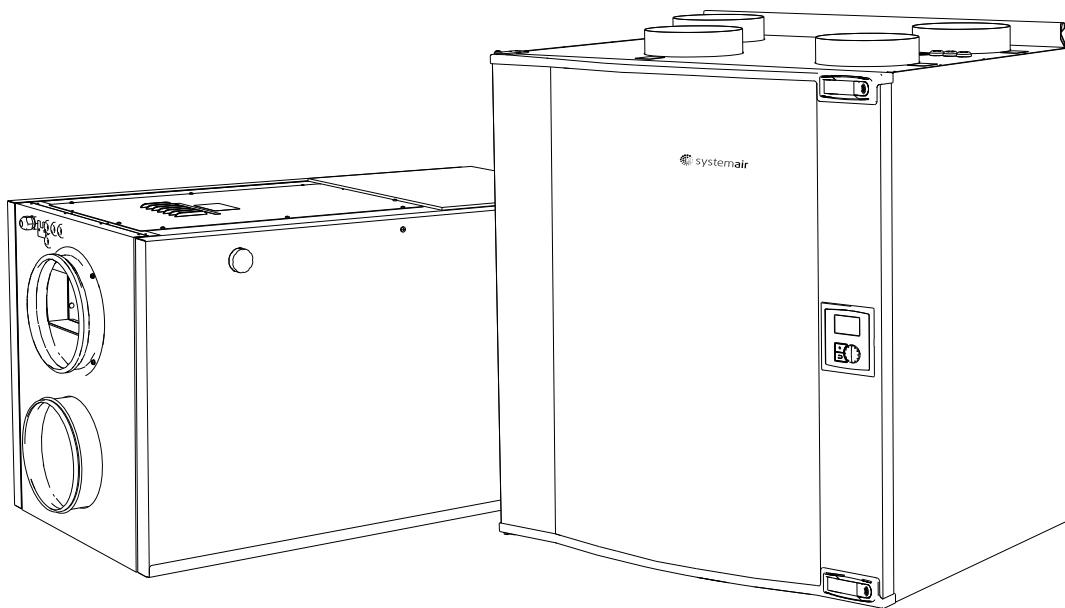


Modbus for Residential units



GB User Manual

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1 Introduction

The unit works as a Modbus slave and complied with MODBUS over serial line specification and implementation guide V1.0 if nothing else is mention in this manual.

2 Transmission modes

Modbus RTU.

Supported function codes:

- 1: Read Coils
- 2: Read Discrete Input
- 3: Read Holding Register
- 4: Read Input Register
- 5: Write Single Coil
- 6: Write Single Register
- 15: Write Multiple Coils
- 16: Write Multiple Registers

3 Physical layer

Two wire RS-485.

The supported communication parameters are:

9600 Bd or 19200 Bd.

No parity, even parity or odd parity.

4 Address

Slave address 1 to 247.

The following exception codes are generated by the slave:

1. ILLEGAL FUNCTION: when using any of the functions code not listed above.
2. ILLEGAL DATA ADDRESS: when addressing any register, coil or digital input higher than the highest address or lower than the lowest address.
3. ILLEGAL DATA VALUE: when the format of the Modbus message is faulty (e.g. wrong message length).

5 Notes

Coils and digital inputs are always available as register as well. The address of the coil or digital input can be calculated as follows:

$Address - (Register\ Address * 16) - 15$

Reading any registers, inputs or coils that are not mentioned in the tables below will result in reading 0. Writing to any address that is not listed as writeable in the tables below, or is not listed at all, will have no effect.

Addressing any register, coil or digital input higher than the highest address will result in error 02, "Illegal Data Address" in the Modbus response.

The column “NVM” indicates if the value is stored in a non-volatile memory (i.e. EEPROM) when writing to it.

6 Wiring

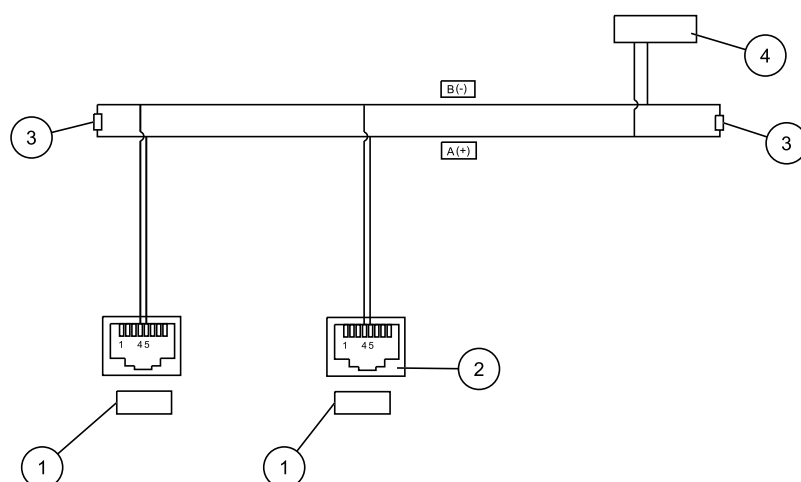


Fig. 1 Modbus wiring

| Position | Description |
|----------|---|
| 1 | VTC unit. |
| 2 | RJ45 on PCB, seen from the top. |
| 3 | Termination resistor, close to the end of the line. |
| 4 | Modbus master. |

