEAK NOISE LEVEL	REGISTER # 17: LUX	REGISTER # 18: LIGHT COLOR T°	REGISTER # 19: LIGHT FLICKERING	REGISTER # 20: ON OFF VENTILATION COMMAND
16-BITS	16-BITS	16-BITS	16-BITS	16-BITS

REGISTER # 21: LINEAR VENTILATION COMMAND	REGISTER #: 22 HEATER COMMAND IN %	REGISTER #: 23 COOLING COMMAND IN %	REGISTER #24: COGNITIVITY INDEX	REGISTER # 25: QUALITY OF SLEEP INDEX
16-BITS	16-BITS	16-BITS	16-BITS	16-BITS

REGISTER #26: HEALTH INDEX	REGISTER # 27: RISK OF VIRUS SPREADING INDEX	REGISTER # 28: IAQ PROBE FLOOR	REGISTER # 29: ACTION CODE	REGISTER # 30: STREET FAÇADE T°
16-BITS	16-BITS			16-BITS

REGISTER # 31: STREET FAÇADE RH	REGISTER # 32: STREET FAÇADE PM10	REGISTER # 33: STREET FAÇADE PM2.5	REGISTER # 34: STREET FAÇADE PM1	REGISTER # 35: STREET FAÇADE NO2
16-BITS	16-BITS	16-BITS	16-BITS	16-BITS
REGISTER # 36: STREET FAÇADE O3	REGISTER # 37: STREET FAÇADE AVERAGE NOISE	REGISTER # 38: STREET FAÇADE PEAK NOISE	REGISTER # 39: RESERVED	REGISTER # 40: BACKYARD FAÇADE T°
16-BITS	16-BITS	16-BITS	16-BITS	16-BITS
REGISTER # 41: BACKYARD FAÇADE RH	REGISTER # 42: BACKYARD FAÇADE PM10	REGISTER # 43: BACKYARD FAÇADE PM2.5	REGISTER # 44: BACKYARD FAÇADE PM1	REGISTER # 45: BACKYARD FAÇADE NO2
16-BITS	16-BITS	16-BITS	16-BITS	16-BITS
REGISTER # 46: BACKYARD FAÇADE O3	REGISTER # 47: BACKYARD FAÇADE AVERAGE NOISE	REGISTER # 48: BACKYARD FAÇADE PEAK NOISE	REGISTER #49: RESERVED	REGISTER # 50: REMOTE LED
16-BITS	16-BITS	16-BITS	16-BITS	16-BITS
REGISTER # 51: LED DIMMING	REGISTER #52: REMEDIAION ON VALUE OR PHYSIOLOGICAL EFFECTS	REGISTER #53: CO2 SET POINT	REGISTER # 54: VOC SET POINT	REGISTER # 55: RH SET POINT
16-BITS	16-BITS	16-BITS	16-BITS	16-BITS
REGISTER # 56: PM2.5 SET POINT	REGISTER # 57: PRODUCTIVITY SETPOINT	REGISTER # 58: QUALITY OF SLEEP SETPOINT	REGISTER # 59: HEALTH SETPOINT	REGISTER # 60: HEATING SETPOINT
16-BITS	16-BITS	16-BITS	16-BITS	16-BITS
REGISTER # 61: COOLING SETPOINT	REGISTER #62: IP RESERVED or NETWORK REGISTRATION			
16-BITS	16-BITS			

Description of read records:

PRODUCT CODE: Register #1 (address 0)

2-CHAR (16-BITS):

01	E5000
02	P5000
03	EP5000
04	AAQ

FIRMWARE VERSION: Register #2 (address 1)

16-BITS

SENSOR PRESENCE: Register #3 (address 2)

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
-----	-----	-----	-----	-----	-----	----	----	----	----	----	----	----	----	----	----

