MODBUS Protocol RVU-NRVU SABIANA

MODBUS Protocol ENY-S/SP, ENY-SHP-170, ENY-P

SABIANA products:
ENY-S-170-270-360-460-600
ENY-SP-180-280-370-460-600
ENY-SHP-170
ENY-P1-2-3-4

MODBUS Protocol

Product descritpion: **Sabiana RVU modbus protocol**

Rev	Date	Description	Author	Verified
1	13/07/16	First draft	I. Gioia	M.Felici
2	20/07/16	Updated parameters, bit commands	I. Gioia	M.Felici
3	25/10/16	Updated parameters, dips confinguration and alarms. Added registers for weekly timers, time and day	I. Gioia	M.Felici
4	11/11/16	Updated Block1 (T-EP fw release, models list), Block3 (machine mode readable)	I. Gioia	M.Felici
5	10/02/17	Block1 (dips+options), Block2 (parameters), Block3 (commands), Blocks 4-7 (weekly program speeds), Blocks 9-12 (system snapshot)	I. Gioia	M.Felici
6	24/02/17	Added data range	I. Gioia	M.Felici
7	08/03/17	Added serial speed configuration Added dip switch addresssing	P.Saporiti	I. Gioia
8	24/03/17	Updated DIPS meaning (0x0104)	I. Gioia	M.Felici
9	09/06/17	Added Data Block 13 for Flows Calibration	I. Gioia	M.Felici
10	22/11/17	Updated parameters (Flush mode,Low RH fan speed), Hours of operation counter, manual speed set/read added in Block 3, weekly program now with 5 speeds, added Out of range status during machine calibration	I. Gioia	M.Felici
11	30/3/2018	Added note to the data types table (byte data type)	I. Gioia	M.Felici
12	16/10/2018	Added register 0x030A and 0x030B (RH/CO2) From firmware release v0.76	I. Gioia	M.Felici
13	16/11/2018	Updated parameters value range	I. Gioia	M.Felici
14	09/05/2019	Added Heater parameters (0x022D-0x0232)	I. Gioia	M.Felici
15	14/05/2019	Updated register 0x0104, 0x0200	I. Gioia	M.Felici
16	29/10/2019	Updated reg 0x011F, 0x0212. Added regs 0x030C...0x0310 (FW rel 1.86)	I. Gioia	M.Felici
17	16/09/2020	Added reg. 0x0122 (Free Cooling/Heating Info)	I. Gioia	M.Felici
18	04/03/2022	Aggiornata per gestione motori alternativi	S.Macri	
19	02/11/2022	Updated for S600 unit and alternative motor reg in the testing block (FW rel 1.94)	M. Verrelli	I. Gioia

Connectors

The MODBUS RTU interface is available via the RS485 port (connector M19)

Serial interface configuration

The serial interface has to be configured as follows:

Speed	9600 bit/sec or 38400 bit/sec (*)
Bit number	8
Parity	No
Stop bit	1

Configuration dip switch DIP 1 (*)

Dip n 10 OFF (default) **speed 9600 bit/sec**

Dip n 10 ON **speed 38400 bit/sec**

(*) only for residential models (controller model 0x52xx)

MODBUS protocol

The MODBUS address of the board is selected by the ADDRESS dips in the range 1-60.

Only the data type “Holding Register” is supported.

The available MODBUS functions are:

- 0x03(3 dec) “Read Holding Registers”
- 0x06(6 dec) “Write Single Register”
- 0x10(16 dec) “Preset Multiple Registers”

The following tables show the data accessible via the MODBUS interface. For each data, the following infomation is specified:

- **Addr**, hexadecimal address
- **Type**, data type (see next table)
- **Attr**, attributes (R read only, W write only, RW read/write)
- **Symb**, short symbolic data name, used only for machine parameters; identifies the parameter name as defined in the technical specifications
- **Description**, short data-specific description (parameter, measure, etc..)
- **Notes**, information about data interpretation, etc...

Writing contiguous registers with a single operation is allowed only if all the registers are marked as writable.

In case of an error for:
- function not supported
- wrong data address
- wrong data lenght
- data not acceptable

the response will be a MODBUS exception.

Table 1: Data types

Type	Description	Range	Dimension	Notes
char	8 bit charachter		1 byte	
byte	8 bit usigned	0...255	1 byte	The valid data is in the most significant byte of the 16bit register
uns16	16 bit unsigned integer	0..65535	2 bytes	
sig16	16 bit signed integer	–32768..32767	2 bytes	
uns32	32 bit unsigned integer	0..4294836225	4 bytes	2 contiguous MODBUS registers, the first one containing the most significant 16 bit
float	Float (32 bit)	-3.4e+38, 3.4e+38	4 bytes	ANSI/IEEE Std754-1985 From the most significant bit: - sign of mantissa - 8 bit for exponent - 23 bit for mantissa

Regarding the supported MODBUS standard, one can refer to the MODBUS official website (Modbus Specifications) and particularly to the documents: Modbus Serial Line Protocol and Implementation Guide V1.02 e Mosbus Application Protocol V1.1b.

Board address Dip Switch setting

DIP 2 is used to define the address number of each machine. The assignment works according to the binary method; the number is defined by placing the different Dips at On or at Off. Use the following table to set the numbering. Pay particular attention to avoid assigning the same number to more units.

Indirizzo/Address	Dip Switches ON	Indirizzo/Address	Dip Switches ON	Indirizzo/Address	Dip Switches ON	
1	1	21	1+3+5	41	1+4+6	
2	2	22	2+3+5	42	2+4+6	
3	1+2	23	1+2+3+5	43	1+2+4+6	
4	3	24	4+5	44	3+4+6	
5	1+3	25	1+4+5	45	1+3+4+6	
6	2+3	26	2+4+5	46	2+3+4+6	
7	1+2+3	27	1+2+4+5	47	1+2+3+4+6	
8	4	28	3+4+5	48	5+6	
9	1+4	29	1+3+4+5	49	1+5+6	
10	2+4	30	2+3+4+5	50	2+5+6	
11	1+2+4	31	1+2+3+4+5	51	1+2+5+6	
12	3+4	32	6	52	3+5+6	
13	1+3+4	33	1+6	53	1+3+5+6	
14	2+3+4	34	2+6	54	2+3+5+6	
15	1+2+3+4	35	1+2+6	55	1+2+3+5+6	
16	5	36	3+6	56	4+5+6	
17	1+5	37	1+3+6	57	1+4+5+6	
18	2+5	38	2+3+6	58	2+4+5+6	
19	1+2+5	39	1+2+3+6	59	1+2+4+5+6	
20	3+5	40	4+6	60	3+4+5+6	

MODBUS BLOCKS LIST:

Block 0: System identification

Addr	Type	Attr.	Size	Description	Notes
0x0000	char	RW	20	Serial Number	Machine ID for customer use
0x000A	uns16	R	2	Controller model	0x5200 ESP170V 0x5201 ESP270 0x5202 ESP360 0x5203 ESP460 0x5204 ESP170H 0x5205 ESP180 0x5206 ESP280 0x5207 ESP370 0x5208 ESP600 0x5300 ENYP1 0x5301 ENYP2 0x5302 ENYP3 0x5303 ENYP4
0x000B	uns16	R	2	Firmware Release	Low byte= minor release, High byte = major release
0x000C	uns16	R	2	Protocol Release	These tables apply if the value is 0x0006
0x000D	uns16	R	2	T-EP Firmware Release	Low byte= minor release, High byte = major release

Block 1: Machine state

Addr	Type	Attr.	Size	Description	Notes
0x0100	Sig16[4]	R	8	Temperature probes	T1,T2,T3,T4 °Cx10
0x0104	Uns16	R	2	Dips Configuration	Bit fields, 1=Dip ON, 0=Dip OFF b0: 1 Inverted configuration b1: 1: Pre-heating present b2: 1: Preheating with Water, 0:HE b3: 1: Post treatment ON b4: 1: Post treatment also summer b5: 1: RL5 IAQ, 0: RL5 Fault signaling b6: 1: Pre treatment b7: 1: IN3 Boiler pressure booster b8: 1: Post treatment external HE b9: • Controller model 0x52xx no function • Controller model 0x53xx: Post treatment: 1 on T2, 0: on T3 b10-13: free b14-15: reserved
0x0105	Uns16	R	2	Machine state and mode	Bit fields b0: 1: Remote OFF active b1: 1: Bypass active b2: 1: Electric Pre Heater active b3: 1: Water pre-heating active b4: 1: Boost active

					b5: 1: Defrost cycle active b6: reserved b7: 1: Party Mode ON b8: 1 On, 0 Off b9-10: Mode • 0:Holiday • 1:Auto • 2:Program • 3:Manual b11: Season • 0:Summer • 1:Winter B12-15: Program selection • 0-3 Preset progrmas (P1-P4) • 4-7 User progrmas (P5-P8)
0x0106	Uns16	R	2	Humidity setpoint	RH% x10 (40.0% = 400)
0x0107	Uns16	R	2	FIlter counter	Filter counter divided by 15minutes
0x0108	Byte	R	1	Digital output	Bit fields b0-1: reserved b2: 1: Damper Clockwise b3: 1: Damper Counterclockwise
0x0109	byte	R	1	Stato Relè	Bit fields (1 On, 0 Off) b0: RL_FAULT_IAQ b1: RL_PREHEAT b2: RL_POSTHEAT b3: RL_FANS b4: RL_POSTCOOL/POSTHEAT2
0x010A	Byte	R	1	Digital Inputs	Bit fields (1 Active, 0 Not Active) b0: reserved b1: C1 b2: C2 b3: C3 b4: C4
0x010B	Uns16	R	2	Fan1 Speed	rpm
0x010C	Uns16	R	2	Fan2 Speed	rpm
0x010D	Uns16	R	2	Duty Cycle Fan1	0,0-100,0% PWM Drive Fan1 (50,0%=500)
0x010E	Uns16	R	2	Duty Cycle Fan2	0,0-100,0% PWM Drive Fan2 (50,0%=500)
0x010F	Uns16	R	2	Duty Cycle El. Preheater	0-100%
0x0110	Uns16	R	2	Alarms	Bit fileds (1 Active, 0 not Active) b0: T1 probe failure, b1: T2 probe failure, b2: T3 probe failure, b3: T4 probe failure, b4: Timekeeper failure,

					b5: Frost alarm b6: Frost alarm (from T2 probe) b7: Fireplace Alarm b8: Pressure transducer failure b9: Filter alarm b10: Fans failure b11: RH or CO2 sensor failure b12: Fan thermic input alarm b13: not used b14: Pre Heating alarm b15:Pre frost alarm (T2)
0x0111	Sig16	R	2	Diff Pressure Sensor 1	Pascal x10
0x0112	Sig16	R	2	Diff Pressure Sensor 2	Pascal x10
0x0113	Uns16	R	2	CO2 reading	ppm
0x0114	Uns16	R	2	RH reading	RH % x10 (50,0%=500)
0x0115	float	R	4	Rho1	
0x0117	float	R	4	Rho2	
0x0119	float	R	4	Rho3	
0x011B	float	R	4	Rho4	
0x011D	Uns16	R	2	Cspeed1	Speed coefficient 1 (multiplied by 0x4000)
0x011E	Uns16	R	2	Cspeed2	Speed coefficient 2 (multiplied by 0x4000)
0x011F	Uns16	R	2	Options/info	b1: 1: RPM too high detected b8: 1: IAQ Used b9: 1: Post treatment used b10: 1: HE used b11: 1: Boiler boost mode used b12: 1: CO2 sensor present b13: 1: Differential pressure sensor present b14: 1: RH sensor present b15: 1: Reverse mounting
0x0120	Uns32	R	4	Hours of operation	Fans ON hours counter
0x0122	Uns16	R	2	FreeCooling/FreeHeating	0: No Free Cooling/Heating 1: Free Cooling 2: Free Heating

Block 2: Machine parameters

Addr	Type	Attr.	Size	Description	Notes
0x0200	Sig16	RW	2	Parameters Flags	Bit field:0 Off, 1 On b0: Free b1: Stop Mode (0 FanOff, 1 FanOn) b2: Flush mode (0 Off, 1 On) b3:MB Uart speed • 0: 9600 bps • 1:38400 bps b4: Hi RH management (0:Off, 1:On) b5-15: Free
0x0201	Sig16	RW	2	Temp probe 1 offset	°C x10 (-40...+40)
0x0202	Sig16	RW	2	Temp probe 2 offset	°C x10 (-40...+40)
0x0203	Sig16	RW	2	Temp probe 3 offset	°C x10 (-40...+40)
0x0204	Sig16	RW	2	Temp probe 4 offset	°C x10 (-40...+40)
0x0205	Sig16	RW	2	Fan min voltage	V x100 (100...1000)
0x0206	Sig16	RW	2	Fan max voltage	V x100 (100...1000)
0x0207	Sig16	RW	2	Fan1 Nominal V drive	V x100 (100...1000)
0x0208	Sig16	RW	2	Fan2 Nominal V drive	V x100 (100...1000)
0x0209	Sig16	RW	2	Fan min speed	rpm (200...4000)
0x020A	Sig16	RW	2	Fan max Speed	rpm (1000...4000)
0x020B	Sig16	RW	2	Fan1 nominal speed	Rpm (normalized) (1000...4000)
0x020C	Sig16	RW	2	Fan2 nominal speed	Rpm (normalized) (1000...4000)
0x020D	Sig16	RW	2	Fan1 installation speed	rpm (1000...4000)
0x020E	Sig16	RW	2	K coefficient 1	x100 (1000...9000)
0x020F	Sig16	RW	2	K coefficient 2	x100 (1000...9000)
0x0210	Sig16	RW	2	Air flow 1	Q: m3/h (30...500)
0x0211	Sig16	RW	2	Air flow 2	Q: m3/h (30...500)
0x0212	Sig16	RW	2	Manual Speed	0-3 (Speed 1- Speed 4) Note: Writing this register triggers the manual speed mode
0x0213	Sig16	RW	2	Speed 1 %	(0...35)
0x0214	Sig16	RW	2	Speed 2 %	(35...70)
0x0215	Sig16	RW	2	Speed 3 %	(45...100)
0x0216	Sig16	RW	2	Speed 4 %	(100...110)
0x0217	Sig16	RW	2	Boost Speed %	(110...130)
0x0218	Sig16	RW	2	Summer T Setpoint	°C x10 (100..300)
0x0219	Sig16	RW	2	Winter T setpoint	°C x10 (100..300)
0x021A	Sig16	RW	2	Air coefficients recalc. interval	minutes (1...15)
0x021B	Sig16	RW	2	Temp for free cooling	°C x10 (100...350)
0x021C	Sig16	RW	2	Temp for free heating	°C x10 (100.300)
0x021D	Sig16	RW	2	Fan2 unbalance %	(-20...+20)
0x021E	Sig16	RW	2	Humidity samples for setpoint	(1...96) (1 sample every 15minutes)
0x021F	Sig16	RW	2	Boost time	minutes (15...240)
0x0220	Sig16	RW	2	P constant for humidity regulator	(5...50)
0x0221	Sig16	RW	2	Filter life	Days (30...400)
0x0222	Sig16	RW	2	CO2 ppm min	ppm (100...30000)
0x0223	Sig16	RW	2	CO2 ppm nom	ppm (100...30000)
0x0224	Sig16	RW	2	CO2 ppm max	ppm (100...30000)

0x0225	Sig16	RW	2	CO2 ppm prop constant	(10...40)
0x0226	Sig16	RW	2	Blocked functions	Bit fileds (1 Active, 0 not Active) b0:Manual mode not allowed b1:Party mode not allowed b2: Holiday mode not allowed b3:Auto mode not allowed b4: Weekly Prog mode not allowed b5: Time/day change not allowed b6: Off command not allowed
0x0227	Sig16	RW	2	CO2 Sensor PPM Range	ppm (100...30000)
0x0228	Sig16	RW	2	Boiler boost time	Minutes (5...20)
0x0229	Sig16	RW	2	RH Low value	RH% x10 (40,0% = 400) (200...450)
0x022A	Sig16	RW	2	RH Standard value	RH% x10 (400...500)
0x022B	Sig16	RW	2	RH Hi value	RH% x10 (600...650)
0x022C	Sig16	RW	2	Fan Speed with RH Low	0-3 (Speed 1- Speed 4)
0x022D	Sig16	RW	2	Heater K Coefficient	10 - 100 (data is *10, means 1.0-10.0)
0x022E	Sig16	RW	2	Heater Power limit mode	0: Limit on RPM, 1: None
0x022F	Sig16	RW	2	Heater PID, P Coefficient	0 - 100
0x0230	Sig16	RW	2	Heater PID, I Coefficient	0 - 100
0x0231	Sig16	RW	2	Heater PID, D Coefficient	0 - 100
0x0232	Sig16	RW	2	T4 value for Heater ON	°C x 10 (0 - 50)

Note:written values out of range are accepted but are truncated to fit in the specified range.

