WAVIN SENTIO

Modbus manual

Contents

Requirements

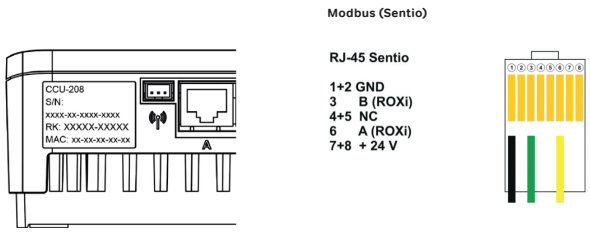
This manual covers the Modbus specification for Sentio control units with firmware version TM60006.0 or higher.
For the Modbus TCP/IP function the control unit needs to be firmware version TM60014 or higher.

Bus parameters

Parameter	Values	
Transmission mode	**RTU**	**TCP**
Supported baud rates	9600,19200(default),38400, 57600 bps	-
Default address	1(default) - 247	IP ADDRESS:502 (unit ID 255 (0xFF) if needed)
Data bits	8	-
Parity	None, odd, even	-
Stop bit	0, 1, 2	-
Possible modes	Disabled (Default), Read only, Read/write, write with password, Master	Disabled (Default), Read only, Read/write, write with password
Physical interface	RS-485 on port A	RJ-45 on LAN port
Reply time limit	Timeout = 500 mS	Timeout = 500 mS
Max reading volume at once:	Max 32 pcs register or 256 bits	Max 32 pcs register or 256 bits

Modbus RTU connection on Sentio control unit

The Modbus RTU shall be connected to the most left RJ-45 connector at the bottom of the Sentio Control unit. The RJ-45 connector is marked with an “A”. This is the only port able to do Modbus RTU.



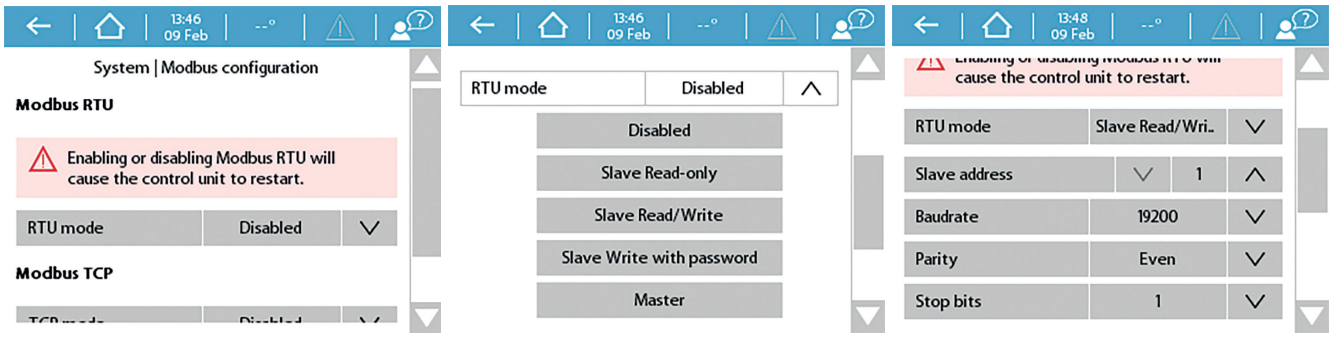
RJ-45 pin layout in Wavin Sentio control unit

Pin no.	
1	GND
2	GND
3	B
4	Not connected
5	Not connected
6	A
7	+ 24 V
8	+ 24 V

Activation and setup of Modbus RTU

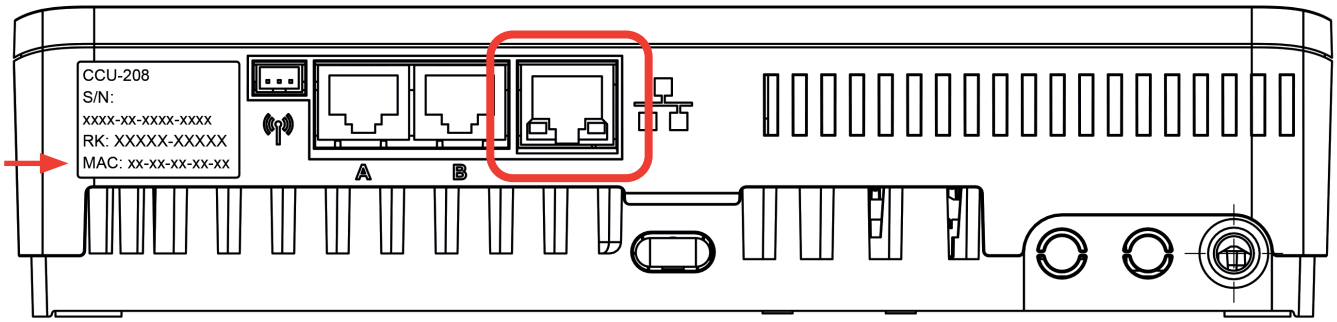
By default is the Modbus RTU connection deactivated. It is only possible to activate the Modbus RTU RJ-45 port A by using a Sentio Display. To activate the Modbus, go to System | Installer settings | Modbus configuration | Modbus RTU and select the desired mode. After selection of Modbus mode, the Sentio control unit is restarted.