- BIT 0: 0 → CO2 sensor not present
1 → CO2 sensor present
- BIT 1: 0 → VOCT sensor not present
1 → VOCT sensor present
- BIT 2: 0 → Temperature sensor not present
1 → Temperature sensor present
- BIT 3: 0 → Humidity sensor not present
1 → Humidity sensor present
- BIT 4: 0 → Particles PM1 sensor not present
1 → Particles PM1 sensor present
- BIT 5: 0 → Particles PM2.5 sensor not present
1 → Particles PM2.5 sensor present
- BIT 6: 0 → Particles PM10 sensor not present
1 → Particles PM10 sensor present
- BIT 7: 0 → Pressure sensor not present
1 → Pressure sensor present
- BIT 8: 0 → Sound sensor not present
1 → Sound sensor present
- BIT 9: 0 → Lux sensor not present
1 → Lux sensor present
- BIT 10: 0 → Light Color T° sensor not present
1 → Light color T° sensor present
- BIT 11: 0 → Flickering sensor not present
1 → Flickering sensor present
- BIT 12: Reserved
- BIT 13: Reserved
- BIT 14: Reserved
- BIT 15: Reserved

BIT STATUS: Register #4 (address 3)

Each failure is allocated to a specific bit so combination of failures can be indicated

	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
CO2 sensor failure																X
VOC sensor failure															X	
T° & RH Sensor Failure														X		
Particles sensor Failure													X			
Pressure sensor												X				

Failure																
Sound sensor Failure										X						
Light sensor failure										X						
NFC EEPROM default									X							
Power supply too low								X								
Power supply too high							X									
T° too high						X										
T° too low					X											
Sensors life span overpassed				X												
Modbus integrity failure			X													
LED driver failure		X														
Reserved	X															

BUILT IN TEST FRU: REGISTER #5 (address 4)

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
-----	-----	-----	-----	-----	-----	----	----	----	----	----	----	----	----	----	----

- BIT 0: 0 → Front PCB FRU to be replaced
1 → Front PCB FRU OK
- BIT 1: 0 → Single band CO2 sensor module to be replaced
1 → Single band CO2 sensor module OK
- BIT 2: 0 → Dual band CO2 sensor module to be replaced
1 → Dual band CO2 sensor module OK
- BIT 3: 0 → VOC sensor module to be replaced
1 → VOC sensor module OK
- BIT 4: 0 → Main board PCB to be replaced
1 → Main board PCB OK
- BIT 5: 0 → Inter board PCB to be replaced
1 → Inter board PCB OK
- BIT 6: 0 → Particles sensor to be replaced
1 → Particles sensor OK
- BIT 7: 0 → Power supply PCB to be replaced
1 → Power supply PCB OK
- BIT 8: 0 → Multiple boards default
1 → No multiple default
- BIT 9: 0 → End of life of replaceable sensor
1 → No end of life of replaceable sensor
- BIT 10: Reserved
- BIT 11: Reserved
- BIT 12: Reserved
- BIT 13: Reserved
- BIT 14: Reserved
- BIT 15: Reserved

CO2 CONCENTRATION (in ppm): Register #6 (address 5)

16-BITS:
 Bit 0 to 14: Value
 Bit 15 = 1: Saturation
 Unit: ppm
 Range: 5000ppm
 Resolution: 1 ppm/LSB

VOC CONCENTRATION (in µg/m3): Register #7 (address 6)

16-BITS:
 Bit 0 to 14: Value
 Bit 15 = 1: Saturation
 Unit: µg/m³
 Range: 65 520 µg/m³
 Resolution: 28 µg/m³/LSB

TEMPERATURE (in 0.1 °C): Register # 8 (address 7)

16-BITS

16 bits = temperature value (signed)

Examples

0°C = 0

12,9°C (value sent: 129) = 129 (decimal)

-5°C (value sent: -50) = -32718 (decimal) (complement at 2 on 16 bits: 1 bit for sign + 15 bits for value)

Range of measurement 0 to +50°C

Resolution: 0,1°C/LSB

RELATIVE HUMIDITY in %: Register # 9 (address 8)