Block 3: Commands

Addr	Type	Attr.	Size	Description	Notes
0x0300	Uns16	RW	2	ON-OFF Command	1=ON 0=OFF
0x0301	Uns16	RW	2	Mode Command Manual	1=Manual
0x0302	Uns16	RW	2	Mode Command Holiday	1=Holiday
0x0303	Uns16	RW	2	Mode Command Party	1=Party
0x0304	Uns16	RW	2	Mode Command Auto	1=Auto
0x0305	Uns16	RW	2	Mode Command Program	1=Program
0x0306	Uns16	RW	2	Timer prog selection	0-7=P1-P8
0x0307	Uns16	RW	2	Mode Selection (single register)	• 0:Holiday • 1:Auto • 2:Program • 3:Manual • 4:Party
0x0308	Uns16	RW	2	Parameter reset	Writing 0x005A results in a parameter reset to factory default Read as 0
0x0309	Uns16	RW	2	Manual speed	0-3 (Speed 1- Speed 4)
0x030A	Uns16	RW	2	External RH Value	0%...100.0% (0...1000) When reading, a value of 0xFFFF means that the data is not yet valid
0x030B	Uns16	RW	2	External CO2 Value	0ppm...30000ppm When reading, a value of 0xFFFF means that the data is not yet valid
0x030C	Uns16	RW	2	Unused	If read returns 0
0x030D	Uns16	RW	2	Unused	If read returns 0
0x030E	Uns16	RW	2	Unused	If read returns 0
0x030F	Uns16	RW	2	Set Holyday mode days	N = Holiday days (1-60) The machine will enter holiday mode for the next N days When read it returns the days left
0x0310	Uns16	RW	2	Reset Filter Counter	Writing 1 resets the filter counter

Block 4: User Timer program 1

Addr	Type	Attr.	Size	Description	Notes
0x0400	Uns16	RW	2	Day 1, interval 1 start time	MSB = hour (0...23) LSB = minutes (0...59)
0x0401	Uns16	RW	2	Day 1, interval 2 start time	MSB = hour, LSB = minutes
0x0402	Uns16	RW	2	Day 1, interval 3 start time	MSB = hour, LSB = minutes
0x0403	Uns16	RW	2	Day 1, interval 4 start time	MSB = hour, LSB = minutes
0x0404	Uns16	RW	2	Day 1, interval 5 start time	MSB = hour, LSB = minutes
0x0405	Uns16	RW	2	Day 1, interval 6 start time	MSB = hour, LSB = minutes
0x0406	Uns16	RW	2	Day 1, interval 7 start time	MSB = hour, LSB = minutes
0x0407	Uns16	RW	2	Day 1, interval 8 start time	MSB = hour, LSB = minutes
0x0408	Uns16	RW	2	Day 2, interval 1 start time	MSB = hour, LSB = minutes
0x0409	Uns16	RW	2	Day 2, interval 2 start time	MSB = hour, LSB = minutes
0x040A	Uns16	RW	2	Day 2, interval 3 start time	MSB = hour, LSB = minutes
0x040B	Uns16	RW	2	Day 2, interval 4 start time	MSB = hour, LSB = minutes
0x040C	Uns16	RW	2	Day 2, interval 5 start time	MSB = hour, LSB = minutes
0x040D	Uns16	RW	2	Day 2, interval 6 start time	MSB = hour, LSB = minutes
0x040E	Uns16	RW	2	Day 2, interval 7 start time	MSB = hour, LSB = minutes
0x040F	Uns16	RW	2	Day 2, interval 8 start time	MSB = hour, LSB = minutes
0x0410	Uns16	RW	2	Day 3, interval 1 start time	MSB = hour, LSB = minutes
0x0411	Uns16	RW	2	Day 3, interval 2 start time	MSB = hour, LSB = minutes
0x0412	Uns16	RW	2	Day 3, interval 3 start time	MSB = hour, LSB = minutes
0x0413	Uns16	RW	2	Day 3, interval 4 start time	MSB = hour, LSB = minutes
0x0414	Uns16	RW	2	Day 3, interval 5 start time	MSB = hour, LSB = minutes
0x0415	Uns16	RW	2	Day 3, interval 6 start time	MSB = hour, LSB = minutes
0x0416	Uns16	RW	2	Day 3, interval 7 start time	MSB = hour, LSB = minutes
0x0417	Uns16	RW	2	Day 3, interval 8 start time	MSB = hour, LSB = minutes
0x0418	Uns16	RW	2	Day 4, interval 1 start time	MSB = hour, LSB = minutes
0x0419	Uns16	RW	2	Day 4, interval 2 start time	MSB = hour, LSB = minutes
0x041A	Uns16	RW	2	Day 4, interval 3 start time	MSB = hour, LSB = minutes
0x041B	Uns16	RW	2	Day 4, interval 4 start time	MSB = hour, LSB = minutes
0x041C	Uns16	RW	2	Day 4, interval 5 start time	MSB = hour, LSB = minutes
0x041D	Uns16	RW	2	Day 4, interval 6 start time	MSB = hour, LSB = minutes
0x041E	Uns16	RW	2	Day 4, interval 7 start time	MSB = hour, LSB = minutes
0x041F	Uns16	RW	2	Day 4, interval 8 start time	MSB = hour, LSB = minutes
0x0420	Uns16	RW	2	Day 5, interval 1 start time	MSB = hour, LSB = minutes
0x0421	Uns16	RW	2	Day 5, interval 2 start time	MSB = hour, LSB = minutes
0x0422	Uns16	RW	2	Day 5, interval 3 start time	MSB = hour, LSB = minutes
0x0423	Uns16	RW	2	Day 5, interval 4 start time	MSB = hour, LSB = minutes
0x0424	Uns16	RW	2	Day 5, interval 5 start time	MSB = hour, LSB = minutes
0x0425	Uns16	RW	2	Day 5, interval 6 start time	MSB = hour, LSB = minutes
0x0426	Uns16	RW	2	Day 5, interval 7 start time	MSB = hour, LSB = minutes

0x0427	Uns16	RW	2	Day 5, interval 8 start time	MSB = hour, LSB = minutes
0x0428	Uns16	RW	2	Day 6, interval 1 start time	MSB = hour, LSB = minutes
0x0429	Uns16	RW	2	Day 6, interval 2 start time	MSB = hour, LSB = minutes
0x042A	Uns16	RW	2	Day 6, interval 3 start time	MSB = hour, LSB = minutes
0x042B	Uns16	RW	2	Day 6, interval 4 start time	MSB = hour, LSB = minutes
0x042C	Uns16	RW	2	Day 6, interval 5 start time	MSB = hour, LSB = minutes
0x042D	Uns16	RW	2	Day 6, interval 6 start time	MSB = hour, LSB = minutes
0x042E	Uns16	RW	2	Day 6, interval 7 start time	MSB = hour, LSB = minutes
0x042F	Uns16	RW	2	Day 6, interval 8 start time	MSB = hour, LSB = minutes
0x0430	Uns16	RW	2	Day 7, interval 1 start time	MSB = hour, LSB = minutes
0x0431	Uns16	RW	2	Day 7, interval 2 start time	MSB = hour, LSB = minutes
0x0432	Uns16	RW	2	Day 7, interval 3 start time	MSB = hour, LSB = minutes
0x0433	Uns16	RW	2	Day 7, interval 4 start time	MSB = hour, LSB = minutes
0x0434	Uns16	RW	2	Day 7, interval 5 start time	MSB = hour, LSB = minutes
0x0435	Uns16	RW	2	Day 7, interval 6 start time	MSB = hour, LSB = minutes
0x0436	Uns16	RW	2	Day 7, interval 7 start time	MSB = hour, LSB = minutes
0x0437	Uns16	RW	2	Day 7, interval 8 start time	MSB = hour, LSB = minutes
0x0438	Uns16	RW	2	Day 1, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0439	Uns16	RW	2	Day 1, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x043A	Uns16	RW	2	Day 1, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x043B	Uns16	RW	2	Day 1, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x043C	Uns16	RW	2	Day 1, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x043D	Uns16	RW	2	Day 1, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x043E	Uns16	RW	2	Day 1, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x043F	Uns16	RW	2	Day 1, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0440	Uns16	RW	2	Day 1, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0441	Uns16	RW	2	Day 2, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0442	Uns16	RW	2	Day 2, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0443	Uns16	RW	2	Day 2, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0444	Uns16	RW	2	Day 2, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0445	Uns16	RW	2	Day 2, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0446	Uns16	RW	2	Day 2, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0447	Uns16	RW	2	Day 2, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0448	Uns16	RW	2	Day 2, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0449	Uns16	RW	2	Day 2, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x044A	Uns16	RW	2	Day 3, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x044B	Uns16	RW	2	Day 3, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x044C	Uns16	RW	2	Day 3, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x044D	Uns16	RW	2	Day 3, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x044E	Uns16	RW	2	Day 3, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x044F	Uns16	RW	2	Day 3, interval 5speed	0-4 (Speed1-Speed4-Boost)

0x0450	Uns16	RW	2	Day 3, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0451	Uns16	RW	2	Day 3, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0452	Uns16	RW	2	Day 3, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0453	Uns16	RW	2	Day 4, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0454	Uns16	RW	2	Day 4, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0455	Uns16	RW	2	Day 4, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0456	Uns16	RW	2	Day 4, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0457	Uns16	RW	2	Day 4, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0458	Uns16	RW	2	Day 4, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0459	Uns16	RW	2	Day 4, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x045A	Uns16	RW	2	Day 4, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x045B	Uns16	RW	2	Day 4, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x045C	Uns16	RW	2	Day 5, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x045D	Uns16	RW	2	Day 5, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x045E	Uns16	RW	2	Day 5, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x045F	Uns16	RW	2	Day 5, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0460	Uns16	RW	2	Day 5, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0461	Uns16	RW	2	Day 5, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0462	Uns16	RW	2	Day 5, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0463	Uns16	RW	2	Day 5, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0464	Uns16	RW	2	Day 5, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0465	Uns16	RW	2	Day 6, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0466	Uns16	RW	2	Day 6, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0467	Uns16	RW	2	Day 6, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0468	Uns16	RW	2	Day 6, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0469	Uns16	RW	2	Day 6, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x046A	Uns16	RW	2	Day 6, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x046B	Uns16	RW	2	Day 6, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x046C	Uns16	RW	2	Day 6, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x046D	Uns16	RW	2	Day 6, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x046E	Uns16	RW	2	Day 7, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x046F	Uns16	RW	2	Day 7, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0470	Uns16	RW	2	Day 7, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0471	Uns16	RW	2	Day 7, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0472	Uns16	RW	2	Day 7, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0473	Uns16	RW	2	Day 7, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0474	Uns16	RW	2	Day 7, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0475	Uns16	RW	2	Day 7, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0476	Uns16	RW	2	Day 7, interval 8 speed	0-4 (Speed1-Speed4-Boost)

Block 5: User Timer program 2
Same as Block4, registers MSB is 0x05

Block 6: User Timer program 3
Same as Block4, registers MSB is 0x06

Block 7: User Timer program 4
Same as Block4, registers MSB is 0x07

Block 8: Time and Day

Addr	Type	Attr.	Size	Description	Notes
0x0800	Uns16	RW	2	Time	MSB = hour (0...23) LSB = minutes (0...59)
0x0801	Uns16	RW	2	Day	Day 1 = Mon ... Day 7 = Sun

Block 9: System snapshot 0h-9h

Addr	Type	Attr.	Size	Description	Notes
0x0900	Uns16	R	2	T1 temperature (last snapshot)	°C
0x0901	Uns16	R	2	T2 temperature	°C
0x0902	Uns16	R	2	T3 temperature	°C
0x0903	Uns16	R	2	T4 temperature	°C
0x0904	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0905	Uns16	R	2	Fan1 Speed	RPM
0x0906	Uns16	R	2	Fan1 Speed	RPM
0x0907	Uns16	R	2	HE Duty Cycle	0-100%
0x0908	Uns16	R	2	Dp Fan1	Pascal
0x0909	Uns16	R	2	Dp Fan2	Pascal
0x090A	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x090B	Uns16	R	2	T1 temperature (1h earlier)	°C
0x090C	Uns16	R	2	T2 temperature	°C
0x090D	Uns16	R	2	T3 temperature	°C
0x090E	Uns16	R	2	T4 temperature	°C
0x090F	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0910	Uns16	R	2	Fan1 Speed	RPM
0x0911	Uns16	R	2	Fan1 Speed	RPM
0x0912	Uns16	R	2	HE Duty Cycle	0-100%
0x0913	Uns16	R	2	Dp Fan1	Pascal
0x0914	Uns16	R	2	Dp Fan2	Pascal
0x0915	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x0916	Uns16	R	2	T1 temperature (2h earlier)	°C
0x0917	Uns16	R	2	T2 temperature	°C
0x0918	Uns16	R	2	T3 temperature	°C
0x0919	Uns16	R	2	T4 temperature	°C
0x091A	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x091B	Uns16	R	2	Fan1 Speed	RPM
0x091C	Uns16	R	2	Fan1 Speed	RPM
0x091D	Uns16	R	2	HE Duty Cycle	0-100%
0x091E	Uns16	R	2	Dp Fan1	Pascal
0x091F	Uns16	R	2	Dp Fan2	Pascal
0x0920	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x0921	Uns16	R	2	T1 temperature (3h earlier)	°C
0x0922	Uns16	R	2	T2 temperature	°C
0x0923	Uns16	R	2	T3 temperature	°C
0x0924	Uns16	R	2	T4 temperature	°C
0x0925	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor

0x0926	Uns16	R	2	Fan1 Speed	RPM
0x0927	Uns16	R	2	Fan1 Speed	RPM
0x0928	Uns16	R	2	HE Duty Cycle	0-100%
0x0929	Uns16	R	2	Dp Fan1	Pascal
0x092A	Uns16	R	2	Dp Fan2	Pascal
0x092B	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x092C	Uns16	R	2	T1 temperature (4h earlier)	°C
0x092D	Uns16	R	2	T2 temperature	°C
0x092E	Uns16	R	2	T3 temperature	°C
0x092F	Uns16	R	2	T4 temperature	°C
0x0930	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0931	Uns16	R	2	Fan1 Speed	RPM
0x0932	Uns16	R	2	Fan1 Speed	RPM
0x0933	Uns16	R	2	HE Duty Cycle	0-100%
0x0934	Uns16	R	2	Dp Fan1	Pascal
0x0935	Uns16	R	2	Dp Fan2	Pascal
0x0936	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x0937	Uns16	R	2	T1 temperature (5h earlier)	°C
0x0938	Uns16	R	2	T2 temperature	°C
0x0939	Uns16	R	2	T3 temperature	°C
0x093A	Uns16	R	2	T4 temperature	°C
0x093B	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x093C	Uns16	R	2	Fan1 Speed	RPM
0x093D	Uns16	R	2	Fan1 Speed	RPM
0x093E	Uns16	R	2	HE Duty Cycle	0-100%
0x093F	Uns16	R	2	Dp Fan1	Pascal
0x0940	Uns16	R	2	Dp Fan2	Pascal
0x0941	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x0942	Uns16	R	2	T1 temperature (6h earlier)	°C
0x0943	Uns16	R	2	T2 temperature	°C
0x0944	Uns16	R	2	T3 temperature	°C
0x0945	Uns16	R	2	T4 temperature	°C
0x0946	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0947	Uns16	R	2	Fan1 Speed	RPM
0x0948	Uns16	R	2	Fan1 Speed	RPM
0x0949	Uns16	R	2	HE Duty Cycle	0-100%
0x094A	Uns16	R	2	Dp Fan1	Pascal
0x094B	Uns16	R	2	Dp Fan2	Pascal
0x094C	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x094D	Uns16	R	2	T1 temperature (7h earlier)	°C
0x094E	Uns16	R	2	T2 temperature	°C

0x094F	Uns16	R	2	T3 temperature	°C
0x0950	Uns16	R	2	T4 temperature	°C
0x0951	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0952	Uns16	R	2	Fan1 Speed	RPM
0x0953	Uns16	R	2	Fan1 Speed	RPM
0x0954	Uns16	R	2	HE Duty Cycle	0-100%
0x0955	Uns16	R	2	Dp Fan1	Pascal
0x0956	Uns16	R	2	Dp Fan2	Pascal
0x0957	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x0958	Uns16	R	2	T1 temperature (8h earlier)	°C
0x0959	Uns16	R	2	T2 temperature	°C
0x095A	Uns16	R	2	T3 temperature	°C
0x095B	Uns16	R	2	T4 temperature	°C
0x095C	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x095D	Uns16	R	2	Fan1 Speed	RPM
0x095E	Uns16	R	2	Fan1 Speed	RPM
0x095F	Uns16	R	2	HE Duty Cycle	0-100%
0x0960	Uns16	R	2	Dp Fan1	Pascal
0x0961	Uns16	R	2	Dp Fan2	Pascal
0x0962	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x0963	Uns16	R	2	T1 temperature (9h earlier)	°C
0x0964	Uns16	R	2	T2 temperature	°C
0x0965	Uns16	R	2	T3 temperature	°C
0x0966	Uns16	R	2	T4 temperature	°C
0x0967	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0968	Uns16	R	2	Fan1 Speed	RPM
0x0969	Uns16	R	2	Fan1 Speed	RPM
0x096A	Uns16	R	2	HE Duty Cycle	0-100%
0x096B	Uns16	R	2	Dp Fan1	Pascal
0x096C	Uns16	R	2	Dp Fan2	Pascal
0x096D	Uns16	R	2	Bypass	0: Not Active, 1: Active

Block 10: System snapshot 10h-19h
Same as Block9, registers MSB is 0x0A

Block 11: System snapshot 20h-29h
Same as Block9, registers MSB is 0x0B

Block 12: System snapshot 30h-35h
Same as Block9, registers MSB is 0x0C. Last block register is 0x0C41.