Remark: After activating the Modbus mode it not possible to use the RJ-45 A connector for the Sentio display.



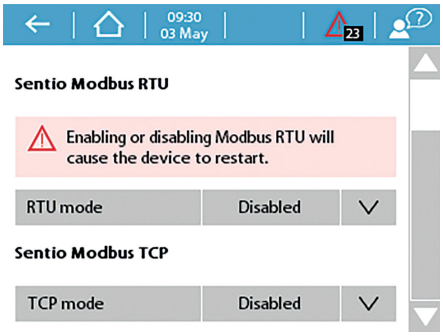
Connection to Sentio Modbus TCP/IP

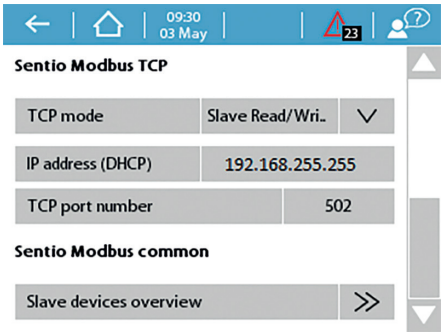
For Modbus TCP/IP an ethernet connection will be made using the RJ-45 LAN port .



Activation and setup of Modbus TCP/IP

Activate the Modbus TCP/IP via the Sentio display by going to System | Installer Settings | Modbus settings - Modbus TCP. After selecting the TCP mode, the function is activated.

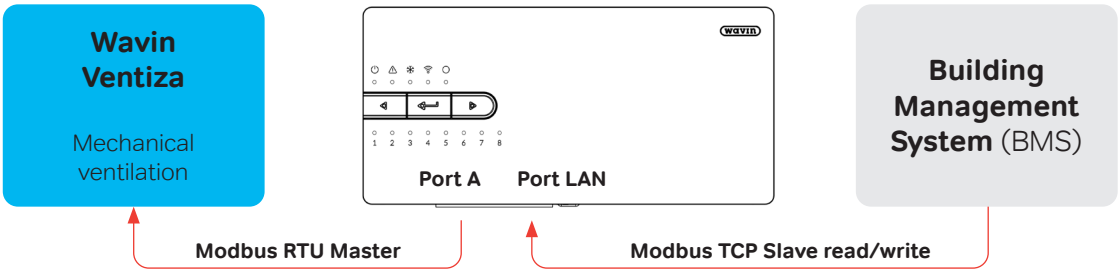




The Sentio device uses a dynamic IP address obtained via an DHCP request. If the IP address requires to be static for the network this can be achieved by configuring the applicable switch or router to serve a static IP address based on MAC address or hostname. The MAC address can be obtained via the sticker on the unit, the hostname used by the Sentio system is:

DHCP: Wavin Sentio CCU#[last four S/N digits]

When using Modbus RTU master to connect to an external device (e.g. Ventiza mechanical ventilation) it is still possible to use the Modbus TCP/IP slave function to connect to a building management system.



Modbus values

List of values

The complete list of values is described appendix 1 in this manual.

Versioning

The list of Modbus values is not finite. As new features are implemented, new values are added. If you want to know exactly which values are offered by your system:

a. Read following Modbus registers or check the 'system information' in the touch screen.

Modbus adress	Value name	Description
00001	Adress space major version	Incremented on incompatible change E.g. when changing format or removing values
00002	Adress space minor version	Incremented on compatible change E.g. when adding new values

b. Find the FW-version at the right side of the 2. row in Appendix 1.

c. The values marked as Yes in this column are supported by your system. If a value is needed that is not supported by the current version, please update the central control unit or contact Wavin support.

Modbus registers

The Modbus offers several types of registers. Following types are supported by Sentio.

Area name	Access width	Access type	Usage
Discrete inputs	1-bit	Read only	Read system alarms and warnings
Input registers	16-bit registers	Read only	Read state values
Holding registers	16-bit registers	Read / Write	Read/write configuration

Modbus commands

The registers described in the previous chapter can be accessed using following commands.
See Modbus specification for packet format - http://modbus.org/docs/Modbus_Application_Protocol_V1_1b3.pdf

Code	Command	Area
0x02	Read discrete inputs	Discrete inputs
0x03	Read holding registers	Holding registers
0x04	Read input registers	Input registers
0x06	Write single register	Holding register
0x10	Write multiple registers	Holding registers

Error handling and return codes

Modbus error codes

Exception code	Command	Area
01	Illegal function	Returned when unknown command is used. See Modbus Commands for list of supported commands.
02	Illegal data address	Returned when reading or writing to register, which does not exist. **NOTE**: This is also the case when multiple registers are accessed in a function and one or more registers don't exist and some registers might exist.
03	Illegal data value	Returned when writing register by a value, which is not supported. See appendix 1 for list of supported values.
04	Slave device failure	Returned when reading of writing register, which contains values from a peripheral, which is disconnected - e.g. the Calefa controller.
06	Server device busy	Returned during device start-up, or when data integrity cannot be guaranteed.