7 Modbus variable list

7.1 Registers for fan control

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|----------------------|------------------|----------|----------------|--------------------|---|
| REG_FAN_SPEED_LEVEL | 101 | R/W | Y ¹ | Reg | 0: Fans off 1: Fans on low speed 2: Fans on normal speed 3: Fans on high speed 4: Auto mode |
| REG_FAN_SF_FLOW_LOW | 102 | R/W | Y ¹ | Reg | Supply air fan speed for low speed |
| REG_FAN_EF_FLOW_LOW | 103 | R/W | Y ¹ | Reg | Extract air fan speed for low speed |
| REG_FAN_SF_FLOW_NOM | 104 | R/W | Y ¹ | Reg | Supply air fan speed for nominal speed |
| REG_FAN_EF_FLOW_NOM | 105 | R/W | Y ¹ | Reg | Extract air fan speed for nominal speed |
| REG_FAN_SF_FLOW_HIGH | 106 | R/W | Y ¹ | Reg | Supply air fan speed for high speed |
| REG_FAN_EF_FLOW_HIGH | 107 | R/W | Y ¹ | Reg | Extract air fan speed for high speed |

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-------------------------------|------------------|----------|-----|--------------------|--|
| REG_FAN_FLOW_UNITS | 108 | R/W | Y | Reg | 0: l/s 1: m3/h |
| REG_FAN_SF_PWM | 109 | R | | Reg | 0..100: 0-10V |
| REG_FAN_EF_PWM | 110 | R | | Reg | 0..100: 0-10V |
| REG_FAN_SF_RPM | 111 | R | | Reg | Rotations per minute |
| REG_FAN_EF_RPM | 112 | R | | Reg | Rotations per minute |
| REG_FAN_ALLOW_MANUAL_FAN_STOP | 114 | R/W | Y | Reg + Coil | Coil 1809: manual fan stop allowed. 0: CD cannot set fan speed to off. 1: CD can set fan speed to off. |
| REG_FAN_SPEED_LOG_RESET | 115 | W | N | Reg | By writing the value 90 to this register, the values of REG_FAN_SPEED_LOG_xF_LVLx will be cleared. |
| REG_FAN_SPEED_LOG_SF_LVL1 | 116 | R | | Reg | Fan speed log values for supply fan, speed level 1. |
| REG_FAN_SPEED_LOG_SF_LVL2 | 117 | R | | Reg | Fan speed log values for supply fan, speed level 2. |
| REG_FAN_SPEED_LOG_SF_LVL3 | 118 | R | | Reg | Fan speed log values for supply fan, speed level 3. |
| REG_FAN_SPEED_LOG_SF_LVL4 | 119 | R | | Reg | Fan speed log values for supply fan, speed level 4. |
| REG_FAN_SPEED_LOG_SF_LVL5 | 120 | R | | Reg | Fan speed log values for supply fan, speed level 5. |
| REG_FAN_SPEED_LOG_EF_LVL1 | 121 | R | | Reg | Fan speed log values for extract fan, speed level 1. |
| REG_FAN_SPEED_LOG_EF_LVL2 | 122 | R | | Reg | Fan speed log values for extract fan, speed level 2. |
| REG_FAN_SPEED_LOG_EF_LVL3 | 123 | R | | Reg | Fan speed log values for extract fan, speed level 3. |
| REG_FAN_SPEED_LOG_EF_LVL4 | 124 | R | | Reg | Fan speed log values for extract fan, speed level 4. |
| REG_FAN_SPEED_LOG_EF_LVL5 | 125 | R | | Reg | Fan speed log values for extract fan, speed level 5. |
| REG_FAN_SPEED_LOG_SF_NR_LVL1 | 126 | R | | Reg | Fan speed log values for supply fan, speed level 1, non-resettable. |
| REG_FAN_SPEED_LOG_SF_NR_LVL2 | 127 | R | | Reg | Fan speed log values for supply fan, speed level 2, non-resettable. |
| REG_FAN_SPEED_LOG_SF_NR_LVL3 | 128 | R | | Reg | Fan speed log values for supply fan, speed level 3, non-resettable. |
| REG_FAN_SPEED_LOG_SF_NR_LVL4 | 129 | R | | Reg | Fan speed log values for supply fan, speed level 4, non-resettable. |
| REG_FAN_SPEED_LOG_SF_NR_LVL5 | 130 | R | | Reg | Fan speed log values for supply fan, speed level 5, non-resettable. |
| REG_FAN_SPEED_LOG_EF_NR_LVL1 | 131 | R | | Reg | Fan speed log values for extract fan, speed level 1, non-resettable. |
| REG_FAN_SPEED_LOG_EF_NR_LVL2 | 132 | R | | Reg | Fan speed log values for extract fan, speed level 2, non-resettable. |
| REG_FAN_SPEED_LOG_EF_NR_LVL3 | 133 | R | | Reg | Fan speed log values for extract fan, speed level 3, non-resettable. |
| REG_FAN_SPEED_LOG_EF_NR_LVL4 | 134 | R | | Reg | Fan speed log values for extract fan, speed level 4, non-resettable. |
| REG_FAN_SPEED_LOG_EF_NR_LVL5 | 135 | R | | Reg | Fan speed log values for extract fan, speed level 5, non-resettable. |
| REG_FAN_SYSTEM_CURVE_SF | 136 | R/W | Y | Reg | System curve for supply fan. Value can be from 1 to 20. |

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-------------------------|------------------|----------|-----|--------------------|--|
| REG_FAN_SYSTEM_CURVE_EF | 137 | R/W | Y | Reg | System curve for extract fan. Value can be from 1 to 10. |
| REG_FAN_CONTROL_TYPE | 138 | R/W | | Reg | Type of fan control: 0: Air flow 1: Speed |
| REG_FAN_INTERLOCK | 139 | R | | Reg | Interlock NO relay state: 0: Relay off 1: Relay active |