2-CHAR (16-BITS):

16 bits = humidity value (not signed)

Unit: %RH

Valid range: 0/200 LSB

Range of measurement: 0 to 100%RH

Resolution: 0,5%/LSB

ABSOLUTE HUMIDITY in g/m³: Register # 10 (address 9)

2-CHAR (16-BITS):

16 bits = humidity value (not signed)

Range: NA, calculated from RH & T°

Resolution: 0.1g/m³

PRESSURE in 0.1 mbar: Register # 11 (address 10)

2-CHAR (16-BITS):

16 bits = pressure value (not signed)

Valid Range: 0/16 384 LSB

Range of measurement: 0 to 1638.4 mbar

Resolution: 0.1 mbar / LSB

PM10 in µg/m³: Register # 12 (address 11)

2-CHAR (16-BITS):

16 bits = PM10 value (not signed)

Valid range: 0/1000 LSB

Range of measurement 0 to 1000 µg/m³

Resolution: 1 µg/m³/LSB

PM2.5 in µg/m³: Register # 13 (address 12)

2-CHAR (16-BITS):

16 bits = PM2.5 value (not signed)

Valid range: 0/1000 LSB

Range of measurement 0 to 1000 µg/m³

Resolution: 1 µg/m³/LSB

PM1 in µg/m³: Register # 14 (address 13)

2-CHAR (16-BITS):

16 bits = PM1 value (not signed)

Valid range: 0/1000 LSB

Range of measurement 0 to 1000 µg/m³

Resolution: 1 µg/m³/LSB

AVERAGE SOUND LEVEL: Register # 15 (address 14)

2-CHAR (16-BITS):

16 bits = Sound average value (not signed)

Period of measurement: 30 seconds

Unit: dBa

Valid Range: 0/122 LSB

Resolution: 1 dBa/LSB

PEAK SOUND LEVEL: Register # 16 (address 15)

2-CHAR (16-BITS):
 16 bits = Sound peak value (not signed)
 Period of measurement: 30 seconds
 Unit: dBa
 Valid Range: 0/122 LSB
 Resolution: 1 dBa/LSB

LUX: Register # 17 (address 16)

2-CHAR (16-BITS):
 16 bits = Lux value (not signed)
 Valid Range: 0/30 000 LSB
 Range of measurement 0 to 30 000 Lux
 Resolution: 1 lux / LSB

LIGHT COLOR T°: Register # 18 (address 17)

2-CHAR (16-BITS):
 16 bits = Light color T° value (not signed)
 Unit: Degree Kelvin
 Valid Range: 0/65 535 LSB
 Range of measurement 600°K to 10 000°K
 Resolution: 1°K / LSB

LIGHT FLICKERING in %: Register # 19 (address 18)

2-CHAR (16-BITS):
 16 bits = Light flickering value (not signed)
 Unit: Percent
 Resolution: 1%/LSB

2 SPEEDS VENTILATION ON OFF COMMAND: Register # 20 (address19)

2-CHAR (16-BITS):
 Character 1: Fan Speed 1
 Character 2: Fan Speed 2

00: Ventilation Off
 FF: Ventilation ON

Example:

- Fan 1 ON
- Fan 2 OFF

REGISTER #20 : ON OFF 2 FAN SPEEDS COMMAND			
Character 1		Character 2	
F	F	0	0
4-CHAR = 16-BITS			

LINEAR VENTILATION COMMAND: Register # 21 (address 20)

2-CHAR (16-bit)
 Value between 0 and 100%. This value can be used to control ventilation in continues. To be noted that to keep the building health a minimum of 10% is applied.
 For Automatic Baseline Calibration of CO2 and VOC sensors, the ventilation will be activated at 100% during 30 minutes once every 15 days.

HEATING COMMAND LINEAR: Register # 22 (address 21)

2-CHAR (16-bit)
 Value between 0 and 100%. This value can be used to control heating in continues.