Block 13: Flows Calibration

Addr	Type	Attr.	Size	Description	Notes
0x0D00	Uns16	W	2	Calibration Command	0 = No Command 1 = Calibrate Fan 1 2 = Calibrate Fan 2 3 = Calibration Set 4 = Calibration Exit
0x0D01	Uns16	R	2	Differential Pressure Goal	Pascal x10
0x0D02	Uns16	R	2	Calibration state	Bit fields: b0: Calibration mode active b1: Calibration done b2: Auto calibration dP Fan1 ok b3: Auto calibration dP Fan2 ok b4: Fan1 Out of Range b5: Fan2 Out of Range
0x0D03	Uns16	RW	2	Fan 1 drive Voltage	Volt x100
0x0D04	Uns16	RW	2	Fan 2 drive Voltage	Volt x100

Notes for flows calibration

Without differential pressure sensor

1. Write the nominal flow parameters for Fan1 and Fan2 (reg. 0x0210 and 0x0211)
2. Enter calibration mode by writing the command 1 for Fan1 or 2 for Fan2. Calibration mode active bit becomes true
3. Write the relative Fan drive register with the desired voltage. If necessary verify the differential pressure goal calculated by the machine (this should be necessary only for residential models 0x52xx)
4. When the calibration is done, write the command 3 Calibration Set
5. Wait for the Calibration done bit to become true. At this point, one can calibrate the other Fan or recalibrate the current Fan by writing the relative command, or exit calibration mode by writing the command 4.

With differential pressure sensor

1. Write the nominal flow parameters for Fan1 (the nominal flow for Fan2 will be set automatically)
2. Enter calibration mode by writing the command 1. Calibration mode active bit becomes true
3. One can check the differential pressure goal and compare it to the actual differential pressure for Fan1 and Fan2 (registers 0x0111 and 0x0112).
4. When the automatic calibration for Fan1 is done the state bit Auto calibration dP Fan1 ok becomes true and the calibration for Fan2 begins. If the Out of Range condition happens, state bit Fan1 Out of Range is true.
5. When the automatic calibration for Fan2 is done the state bit Auto calibration dP Fan2 ok and the Calibration done bit become true. If the Out of Range condition happens, state bit Fan2 Out of Range is true.
6. At this point one can exit calibration mode by writing the command 4 Calibration Exit

MODBUS Protocol ENY-SHP-130/150

SABIANA products:
ENY-SHP-130
ENY-SHP-150

Product descritpion: **Sabiana RVU modbus protocol**

Rev	Date	Description	Author	Verified
0	16/08/18	First draft	I. Gioia	M.Felici
1	26/10/18	Added register for freecooling in the commands block	I. Gioia	M.Felici
1a	26/10/18	Added freecooling bit in state block	I. Gioia	M.Felici
2	19/12/18	Implemented reg 0x0104, modfied reg 0x011F	I. Gioia	M.Felici
3	25/01/19	Bit for WM-NTC present (0x011F)	I. Gioia	M.Felici
4	11/02/19	Added register 0x030D-0x030E-0x030F	I. Gioia	M.Felici
5	22/02/19	Implemented registers 0x011C-0x011D-0x011E	I. Gioia	M.Felici
6	06/03/19	Implemented filter counter reset command (reg. 0x0310)	I. Gioia	M.Felici
7	29/10/19	Updated regs 0x011F, 0x0205,0x0206,0x0210,0x0211,0x0212 FW rel 0.82	I. Gioia	M.Felici
7a	30/10/19	Added registers 0x022D-0x0232 (errata corrige rel 7) Added 0x5401: F150 for register 0x000A “Controller model”	I. Gioia	M.Felici

Connectors

The MODBUS RTU interface is available via the RS485 port (connector M19)

Serial interface configuration

The serial interface has to be configured as follows:

Speed	9600 bit/sec or 38400 bit/sec (*)
Bit number	8
Parity	No
Stop bit	1

Depends on MSBP Parameter value (0x0200 bit3) (*)

MODBUS protocol

The MODBUS address of the board is selected by the ADDRESS dips in the range 1-60.

Only the data type “Holding Register” is supported.

The available MODBUS functions are:

- 0x03(3 dec) “Read Holding Registers”
- 0x06(6 dec) “Write Single Register”
- 0x10(16 dec) “Preset Multiple Registers”

The following tables show the data accessible via the MODBUS interface. For each data, the following infomation is specified:

- **Addr**, hexadecimal address
- **Type**, data type (see next table)
- **Attr**, attributes (R read only, W write only, RW read/write)
- **Symb**, short symbolic data name, used only for machine parameters; identifies the parameter name as defined in the technical specifications
- **Description**, short data-specific description (parameter, measure, etc..)
- **Notes**, information about data interpretation, etc...

Writing contiguous registers with a single operation is allowed only if all the registers are marked as writable.

In case of an error for:
- function not supported
- wrong data address
- wrong data lenght
- data not acceptable

the response will be a MODBUS exception.

Table 2: Data types

Type	Description	Range	Dimension	Notes
char	8 bit charachter		1 byte	
byte	8 bit usigned	0...255	1 byte	The valid data is in the most significant byte of the 16bit register
uns16	16 bit unsigned integer	0..65535	2 bytes	
sig16	16 bit signed integer	–32768..32767	2 bytes	
uns32	32 bit unsigned integer	0..4294836225	4 bytes	2 contiguous MODBUS registers, the first one containing the most significant 16 bit
float	Float (32 bit)	-3.4e+38, 3.4e+38	4 bytes	ANSI/IEEE Std754-1985 From the most significant bit: - sign of mantissa - 8 bit for exponent - 23 bit for mantissa

Regarding the supported MODBUS standard, one can refer to the MODBUS official website (Modbus Specifications) and particularly to the documents: Modbus Serial Line Protocol and Implementation Guide V1.02 e Mosbus Application Protocol V1.1b.

MODBUS BLOCKS LIST:

Block 0: System identification

Addr	Type	Attr.	Size	Description	Notes
0x0000	char	RW	20	Serial Number	Machine ID for customer use
0x000A	uns16	R	2	Controller model	0x5400: F130 0x5401: F150
0x000B	uns16	R	2	Firmware Release	Low byte= minor release, High byte = major release
0x000C	uns16	R	2	Protocol Release	These tables applies if the value is 0x0006
0x000D	uns16	R	2	T-EP Firmware Release	Low byte= minor release, High byte = major release 0x0000 = T-EP not connected

Block 1: Machine state

Addr	Type	Attr.	Size	Description	Notes
0x0100	Sig16[4]	R	8	Temperature probes	T1,T2,T3,T4 °Cx10
0x0104	Uns16	R	2	Current Fan Speed	0=Speed1 1=Speed2 2=Speed3 3=Speed4 4=Boost Speed The information means that the actual speed is <= speed n
0x0105	Uns16	R	2	Machine state and mode	Bit fields b0: 1: Remote OFF active b1: 1: reserved b2: 1: Electric Pre Heater active b3: 1: Water pre-heating active b4: 1: Boost active b5: 1: Defrost cycle active b6: reserved b7: 1: Party Mode ON b8: 1 On, 0 Off b9-10: Mode • 0:Holiday • 1:Auto • 2:Program • 3:Manual b11: Season • 0:Summer • 1:Winter b12-14: Program selection • 0-3 Preset progrmas (P1-P4) • 4-7 User progrmas (P5-P8) b15: Freecooling Mode (1=ON and Mode bits become "don't care")
0x0106	Uns16	R	2	Humidity setpoint	RH% x10 (40.0% = 400)
0x0107	Uns16	R	2	FIlter counter	Filter counter divided by 20 minutes

0x0108	Byte	R	1	Reserved	
0x0109	byte	R	1	Stato Relè	Bit fields (1 On, 0 Off) b0: Relè Fan b1: Out 3_4 b2: Relè FC_FC
0x010A	Byte	R	1	Digital Inputs	Bit fields (1 Active, 0 Not Active) b0: reserved b1: C1 b2: C3 b3: C4
0x010B	Uns16	R	2	Fan1 Speed	rpm
0x010C	Uns16	R	2	Fan2 Speed	rpm
0x010D	Uns16	R	2	Duty Cycle Fan1	0,0-100,0% PWM Drive Fan1 (50,0%=500)
0x010E	Uns16	R	2	Duty Cycle Fan2	0,0-100,0% PWM Drive Fan2 (50,0%=500)
0x010F	Uns16	R	2	Duty Cycle El. Preheater	0-100%
0x0110	Uns16	R	2	Alarms	Bit fileds (1 Active, 0 not Active) b0: T1 probe failure, b1: T2 probe failure, b2: T3 probe failure, b3: T4 probe failure, b4: Timekeeper failure, b5: Frost alarm b6: Frost alarm (from T2 probe) b7: Fireplace Alarm b8: Pressure transducer failure b9: Filter alarm b10: Fans failure b11: RH or CO2 sensor failure b12: not used b13: not used b14: Pre Heating alarm b15:Pre frost alarm (T2)
0x0111	Sig16	R	2	Not used	Returns 0
0x0112	Sig16	R	2	Not used	Returns 0
0x0113	Uns16	R	2	CO2 reading	ppm
0x0114	Uns16	R	2	RH reading	RH % x10 (50,0%=500)
0x0115	Uns16	R	2	Not used	Returns 0
0x0116	Uns16	R	2	Not used	Returns 0
0x0117	Uns16	R	2	Not used	Returns 0
0x0118	Uns16	R	2	Not used	Returns 0
0x0119	Uns16	R	2	Not used	Returns 0
0x011A	Uns16	R	2	Not used	Returns 0
0x011B	Uns16	R	2	Not used	Returns 0
0x011C	Uns16	R	2	WM-NTC Time	MSB Hrs, LSB Mins

0x011D	Uns16	R	2	WM-NTC Day	0:Monday...6: Sunday
0x011E	Uns16	R	2	Holiday days	Remaining days for holiday mode
0x011F	Uns16	R	2	Options	b0: WM-NTC present b1: RPM too high detected b8: 1: IAQ Used b9: 1: Post treatment used b10: 1: HE used b11: 1: Not used b12: 1: CO2 sensor present b13: 1: T-EP present b14: 1: RH sensor present b15: 1: Not used
0x0120	Uns32	R	4	Hours of operation	Fans ON hours counter

Block 2: Machine parameters

Addr	Type	Attr.	Size	Description	Notes
0x0200	Sig16	RW	2	Parameters Flags	Bit field:0 Off, 1 On b0: Free b1: Stop Mode (0 FanOff, 1 FanOn) b2: Flush mode (0 Off, 1 On) b3: Uart Speed (0:9600, 1:38400) b4: Hi RH management (0:off, 1:on) b5-15: Free
0x0201	Sig16	RW	2	Temp probe 1 offset	°C x10 (-40...+40)
0x0202	Sig16	RW	2	Temp probe 2 offset	°C x10 (-40...+40)
0x0203	Sig16	RW	2	Temp probe 3 offset	°C x10 (-40...+40)
0x0204	Sig16	RW	2	Temp probe 4 offset	°C x10 (-40...+40)
0x0205	Sig16	RW	2	Min air flow (Q min)	Q: m3/h (54...66)
0x0206	Sig16	RW	2	Max air flow (Q max)	Q: m3/h F130 (117...143) F150 (135...165)
0x0207	Sig16	RW	2	Fan1 Nominal V drive	V x100 (100...1000)
0x0208	Sig16	RW	2	Fan2 Nominal V drive	V x100 (100...1000)
0x0209	Sig16	RW	2	Fan min speed	rpm (200...4000)
0x020A	Sig16	RW	2	Fan max Speed	rpm (1000...4000)
0x020B	Sig16	RW	2	Not used	
0x020C	Sig16	RW	2	Not used	
0x020D	Sig16	RW	2	Not used	
0x020E	Sig16	RW	2	Not used	
0x020F	Sig16	RW	2	Not used	
0x0210	Sig16	RW	2	Air flow 1	Q: m3/h min=reg0x0205, max=reg 0x0206
0x0211	Sig16	RW	2	Air flow 2	Q: m3/h (60...130) min=the highest value among • reg 0x0210-20% • reg 0x0205 max= the lowest value among • reg 0x0210+20%

					• reg 0x0206
0x0212	Sig16	RW	2	Manual Speed	0-3 (Speed 1- Speed 4) Note: Writing this register triggers the manual speed mode
0x0213	Sig16	RW	2	Speed 1 %	(0...35)
0x0214	Sig16	RW	2	Speed 2 %	(35...70)
0x0215	Sig16	RW	2	Speed 3 %	(45...100)
0x0216	Sig16	RW	2	Speed 4 %	(100...110)
0x0217	Sig16	RW	2	Boost Speed %	(110...130)
0x0218	Sig16	RW	2	Summer T Setpoint	°C x10 (100..300)
0x0219	Sig16	RW	2	Winter T setpoint	°C x10 (100..300)
0x021A	Sig16	RW	2	Not used	
0x021B	Sig16	RW	2	Temp for free cooling	°C x10 (100...350)
0x021C	Sig16	RW	2	Temp for free heating	°C x10 (100.300)
0x021D	Sig16	RW	2	Not used	
0x021E	Sig16	RW	2	Humidity samples for setpoint	(1...96) (1 sample every 15minutes)
0x021F	Sig16	RW	2	Boost time	minutes (60...240)
0x0220	Sig16	RW	2	P constant for humidity regulator	(5...50)
0x0221	Sig16	RW	2	Filter life	Days (15...400)
0x0222	Sig16	RW	2	CO2 ppm min	ppm (100...2000)
0x0223	Sig16	RW	2	CO2 ppm nom	ppm (100... 2000)
0x0224	Sig16	RW	2	CO2 ppm max	ppm (100... 2000)
0x0225	Sig16	RW	2	CO2 ppm prop constant	(10...40)
0x0226	Sig16	RW	2	Blocked functions	Bit fileds (1 Active, 0 not Active) b0:Manual mode not allowed b1:Party mode not allowed b2: Holiday mode not allowed b3:Auto mode not allowed b4: Weekly Prog mode not allowed b5: Time/day change not allowed b6: Off command not allowed
0x0227	Sig16	RW	2	CO2 Sensor PPM Range	ppm (100...30000)
0x0228	Sig16	RW	2	Boiler boost time	Minutes (5...20)
0x0229	Sig16	RW	2	RH Low value	RH% x10 (40,0% = 400) (200...450)
0x022A	Sig16	RW	2	RH Standard value	RH% x10 (400...500)
0x022B	Sig16	RW	2	RH Hi value	RH% x10 (600...650)
0x022C	Sig16	RW	2	Fan Speed with RH Low	0-3 (Speed 1- Speed 4)
0x022D	Sig16	RW	2	Heater K Coefficient	10 - 100 (data is *10, means 1.0-10.0)
0x022E	Sig16	RW	2	Heater Power limit mode	0: Limit on RPM, 1: None
0x022F	Sig16	RW	2	Heater PID, P Coefficient	0 - 100
0x0230	Sig16	RW	2	Heater PID, I Coefficient	0 - 100
0x0231	Sig16	RW	2	Heater PID, D Coefficient	0 - 100
0x0232	Sig16	RW	2	T4 value for Heater ON	°C x 10 (0 - 50)

Note:written values out of range are accepted but are truncated to fit in the specified range.