1. Stored by writing to register 549 (REG_STORE_NVM).

7.2 Registers for heater control

| Name | Register address | R or R/W | NVM | Scaling | Access (Reg./Coil) | Description/remarks |
|--------------------|------------------|----------|----------------|---------|--------------------|--|
| REG_HC_HEATER_TYPE | 201 | R/W | Y | 1 | Reg | 0: no heater 1: Water heater 2: Electrical heater 3: Other |
| REG_HC_COOLER_TYPE | 202 | R/W | Y | 1 | Reg | 0: no cooler 1: water cooler |
| REG_HC_WC_SIGNAL | 204 | R | | 1 | Reg | Signal to cooler output (in %) |
| REG_HC_WH_SIGNAL | 205 | R | | 1 | Reg | Signal to analog heater output (in %) |
| REG_HC_FPS_LEVEL | 206 | R/W | Y | 1 | Reg | Frost protection level. Allowed values: 70, 80, 90, 100, 110, 120 = 7, 8, 9, 10, 11, 12 °C. |
| REG_HC_TEMP_LVL | 207 | R/W | Y ¹ | | Reg | Temperature set point level: 0: Manual summer mode. 1 to 5: correspond to temperature levels as given by REG_HC_TEMP_LVL1 to REG_HC_TEMP_LVL5. 6 to 29: extension of levels 1 to 5. |
| REG_HC_TEMP_SP | 208 | R | | 1 | Reg | Temperature set point. |
| REG_HC_TEMP_LVL1 | 209 | R | | 10 | Reg | Temperature level 1 * 10. Note: from PCU-ECx program version 5.01.00, this register is not supported anymore. |
| REG_HC_TEMP_LVL2 | 210 | R | | 10 | Reg | Temperature level 2 * 10. Note: from PCU-ECx program version 5.01.00, this register is not supported anymore. |
| REG_HC_TEMP_LVL3 | 211 | R | | 10 | Reg | Temperature level 3 * 10. Note: from PCU-ECx program version 5.01.00, this register is not supported anymore. |
| REG_HC_TEMP_LVL4 | 212 | R | | 10 | Reg | Temperature level 4 * 10. Note: from PCU-ECx program version 5.01.00, this register is not supported anymore. |
| REG_HC_TEMP_LVL5 | 213 | R | | 10 | Reg | Temperature level 5 * 10. Note: from PCU-ECx program version 5.01.00, this register is not supported anymore. |
| REG_HC_TEMP_IN1 | 214 | R | | 10 | Reg | Temperature on sensor 1 * 10. Supply air sensor. |
| REG_HC_TEMP_IN2 | 215 | R | | 10 | Reg | Temperature on sensor 2 * 10. Extract air sensor. |

| Name | Register address | R or R/W | NVM | Scaling | Access (Reg./Coil) | Description/remarks |
|----------------------------------|------------------|----------|-----|---------|--------------------|---|
| REG_HC_TEMP_IN3 | 216 | R | | 10 | Reg | Temperature on sensor 3 * 10. Exhaust air sensor/Preheater sensor. |
| REG_HC_TEMP_IN4 | 217 | R | | 10 | Reg | Temperature on sensor 4 * 10. Overheating/Frost protection sensor. |
| REG_HC_TEMP_IN5 | 218 | R | | 10 | Reg | Temperature on sensor 5 * 10. Outdoor air sensor. |
| REG_HC_TEMP_STATE | 219 | R | | 1 | Reg + Coil | Coil 3489: State of temperature sensor on input 1 Coil 3490: State of temperature sensor on input 2 Coil 3491: State of temperature sensor on input 3 Coil 3492: State of temperature sensor on input 4 Coil 3493: State of temperature sensor on input 5 Coil state: 0: no sensor fault 1: sensor fault |
| REG_HC_PRE-HEATER_TYPE | 220 | R/W | Y | | Reg | 0: No preheater 1: Electrical preheater |
| REG_HC_HEATER_TEMP_SP_HOME_LEAVE | 221 | R | | | Reg | Set point support control heater during "Home/Leave" function. |
| REG_HC_TEMP_SP_DEG | 222 | R/W | | | Reg | Setpoint for temperature regulation (*10). |
| REG_HC_INTERVAL_COOLING_LOW | 223 | R/W | | | Reg | Combined controller output at which cooling is at maximum. |
| REG_HC_INTERVAL_COOLING_HIGH | 224 | R/W | | | Reg | Combined Controller output at which cooling is at minimum. |
| REG_HC_INTERVAL_EXCHANGING_LOW | 225 | R/W | | | Reg | Lower limit for heat exchanging range for combined temperature regulator. |
| REG_HC_INTERVAL_EXCHANGING_HIGH | 226 | R/W | | | Reg | Upper limit for heat exchanging range for combined temperature regulator. |
| REG_HC_INTERVAL_HEATING_LOW | 227 | R/W | | | Reg | Lower limit for heating range for combined temperature regulator. |
| REG_HC_INTERVAL_HEATING_HIGH | 228 | R/W | | | Reg | Upper limit for heating range for combined temperature regulator. |
| REG_HC_P_BAND | 229 | R/W | | | Reg | P-Band for combined temperature regulator (*10). Range: 10-600 (corresponding to 1 to 60 °C) |
| REG_HC_I_TIME | 230 | R/W | | | Reg | I_Time for combined temperature regulator Range:1-240 0: no integration |
| REG_PREHEATER_SET-POINT | 231 | R/W | | | Reg | Preheater set point. Range: -300-0 (corresponding to -30 to 0 °C) |
| REG_PREHEATER_P_BAND | 232 | R/W | | | Reg | Preheater P-Band (* 10). Range: 10-600 (corresponding to 1 to 60 °C) |
| REG_PREHEATER_I_TIME | 233 | R/W | | | Reg | Preheater I-Time. Range:1-240 0: no integration |
| REG_HC_OUT | 234 | R | | | Reg | Output of the split level temperature controller. Range: 0-100%. |
| REG_PREHEATER_OUT | 235 | R | | | Reg | Output of the PI controller for the electrical preheater. Range: 0-100%. |
| REG_HC_TEMP_SP_DEG_STEP | 236 | R | | | Reg | Temperature setting step (*10). Example: 10 = 1 degree step. 25 = 2.5 degree step. |