COOLING COMMAND LINEAR: Register # 23 (address 22)

2-CHAR (16-bit)

Value between 0 and 100%. This value can be used to control air conditioning in continues.

COGNITIVITY INDEX: Register # 24 (address 23)

2-CHAR (16-bit)

Cognitivity / productivity

Value between 0 and 100%

QUALITY OF SLEEP INDEX: Register # 25 (address 24)

2-CHAR (16-bit)

Quality of sleep

Value between 0 and 100%

HEALTH INDEX: Register # 26 (address 25)

2-CHAR (16-bit)

RISK OF VIRUS SPREADING INDEX: Register # 27 (address 26)

2-CHAR (16-bit)

Value between 0 and 100%

ACTION CODE: Register # 28 (address 27)

Launch an action via Modbus and read the status:

- Calibrate CO2 sensor:
 - o 0xCA00 : A calibration has been requested
 - o 0xCA01 : A calibration is underway (the 20 minutes' calibration count down has been launched)
 - o 0xCA02 : The calibration has been performed successfully
 - o 0xCA03 : The calibration has failed

- Air flushing opportunity for ABC:
 - o 0xF701 : A flushing opportunity has occurred (once an hour to 4 time per day)
 - o 0xF700 : The flushing opportunity has been interrupted (occupancy detected)

IAQ PROBE STORRY°: Register # 29 (address 28)

2-CHAR (16-bit)

Depending of the altitude the IAQ probe (considered installed at ground floor level), the outdoor air quality will be adjusted.

STREET FAÇADE T°: Register # 30 (address 29)

2-CHAR (16-bit)

Outdoor temperature on street façade

16 bits = temperature value (signed)

Examples

0°C = 0

12,9°C (value sent: 129) = 129 (decimal)

-5°C (value sent: -50) = -32718 (decimal) (complement at 2 on 16 bits: 1 bit for sign + 15 bits for value)

Range of measurement -20 to +50°C

Resolution: 0,1°C/LSB

STREET FAÇADE RELATIVE HUMIDITY in %: Register # 31 (address 30)

2-CHAR (16-BITS):

16 bits = humidity value (not signed)

Unit: %RH

Valid range: 0/200 LSB

Range of measurement: 0 to 100%RH

Resolution: 0,5%/LSB

STREET FAÇADE PM10 in µg/m3: Register # 32 (address 31)

2-CHAR (16-BITS):
16 bits = PM10 value (not signed)
Valid range: 0/1000 LSB
Range of measurement 0 to 1000 µg/m³
Resolution: 1 µg/m³/LSB

STREET FAÇADE PM2.5 in µg/m3: Register # 33 (address 32)

2-CHAR (16-BITS):
16 bits = PM2.5 value (not signed)
Valid range: 0/1000 LSB
Range of measurement 0 to 1000 µg/m³
Resolution: 1 µg/m³/LSB

STREET FAÇADE PM1 in µg/m3: Register # 34 (address 33)

2-CHAR (16-BITS):
16 bits = PM1 value (not signed)
Valid range: 0/1000 LSB
Range of measurement 0 to 1000 µg/m³
Resolution: 1 µg/m³/LSB

STREET FAÇADE NO2: Register # 35 (address 34)

2-CHAR (16-BITS):
Valid range 200 µg/m³
Resolution: 0.2 µg/m³/LSB

STREET FAÇADE O3: Register # 36 (address 35)

2-CHAR (16-BITS):
Valid range 200 µg/m³
Resolution: 0.2 µg/m³/LSB

STREET FAÇADE AVERAGE SOUND LEVEL: Register # 37 (address 36)

2-CHAR (16-BITS):
16 bits = Sound average value (not signed)
Period of measurement: 30 seconds
Unit: dBA
Valid Range: 0/122 LSB
Resolution: 1 dBA/LSB

STREET FAÇADE PEAK SOUND LEVEL: Register # 38 (address 37)