Block 3: Commands

Addr	Type	Attr.	Size	Description	Notes
0x0300	Uns16	RW	2	ON-OFF Command	1=ON 0=OFF
0x0301	Uns16	RW	2	Mode Command Manual	1=Manual
0x0302	Uns16	RW	2	Mode Command Holiday	1=Holiday
0x0303	Uns16	RW	2	Mode Command Party	1=Party
0x0304	Uns16	RW	2	Mode Command Auto	1=Auto
0x0305	Uns16	RW	2	Mode Command Program	1=Program
0x0306	Uns16	RW	2	Timer prog selection	0-7=P1-P8
0x0307	Uns16	RW	2	Mode Selection (single register)	• 0:Holiday • 1:Auto • 2:Program • 3:Manual • 4:Party • 5:Free Cooling
0x0308	Uns16	RW	2	Parameter reset	Writing 0x005A results in a parameter reset to factory default Read as 0
0x0309	Uns16	RW	2	Manual speed	0-3 (Speed 1- Speed 4)
0x030A	Uns16	RW	2	External RH Value	0%...100.0% (0...1000) When reading, a value of 0xFFFF means that the data is not yet valid
0x030B	Uns16	RW	2	External CO2 Value	0ppm...30000ppm When reading, a value of 0xFFFF means that the data is not yet valid
0x030C	Uns16	RW	2	Mode Command Free Cooling	1=Free Cooling
0x030D	Uns16	RW	2	Set WM-RVU Current Time	MSB Hrs, LSB Mins
0x030E	Uns16	RW	2	Set WM-RVU Current Day	0:Monday...6: Sunday
0x030F	Uns16	RW	2	Set Holyday mode days	N = Holiday days (1-60) The machine will enter holiday mode for the next N days When read it returns the days left
0x0310	Uns16	RW	2	Reset Filter Counter	Writing 1 resets the filter counter

Block 4: User Timer program 1

Addr	Type	Attr.	Size	Description	Notes
0x0400	Uns16	RW	2	Day 1, interval 1 start time	MSB = hour (0...23) LSB = minutes (0...59)
0x0401	Uns16	RW	2	Day 1, interval 2 start time	MSB = hour, LSB = minutes
0x0402	Uns16	RW	2	Day 1, interval 3 start time	MSB = hour, LSB = minutes
0x0403	Uns16	RW	2	Day 1, interval 4 start time	MSB = hour, LSB = minutes
0x0404	Uns16	RW	2	Day 1, interval 5 start time	MSB = hour, LSB = minutes
0x0405	Uns16	RW	2	Day 1, interval 6 start time	MSB = hour, LSB = minutes
0x0406	Uns16	RW	2	Day 1, interval 7 start time	MSB = hour, LSB = minutes
0x0407	Uns16	RW	2	Day 1, interval 8 start time	MSB = hour, LSB = minutes
0x0408	Uns16	RW	2	Day 2, interval 1 start time	MSB = hour, LSB = minutes
0x0409	Uns16	RW	2	Day 2, interval 2 start time	MSB = hour, LSB = minutes
0x040A	Uns16	RW	2	Day 2, interval 3 start time	MSB = hour, LSB = minutes
0x040B	Uns16	RW	2	Day 2, interval 4 start time	MSB = hour, LSB = minutes
0x040C	Uns16	RW	2	Day 2, interval 5 start time	MSB = hour, LSB = minutes
0x040D	Uns16	RW	2	Day 2, interval 6 start time	MSB = hour, LSB = minutes
0x040E	Uns16	RW	2	Day 2, interval 7 start time	MSB = hour, LSB = minutes
0x040F	Uns16	RW	2	Day 2, interval 8 start time	MSB = hour, LSB = minutes
0x0410	Uns16	RW	2	Day 3, interval 1 start time	MSB = hour, LSB = minutes
0x0411	Uns16	RW	2	Day 3, interval 2 start time	MSB = hour, LSB = minutes
0x0412	Uns16	RW	2	Day 3, interval 3 start time	MSB = hour, LSB = minutes
0x0413	Uns16	RW	2	Day 3, interval 4 start time	MSB = hour, LSB = minutes
0x0414	Uns16	RW	2	Day 3, interval 5 start time	MSB = hour, LSB = minutes
0x0415	Uns16	RW	2	Day 3, interval 6 start time	MSB = hour, LSB = minutes
0x0416	Uns16	RW	2	Day 3, interval 7 start time	MSB = hour, LSB = minutes
0x0417	Uns16	RW	2	Day 3, interval 8 start time	MSB = hour, LSB = minutes
0x0418	Uns16	RW	2	Day 4, interval 1 start time	MSB = hour, LSB = minutes
0x0419	Uns16	RW	2	Day 4, interval 2 start time	MSB = hour, LSB = minutes
0x041A	Uns16	RW	2	Day 4, interval 3 start time	MSB = hour, LSB = minutes
0x041B	Uns16	RW	2	Day 4, interval 4 start time	MSB = hour, LSB = minutes
0x041C	Uns16	RW	2	Day 4, interval 5 start time	MSB = hour, LSB = minutes
0x041D	Uns16	RW	2	Day 4, interval 6 start time	MSB = hour, LSB = minutes
0x041E	Uns16	RW	2	Day 4, interval 7 start time	MSB = hour, LSB = minutes
0x041F	Uns16	RW	2	Day 4, interval 8 start time	MSB = hour, LSB = minutes
0x0420	Uns16	RW	2	Day 5, interval 1 start time	MSB = hour, LSB = minutes
0x0421	Uns16	RW	2	Day 5, interval 2 start time	MSB = hour, LSB = minutes
0x0422	Uns16	RW	2	Day 5, interval 3 start time	MSB = hour, LSB = minutes
0x0423	Uns16	RW	2	Day 5, interval 4 start time	MSB = hour, LSB = minutes
0x0424	Uns16	RW	2	Day 5, interval 5 start time	MSB = hour, LSB = minutes
0x0425	Uns16	RW	2	Day 5, interval 6 start time	MSB = hour, LSB = minutes

0x0426	Uns16	RW	2	Day 5, interval 7 start time	MSB = hour, LSB = minutes
0x0427	Uns16	RW	2	Day 5, interval 8 start time	MSB = hour, LSB = minutes
0x0428	Uns16	RW	2	Day 6, interval 1 start time	MSB = hour, LSB = minutes
0x0429	Uns16	RW	2	Day 6, interval 2 start time	MSB = hour, LSB = minutes
0x042A	Uns16	RW	2	Day 6, interval 3 start time	MSB = hour, LSB = minutes
0x042B	Uns16	RW	2	Day 6, interval 4 start time	MSB = hour, LSB = minutes
0x042C	Uns16	RW	2	Day 6, interval 5 start time	MSB = hour, LSB = minutes
0x042D	Uns16	RW	2	Day 6, interval 6 start time	MSB = hour, LSB = minutes
0x042E	Uns16	RW	2	Day 6, interval 7 start time	MSB = hour, LSB = minutes
0x042F	Uns16	RW	2	Day 6, interval 8 start time	MSB = hour, LSB = minutes
0x0430	Uns16	RW	2	Day 7, interval 1 start time	MSB = hour, LSB = minutes
0x0431	Uns16	RW	2	Day 7, interval 2 start time	MSB = hour, LSB = minutes
0x0432	Uns16	RW	2	Day 7, interval 3 start time	MSB = hour, LSB = minutes
0x0433	Uns16	RW	2	Day 7, interval 4 start time	MSB = hour, LSB = minutes
0x0434	Uns16	RW	2	Day 7, interval 5 start time	MSB = hour, LSB = minutes
0x0435	Uns16	RW	2	Day 7, interval 6 start time	MSB = hour, LSB = minutes
0x0436	Uns16	RW	2	Day 7, interval 7 start time	MSB = hour, LSB = minutes
0x0437	Uns16	RW	2	Day 7, interval 8 start time	MSB = hour, LSB = minutes
0x0438	Uns16	RW	2	Day 1, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0439	Uns16	RW	2	Day 1, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x043A	Uns16	RW	2	Day 1, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x043B	Uns16	RW	2	Day 1, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x043C	Uns16	RW	2	Day 1, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x043D	Uns16	RW	2	Day 1, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x043E	Uns16	RW	2	Day 1, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x043F	Uns16	RW	2	Day 1, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0440	Uns16	RW	2	Day 1, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0441	Uns16	RW	2	Day 2, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0442	Uns16	RW	2	Day 2, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0443	Uns16	RW	2	Day 2, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0444	Uns16	RW	2	Day 2, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0445	Uns16	RW	2	Day 2, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0446	Uns16	RW	2	Day 2, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0447	Uns16	RW	2	Day 2, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0448	Uns16	RW	2	Day 2, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0449	Uns16	RW	2	Day 2, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x044A	Uns16	RW	2	Day 3, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x044B	Uns16	RW	2	Day 3, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x044C	Uns16	RW	2	Day 3, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x044D	Uns16	RW	2	Day 3, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x044E	Uns16	RW	2	Day 3, interval 4speed	0-4 (Speed1-Speed4-Boost)

0x044F	Uns16	RW	2	Day 3, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0450	Uns16	RW	2	Day 3, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0451	Uns16	RW	2	Day 3, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0452	Uns16	RW	2	Day 3, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0453	Uns16	RW	2	Day 4, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0454	Uns16	RW	2	Day 4, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0455	Uns16	RW	2	Day 4, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0456	Uns16	RW	2	Day 4, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0457	Uns16	RW	2	Day 4, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0458	Uns16	RW	2	Day 4, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0459	Uns16	RW	2	Day 4, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x045A	Uns16	RW	2	Day 4, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x045B	Uns16	RW	2	Day 4, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x045C	Uns16	RW	2	Day 5, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x045D	Uns16	RW	2	Day 5, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x045E	Uns16	RW	2	Day 5, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x045F	Uns16	RW	2	Day 5, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0460	Uns16	RW	2	Day 5, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0461	Uns16	RW	2	Day 5, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0462	Uns16	RW	2	Day 5, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0463	Uns16	RW	2	Day 5, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0464	Uns16	RW	2	Day 5, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0465	Uns16	RW	2	Day 6, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0466	Uns16	RW	2	Day 6, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0467	Uns16	RW	2	Day 6, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0468	Uns16	RW	2	Day 6, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0469	Uns16	RW	2	Day 6, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x046A	Uns16	RW	2	Day 6, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x046B	Uns16	RW	2	Day 6, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x046C	Uns16	RW	2	Day 6, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x046D	Uns16	RW	2	Day 6, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x046E	Uns16	RW	2	Day 7, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x046F	Uns16	RW	2	Day 7, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0470	Uns16	RW	2	Day 7, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0471	Uns16	RW	2	Day 7, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0472	Uns16	RW	2	Day 7, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0473	Uns16	RW	2	Day 7, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0474	Uns16	RW	2	Day 7, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0475	Uns16	RW	2	Day 7, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0476	Uns16	RW	2	Day 7, interval 8 speed	0-4 (Speed1-Speed4-Boost)

Block 5: User Timer program 2

Same as Block4, registers MSB is 0x05

Block 6: User Timer program 3
Same as Block4, registers MSB is 0x06

Block 7: User Timer program 4
Same as Block4, registers MSB is 0x07

Block 8: Time and Day

Addr	Type	Attr.	Size	Description	Notes
0x0800	Uns16	RW	2	Time	MSB = hour (0...23) LSB = minutes (0...59)
0x0801	Uns16	RW	2	Day	Day 1 = Mon ... Day 7 = Sun

Note: reading and writing this block make sense only if T-EP is connected

Block 9: System snapshot 0h-9h

Addr	Type	Attr.	Size	Description	Notes
0x0900	Uns16	R	2	T1 temperature (last snapshot)	°C
0x0901	Uns16	R	2	T2 temperature	°C
0x0902	Uns16	R	2	T3 temperature	°C
0x0903	Uns16	R	2	T4 temperature	°C
0x0904	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0905	Uns16	R	2	Fan1 Speed	RPM
0x0906	Uns16	R	2	Fan1 Speed	RPM
0x0907	Uns16	R	2	HE Duty Cycle	0-100%
0x0908	Uns16	R	2	Not used	
0x0909	Uns16	R	2	Not used	
0x090A	Uns16	R	2	Not used	
0x090B	Uns16	R	2	T1 temperature (1h earlier)	°C
0x090C	Uns16	R	2	T2 temperature	°C
0x090D	Uns16	R	2	T3 temperature	°C
0x090E	Uns16	R	2	T4 temperature	°C
0x090F	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0910	Uns16	R	2	Fan1 Speed	RPM
0x0911	Uns16	R	2	Fan1 Speed	RPM
0x0912	Uns16	R	2	HE Duty Cycle	0-100%
0x0913	Uns16	R	2	Not used	
0x0914	Uns16	R	2	Not used	
0x0915	Uns16	R	2	Not used	
0x0916	Uns16	R	2	T1 temperature (2h earlier)	°C
0x0917	Uns16	R	2	T2 temperature	°C
0x0918	Uns16	R	2	T3 temperature	°C
0x0919	Uns16	R	2	T4 temperature	°C
0x091A	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x091B	Uns16	R	2	Fan1 Speed	RPM
0x091C	Uns16	R	2	Fan1 Speed	RPM
0x091D	Uns16	R	2	HE Duty Cycle	0-100%
0x091E	Uns16	R	2	Not used	
0x091F	Uns16	R	2	Not used	
0x0920	Uns16	R	2	Not used	
0x0921	Uns16	R	2	T1 temperature (3h earlier)	°C
0x0922	Uns16	R	2	T2 temperature	°C
0x0923	Uns16	R	2	T3 temperature	°C
0x0924	Uns16	R	2	T4 temperature	°C
0x0925	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor

0x0926	Uns16	R	2	Fan1 Speed	RPM
0x0927	Uns16	R	2	Fan1 Speed	RPM
0x0928	Uns16	R	2	HE Duty Cycle	0-100%
0x0929	Uns16	R	2	Dp Fan1	Pascal
0x092A	Uns16	R	2	Dp Fan2	Pascal
0x092B	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x092C	Uns16	R	2	T1 temperature (4h earlier)	°C
0x092D	Uns16	R	2	T2 temperature	°C
0x092E	Uns16	R	2	T3 temperature	°C
0x092F	Uns16	R	2	T4 temperature	°C
0x0930	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0931	Uns16	R	2	Fan1 Speed	RPM
0x0932	Uns16	R	2	Fan1 Speed	RPM
0x0933	Uns16	R	2	HE Duty Cycle	0-100%
0x0934	Uns16	R	2	Not used	
0x0935	Uns16	R	2	Not used	
0x0936	Uns16	R	2	Not used	
0x0937	Uns16	R	2	T1 temperature (5h earlier)	°C
0x0938	Uns16	R	2	T2 temperature	°C
0x0939	Uns16	R	2	T3 temperature	°C
0x093A	Uns16	R	2	T4 temperature	°C
0x093B	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x093C	Uns16	R	2	Fan1 Speed	RPM
0x093D	Uns16	R	2	Fan1 Speed	RPM
0x093E	Uns16	R	2	HE Duty Cycle	0-100%
0x093F	Uns16	R	2	Not used	
0x0940	Uns16	R	2	Not used	
0x0941	Uns16	R	2	Not used	
0x0942	Uns16	R	2	T1 temperature (6h earlier)	°C
0x0943	Uns16	R	2	T2 temperature	°C
0x0944	Uns16	R	2	T3 temperature	°C
0x0945	Uns16	R	2	T4 temperature	°C
0x0946	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0947	Uns16	R	2	Fan1 Speed	RPM
0x0948	Uns16	R	2	Fan1 Speed	RPM
0x0949	Uns16	R	2	HE Duty Cycle	0-100%
0x094A	Uns16	R	2	Not used	
0x094B	Uns16	R	2	Not used	
0x094C	Uns16	R	2	Not used	
0x094D	Uns16	R	2	T1 temperature (7h earlier)	°C
0x094E	Uns16	R	2	T2 temperature	°C

0x094F	Uns16	R	2	T3 temperature	°C
0x0950	Uns16	R	2	T4 temperature	°C
0x0951	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0952	Uns16	R	2	Fan1 Speed	RPM
0x0953	Uns16	R	2	Fan1 Speed	RPM
0x0954	Uns16	R	2	HE Duty Cycle	0-100%
0x0955	Uns16	R	2	Not used	
0x0956	Uns16	R	2	Not used	
0x0957	Uns16	R	2	Not used	
0x0958	Uns16	R	2	T1 temperature (8h earlier)	°C
0x0959	Uns16	R	2	T2 temperature	°C
0x095A	Uns16	R	2	T3 temperature	°C
0x095B	Uns16	R	2	T4 temperature	°C
0x095C	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x095D	Uns16	R	2	Fan1 Speed	RPM
0x095E	Uns16	R	2	Fan1 Speed	RPM
0x095F	Uns16	R	2	HE Duty Cycle	0-100%
0x0960	Uns16	R	2	Not used	
0x0961	Uns16	R	2	Not used	
0x0962	Uns16	R	2	Not used	
0x0963	Uns16	R	2	T1 temperature (9h earlier)	°C
0x0964	Uns16	R	2	T2 temperature	°C
0x0965	Uns16	R	2	T3 temperature	°C
0x0966	Uns16	R	2	T4 temperature	°C
0x0967	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0968	Uns16	R	2	Fan1 Speed	RPM
0x0969	Uns16	R	2	Fan1 Speed	RPM
0x096A	Uns16	R	2	HE Duty Cycle	0-100%
0x096B	Uns16	R	2	Not used	
0x096C	Uns16	R	2	Not used	
0x096D	Uns16	R	2	Not used	

Block 10: System snapshot 10h-19h
Same as Block9, registers MSB is 0x0A

Block 11: System snapshot 20h-29h
Same as Block9, registers MSB is 0x0B

Block 12: System snapshot 30h-35h
Same as Block9, registers MSB is 0x0C. Last block register is 0x0C41.