1. Stored by writing to register 549 (REG_STORE_NVM).

7.3 Registers for the damper

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|----------------|------------------|----------|-----|--------------------|---|
| REG_DAMPER_PWM | 301 | R | | Reg | Output value for exchanger. 0-100 correspond to 0 to 10V. |

7.4 Registers for the rotor

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|--------------------------|------------------|----------|-----|--------------------|--|
| REG_ROTOR_STATE | 351 | R | | Reg | State for the rotor control state machine. 0: Normal 1: Rotor fault assumed 2: Rotor fault detected 3: Summer mode conditions valid, but summer mode not yet active. 4: Summer mode 5: Waiting to go out of Manual summer mode due to temperature conditions 6: Manual summer mode 7: Rotor cleaning during summer mode 8: Rotor cleaning during manual summer mode 9: Fans off 10: Rotor cleaning during fans off 11: Rotor fault, conditions for rotor fault not valid anymore |
| REG_ROTOR_RELAY_ACTIVE | 352 | R | | Reg + Coil | Coil 5617: rotor relay active. 0: not active 1: active. |
| REG_SYSTEM_ROTOR_TYPE | 353 | R/W | | Reg | Indicates the type of rotor control: 0: On/off control 1: Variable control |
| REG_SYSTEM_PASSIVE_HOUSE | 354 | R/W | | Reg | 0: Passive house mode not active 1: Passive house mode active Register introduced in PCU-EC4 program version 5.09.00 |

7.5 Registers for RH sensor

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|--------------------------|------------------|----------|-----|--------------------|--|
| REG_RH_SENSOR_VALUE | 381 | R | | Reg | RH sensor value (in %). |
| Reserved | | | | | |
| REG_RH_SENSOR_DATA_VALID | 383 | R | | Reg | Indicates that valid data from the RH sensor is available. |

7.6 Registers for the week program

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-------------------------|------------------|----------|-----|--------------------|--|
| REG_WP_ACTIVE | 401 | R | | Reg + Coil | Coil address: 6401 0: week program not active 1: week program active |
| REG_WP_ON_LVL | 402 | R/W | Y | Reg | Week program active speed level. |
| REG_WP_OFF_LVL | 403 | R/W | Y | Reg | Week program inactive speed level. |
| REG_WP_WD1_PRD1_START_H | 404 | R/W | Y | Reg | Start of week program, day 1, period 1, hour |
| REG_WP_WD1_PRD1_START_M | 405 | R/W | Y | Reg | Start of week program, day 1, period 1, minute. Allowed values: 0, 10, 15, 20, 30, 40, 45, 50 |
| REG_WP_WD1_PRD1_END_H | 406 | R/W | Y | Reg | End of week program, day 1, period 1, hour |
| REG_WP_WD1_PRD1_END_M | 407 | R/W | Y | Reg | End of week program, day 1, period 1, minute. Allowed values: 0, 10, 15, 20, 30, 40, 45, 50 |
| REG_WP_WD1_PRD2_START_H | 408 | R/W | Y | Reg | |
| REG_WP_WD1_PRD2_START_M | 409 | R/W | Y | Reg | |
| REG_WP_WD1_PRD2_END_H | 410 | R/W | Y | Reg | |
| REG_WP_WD1_PRD2_END_M | 411 | R/W | Y | Reg | |
| REG_WP_WD2_PRD1_START_H | 412 | R/W | Y | Reg | |
| REG_WP_WD2_PRD1_START_M | 413 | R/W | Y | Reg | |
| REG_WP_WD2_PRD1_END_H | 414 | R/W | Y | Reg | |
| REG_WP_WD2_PRD1_END_M | 415 | R/W | Y | Reg | |
| REG_WP_WD2_PRD2_START_H | 416 | R/W | Y | Reg | |
| REG_WP_WD2_PRD2_START_M | 417 | R/W | Y | Reg | |
| REG_WP_WD2_PRD2_END_H | 418 | R/W | Y | Reg | |
| REG_WP_WD2_PRD2_END_M | 419 | R/W | Y | Reg | |
| REG_WP_WD3_PRD1_START_H | 420 | R/W | Y | Reg | |
| REG_WP_WD3_PRD1_START_M | 421 | R/W | Y | Reg | |
| REG_WP_WD3_PRD1_END_H | 422 | R/W | Y | Reg | |
| REG_WP_WD3_PRD1_END_M | 423 | R/W | Y | Reg | |
| REG_WP_WD3_PRD2_START_H | 424 | R/W | Y | Reg | |
| REG_WP_WD3_PRD2_START_M | 425 | R/W | Y | Reg | |
| REG_WP_WD3_PRD2_END_H | 426 | R/W | Y | Reg | |
| REG_WP_WD3_PRD2_END_M | 427 | R/W | Y | Reg | |
| REG_WP_WD4_PRD1_START_H | 428 | R/W | Y | Reg | |
| REG_WP_WD4_PRD1_START_M | 429 | R/W | Y | Reg | |
| REG_WP_WD4_PRD1_END_H | 430 | R/W | Y | Reg | |
| REG_WP_WD4_PRD1_END_M | 431 | R/W | Y | Reg | |
| REG_WP_WD4_PRD2_START_H | 432 | R/W | Y | Reg | |
| REG_WP_WD4_PRD2_START_M | 433 | R/W | Y | Reg | |
| REG_WP_WD4_PRD2_END_H | 434 | R/W | Y | Reg | |
| REG_WP_WD4_PRD2_END_M | 435 | R/W | Y | Reg | |
| REG_WP_WD5_PRD1_START_H | 436 | R/W | Y | Reg | |
| REG_WP_WD5_PRD1_START_M | 437 | R/W | Y | Reg | |
| REG_WP_WD5_PRD1_END_H | 438 | R/W | Y | Reg | |
| REG_WP_WD5_PRD1_END_M | 439 | R/W | Y | Reg | |