2-CHAR (16-BITS):
16 bits = Sound peak value (not signed)
Period of measurement: 30 seconds
Unit: dBA
Valid Range: 0/122 LSB
Resolution: 1 dBA/LSB

RESERVED: Register # 39 (address 38)

BACKYARD FAÇADE T°: Register # 40 (address 39)

2-CHAR (16-bit)
Outdoor temperature on street façade
16 bits = temperature value (signed)

Examples
0°C = 0
12,9°C (value sent: 129) = 129 (decimal)

-5°C (value sent: -50) = -32718 (decimal) (complement at 2 on 16 bits: 1 bit for sign + 15 bits for value)

Range of measurement -20 to +50°C

Resolution: 0,1°C/LSB

BACKYARD FAÇADE RELATIVE HUMIDITY in %: Register # 41 (address 40)

2-CHAR (16-BITS):

16 bits = humidity value (not signed)

Unit: %RH

Valid range: 0/200 LSB

Range of measurement: 0 to 100%RH

Resolution: 0,5%/LSB

BACKYARD FAÇADE PM10 in µg/m³: Register # 42 (address 41)

2-CHAR (16-BITS):

16 bits = PM10 value (not signed)

Valid range: 0/1000 LSB

Range of measurement 0 to 1000 µg/m³

Resolution: 1 µg/m³/LSB

BACKYARD FAÇADE PM2.5 in µg/m³: Register # 43 (address 42)

2-CHAR (16-BITS):

16 bits = PM2.5 value (not signed)

Valid range: 0/1000 LSB

Range of measurement 0 to 1000 µg/m³

Resolution: 1 µg/m³/LSB

BACKYARD FAÇADE PM1 in µg/m³: Register # 44 (address 43)

2-CHAR (16-BITS):

16 bits = PM1 value (not signed)

Valid range: 0/1000 LSB

Range of measurement 0 to 1000 µg/m³

Resolution: 1 µg/m³/LSB

BACKYARD FAÇADE NO2: Register # 45 (address 44)

2-CHAR (16-BITS):

Valid range 200 µg/m³

Resolution: 0.2 µg/m³/LSB

BACKYARD FAÇADE O3: Register # 46 (address 45)

2-CHAR (16-BITS):

Valid range 200 µg/m³

Resolution: 0.2 µg/m³/LSB

BACKYARD FAÇADE AVERAGE SOUND LEVEL: Register # 47 (address 46)

2-CHAR (16-BITS):

16 bits = Sound average value (not signed)

Period of measurement: 30 seconds

Unit: dBA

Valid Range: 0/122 LSB

Resolution: 1 dBA/LSB

BACKYARD FAÇADE PEAK SOUND LEVEL: Register # 48 (address 47)

2-CHAR (16-BITS):

16 bits = Sound peak value (not signed)

Period of measurement: 30 seconds

Unit: dBA

Valid Range: 0/122 LSB

RESERVED: Register # 49 (address 48)

REMOTE LEDs: Register # 50 (address 49)

2-CHAR (16-bit)

BIT 0 : 0 → LED Flag Remote Off
1 → LED Flag Remote ON

BIT 1 & 2: Blue and yellow LEDs driving mode
00 → ON / OFF mode
01 → Slow breathing mode
10 → Fast breathing mode
11 → Reserved (assumed ON / OFF)

BIT 3 : 0 → Blue LED Off
1 → Blue LED active

BIT 4 : 0 → Yellow LED Off
1 → Yellow LED active

BIT 5: 0 → Window Green left LED Off
1 → Window Green left LED On

BIT 6: 0 → Window Red left LED Off
1 → Window Red left LED On

BIT 7: 0 → Window Green right LED Off
1 → Window Green right LED On

BIT 8: 0 → Window Red right LED Off
1 → Window Red right LED On

There is no red central LED remote control as it is reserved to failures detected by the probe itself and will override the remote led driving.