MODBUS Protocol ENY-SHP-270 e ENY-SP-225

Product descritpion: **Sabiana RVU modbus protocol**

Rev	Date	Description	Author	Verified
0	28/10/21	First draft	I. Gioia	M.Felici
0	24/11/21	Draft BUG-Fixing – implements	T. Zacher	T. Zacher
1	06/12/21	Review after debug	I. Gioia	
2	31/01/22	Note on reg 0x0105, bit 15 (Auto+Program mode) Reg 0x000A machine model is now 0x5509	I. Gioia	
3	10/02/22	Added dips reg.0x0111, added dummy registers for future use	I. Gioia	
4	20/02/23	Specified parameter range for model C225	I. Gioia	
5	27/06/23	Added new antifreeze parameters for model C225	I. Gioia	
6	10/07/23	Added C225 model in block 0, deleted unused parameters in block 2	I. Gioia	

Connectors

The MODBUS RTU interface is available via the RS485 ports.

Serial interface configuration

The serial interface has to be configured as follows:

Speed	9600 bit/sec or 38400 bit/sec (*)(**)
Bit number	8
Parity	No
Stop bit	1

*Depends on the Modbus Port Speed parameter setted via T-EP.

** On KNX port the interface speed is 1200bit/sec.

MODBUS protocol

The MODBUS address of the board is selected by the ADDRESS dips in the range 1-60.

Only the data type “Holding Register” is supported.

The available MODBUS functions are:

- 0x03(3 dec) “Read Holding Registers”
- 0x06(6 dec) “Write Single Register”
- 0x10(16 dec) “Preset Multiple Registers”

The following tables show the data accessible via the MODBUS interface. For each data, the following infomation is specified:

- **Addr**, hexadecimal address
- **Type**, data type (see next table)
- **Attr**, attributes (R read only, W write only, RW read/write)
- **Symb**, short symbolic data name, used only for machine parameters; identifies the parameter name as defined in the technical specifications
- **Description**, short data-specific description (parameter, measure, etc..)
- **Notes**, information about data interpretation, etc...

Writing contiguous registers with a single operation is allowed only if all the registers are marked as writable.

In case of an error for:
- function not supported
- wrong data address
- wrong data lenght
- data not acceptable

the response will be a MODBUS exception.

Table 3: Data types

Type	Description	Range	Dimension	Notes
char	8 bit charachter		1 byte	
byte	8 bit usigned	0...255	1 byte	The valid data is in the most significant byte of the 16bit register
uns16	16 bit unsigned integer	0..65535	2 bytes	
sig16	16 bit signed integer	–32768..32767	2 bytes	
uns32	32 bit unsigned integer	0..4294836225	4 bytes	2 contiguous MODBUS registers, the first one containing the most significant 16 bit
float	Float (32 bit)	-3.4e+38, 3.4e+38	4 bytes	ANSI/IEEE Std754-1985 From the most significant bit: - sign of mantissa - 8 bit for exponent - 23 bit for mantissa

Regarding the supported MODBUS standard, one can refer to the MODBUS official website (Modbus Specifications) and particularly to the documents: Modbus Serial Line Protocol and Implementation Guide V1.02 e Mosbus Application Protocol V1.1b.

MODBUS BLOCKS LIST:

Block 0: System identification

Addr	Type	Attr.	Size	Description	Notes
0x0000	char	RW	20	Serial Number	Machine ID for customer use
0x000A	uns16	R	2	Controller model	0x5509: F270 0x5510: C225
0x000B	uns16	R	2	Firmware Release	Low byte= minor release, High byte = major release
0x000C	uns16	R	2	Protocol Release	These tables apply if the value is 0x0002
0x000D	uns16	R	2	T-EP Firmware Release	Low byte= minor release, High byte = major release 0x0000 = T-EP not connected

Block 1: Machine state

Addr	Type	Attr.	Size	Description	Notes
0x0100	Sig16[4]	R	8	Temperature probes	T1,T2,T3,T4 °Cx10
0x0104	Uns16	R	2	Current Fan Speed	0=Speed1 1=Speed2 2=Speed3 3=Speed4 4=Boost Speed The information means that the actual speed is <= speed n
0x0105	Uns16	R	2	Machine state and mode	Bit fields b0: 1: Remote OFF active b1: 1: Bypass b2: 1: Electric Pre Heater active b3: 1: Water pre-heating active b4: 1: Boost active b5: 1: Defrost cycle active b6: 1: Boiler boost b7: 1: Party Mode ON b8: 1 On, 0 Off b9-10: Mode (see also b15) • 0:Holiday • 1:Auto • 2:Program • 3:Manual b11: Season • 0:Summer • 1:Winter b12-14: Program selection • 0-3 Preset programs (P1-P4) • 4-7 User programs (P5-P8) b15: Mode AUTO+PROGRAM (1 = mode active and the Mode bits b9-b10 become "don't care")
0x0106	Uns16	R	2	Humidity setpoint	RH% x10 (40.0% = 400)

0x0107	Uns16	R	2	FIlter counter	Filter counter divided by 20 minutes
0x0108	Byte	R	1	Not Used	
0x0109	byte	R	1	Output State	Bit fields (1 On, 0 Off) b0: Relay Fan b1: Relay Q2 b2: Relay Q3 b3: Relay FC_FC
0x010A	Byte	R	1	Digital Inputs	Bit fields (1 Active, 0 Not Active) b0: reserved b1: C1 b2: C3 b3: C4 (Resistance phase feedback)
0x010B	Uns16	R	2	Fan1 Speed	rpm
0x010C	Uns16	R	2	Fan2 Speed	rpm
0x010D	Uns16	R	2	Duty Cycle Fan1	0,0-100,0% PWM Drive Fan1 (50,0%=500)
0x010E	Uns16	R	2	Duty Cycle Fan2	0,0-100,0% PWM Drive Fan2 (50,0%=500)
0x010F	Uns16	R	2	Duty Cycle El. Preheater	0-100%
0x0110	Uns16	R	2	Alarms	Bit fileds (1 Active, 0 not Active) b0: T1 probe failure, b1: T2 probe failure, b2: T3 probe failure, b3: T4 probe failure, b4: Timekeeper failure, b5: Frost alarm b6: Frost alarm (from T2 probe) b7: Fireplace Alarm (from digital input) b8: Pressure transducer failure b9: Filter alarm b10: Fans failure b11: RH or CO2 sensor failure b12: not used b13: not used b14: Pre Heating alarm b15:Pre frost alarm (T2)
0x0111	Sig16	R	2	ConfigurationDips	Bit fields, 1=Dip ON, 0=Dip OFF b0: 1 Inverted configuration b1: 1: Pre-heating present b2: 1: Preheating with Water, 0:HE b3: 1: Post treatment ON b4: 1: Post treatment also summer b5: 1: FC-FC IAQ, 0: FC-FC Fault signaling b6: 1: Geothermal treatment b7: 1: IN3 Boiler pressure booster

0x0112	Sig16	R	2	Not used	Returns 0
0x0113	Uns16	R	2	CO2 reading	ppm
0x0114	Uns16	R	2	RH3 reading	RH % x10 (50,0%=500)
0x0115	Uns16	R	2	Not used	Returns 0
0x0116	Uns16	R	2	Not used	Returns 0
0x0117	Uns16	R	2	Not used	Returns 0
0x0118	Uns16	R	2	Not used	Returns 0
0x0119	Uns16	R	2	Not used	Returns 0
0x011A	Uns16	R	2	Not used	Returns 0
0x011B	Uns16	R	2	Not used	Returns 0
0x011C	Uns16	R	2	WM-RVU Time	MSB Hrs, LSB Mins
0x011D	Uns16	R	2	WM-RVU Day	0:Monday...6: Sunday
0x011E	Uns16	R	2	Holiday days	Remaining days for holiday mode
0x011F	Uns16	R	2	Options	b0: WM-RVU present b1: RPM too high detected b8: 1: IAQ Used b9: 1: Post treatment used b10: 1: HE used b11: 1: Not used b12: 1: CO2 sensor present b13: 1: T-EP present b14: 1: RH sensor present b15: 1: Not used
0x0120	Uns32	R	4	Hours of operation	Fans ON hours counter
0x0122	Uns32	R	4	PWM Heater hours of operation	
0x0124	Uns16	R	2	RH1 reading	RH % x10 (50,0%=500)
0x0125	Uns16	R	2	Analog Out Reading	Volt x 10 (6.2V = 62)
0x0126	Uns16	R	2	Dummy	For future use
0x0127	Uns16	R	2	Dummy	For future use
0x0128	Uns16	R	2	Dummy	For future use
0x0129	Uns16	R	2	Dummy	For future use
0x012A	Uns16	R	2	Dummy	For future use
0x012B	Uns16	R	2	Dummy	For future use

Block 2: Machine parameters

Addr	Type	Attr.	Size	Description	Notes
0x0200	Sig16	RW	2	Parameters Flags	Bit field:0 Off, 1 On b0: Free b1: Stop Mode (0 FanOff, 1 FanOn) b2: Flush mode (0 Off, 1 On) b3: not used b4: Hi RH management (0:off, 1:on) b5: Antifreeze probe (0:T4, 1:T1) b6-7: not used b8: 1: Double RH auto mode disabled b9: Postheating probe ref (0:T3, 1:T2) b10: Post treatment type (0: all seasons, 1: only cool) b11: Fireplace mode (1: ON) b12: FreeHeating Conf: • 0 FreeHeating+FreeCooling • 1 FreeCooling Only b13-15: Free
0x0201	Sig16	RW	2	Temp probe 1 offset	°C x10 (-40...+40)
0x0202	Sig16	RW	2	Temp probe 2 offset	°C x10 (-40...+40)
0x0203	Sig16	RW	2	Temp probe 3 offset	°C x10 (-40...+40)
0x0204	Sig16	RW	2	Temp probe 4 offset	°C x10 (-40...+40)
0x0205	Sig16	RW	2	Min air flow (Q min)	Q: m3/h F270: (80...95) C225: (50...61)
0x0206	Sig16	RW	2	Max air flow (Q max)	Q: m3/h F270: (243...270) C225: (203...225)
0x0207	Sig16	RW	2	Fan1 Nominal V drive	V x100 (100...1000)
0x0208	Sig16	RW	2	Fan2 Nominal V drive	V x100 (100...1000)
0x0209	Sig16	RW	2	Fan min speed	rpm F270: (90...110) C225: (540...660)
0x020A	Sig16	RW	2	Fan max Speed	rpm F270: (2610...3190) C225: (2700...3300)
0x020B	Sig16	RW	2	Not used	
0x020C	Sig16	RW	2	Not used	
0x020D	Sig16	RW	2	Not used	
0x020E	Sig16	RW	2	Not used	
0x020F	Sig16	RW	2	Not used	
0x0210	Sig16	RW	2	Air flow 1	Q: m3/h min=reg0x0205, max=reg 0x0206
0x0211	Sig16	RW	2	Air flow 2	Q: m3/h (60...130) min=the highest value among • reg 0x0210-20% • reg 0x0205 max= the lowest value among

					• reg 0x0210+20% • reg 0x0206
0x0212	Sig16	RW	2	Manual Speed	0-3 (Speed 1- Speed 4) Note: Writing this register also triggers the manual speed mode
0x0213	Sig16	RW	2	Speed 1 %	(0...35)
0x0214	Sig16	RW	2	Speed 2 %	(35...70)
0x0215	Sig16	RW	2	Speed 3 %	(45...100)
0x0216	Sig16	RW	2	Speed 4 %	(100...110)
0x0217	Sig16	RW	2	Boost Speed %	(110...130)
0x0218	Sig16	RW	2	Summer T Setpoint	°C x10 (100..300)
0x0219	Sig16	RW	2	Winter T setpoint	°C x10 (100..300)
0x021A	Sig16	RW	2	Not used	
0x021B	Sig16	RW	2	Temp for free cooling	°C x10 (100...350)
0x021C	Sig16	RW	2	Temp for free heating	°C x10 (100.300)
0x021D	Sig16	RW	2	Fan1/2 Balance %	(-30% ... +30%)
0x021E	Sig16	RW	2	Humidity samples for setpoint	(1...96) (1 sample every 15minutes)
0x021F	Sig16	RW	2	Boost time	minutes (15-240)
0x0220	Sig16	RW	2	P constant for humidity regulator	(5...50)
0x0221	Sig16	RW	2	Filter life	Days (30-360)
0x0222	Sig16	RW	2	CO2 ppm min	ppm (100 ... reg 0x0223 val)
0x0223	Sig16	RW	2	CO2 ppm nom	ppm (reg 0x0222 val ... reg 0x0224 val)
0x0224	Sig16	RW	2	CO2 ppm max	ppm (reg 0x0223 val ... reg 0x0227 val)
0x0225	Sig16	RW	2	CO2 ppm prop constant	1,0…4,0 (x10 (10...40)
0x0226	Sig16	RW	2	Blocked functions	Bit fileds (1 Active, 0 not Active) b0:Manual mode not allowed b1:Party mode not allowed b2: Holiday mode not allowed b3:Auto mode not allowed b4: Weekly Prog mode not allowed b5: Time/day change not allowed b6: Off command not allowed
0x0227	Sig16	RW	2	CO2 Sensor PPM Range	ppm (reg 0x0224 val ... 30000)
0x0228	Sig16	RW	2	Boiler boost time	Minutes (5...20)
0x0229	Sig16	RW	2	RH Low value	RH% x10 (40,0% = 400) (200...450)
0x022A	Sig16	RW	2	RH Standard value	RH% x10 (400-600)
0x022B	Sig16	RW	2	RH Hi value	RH% x10 (600-800)
0x022C	Sig16	RW	2	Fan Speed with RH Low	0-3 (Speed 1- Speed 4)
0x022D	Sig16	RW	2	Heater K Coefficient	10 - 100 (data is *10, means 1.0-10.0)
0x022E	Sig16	RW	2	Heater Power limit mode	0: Limit on RPM, 1: None
0x022F	Sig16	RW	2	Heater PID, P Coefficient	0...100
0x0230	Sig16	RW	2	Heater PID, I Coefficient	0...100
0x0231	Sig16	RW	2	Heater PID, D Coefficient	0...100
0x0232	Sig16	RW	2	T4 value for Heater ON	°C x 10 (0 - 50)
0x0233	Sig16	RW	2	Vout Fan1 F270: Q100 C225: Q53	Volt x100 (100 ... reg 0x0234)

0x0234	Sig16	RW	2	Vout Fan1 F270: Q150 C225: Q92	Volt x100 (reg 0x0233 ... reg 0x0235)
0x0235	Sig16	RW	2	Vout Fan1 F270: Q190 C225: Q136	Volt x100 (reg 0x0234 ... reg0x0236)
0x0236	Sig16	RW	2	Vout Fan1 F270: Q270 C225: Q180	Volt x100 (reg 0x0235 ... reg 0x0237)
0x0237	Sig16	RW	2	Vout Fan1 F270: Q300 C225: Q225	Volt x100 (reg 0x0236 ... 1000)
0x0238	Sig16	RW	2	Party Time duration	15 - 240 minutes
0x0239	Sig16	RW	2	Bypass mode	0 = Auto 1 = Off 2 = On 3 = Single Supply 4 = Single Extraction
0x023A	Sig16	RW	2	Post treatment, T2 Cooling	°C x10 (100...500)
0x023B	Sig16	RW	2	Post treatment, T2 Heating	°C x10 (100...500)
0x023C	Sig16	RW	2	Post treatment, T3 Cooling	°C x10 (100...500)
0x023D	Sig16	RW	2	Post treatment, T3 Heating	°C x10 (100...500)
0x023E	Sig16	RW	2	Post treatment, hysteresis step 1	°C x10 (0...20)
0x023F	Sig16	RW	2	Post treatment, hysteresis step 2	°C x10 (0...20)
0x0240	Sig16	RW	2	Humidity regulation const P2	5...50
0x0241	Sig16	RW	2	Vout Fan2 F270: Q100 C225: Q53	Volt x100 (100 ... reg 0x0242)
0x0242	Sig16	RW	2	Vout Fan2 F270: Q150 C225: Q92	Volt x100 (reg 0x0241 ... reg 0x0243)
0x0243	Sig16	RW	2	Vout Fan2 F270: Q190 C225: Q136	Volt x100 (reg 0x0242 ... reg0x0244)
0x0244	Sig16	RW	2	Vout Fan2 F270: Q270 C225: Q180	Volt x100 (reg 0x0243 ... reg 0x0245)
0x0245	Sig16	RW	2	Vout Fan2 F270: Q300 C225: Q225	Volt x100 (reg 0x0244 ... 1000)
0x0246	Sig16	RW	2	Batt Geo Valve On time	2...60 minutes
0x0247	Sig16	RW	2	RH Start 0 (RH logic)	RH% x10 (80...120)
0x0248	Sig16	RW	2	RH Start 100 (RH logic)	RH% x10 (30...70)
0x0249	Sig16	RW	2	RH Gap (RH logic)	RH% x10 (5...50)
0x024A	Sig16	RW	2	RH GapC (RH logic)	RH% x10 (20...100)
0x024B	Sig16	RW	2	T1: Start defrost with heater	°C x10 (-50...0)
0x024C	Sig16	RW	2	T1: Stop defrost with heater	°C x10 (-50...0)
0x024D	Sig16	RW	2	T4: Stop defrost with heater	°C x10 (0...150)
0x024E	Sig16	RW	2	T4: defrost with heater setpoint	°C x10 (0...150)

0x024F	Sig16	RW	2	Defrost Resistance cycle time	10ms...100ms Duration of 1% pwm
0x0250	Sig16	RW	2	Bypass Fan Slowdown	Volt x100 (100...1000)
0x0251	Sig16	RW	2	C225 antifreeze slope coeff	x100 (5...25) [actual 0,05...0,25]
0x0252	Sig16	RW	2	Free Parameter	For future use
0x0253	Sig16	RW	2	Free Parameter	For future use

Note:written values out of range are accepted but are truncated to fit in the specified range.