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-------------------------|------------------|----------|-----|--------------------|---------------------|
| REG_WP_WD5_PRD2_START_H | 440 | R/W | Y | Reg | |
| REG_WP_WD5_PRD2_START_M | 441 | R/W | Y | Reg | |
| REG_WP_WD5_PRD2_END_H | 442 | R/W | Y | Reg | |
| REG_WP_WD5_PRD2_END_M | 443 | R/W | Y | Reg | |
| REG_WP_WD6_PRD1_START_H | 444 | R/W | Y | Reg | |
| REG_WP_WD6_PRD1_START_M | 445 | R/W | Y | Reg | |
| REG_WP_WD6_PRD1_END_H | 446 | R/W | Y | Reg | |
| REG_WP_WD6_PRD1_END_M | 447 | R/W | Y | Reg | |
| REG_WP_WD6_PRD2_START_H | 448 | R/W | Y | Reg | |
| REG_WP_WD6_PRD2_START_M | 449 | R/W | Y | Reg | |
| REG_WP_WD6_PRD2_END_H | 450 | R/W | Y | Reg | |
| REG_WP_WD6_PRD2_END_M | 451 | R/W | Y | Reg | |
| REG_WP_WD7_PRD1_START_H | 452 | R/W | Y | Reg | |
| REG_WP_WD7_PRD1_START_M | 453 | R/W | Y | Reg | |
| REG_WP_WD7_PRD1_END_H | 454 | R/W | Y | Reg | |
| REG_WP_WD7_PRD1_END_M | 455 | R/W | Y | Reg | |
| REG_WP_WD7_PRD2_START_H | 456 | R/W | Y | Reg | |
| REG_WP_WD7_PRD2_START_M | 457 | R/W | Y | Reg | |
| REG_WP_WD7_PRD2_END_H | 458 | R/W | Y | Reg | |
| REG_WP_WD7_PRD2_END_M | 459 | R/W | Y | Reg | |

7.7 Registers for system parameters

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|------------------------|------------------|----------|-----|--------------------|---|
| REG_SYSTEM_TYPE | 501 | R/W | Y | Reg | 0: VR400 1: VR700 2: VR700DK 3: VR400DE 4: VTC300 5: VTC700 12: VTR150K 13: VTR200B 14: VSR300 15: VSR500 16: VSR150 17: VTR300 18: VTR500 19: VSR300DE 20: VTC200 21: VTC100 All other values are ignored. |
| REG_SYSTEM_PROG_V_HIGH | 502 | R | | Reg | PCU-ECx Main program version, high number |
| REG_SYSTEM_PROG_V_MID | 503 | R | | Reg | PCU-ECx Main program version, middle number |

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|---|------------------|----------|-----|--------------------|--|
| REG_SYSTEM_PROG_V_LOW | 504 | R | | Reg | PCU-ECx Main program version, low number |
| REG_SYSTEM_BOOT_PROG_V_HIGH | 505 | R | | Reg | PCU-ECx Boot program version, high number |
| REG_SYSTEM_BOOT_PROG_V_MID | 506 | R | | Reg | PCU-ECx Boot program version, middle number |
| REG_SYSTEM_BOOT_PROG_V_LOW | 507 | R | | Reg | PCU-ECx Boot program version, low number |
| REG_SYSTEM_PROG_STATE | 508 | R | | Reg | Program state: 1: Main program 2: Boot loader 3: Boot loading, boot loading request accepted Note: this register is also supported by the boot loader program. |
| REG_SYSTEM_START_BOOTLOADER | 509 | W | N | Reg | Writing a none-zero value to this register activates the boot loader. The following flags indicate what programs shall be downloaded: Bit 0: Download CD3 program Bit 8: Download PCU-EC3 program Note: this function is also supported by the boot loader program. Can only be accessed by addressing with Function Code 6 ("Write single register"). |
| REG_SYSTEM_BOOT- LOADER_FLAGS | 510 | R | | Reg | Bit 0: Boot loading is requested by the PCU-EC3 card . |
| REG_SYS- TEM_BRIDGE_CD3_FIRMWARE_H | 518 | R/W | | Reg | Program version for CD2/3 available in Z-wave bridge, high number |
| REG_SYS- TEM_BRIDGE_CD3_FIRMWARE_M | 519 | R/W | | Reg | Program version for CD2/3 available in Z-wave bridge, middle number |
| REG_SYS- TEM_BRIDGE_CD3_FIRMWARE_L | 520 | R/W | | Reg | Program version for CD2/3 available in Z-wave bridge, low number |
| REG_SYSTEM_BRIDGE_PCU_EC3_F- IRMWARE_H | 521 | R/W | | Reg | Program version for PCU-ECx available in Z-wave bridge, high number |
| REG_SYSTEM_BRIDGE_PCU_EC3_F- IRMWARE_M | 522 | R/W | | Reg | Program version for PCU-ECx available in Z-wave bridge, middle number |
| REG_SYSTEM_BRIDGE_PCU_EC3_F- IRMWARE_L | 523 | R/W | | Reg | Program version for PCU-ECx available in Z-wave bridge, low number |
| REG_SYSTEM_CDX_PROG_V_H | 524 | R | | Reg | CDx program version, high number. Note: contains the program version of the CDx panel operated latest. If the CDx is not operated since power on, the value is 0. |
| REG_SYSTEM_CDX_PROG_V_M | 525 | R | | Reg | CDx program version, middle number Note: contains the program version of the CDx panel operated latest. If the CDx is not operated since power on, the value is 0. |