LEDs DIMMING: Register # 51 (address 50)

REGISTER #29 : LEDs DIMMING	
Byte 1	Byte 0
LED Dimming (%)	LEDs Rules
16-BITS	

2-CHAR (16-bit)
Byte 0: LEDs Rules
Byte 1: LEDs Dimming in %

LEDS dimming
Value between 0 and 100%

BIT 0: 0 → Dimming on physiological effects
1 → Dimming on thresholds

BIT 1: 0 → Off at night
1 → On at night

BIT 2: 0 → 100% of dimming set point at night (if Bit 1 at 1)
1 → 10% of dimming set point at night (if Bit 1 at 1)

REMEDICATION ON THRESHOLD OR PHYSIOLOGICAL EFFECTS: Register # 52 (address 51)

2-CHAR (16-BITS):

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
-----	-----	-----	-----	-----	-----	----	----	----	----	----	----	----	----	----	----

BIT 0: 0 → Thresholds on concentration setpoints with OR
 1 → Physiological effects

BIT 1: 0 → Health not taken into account in Physiological effects
 1 → Health taken into account in Physiological effects

BIT 2: 0 → Productivity / cognitivity taken into account in Physiological effects
 1 → Quality of sleep taken into account in Physiological effects

CO2 SET POINT: Register 53 (address 52)

2-CHAR (16-bit)
 Same as measure

VOC SET POINT: Register # 54 (address 53)

2-CHAR (16-bit)
 Same as measure

RH SET POINT: Register # 55 (address 54)

2-CHAR (16-bit)

PM2.5 SET POINT: Register # 56 (address 55)

2-CHAR (16-bit)
 Same as measure

PRODUCTIVITY SET POINT: Register # 57 (address 56)

2-CHAR (16-bit)
 Value between 0 and 100%

QUALITY OF SLEEP SET POINT: Register # 58 (address 57)

2-CHAR (16-bit)
 Value between 0 and 100%

HEALTH SET POINT: Register # 59 (address 58)

2-CHAR (16-bit)
 Value between 0 and 100%

HEATING SETPOINT (in 0.1 °C): Register # 60 (address 59)

2-CHAR (16-BITS)
 16 bits = temperature value (unsigned)
 Examples
 20.9°C (value sent: 209) = 209 (decimal)

COOLING SETPOINT (in 0.1 °C): Register # 61 (address 60)

2-CHAR (16-BITS)
 16 bits = temperature value (unsigned)
 Examples
 28.9°C (value sent: 289) = 289 (decimal)

IP NETWORK REGISTRATION: Register # 62 (address 61)
(Specific to POE version with external POE interface)

16-BITS
 Byte 1: = 00 and Byte 2: FF: Registration requested

Byte 1: = FF and Byte 2: 00: Registration acknowledged, no request

REGISTER #40 : IP NETWORK REGISTRATION			
Byte 1		Byte 2	
F	F	0	0
16-BITS			

Write access: Function = 16 (0x10)

Only registers 28 to 62 are writable to allow adjustment of ventilation, heating and cooling set points, LED dimming and registration request.

Response to master when using function 16 (0x10)

Write acknowledge:

FUNCTION CODE (0x10)	REGISTER'S ADDRESS	NUMBER OF REGISTERS TO WRITE
8-BIT	16-BIT	16-BIT

When ending with an error:

ERROR CODE (0x90)	EXCEPTION CODE
8-BIT	8-BIT

The exception code used by the EP5000 is the exception n° 3 (Illegal data value). This exception means registration is impossible.


```
    uIndex = uchCRCHi ^ *puchMsg; //++ ; /* calculate the CRC */
    puchMsg++;
    uchCRCHi = uchCRCLo ^ auchCRCHi[uIndex];
    uchCRCLo = auchCRCLo[uIndex] ;
}

usVal1 = uchCRCHi;
usVal2 = uchCRCLo;

usVal1 = usVal1 << 8;
usVal1 = usVal1 | usVal2;

return usVal1; //((unsigned short)uchCRCHi << 8) | (unsigned short)uchCRCLo);
}
```