Block 3: Commands

Addr	Type	Attr.	Size	Description	Notes
0x0300	Uns16	RW	2	ON-OFF Command	1=ON 0=OFF
0x0301	Uns16	RW	2	Mode Command Manual	1=Manual
0x0302	Uns16	RW	2	Mode Command Holiday	1=Holiday
0x0303	Uns16	RW	2	Mode Command Party	1=Party
0x0304	Uns16	RW	2	Mode Command Auto	1=Auto
0x0305	Uns16	RW	2	Mode Command Program	1=Program
0x0306	Uns16	RW	2	Timer prog selection	0-7=P1-P8
0x0307	Uns16	RW	2	Mode Selection (single register)	• 0:Holiday • 1:Auto • 2:Program • 3:Manual • 4:Party • 5:Auto+Program
0x0308	Uns16	RW	2	Parameter reset	Writing 0x005A results in a parameter reset to factory default Read as 0
0x0309	Uns16	RW	2	Manual speed	0-3 (Speed 1- Speed 4) Note: manual mode is NOT triggered by writing this register
0x030A	Uns16	RW	2	External RH3 Value	0%...100.0% (0...1000) When reading, a value of 0xFFFF means that the data is not yet valid
0x030B	Uns16	RW	2	External CO2 Value	0ppm...30000ppm When reading, a value of 0xFFFF means that the data is not yet valid
0x030C	Uns16	RW	2	Mode Command Auto+Program	1= Auto+Program
0x030D	Uns16	RW	2	Set WM-RVU Current Time	MSB Hrs, LSB Mins
0x030E	Uns16	RW	2	Set WM-RVU Current Day	0:Monday...6: Sunday
0x030F	Uns16	RW	2	Set Holyday mode days	N = Holiday days (1-60) The machine will enter holiday mode for the next N days When read it returns the days left
0x0310	Uns16	RW	2	Reset Filter Counter	Writing 1 resets the filter counter
0x0311	Uns16	RW	2	External RH1 Value	0%...100.0% (0...1000) When reading, a value of 0xFFFF means that the data is not yet valid
0x0312	Uns16	RW	2	Dummy	For future use
0x0313	Uns16	RW	2	Dummy	For future use
0x0314	Uns16	RW	2	Dummy	For future use
0x0315	Uns16	RW	2	Dummy	For future use
0x0316	Uns16	RW	2	Dummy	For future use

Block 4: User Timer program 1

Addr	Type	Attr.	Size	Description	Notes
0x0400	Uns16	RW	2	Day 1, interval 1 start time	MSB = hour (0...23) LSB = minutes (0...59)
0x0401	Uns16	RW	2	Day 1, interval 2 start time	MSB = hour, LSB = minutes
0x0402	Uns16	RW	2	Day 1, interval 3 start time	MSB = hour, LSB = minutes
0x0403	Uns16	RW	2	Day 1, interval 4 start time	MSB = hour, LSB = minutes
0x0404	Uns16	RW	2	Day 1, interval 5 start time	MSB = hour, LSB = minutes
0x0405	Uns16	RW	2	Day 1, interval 6 start time	MSB = hour, LSB = minutes
0x0406	Uns16	RW	2	Day 1, interval 7 start time	MSB = hour, LSB = minutes
0x0407	Uns16	RW	2	Day 1, interval 8 start time	MSB = hour, LSB = minutes
0x0408	Uns16	RW	2	Day 2, interval 1 start time	MSB = hour, LSB = minutes
0x0409	Uns16	RW	2	Day 2, interval 2 start time	MSB = hour, LSB = minutes
0x040A	Uns16	RW	2	Day 2, interval 3 start time	MSB = hour, LSB = minutes
0x040B	Uns16	RW	2	Day 2, interval 4 start time	MSB = hour, LSB = minutes
0x040C	Uns16	RW	2	Day 2, interval 5 start time	MSB = hour, LSB = minutes
0x040D	Uns16	RW	2	Day 2, interval 6 start time	MSB = hour, LSB = minutes
0x040E	Uns16	RW	2	Day 2, interval 7 start time	MSB = hour, LSB = minutes
0x040F	Uns16	RW	2	Day 2, interval 8 start time	MSB = hour, LSB = minutes
0x0410	Uns16	RW	2	Day 3, interval 1 start time	MSB = hour, LSB = minutes
0x0411	Uns16	RW	2	Day 3, interval 2 start time	MSB = hour, LSB = minutes
0x0412	Uns16	RW	2	Day 3, interval 3 start time	MSB = hour, LSB = minutes
0x0413	Uns16	RW	2	Day 3, interval 4 start time	MSB = hour, LSB = minutes
0x0414	Uns16	RW	2	Day 3, interval 5 start time	MSB = hour, LSB = minutes
0x0415	Uns16	RW	2	Day 3, interval 6 start time	MSB = hour, LSB = minutes
0x0416	Uns16	RW	2	Day 3, interval 7 start time	MSB = hour, LSB = minutes
0x0417	Uns16	RW	2	Day 3, interval 8 start time	MSB = hour, LSB = minutes
0x0418	Uns16	RW	2	Day 4, interval 1 start time	MSB = hour, LSB = minutes
0x0419	Uns16	RW	2	Day 4, interval 2 start time	MSB = hour, LSB = minutes
0x041A	Uns16	RW	2	Day 4, interval 3 start time	MSB = hour, LSB = minutes
0x041B	Uns16	RW	2	Day 4, interval 4 start time	MSB = hour, LSB = minutes
0x041C	Uns16	RW	2	Day 4, interval 5 start time	MSB = hour, LSB = minutes
0x041D	Uns16	RW	2	Day 4, interval 6 start time	MSB = hour, LSB = minutes
0x041E	Uns16	RW	2	Day 4, interval 7 start time	MSB = hour, LSB = minutes
0x041F	Uns16	RW	2	Day 4, interval 8 start time	MSB = hour, LSB = minutes
0x0420	Uns16	RW	2	Day 5, interval 1 start time	MSB = hour, LSB = minutes
0x0421	Uns16	RW	2	Day 5, interval 2 start time	MSB = hour, LSB = minutes
0x0422	Uns16	RW	2	Day 5, interval 3 start time	MSB = hour, LSB = minutes
0x0423	Uns16	RW	2	Day 5, interval 4 start time	MSB = hour, LSB = minutes
0x0424	Uns16	RW	2	Day 5, interval 5 start time	MSB = hour, LSB = minutes
0x0425	Uns16	RW	2	Day 5, interval 6 start time	MSB = hour, LSB = minutes

0x0426	Uns16	RW	2	Day 5, interval 7 start time	MSB = hour, LSB = minutes
0x0427	Uns16	RW	2	Day 5, interval 8 start time	MSB = hour, LSB = minutes
0x0428	Uns16	RW	2	Day 6, interval 1 start time	MSB = hour, LSB = minutes
0x0429	Uns16	RW	2	Day 6, interval 2 start time	MSB = hour, LSB = minutes
0x042A	Uns16	RW	2	Day 6, interval 3 start time	MSB = hour, LSB = minutes
0x042B	Uns16	RW	2	Day 6, interval 4 start time	MSB = hour, LSB = minutes
0x042C	Uns16	RW	2	Day 6, interval 5 start time	MSB = hour, LSB = minutes
0x042D	Uns16	RW	2	Day 6, interval 6 start time	MSB = hour, LSB = minutes
0x042E	Uns16	RW	2	Day 6, interval 7 start time	MSB = hour, LSB = minutes
0x042F	Uns16	RW	2	Day 6, interval 8 start time	MSB = hour, LSB = minutes
0x0430	Uns16	RW	2	Day 7, interval 1 start time	MSB = hour, LSB = minutes
0x0431	Uns16	RW	2	Day 7, interval 2 start time	MSB = hour, LSB = minutes
0x0432	Uns16	RW	2	Day 7, interval 3 start time	MSB = hour, LSB = minutes
0x0433	Uns16	RW	2	Day 7, interval 4 start time	MSB = hour, LSB = minutes
0x0434	Uns16	RW	2	Day 7, interval 5 start time	MSB = hour, LSB = minutes
0x0435	Uns16	RW	2	Day 7, interval 6 start time	MSB = hour, LSB = minutes
0x0436	Uns16	RW	2	Day 7, interval 7 start time	MSB = hour, LSB = minutes
0x0437	Uns16	RW	2	Day 7, interval 8 start time	MSB = hour, LSB = minutes
0x0438	Uns16	RW	2	Day 1, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0439	Uns16	RW	2	Day 1, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x043A	Uns16	RW	2	Day 1, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x043B	Uns16	RW	2	Day 1, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x043C	Uns16	RW	2	Day 1, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x043D	Uns16	RW	2	Day 1, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x043E	Uns16	RW	2	Day 1, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x043F	Uns16	RW	2	Day 1, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0440	Uns16	RW	2	Day 1, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0441	Uns16	RW	2	Day 2, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0442	Uns16	RW	2	Day 2, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0443	Uns16	RW	2	Day 2, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0444	Uns16	RW	2	Day 2, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0445	Uns16	RW	2	Day 2, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0446	Uns16	RW	2	Day 2, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0447	Uns16	RW	2	Day 2, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0448	Uns16	RW	2	Day 2, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0449	Uns16	RW	2	Day 2, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x044A	Uns16	RW	2	Day 3, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x044B	Uns16	RW	2	Day 3, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x044C	Uns16	RW	2	Day 3, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x044D	Uns16	RW	2	Day 3, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x044E	Uns16	RW	2	Day 3, interval 4speed	0-4 (Speed1-Speed4-Boost)

0x044F	Uns16	RW	2	Day 3, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0450	Uns16	RW	2	Day 3, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0451	Uns16	RW	2	Day 3, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0452	Uns16	RW	2	Day 3, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0453	Uns16	RW	2	Day 4, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0454	Uns16	RW	2	Day 4, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0455	Uns16	RW	2	Day 4, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0456	Uns16	RW	2	Day 4, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0457	Uns16	RW	2	Day 4, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0458	Uns16	RW	2	Day 4, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0459	Uns16	RW	2	Day 4, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x045A	Uns16	RW	2	Day 4, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x045B	Uns16	RW	2	Day 4, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x045C	Uns16	RW	2	Day 5, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x045D	Uns16	RW	2	Day 5, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x045E	Uns16	RW	2	Day 5, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x045F	Uns16	RW	2	Day 5, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0460	Uns16	RW	2	Day 5, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0461	Uns16	RW	2	Day 5, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0462	Uns16	RW	2	Day 5, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0463	Uns16	RW	2	Day 5, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0464	Uns16	RW	2	Day 5, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0465	Uns16	RW	2	Day 6, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0466	Uns16	RW	2	Day 6, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0467	Uns16	RW	2	Day 6, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0468	Uns16	RW	2	Day 6, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0469	Uns16	RW	2	Day 6, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x046A	Uns16	RW	2	Day 6, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x046B	Uns16	RW	2	Day 6, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x046C	Uns16	RW	2	Day 6, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x046D	Uns16	RW	2	Day 6, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x046E	Uns16	RW	2	Day 7, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x046F	Uns16	RW	2	Day 7, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0470	Uns16	RW	2	Day 7, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0471	Uns16	RW	2	Day 7, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0472	Uns16	RW	2	Day 7, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0473	Uns16	RW	2	Day 7, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0474	Uns16	RW	2	Day 7, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0475	Uns16	RW	2	Day 7, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0476	Uns16	RW	2	Day 7, interval 8 speed	0-4 (Speed1-Speed4-Boost)

Block 5: User Timer program 2
Same as Block4, registers MSB is 0x05

Block 6: User Timer program 3
Same as Block4, registers MSB is 0x06

Block 7: User Timer program 4
Same as Block4, registers MSB is 0x07

Block 8: Time and Day

Addr	Type	Attr.	Size	Description	Notes
0x0800	Uns16	RW	2	Time	MSB = hour (0...23) LSB = minutes (0...59)
0x0801	Uns16	RW	2	Day	Day 1 = Mon ... Day 7 = Sun

Note: reading and writing this block make sense only if T-EP is connected

SNAPSHOT BLOCKS NON IMPLEMENTED YET

Block 9: System snapshot 0h-9h

Addr	Type	Attr.	Size	Description	Notes
0x0900	Uns16	R	2	T1 temperature (last snapshot)	°C
0x0901	Uns16	R	2	T2 temperature	°C
0x0902	Uns16	R	2	T3 temperature	°C
0x0903	Uns16	R	2	T4 temperature	°C
0x0904	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0905	Uns16	R	2	Fan1 Speed	RPM
0x0906	Uns16	R	2	Fan1 Speed	RPM
0x0907	Uns16	R	2	HE Duty Cycle	0-100%
0x0908	Uns16	R	2	Not used	
0x0909	Uns16	R	2	Not used	
0x090A	Uns16	R	2	Not used	
0x090B	Uns16	R	2	T1 temperature (1h earlier)	°C
0x090C	Uns16	R	2	T2 temperature	°C
0x090D	Uns16	R	2	T3 temperature	°C
0x090E	Uns16	R	2	T4 temperature	°C
0x090F	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0910	Uns16	R	2	Fan1 Speed	RPM
0x0911	Uns16	R	2	Fan1 Speed	RPM
0x0912	Uns16	R	2	HE Duty Cycle	0-100%
0x0913	Uns16	R	2	Not used	
0x0914	Uns16	R	2	Not used	
0x0915	Uns16	R	2	Not used	
0x0916	Uns16	R	2	T1 temperature (2h earlier)	°C
0x0917	Uns16	R	2	T2 temperature	°C
0x0918	Uns16	R	2	T3 temperature	°C
0x0919	Uns16	R	2	T4 temperature	°C
0x091A	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x091B	Uns16	R	2	Fan1 Speed	RPM
0x091C	Uns16	R	2	Fan1 Speed	RPM
0x091D	Uns16	R	2	HE Duty Cycle	0-100%
0x091E	Uns16	R	2	Not used	
0x091F	Uns16	R	2	Not used	
0x0920	Uns16	R	2	Not used	
0x0921	Uns16	R	2	T1 temperature (3h earlier)	°C
0x0922	Uns16	R	2	T2 temperature	°C
0x0923	Uns16	R	2	T3 temperature	°C
0x0924	Uns16	R	2	T4 temperature	°C
0x0925	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor

0x0926	Uns16	R	2	Fan1 Speed	RPM
0x0927	Uns16	R	2	Fan1 Speed	RPM
0x0928	Uns16	R	2	HE Duty Cycle	0-100%
0x0929	Uns16	R	2	Dp Fan1	Pascal
0x092A	Uns16	R	2	Dp Fan2	Pascal
0x092B	Uns16	R	2	Bypass	0: Not Active, 1: Active
0x092C	Uns16	R	2	T1 temperature (4h earlier)	°C
0x092D	Uns16	R	2	T2 temperature	°C
0x092E	Uns16	R	2	T3 temperature	°C
0x092F	Uns16	R	2	T4 temperature	°C
0x0930	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0931	Uns16	R	2	Fan1 Speed	RPM
0x0932	Uns16	R	2	Fan1 Speed	RPM
0x0933	Uns16	R	2	HE Duty Cycle	0-100%
0x0934	Uns16	R	2	Not used	
0x0935	Uns16	R	2	Not used	
0x0936	Uns16	R	2	Not used	
0x0937	Uns16	R	2	T1 temperature (5h earlier)	°C
0x0938	Uns16	R	2	T2 temperature	°C
0x0939	Uns16	R	2	T3 temperature	°C
0x093A	Uns16	R	2	T4 temperature	°C
0x093B	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x093C	Uns16	R	2	Fan1 Speed	RPM
0x093D	Uns16	R	2	Fan1 Speed	RPM
0x093E	Uns16	R	2	HE Duty Cycle	0-100%
0x093F	Uns16	R	2	Not used	
0x0940	Uns16	R	2	Not used	
0x0941	Uns16	R	2	Not used	
0x0942	Uns16	R	2	T1 temperature (6h earlier)	°C
0x0943	Uns16	R	2	T2 temperature	°C
0x0944	Uns16	R	2	T3 temperature	°C
0x0945	Uns16	R	2	T4 temperature	°C
0x0946	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0947	Uns16	R	2	Fan1 Speed	RPM
0x0948	Uns16	R	2	Fan1 Speed	RPM
0x0949	Uns16	R	2	HE Duty Cycle	0-100%
0x094A	Uns16	R	2	Not used	
0x094B	Uns16	R	2	Not used	
0x094C	Uns16	R	2	Not used	
0x094D	Uns16	R	2	T1 temperature (7h earlier)	°C
0x094E	Uns16	R	2	T2 temperature	°C

0x094F	Uns16	R	2	T3 temperature	°C
0x0950	Uns16	R	2	T4 temperature	°C
0x0951	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0952	Uns16	R	2	Fan1 Speed	RPM
0x0953	Uns16	R	2	Fan1 Speed	RPM
0x0954	Uns16	R	2	HE Duty Cycle	0-100%
0x0955	Uns16	R	2	Not used	
0x0956	Uns16	R	2	Not used	
0x0957	Uns16	R	2	Not used	
0x0958	Uns16	R	2	T1 temperature (8h earlier)	°C
0x0959	Uns16	R	2	T2 temperature	°C
0x095A	Uns16	R	2	T3 temperature	°C
0x095B	Uns16	R	2	T4 temperature	°C
0x095C	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x095D	Uns16	R	2	Fan1 Speed	RPM
0x095E	Uns16	R	2	Fan1 Speed	RPM
0x095F	Uns16	R	2	HE Duty Cycle	0-100%
0x0960	Uns16	R	2	Not used	
0x0961	Uns16	R	2	Not used	
0x0962	Uns16	R	2	Not used	
0x0963	Uns16	R	2	T1 temperature (9h earlier)	°C
0x0964	Uns16	R	2	T2 temperature	°C
0x0965	Uns16	R	2	T3 temperature	°C
0x0966	Uns16	R	2	T4 temperature	°C
0x0967	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0968	Uns16	R	2	Fan1 Speed	RPM
0x0969	Uns16	R	2	Fan1 Speed	RPM
0x096A	Uns16	R	2	HE Duty Cycle	0-100%
0x096B	Uns16	R	2	Not used	
0x096C	Uns16	R	2	Not used	
0x096D	Uns16	R	2	Not used	

Block 10: System snapshot 10h-19h
Same as Block9, registers MSB is 0x0A

Block 11: System snapshot 20h-29h
Same as Block9, registers MSB is 0x0B

Block 12: System snapshot 30h-35h
Same as Block9, registers MSB is 0x0C. Last block register is 0x0C41.