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|--------------------------|------------------|----------|-----|--------------------|---|
| REG_SYSTEM_CD_X_PROG_V_L | 526 | R | | Reg | CDx program version, low number Note: contains the program version of the CDx panel operated latest. If the CDx is not operated since power on, the value is 0. |
| REG_STORE_NVM | 549 | W | N | Reg | Write value 165 will stores the following parameters in NVM: <ul style="list-style-type: none"> • REG_FAN_SPEED_LEVEL • REG_HC_TEMP_LVL • REG_FAN_SF_FLOW_LOW • REG_FAN_EF_FLOW_LOW • REG_FAN_SF_FLOW_NOM • REG_FAN_EF_FLOW_NOM • REG_FAN_SF_FLOW_HIGH • REG_FAN_EF_FLOW_HIGH All other values: no functionality. Can only be activated by addressing with Function Code 6 (“Write single register”). |

7.8 Registers for clock

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|--------------|------------------|----------|-----|--------------------|---|
| REG_CLK_S | 551 | R/W | Y | Reg | Clock: seconds (0..59) |
| REG_CLK_M | 552 | R/W | Y | Reg | Clock: minutes (0..59) |
| REG_CLK_H | 553 | R/W | Y | Reg | Clock: hours (0..23) |
| REG_CLK_D | 554 | R/W | Y | Reg | Clock: day of month (1..31) |
| REG_CLK_MNTH | 555 | R/W | Y | Reg | Clock: month (1..12) |
| REG_CLK_Y | 556 | R/W | Y | Reg | Clock: year (0 = 2000) |
| REG_CLK_WD | 557 | R | | Reg | Clock: day of week (0..6: Monday..sunday) |

7.9 Registers for the filter

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-----------------|------------------|----------|-----|--------------------|--|
| REG_FILTER_PER | 601 | R/W | Y | Reg | Filter replace time in months |
| REG_FILTER_DAYS | 602 | R/W | Y | Reg | Elapsed days since last filter replacement |

7.10 Registers for VTC defrosting

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|------------------------|------------------|----------|-----|--------------------|---|
| REG_DEFR_STATE_VTC | 651 | R | | Reg | State of defrosting state machine. 0: No defrosting ongoing 2: Bypass defrosting 3: Stop defrosting 4: Defrost error |
| REG_DEFR_CONFIGURATION | 652 | R | | Reg | Defrosting configuration. 0: A 1: B 2: C (no longer supported by PCU-EC4) 3: D (no longer supported by PCU-EC4) |
| REG_DEFR_UNBAL_ALLOWED | 653 | R/W | Y | Reg + Coil | Coil 10433: Unbalance allowed. 0: Unbalance not allowed. 1: Unbalance allowed. |
| REG_DEFR_MODE_VTC | 654 | R/W | Y | Reg | Defrosting mode. Allowed values: If no RH sensor is present: 1–5. If RH sensor is present: 1–3, corresponding to Soft, Normal and Hard. |
| REG_RH_SENSOR_PRESENT | 655 | R/W | | Reg | Setting of presence of RH sensor. 0: Sensor is not connected, or the sensor is connected but shall not be used. 1: Sensor is connected and shall be used. |

7.11 Register for VR/VTR defrosting

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-------------------|------------------|----------|-----|--------------------|--|
| REG_DEFR_STATE_VR | 671 | R | | Reg | State of defrosting state machine. 0: Inactive 1: Low temperature 2: Defrosting |
| REG_DEFR_MODE_VR | 672 | R/RW | Y | Reg | Defrosting mode. Allowed values: 0-5. |

7.12 Registers for the digital inputs

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|------------------------------|------------------|----------|-----|--------------------|---|
| REG_DI_ALL | 701 | R/W | | Reg + Coil | <p>When writing: activation of the functions connected to the digital inputs.</p> <p>0: deactive input. 1: activate input.</p> <p>When reading: obtaining of the values on the physical inputs on the PCU-EC4 card.</p> <p>0: actual input is not active, i.e. the input is not connected to signal GND. 1: actual input is active, i.e. the input is connected to signal GND.</p> <p>Bit 0: input 1 (D11) Bit 1: input 2 (D12) Bit 2: input 3 (D13) Bit 3: input 4 (Heater on/off) Bit 4: input 5 (Extended running/Boost mode) Bit 5: input 6 (Rotor/Damper). Note: read only! Bit 6: input 7 (Home Leave/Away) Bit 7: not used. Write as 0.</p> <p>Coil 11201: input 1. Coil 11202: input 2. Coil 11203: input 3. Coil 11204: input 4. Coil 11205: input 5. Coil 11206: input 6. Note: read only! Coil 11207: input 7.</p> |
| REG_DI_EXT_RUNNING_M | 702 | R/W | Y | Reg | Extended running time in minutes |
| REG_DI_EXT_RUNNING_SPEED_LVL | 703 | R/W | Y | Reg | <p>Fan speed level during extended running:</p> <p>0: Off 1: Low speed 2: Normal speed 3: High speed</p> |
| REG_DI1_SF_LVL | 704 | R/W | Y | Reg | Supply fan speed level at activated digital input 1 |
| REG_DI1_EF_LVL | 705 | R/W | Y | Reg | Extract fan speed level at activated digital input 1 |
| REG_DI2_SF_LVL | 706 | R/W | Y | Reg | Supply fan speed level at activated digital input 2 |
| REG_DI2_EF_LVL | 707 | R/W | Y | Reg | Extract fan speed level at activated digital input 2 |
| REG_DI3_SF_LVL | 708 | R/W | Y | Reg | Supply fan speed level at activated digital input 3 |
| REG_DI3_EF_LVL | 709 | R/W | Y | Reg | Extract fan speed level at activated digital input 3 |

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-----------------------------------|------------------|----------|-----|--------------------|---|
| REG_DI_FUNCTIONS | 710 | R | | Reg | Functions active due to activated digital inputs. Bit 0: input 1 (DI1) Bit 1: input 2 (DI2) Bit 2: input 3 (DI3) Bit 3: input 4 (Heater on/off) Bit 4: input 5 (Extended running/Boost mode) Bit 5: input 6 (Rotor/Damper). Bit 6: input 7 (Home Leave/Away) Bit 7: not used. |
| REG_DI_MODBUS | 711 | R | | Reg | Latest value written to register REG_DI_ALL. Bit 0: input 1 (DI1) Bit 1: input 2 (DI2) Bit 2: input 3 (DI3) Bit 3: input 4 (Heater on/off) Bit 4: input 5 (Extended running/Boost mode) Bit 5: not used. Bit 6: input 7 (Home Leave/Away) Bit 7: not used. |
| REG_DI_WIRELESS | 712 | R | | Reg | OR-ed value of all Wireless inputs. Bit 0: input 1 (DI1) Bit 1: input 2 (DI2) Bit 2: input 3 (DI3) Bit 3: input 4 (Heater on/off) Bit 4: input 5 (Extended running/Boost mode) Bit 5: not used. Bit 6: input 7 (Home Leave/Away) Bit 7: not used. |
| REG_DI_REMAINING_TIME_1 | 713 | R | | Reg | Remaining time (in seconds) of set delay for DI 1. |
| REG_DI_REMAINING_TIME_2 | 714 | R | | Reg | Remaining time (in seconds) of set delay for DI 2. |
| REG_DI_REMAINING_TIME_3 | 715 | R | | Reg | Remaining time (in seconds) of set delay for DI 3. |
| REG_DI_REMAINING_TIME_EXT_RUNNING | 716 | R | | Reg | Remaining time (in seconds) of set delay for Extended running. |

7.13 Registers for PCU-PB

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-------------------|------------------|----------|-----|--------------------|---|
| REG_PCU_PB_RELAYS | 751 | R | | Reg + Coil | Coil Address 12001: relay for preheater on Coil Address 12002: relay for reheater on Coil Address 12003: common relay for heater and preheater on |

7.14 Registers for alarms

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-------------------------|------------------|----------|-----|--------------------|---|
| REG_ALARMS_ALL | 801 | R | | Reg + Coil | Coil Address 12801: Filter alarm Coil Address 12802: Fan alarm Coil Address 12803: Not used Coil Address 12804: Rotor alarm Coil Address 12805: Frost alarm Coil Address 12806: PCU-PB alarm Coil Address 12807: Temperature sensor alarm Coil Address 12808: Emergency Thermostat alarm Coil Address 12809: Damper alarm Coil Address 12810: Low SS alarm Coil Address 12811: Defrost alarm Coil Address 12812: RH sensor Coil value 0: alarm not active Coil value 1: alarm active |
| REG_ALARMS_RELAY_ACTIVE | 802 | R | | Reg + Coil | Coil address 12817: alarm relay active. 0: Relay not active. 1: Relay active. |
| REG_ALARMS_ALL_DETAILED | 803 | R | | Reg | All alarm flags, including temperature sensor status flags. Bit 0: Filter alarm Bit 1: Fan alarm Bit 2: Rotor alarm Bit 3: Frost alarm Bit 4: PCU-PB alarm Bit 5: Emergency thermostat alarm Bit 6: Damper alarm Bit 7: Low SS alarm Bit 8: Defrost alarm Bit 9: RH sensor alarm Bit 10: Supply air sensor alarm Bit 11: Extract air sensor alarm Bit 12: Exhaust air/Preheater sensor alarm Bit 13: Over temperature/Frost protection sensor alarm Bit 14: Outdoor air sensor alarm |