Block 14: Force Outputs

Addr	Type	Attr.	Size	Description	Notes
0x0E00	Uns16	RW	2	Vout Fan1	Volt x 100 (0.00 - 10.00 V)
0x0E01	Uns16	RW	2	Vout Fan2	Volt x 100 (0.00 - 10.00 V)
0x0E02	Uns16	RW	2	Q2 state	0: Off, 1: On
0x0E03	Uns16	RW	2	Q3 state	0: Off, 1: On
0x0E04	Uns16	RW	2	FCFC state	0: Off, 1: On
0x0E05	Uns16	RW	2	PWM Heater	0 - 100 %
0x0E06	Uns16	RW	2	Analog Output	Volt x 10 (0 - 10.0V)
0x0E07	Uns16	W	2	Dampers	0: Close 1:Open
0x0E08	Uns16	W	2	Reset Outputs	Writing 1 stops forcing the outputs

Block 15: Force Inputs

Addr	Type	Attr.	Size	Description	Notes
0x0F00	Uns16	RW	2	T1 temperature	°C x10
0x0F01	Uns16	RW	2	T2 temperature	°C x10
0x0F02	Uns16	RW	2	T3 temperature	°C x10
0x0F03	Uns16	RW	2	T4 temperature	°C x10
0x0F04	Uns16	RW	2	RH3	0.0 - 100.0% (0 - 1000)
0x0F05	Uns16	RW	2	RH1	0.0 - 100.0% (0 - 1000)
0x0F06	Uns16	RW	2	RH3 Average	0.0 - 100.0% (0 - 1000)
0x0F07	Uns16	RW	2	CO2 Value	PPM
0x0F08	Uns16	W	2	Reset Inputs	Writing 1 stops forcing the inputs

MODBUS Protocol ENY-VAV

SABIANA products:
ENY-VAV-250-400

Product descritpion: **Sabiana RVU modbus protocol**

Rev	Date	Description	Author	Verified
0	06/05/22	First draft	I. Gioia	

Connectors

The MODBUS RTU interface is available via the RS485 port (connector M13)

Serial interface configuration

The serial interface has to be configured as follows:

Speed	9600 bit/sec or 38400 bit/sec (*)
Bit number	8
Parity	No
Stop bit	1

Depends on MSBP Parameter value (0x0200 bit3) (*)

MODBUS protocol

The MODBUS address of the board is selected by the ADDRESS dips in the range 1-60.

Only the data type “Holding Register” is supported.

The available MODBUS functions are:

- 0x03(3 dec) “Read Holding Registers”
- 0x06(6 dec) “Write Single Register”
- 0x10(16 dec) “Preset Multiple Registers”

The following tables show the data accessible via the MODBUS interface. For each data, the following infomation is specified:

- **Addr**, hexadecimal address
- **Type**, data type (see next table)
- **Attr**, attributes (R read only, W write only, RW read/write)
- **Symb**, short symbolic data name, used only for machine parameters; identifies the parameter name as defined in the technical specifications
- **Description**, short data-specific description (parameter, measure, etc..)
- **Notes**, information about data interpretation, etc...

Writing contiguous registers with a single operation is allowed only if all the registers are marked as writable.

In case of an error for:
- function not supported
- wrong data address
- wrong data lenght
- data not acceptable

the response will be a MODBUS exception.

Table 4: Data types

Type	Description	Range	Dimension	Notes
char	8 bit charachter		1 byte	
byte	8 bit usigned	0...255	1 byte	The valid data is in the most significant byte of the 16bit register
uns16	16 bit unsigned integer	0..65535	2 bytes	
sig16	16 bit signed integer	–32768..32767	2 bytes	
uns32	32 bit unsigned integer	0..4294836225	4 bytes	2 contiguous MODBUS registers, the first one containing the most significant 16 bit
float	Float (32 bit)	-3.4e+38, 3.4e+38	4 bytes	ANSI/IEEE Std754-1985 From the most significant bit: - sign of mantissa - 8 bit for exponent - 23 bit for mantissa

Regarding the supported MODBUS standard, one can refer to the MODBUS official website (Modbus Specifications) and particularly to the documents: Modbus Serial Line Protocol and Implementation Guide V1.02 e Mosbus Application Protocol V1.1b.

MODBUS BLOCKS LIST:

Block 0: System identification

Addr	Type	Attr.	Size	Description	Notes
0x0000	char	RW	20	Serial Number	Machine ID for customer use
0x000A	uns16	R	2	Controller model	0x5480: VAV250 0x5481: VAV400
0x000B	uns16	R	2	Firmware Release	Low byte= minor release, High byte = major release
0x000C	uns16	R	2	Protocol Release	These tables applies if the value is 0x0000
0x000D	uns16	R	2	T-EP Firmware Release	Low byte= minor release, High byte = major release 0x0000 = T-EP not connected

Block 1: Machine state

Addr	Type	Attr.	Size	Description	Notes
0x0100	Uns16	R	2	Not Used	Returns 0
0x0101	Uns16	R	2	Not Used	Returns 0
0x0102	Sig16	R	2	Temperature Probe	°Cx10
0x0103	Uns16	R	2	Not Used	Returns 0
0x0104	Uns16	R	2	Current Speed selection	0=Speed1 1=Speed2 2=Speed3 3=Speed4 4=Boost Speed The information means that the actual speed is <= speed n
0x0105	Uns16	R	2	Machine state and mode	Bit fields b0: 1: Remote OFF active b1: reserved b2: 1: Electric Pre Heater active b3: reserved b4: 1: Boost active b5: reserved b6: reserved b7: 1: Party Mode ON b8: 1 VAV On, 0 VAV Off b9-10: Mode • 0:Holiday • 1:Auto • 2:Program • 3:Manual b11: reserved b12-14: Program selection • 0-3 Preset progrmas (P1-P4) • 4-7 User progrmas (P5-P8) b15: reserved
0x0106	Uns16	R	2	Humidity setpoint	RH% x10 (40.0% = 400)
0x0107	Uns16	R	2	Filter counter	Filter counter divided by 20 minutes

0x0108	Byte	R	1	Reserved	
0x0109	byte	R	1	Stato Relè	Bit fields (1 On, 0 Off) b0: Relay DO b1: Relay FAN b2: Relay FC_FC
0x010A	Byte	R	1	Digital Inputs	Bit fields (1 Active, 0 Not Active) b0: reserved b1: C1 b2: C3
0x010B	Uns16	R	2	Feedback Damper 1	Volt x10
0x010C	Uns16	R	2	Feedback Damper 2	Volt x10
0x010D	Uns16	R	2	Output Damper 1	Volt x100
0x010E	Uns16	R	2	Output Damper 2	Volt x100
0x010F	Uns16	R	2	DO output value % Post Heat or Cons	0-100%
0x0110	Uns16	R	2	Alarms	Bit fileds (1 Active, 0 not Active) b0: not used, b1: not used, b2: T3 probe failure, b3: not used, b4: Timekeeper failure, b5: not used b6: not used b7: Fireplace Alarm b8: not used b9: Filter alarm b10: Damper feedback error b11: RH or CO2 sensor failure b12 - b15: not used
0x0111	Sig16	R	2	Not used	Returns 0
0x0112	Sig16	R	2	Not used	Returns 0
0x0113	Uns16	R	2	CO2 reading	ppm
0x0114	Uns16	R	2	RH reading	RH % x10 (50,0%=500)
0x0115	Uns16	R	2	Not used	Returns 0
0x0116	Uns16	R	2	Not used	Returns 0
0x0117	Uns16	R	2	Not used	Returns 0
0x0118	Uns16	R	2	Not used	Returns 0
0x0119	Uns16	R	2	Not used	Returns 0
0x011A	Uns16	R	2	Not used	Returns 0
0x011B	Uns16	R	2	Not used	Returns 0
0x011C	Uns16	R	2	WM-RVU Time	MSB Hrs, LSB Mins
0x011D	Uns16	R	2	WM-RVU Day	0:Monday...6: Sunday
0x011E	Uns16	R	2	Holiday days	Remaining days for holiday mode
0x011F	Uns16	R	2	Options	b0: WM-RVU present b1-7: not used

					b8: 1: IAQ Used b9: 1: Post treatment used b10: 1: HE used b11: 1: Boiler boost available b12: 1: CO2 sensor present b13: 1: T-EP present b14: 1: RH sensor present b15: 1: Inverted configuration
0x0120	Uns32	R	4	Hours of operation	Fans ON hours counter

Block 2: Machine parameters

Addr	Type	Attr.	Size	Description	Notes
0x0200	Sig16	RW	2	Parameters Flags	Bit field:0 Off, 1 On b0: Not used b1: Stop Mode from WM-RVU or Vector (0 VAV Off, 1 VAV min speed) b2: Not used b3: Uart Speed (0:9600, 1:38400) b4: Hi RH management (0:off, 1:on) b5: Not used b6: Direction (0 Standard, 1 Reverse) b7: Filter (1 filter function ON= b8-b10: not used b11: Fireplace function (1: ON) b12-b15: not used
0x0201	Sig16	RW	2	Max Volt output	Volt x100 (7.00 - 10.00)
0x0202	Sig16	RW	2	Not used	
0x0203	Sig16	RW	2	Not used	
0x0204	Sig16	RW	2	Not used	
0x0205	Sig16	RW	2	Min air flow (Q min)	VAV250: Q m3/h 67...82) VAV400: Q: m3/h (108...132)
0x0206	Sig16	RW	2	Max air flow (Q max)	Q: m3/h VAV250 (225...275) VAV400(360...440)
0x0207	Sig16	RW	2	Damper1 Nominal V drive	V x100 (100...1000)
0x0208	Sig16	RW	2	Damper2 Nominal V drive	V x100 (100...1000)
0x0209	Sig16	RW	2	Tilt min volt	Volt x10
0x020A	Sig16	RW	2	Not used	
0x020B	Sig16	RW	2	Not used	
0x020C	Sig16	RW	2	Not used	
0x020D	Sig16	RW	2	Not used	
0x020E	Sig16	RW	2	Not used	
0x020F	Sig16	RW	2	Not used	
0x0210	Sig16	RW	2	Air flow 1	Q: m3/h min=reg0x0205, max=reg 0x0206
0x0211	Sig16	RW	2	Air flow 2	Q: m3/h min=the highest value among • reg 0x0210-20%

					• reg 0x0205 max= the lowest value among • reg 0x0210+20% • reg 0x0206
0x0212	Sig16	RW	2	Manual Speed	0-3 (Speed 1- Speed 4) Note: Writing this register triggers the manual speed mode
0x0213	Sig16	RW	2	Speed 1 %	(0...35)
0x0214	Sig16	RW	2	Speed 2 %	(35...70)
0x0215	Sig16	RW	2	Speed 3 %	(45...100)
0x0216	Sig16	RW	2	Speed 4 %	(100...110)
0x0217	Sig16	RW	2	Boost Speed %	(110...130)
0x0218	Sig16	RW	2	Summer T Setpoint	°C x10 (100..300)
0x0219	Sig16	RW	2	Winter T setpoint	°C x10 (100..300)
0x021A	Sig16	RW	2	Not used	
0x021B	Sig16	RW	2	Not used	
0x021C	Sig16	RW	2	Heating setpoint	°C x10 (100.300)
0x021D	Sig16	RW	2	Not used	
0x021E	Sig16	RW	2	Humidity samples for setpoint	(1...96) (1 sample every 15minutes)
0x021F	Sig16	RW	2	Boost time	minutes (60...240)
0x0220	Sig16	RW	2	P constant for humidity regulator	(5...50)
0x0221	Sig16	RW	2	Filter life	Days (15...360)
0x0222	Sig16	RW	2	CO2 ppm min	ppm (100...1000)
0x0223	Sig16	RW	2	CO2 ppm nom	ppm (500...1500)
0x0224	Sig16	RW	2	CO2 ppm max	ppm (1000...2000)
0x0225	Sig16	RW	2	CO2 ppm prop constant	(10...40)
0x0226	Sig16	RW	2	Blocked functions	Bit fileds (1 Active, 0 not Active) b0:Manual mode not allowed b1:Party mode not allowed b2: Holiday mode not allowed b3:Auto mode not allowed b4: Weekly Prog mode not allowed b5: Time/day change not allowed b6: Off command not allowed
0x0227	Sig16	RW	2	CO2 Sensor PPM Range	ppm (1500...30000)
0x0228	Sig16	RW	2	Boiler boost time	Minutes (5...20)
0x0229	Sig16	RW	2	RH Low value	RH% x10 (40,0% = 400) (200...450)
0x022A	Sig16	RW	2	RH Standard value	RH% x10 (400...600)
0x022B	Sig16	RW	2	RH Hi value	RH% x10 (600...800)
0x022C	Sig16	RW	2	Fan Speed with RH Low	0-3 (Speed 1- Speed 4)
0x022D	Sig16	RW	2	Not used	
0x022E	Sig16	RW	2	Not used	
0x022F	Sig16	RW	2	Heater PID, P Coefficient	0 - 100
0x0230	Sig16	RW	2	Heater PID, I Coefficient	0 - 100
0x0231	Sig16	RW	2	Heater PID, D Coefficient	0 - 100
0x0232	Sig16	RW	2	Not used	
0x0233	Sig16	RW	2	Not used	
0x0234	Sig16	RW	2	Not used	
0x0235	Sig16	RW	2	Not used	

0x0236	Sig16	RW	2	Not used	
0x0237	Sig16	RW	2	Not used	

Note:written values out of range are accepted but are truncated to fit in the specified range.