7.15 Register for demand control

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-------------------------------|------------------|----------|-----|--------------------|---|
| REG_DEMC_CO2_SP | 851 | R/W | | Reg | Range: 0-2000 0: Off |
| REG_DEMC_CO2_P_BAND | 852 | R/W | | Reg | Range: 1-2000 |
| REG_DEMC_CO2_I_TIME | 853 | R/W | | Reg | Range:1-120 0: no integration |
| REG_DEMC_RH_SP_SUMMER | 854 | R/W | | Reg | Range: 0-100 0: Off Note: old register name (before PCU-EC4 program version 5.09.00) is REG_DEMC_RH_SP |
| REG_DEMC_RH_P_BAND | 855 | R/W | | Reg | Range: 1-100 |
| REG_DEMC_RH_I_TIME | 856 | R/W | | Reg | Range:1-120 0: no integration |
| REG_DEMC_STATE | 857 | R | | Reg | 0: Start up 1: Waiting for sensor network 2: Waiting for sensor data 3: Auto mode 4: normal mode |
| REG_DEMC_MODBUS_CO2_VALUE | 858 | W | | Reg | Value in ppm. Range: 0-2000. |
| REG_DEMC_MODBUS_RH_VALUE | 859 | W | | Reg | Value in %. Range: 0-100. |
| REG_DEMC_MODBUS_CO2_OUT | 860 | R | | Reg | Output of PI controller for CO2 regulation. |
| REG_DEMC_MODBUS_RH_OUT | 861 | R | | Reg | Output of PI controller for RH regulation. |
| REG_DEMC_ALLOWED | 862 | R | | Reg | Indicates if auto mode can be set (based on sensor data and demand control set points). Bit 0: 0: Auto mode cannot be activated 1: Auto mode can be activated Bit 1-15: not used. |
| REG_DEMC_RH_SP_WINTER | 863 | R/W | | Reg | Range: 0–100 Register introduced in PCU-EC4 program version 5.09.00. |
| REG_DEMC_SUMMER_WINTER_MODE | 864 | R | | Reg | 0: Summer 1: Winter Register introduced in PCU-EC4 program version 5.09.00. |
| REG_DEMC_SUMMER_WINTER_CNTR_H | 865 | R | | Reg | Highest 16 bits of remaining time until summer mode. |
| REG_DEMC_SUMMER_WINTER_CNTR_H | 866 | R | | Reg | Lowest 16 bits of remaining time until summer mode. |

7.16 Register for wireless network

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|------------------------|------------------|----------|-----|--------------------|--|
| REG_WL_NODE_1_TYPE | 901 | R | | Reg | 0: No connected 1: CO2 sensor 2: RH sensor 3: DI module 4: User interface |
| REG_WL_NODE_1_VALUE_T | 902 | R | | Reg + Coil | Value depending on node type: REG_WL_NODE_1_TYPE = 1: CO2 value REG_WL_NODE_1_TYPE = 2: RH value REG_WL_NODE_1_TYPE = 3: use coils to read: Coil Address 14417: input 1 Coil Address 14418: input 2 All other node types: 0. |
| REG_WL_NODE_1_STATUS | 903 | R | | Reg | Node state: 0: not bound 1: OK 2: Battery failure 3: Communication failure 4: No network 5: Sensor failure |
| REG_WL_NODE_2_xx | 911-920 | | | | As for register addresses 901-910 |
| REG_WL_NODE_3_xx | 921-930 | | | | As for register addresses 901-910 |
| REG_WL_NODE_4_xx | 931-940 | | | | As for register addresses 901-910 |
| REG_WL_NODE_5_xx | 941-950 | | | | As for register addresses 901-910 |
| REG_WL_NODE_6_xx | 951-960 | | | | As for register addresses 901-910 |
| REG_WL_NODE_7_xx | 961-970 | | | | As for register addresses 901-910 |
| REG_WL_NODE_8_xx | 971-980 | | | | As for register addresses 901-910 |
| REG_WL_NODE_9_xx | 981-990 | | | | As for register addresses 901-910 |
| REG_WL_NODE_10_xx | 991-1000 | | | | As for register addresses 901-910 |
| REG_WL_DI_CONNECTION_1 | 1001 | | | | 0: Not connected 1: DI1 2: DI2 3: DI3 4: DI4 5: DI5 6: not accepted 7: DI7 Other values: not accepted |
| REG_WL_DI_CONNECTION_2 | 1002 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_3 | 1003 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_4 | 1004 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_5 | 1005 | | | | As for REG_WL_DI_CONNECTION_1 |

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-------------------------|------------------|----------|-----|--------------------|-------------------------------|
| REG_WL_DI_CONNECTION_6 | 1006 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_7 | 1007 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_8 | 1008 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_9 | 1009 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_10 | 1010 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_11 | 1011 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_12 | 1012 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_13 | 1013 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_14 | 1014 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_15 | 1015 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_16 | 1016 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_17 | 1017 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_18 | 1018 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_19 | 1019 | | | | As for REG_WL_DI_CONNECTION_1 |
| REG_WL_DI_CONNECTION_20 | 1020 | | | | As for REG_WL_DI_CONNECTION_1 |

7.17 Registers for RH transfer control

| Name | Register address | R or R/W | NVM | Access (Reg./Coil) | Description/remarks |
|-----------------|------------------|----------|-----|--------------------|-----------------------------------|
| REG_RH_TC_SP | 1101 | R/W | | Reg | Setpoint for RH transfer control. |
| REG_RH_TC_PBAND | 1102 | R/W | | Reg | P-band for RH transfer control. |
| REG_RH_TC_ITIME | 1103 | R/W | | Reg | I-time for RH transfer control. |
| REG_RH_TC_OUT | 1104 | R | | Reg | Output of RH transfer controller. |

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