Block 3: Commands

Addr	Type	Attr.	Size	Description	Notes
0x0300	Uns16	RW	2	ON-OFF Command	1=ON 0=OFF
0x0301	Uns16	RW	2	Mode Command Manual	1=Manual
0x0302	Uns16	RW	2	Mode Command Holiday	1=Holiday
0x0303	Uns16	RW	2	Mode Command Party	1=Party
0x0304	Uns16	RW	2	Mode Command Auto	1=Auto
0x0305	Uns16	RW	2	Mode Command Program	1=Program
0x0306	Uns16	RW	2	Timer prog selection	0-7=P1-P8
0x0307	Uns16	RW	2	Mode Selection (single register)	• 0:Holiday • 1:Auto • 2:Program • 3:Manual • 4:Party
0x0308	Uns16	RW	2	Parameter reset	Writing 0x005A results in a parameter reset to factory default Read as 0
0x0309	Uns16	RW	2	Manual speed	0-3 (Speed 1- Speed 4)
0x030A	Uns16	RW	2	External RH Value	0%...100.0% (0...1000) When reading, a value of 0xFFFF means that the data is not yet valid
0x030B	Uns16	RW	2	External CO2 Value	0ppm...30000ppm When reading, a value of 0xFFFF means that the data is not yet valid
0x030C	Uns16	RW	2	Not used	
0x030D	Uns16	RW	2	Set WM-RVU Current Time	MSB Hrs, LSB Mins
0x030E	Uns16	RW	2	Set WM-RVU Current Day	0:Monday...6: Sunday
0x030F	Uns16	RW	2	Set Holyday mode days	N = Holiday days (1-60) The machine will enter holiday mode for the next N days When read it returns the days left
0x0310	Uns16	RW	2	Reset Filter Counter	Writing 1 resets the filter counter

Block 4: User Timer program 1

Addr	Type	Attr.	Size	Description	Notes
0x0400	Uns16	RW	2	Day 1, interval 1 start time	MSB = hour (0...23) LSB = minutes (0...59)
0x0401	Uns16	RW	2	Day 1, interval 2 start time	MSB = hour, LSB = minutes
0x0402	Uns16	RW	2	Day 1, interval 3 start time	MSB = hour, LSB = minutes
0x0403	Uns16	RW	2	Day 1, interval 4 start time	MSB = hour, LSB = minutes
0x0404	Uns16	RW	2	Day 1, interval 5 start time	MSB = hour, LSB = minutes
0x0405	Uns16	RW	2	Day 1, interval 6 start time	MSB = hour, LSB = minutes
0x0406	Uns16	RW	2	Day 1, interval 7 start time	MSB = hour, LSB = minutes
0x0407	Uns16	RW	2	Day 1, interval 8 start time	MSB = hour, LSB = minutes
0x0408	Uns16	RW	2	Day 2, interval 1 start time	MSB = hour, LSB = minutes
0x0409	Uns16	RW	2	Day 2, interval 2 start time	MSB = hour, LSB = minutes
0x040A	Uns16	RW	2	Day 2, interval 3 start time	MSB = hour, LSB = minutes
0x040B	Uns16	RW	2	Day 2, interval 4 start time	MSB = hour, LSB = minutes
0x040C	Uns16	RW	2	Day 2, interval 5 start time	MSB = hour, LSB = minutes
0x040D	Uns16	RW	2	Day 2, interval 6 start time	MSB = hour, LSB = minutes
0x040E	Uns16	RW	2	Day 2, interval 7 start time	MSB = hour, LSB = minutes
0x040F	Uns16	RW	2	Day 2, interval 8 start time	MSB = hour, LSB = minutes
0x0410	Uns16	RW	2	Day 3, interval 1 start time	MSB = hour, LSB = minutes
0x0411	Uns16	RW	2	Day 3, interval 2 start time	MSB = hour, LSB = minutes
0x0412	Uns16	RW	2	Day 3, interval 3 start time	MSB = hour, LSB = minutes
0x0413	Uns16	RW	2	Day 3, interval 4 start time	MSB = hour, LSB = minutes
0x0414	Uns16	RW	2	Day 3, interval 5 start time	MSB = hour, LSB = minutes
0x0415	Uns16	RW	2	Day 3, interval 6 start time	MSB = hour, LSB = minutes
0x0416	Uns16	RW	2	Day 3, interval 7 start time	MSB = hour, LSB = minutes
0x0417	Uns16	RW	2	Day 3, interval 8 start time	MSB = hour, LSB = minutes
0x0418	Uns16	RW	2	Day 4, interval 1 start time	MSB = hour, LSB = minutes
0x0419	Uns16	RW	2	Day 4, interval 2 start time	MSB = hour, LSB = minutes
0x041A	Uns16	RW	2	Day 4, interval 3 start time	MSB = hour, LSB = minutes
0x041B	Uns16	RW	2	Day 4, interval 4 start time	MSB = hour, LSB = minutes
0x041C	Uns16	RW	2	Day 4, interval 5 start time	MSB = hour, LSB = minutes
0x041D	Uns16	RW	2	Day 4, interval 6 start time	MSB = hour, LSB = minutes
0x041E	Uns16	RW	2	Day 4, interval 7 start time	MSB = hour, LSB = minutes
0x041F	Uns16	RW	2	Day 4, interval 8 start time	MSB = hour, LSB = minutes
0x0420	Uns16	RW	2	Day 5, interval 1 start time	MSB = hour, LSB = minutes
0x0421	Uns16	RW	2	Day 5, interval 2 start time	MSB = hour, LSB = minutes
0x0422	Uns16	RW	2	Day 5, interval 3 start time	MSB = hour, LSB = minutes
0x0423	Uns16	RW	2	Day 5, interval 4 start time	MSB = hour, LSB = minutes
0x0424	Uns16	RW	2	Day 5, interval 5 start time	MSB = hour, LSB = minutes
0x0425	Uns16	RW	2	Day 5, interval 6 start time	MSB = hour, LSB = minutes

0x0426	Uns16	RW	2	Day 5, interval 7 start time	MSB = hour, LSB = minutes
0x0427	Uns16	RW	2	Day 5, interval 8 start time	MSB = hour, LSB = minutes
0x0428	Uns16	RW	2	Day 6, interval 1 start time	MSB = hour, LSB = minutes
0x0429	Uns16	RW	2	Day 6, interval 2 start time	MSB = hour, LSB = minutes
0x042A	Uns16	RW	2	Day 6, interval 3 start time	MSB = hour, LSB = minutes
0x042B	Uns16	RW	2	Day 6, interval 4 start time	MSB = hour, LSB = minutes
0x042C	Uns16	RW	2	Day 6, interval 5 start time	MSB = hour, LSB = minutes
0x042D	Uns16	RW	2	Day 6, interval 6 start time	MSB = hour, LSB = minutes
0x042E	Uns16	RW	2	Day 6, interval 7 start time	MSB = hour, LSB = minutes
0x042F	Uns16	RW	2	Day 6, interval 8 start time	MSB = hour, LSB = minutes
0x0430	Uns16	RW	2	Day 7, interval 1 start time	MSB = hour, LSB = minutes
0x0431	Uns16	RW	2	Day 7, interval 2 start time	MSB = hour, LSB = minutes
0x0432	Uns16	RW	2	Day 7, interval 3 start time	MSB = hour, LSB = minutes
0x0433	Uns16	RW	2	Day 7, interval 4 start time	MSB = hour, LSB = minutes
0x0434	Uns16	RW	2	Day 7, interval 5 start time	MSB = hour, LSB = minutes
0x0435	Uns16	RW	2	Day 7, interval 6 start time	MSB = hour, LSB = minutes
0x0436	Uns16	RW	2	Day 7, interval 7 start time	MSB = hour, LSB = minutes
0x0437	Uns16	RW	2	Day 7, interval 8 start time	MSB = hour, LSB = minutes
0x0438	Uns16	RW	2	Day 1, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0439	Uns16	RW	2	Day 1, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x043A	Uns16	RW	2	Day 1, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x043B	Uns16	RW	2	Day 1, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x043C	Uns16	RW	2	Day 1, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x043D	Uns16	RW	2	Day 1, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x043E	Uns16	RW	2	Day 1, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x043F	Uns16	RW	2	Day 1, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0440	Uns16	RW	2	Day 1, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0441	Uns16	RW	2	Day 2, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0442	Uns16	RW	2	Day 2, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0443	Uns16	RW	2	Day 2, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0444	Uns16	RW	2	Day 2, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0445	Uns16	RW	2	Day 2, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0446	Uns16	RW	2	Day 2, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0447	Uns16	RW	2	Day 2, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0448	Uns16	RW	2	Day 2, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0449	Uns16	RW	2	Day 2, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x044A	Uns16	RW	2	Day 3, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x044B	Uns16	RW	2	Day 3, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x044C	Uns16	RW	2	Day 3, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x044D	Uns16	RW	2	Day 3, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x044E	Uns16	RW	2	Day 3, interval 4speed	0-4 (Speed1-Speed4-Boost)

0x044F	Uns16	RW	2	Day 3, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0450	Uns16	RW	2	Day 3, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0451	Uns16	RW	2	Day 3, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0452	Uns16	RW	2	Day 3, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0453	Uns16	RW	2	Day 4, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0454	Uns16	RW	2	Day 4, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0455	Uns16	RW	2	Day 4, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0456	Uns16	RW	2	Day 4, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0457	Uns16	RW	2	Day 4, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0458	Uns16	RW	2	Day 4, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0459	Uns16	RW	2	Day 4, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x045A	Uns16	RW	2	Day 4, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x045B	Uns16	RW	2	Day 4, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x045C	Uns16	RW	2	Day 5, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x045D	Uns16	RW	2	Day 5, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x045E	Uns16	RW	2	Day 5, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x045F	Uns16	RW	2	Day 5, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0460	Uns16	RW	2	Day 5, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0461	Uns16	RW	2	Day 5, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0462	Uns16	RW	2	Day 5, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0463	Uns16	RW	2	Day 5, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0464	Uns16	RW	2	Day 5, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x0465	Uns16	RW	2	Day 6, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x0466	Uns16	RW	2	Day 6, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0467	Uns16	RW	2	Day 6, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0468	Uns16	RW	2	Day 6, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0469	Uns16	RW	2	Day 6, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x046A	Uns16	RW	2	Day 6, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x046B	Uns16	RW	2	Day 6, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x046C	Uns16	RW	2	Day 6, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x046D	Uns16	RW	2	Day 6, interval 8 speed	0-4 (Speed1-Speed4-Boost)
0x046E	Uns16	RW	2	Day 7, speed before interval 1	0-4 (Speed1-Speed4-Boost)
0x046F	Uns16	RW	2	Day 7, interval 1speed	0-4 (Speed1-Speed4-Boost)
0x0470	Uns16	RW	2	Day 7, interval 2speed	0-4 (Speed1-Speed4-Boost)
0x0471	Uns16	RW	2	Day 7, interval 3speed	0-4 (Speed1-Speed4-Boost)
0x0472	Uns16	RW	2	Day 7, interval 4speed	0-4 (Speed1-Speed4-Boost)
0x0473	Uns16	RW	2	Day 7, interval 5speed	0-4 (Speed1-Speed4-Boost)
0x0474	Uns16	RW	2	Day 7, interval 6speed	0-4 (Speed1-Speed4-Boost)
0x0475	Uns16	RW	2	Day 7, interval 7 speed	0-4 (Speed1-Speed4-Boost)
0x0476	Uns16	RW	2	Day 7, interval 8 speed	0-4 (Speed1-Speed4-Boost)

Block 5: User Timer program 2

Same as Block4, registers MSB is 0x05

Block 6: User Timer program 3
Same as Block4, registers MSB is 0x06

Block 7: User Timer program 4
Same as Block4, registers MSB is 0x07

Block 8: Time and Day

Addr	Type	Attr.	Size	Description	Notes
0x0800	Uns16	RW	2	Time	MSB = hour (0...23) LSB = minutes (0...59)
0x0801	Uns16	RW	2	Day	Day 1 = Mon ... Day 7 = Sun

Note: reading and writing this block make sense only if T-EP is connected

Block 9: System snapshot 0h-9h

Addr	Type	Attr.	Size	Description	Notes
0x0900	Uns16	R	2	Not used	
0x0901	Uns16	R	2	Not used	
0x0902	Uns16	R	2	T3 temperature	°C
0x0903	Uns16	R	2	Not used	
0x0904	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0905	Uns16	R	2	Tilt1 position	Volt x10
0x0906	Uns16	R	2	Tilt2 position	Volt x10
0x0907	Uns16	R	2	Heater Duty Cycle	0-100%
0x0908	Uns16	R	2	Not used	
0x0909	Uns16	R	2	Not used	
0x090A	Uns16	R	2	Not used	
0x090B	Uns16	R	2	Not used (1h earlier)	
0x090C	Uns16	R	2	Not used	
0x090D	Uns16	R	2	T3 temperature	°C
0x090E	Uns16	R	2	Not used	
0x090F	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0910	Uns16	R	2	Tilt1 position	Volt x10
0x0911	Uns16	R	2	Tilt2 position	Volt x10
0x0912	Uns16	R	2	Heater Duty Cycle	0-100%
0x0913	Uns16	R	2	Not used	
0x0914	Uns16	R	2	Not used	
0x0915	Uns16	R	2	Not used	
0x0916	Uns16	R	2	Not used (2h earlier)	
0x0917	Uns16	R	2	Not used	
0x0918	Uns16	R	2	T3 temperature	°C
0x0919	Uns16	R	2	Not used	
0x091A	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x091B	Uns16	R	2	Tilt1 position	Volt x10
0x091C	Uns16	R	2	Tilt2 position	Volt x10
0x091D	Uns16	R	2	Heater Duty Cycle	0-100%
0x091E	Uns16	R	2	Not used	
0x091F	Uns16	R	2	Not used	
0x0920	Uns16	R	2	Not used	
0x0921	Uns16	R	2	Not used (3h earlier)	
0x0922	Uns16	R	2	Not used	
0x0923	Uns16	R	2	T3 temperature	°C
0x0924	Uns16	R	2	Not used	
0x0925	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor

0x0926	Uns16	R	2	Tilt1 position	Volt x10
0x0927	Uns16	R	2	Tilt2 position	Volt x10
0x0928	Uns16	R	2	Heater Duty Cycle	0-100%
0x0929	Uns16	R	2	Not used	
0x092A	Uns16	R	2	Not used	
0x092B	Uns16	R	2	Not used	
0x092C	Uns16	R	2	Not used (4h earlier)	
0x092D	Uns16	R	2	Not used	
0x092E	Uns16	R	2	T3 temperature	°C
0x092F	Uns16	R	2	Not used	
0x0930	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0931	Uns16	R	2	Tilt1 position	Volt x10
0x0932	Uns16	R	2	Tilt2 position	Volt x10
0x0933	Uns16	R	2	Heater Duty Cycle	0-100%
0x0934	Uns16	R	2	Not used	
0x0935	Uns16	R	2	Not used	
0x0936	Uns16	R	2	Not used	
0x0937	Uns16	R	2	Not used (5h earlier)	
0x0938	Uns16	R	2	Not used	
0x0939	Uns16	R	2	T3 temperature	°C
0x093A	Uns16	R	2	Not used	
0x093B	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x093C	Uns16	R	2	Tilt1 position	Volt x10
0x093D	Uns16	R	2	Tilt2 position	Volt x10
0x093E	Uns16	R	2	Heater Duty Cycle	0-100%
0x093F	Uns16	R	2	Not used	
0x0940	Uns16	R	2	Not used	
0x0941	Uns16	R	2	Not used	
0x0942	Uns16	R	2	Not used (6h earlier)	
0x0943	Uns16	R	2	Not used	
0x0944	Uns16	R	2	T3 temperature	°C
0x0945	Uns16	R	2	Not used	
0x0946	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0947	Uns16	R	2	Tilt1 position	Volt x10
0x0948	Uns16	R	2	Tilt2 position	Volt x10
0x0949	Uns16	R	2	Heater Duty Cycle	0-100%
0x094A	Uns16	R	2	Not used	
0x094B	Uns16	R	2	Not used	
0x094C	Uns16	R	2	Not used	
0x094D	Uns16	R	2	Not used (7h earlier)	
0x094E	Uns16	R	2	Not used	

0x094F	Uns16	R	2	T3 temperature	°C
0x0950	Uns16	R	2	Not used	
0x0951	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0952	Uns16	R	2	Tilt1 position	Volt x10
0x0953	Uns16	R	2	Tilt2 position	Volt x10
0x0954	Uns16	R	2	Heater Duty Cycle	0-100%
0x0955	Uns16	R	2	Not used	
0x0956	Uns16	R	2	Not used	
0x0957	Uns16	R	2	Not used	
0x0958	Uns16	R	2	Not used (8h earlier)	
0x0959	Uns16	R	2	Not used	
0x095A	Uns16	R	2	T3 temperature	°C
0x095B	Uns16	R	2	Not used	
0x095C	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x095D	Uns16	R	2	Tilt1 position	Volt x10
0x095E	Uns16	R	2	Tilt2 position	Volt x10
0x095F	Uns16	R	2	Heater Duty Cycle	0-100%
0x0960	Uns16	R	2	Not used	
0x0961	Uns16	R	2	Not used	
0x0962	Uns16	R	2	Not used	
0x0963	Uns16	R	2	Not used (9h earlier)	
0x0964	Uns16	R	2	Not used	
0x0965	Uns16	R	2	T3 temperature	°C
0x0966	Uns16	R	2	Not used	
0x0967	Uns16	R	2	RH% or CO2 ppm	Depending on the connected sensor
0x0968	Uns16	R	2	Tilt1 position	Volt x10
0x0969	Uns16	R	2	Tilt2 position	Volt x10
0x096A	Uns16	R	2	Heater Duty Cycle	0-100%
0x096B	Uns16	R	2	Not used	
0x096C	Uns16	R	2	Not used	
0x096D	Uns16	R	2	Not used	

Block 10: System snapshot 10h-19h
Same as Block9, registers MSB is 0x0A

Block 11: System snapshot 20h-29h
Same as Block9, registers MSB is 0x0B

Block 12: System snapshot 30h-35h
Same as Block9, registers MSB is 0x0C. Last block register is 0x0C41.