Device booting

Device returns exception code SERVER DEVICE BUSY (06) during start-up, because data integrity cannot be guaranteed during start-up. Please wait for the system to finish its start-up.

Invalid value

If a measured value is not initialized -e.g. due to failure or long response time from wireless peripherals -then INVALID_VALUE is returned as a response to read command.

Data validation

When a configuration data is set, then it is validated and can be modified by system to meet the system requirements or it can be rejected.

- If value is lower than minimum, then it is set to minimum
- If value is higher than maximum, then it is set to maximum
- If value is not aligned to step, it is aligned (e.g. temperature 15.2 is aligned to 15.0)
- If a string value (val_utf8) is longer than the device can store, the string is shortened

Data types

All Modbus registers consist of 16 bits of data. The meaning of this data can be different and multiple registers can be combined to hold more data. Following data types are supported:

Type	Length	Range	Invalid value
val_enum	1B	0..255	0xFF
val_u	1B	0..255	0xFF
val_u2	2B	0..65535	0xFFFF
val_u4	4B	0..4294967295	0xFFFFFFFF
val_utf8	2b LEN + UTF8	Utf8. max 256B	LEN= 0xFFFF, no data
val_d2_fp100	2B	Fixed-point (-327,68..327,67)	0x7FFF

Reading and writing text values (datatype val_utf8)

val_utf8 is composed by multiple 16 bits holding registers, but the data itself is an array of bytes. When for instance the string “Hello” is stored in the array the first byte is placed first in the packet etc. This results in a read response of:

Command

Command code	Byte count	Reg X Hi	Reg X Lo	Reg X+1 Hi	Reg X+1 Lo	Reg X+2 Hi	Reg X+2 Lo	Reg X+3 Hi	Reg X+3 Lo
0x03	0x08	“H”	“e”	“l”	“l”	“o”	“0x00”	“0x00”	“0x00”

It is also possible to store UTF-8 strings – e.g. “**Blå Værelse**”. In this case, the national characters are encoded into multiple bytes. We see that 13 bytes will be needed to save the entire text.

Character	Value
B	0x42
l	0x6c
å	0xc3
	0xa5
V	0x56
æ	0xc3
	0xa6
r	0x72
e	0x65
l	0x6c
s	0x73
e	0x65

Appendix

Object	Parameter	R/W	Modbus Table	Modbus Address	Data type	Description	3.2 FWPKG 12	3.3 FWPKG 14	3.4 FWPKG 16
Notes for integrators									
	When data are changed, either by writing to holding registers or due to a changes made by other user interface (e.g. thermostat), the system may trigger configuration save procedure which prevents the device from retrieving the data requested. In such cases the device responds with an exception code *0x06 SLAVE_DEVICE_BUSY* as per Modbus Protocol Specification and the request shall be repeated again.								
LOCATION									
Location				**000xx**					
	Aggregated warning	R	Discrete Inputs	**00001**		A problem is pending in whole system (Location)	YES	YES	YES
	Aggregated error	R	Discrete Inputs	**00002**		A critical problem is pending in whole system (Location)	YES	YES	YES
	Address space major version	R	Input Register	**00001**	val_u1	= 3 (Incremented on incompatible change)	YES	YES	YES
	Address space minor version	R	Input Register	**00002**	val_u1	= 1 (Incremented on compatible change)	**CHANGED**	**CHANGED**	YES
	Dev type	R	Input Register	**00010**	val_u1	1 - CCU-208 2 - DHW-201 (Calefa)	YES	YES	YES
	Dev hw version	R	Input Register	**00011**	val_u1		YES	YES	YES
	Dev sw version	R	Input Register	**00012**	val_u1		YES	YES	YES
	Dev sw version minor	R	Input Register	**00013**	val_u1		YES	YES	YES
	Dev serial number prefix	R	Input Register	**00014**	val_u2	= 1530	YES	YES	YES
	Dev serial number	R	Input Register	**00015-00016**	val_u4		YES	YES	YES
	Heating/Cooling mode	R	Input Register	**00020**	val_u1	0 - HEATING 1 - COOLING	YES	YES	YES
									YES
	Address space major version	R/W	Holding register	**00001**	val_u1	= 3 (Incremented on incompatible change)	YES	YES	YES
	Address space minor version	R/W	Holding register	**00002**	val_u1	= 1 (Incremented on compatible change)	YES	YES	YES
	Modbus slave address	R/W	Holding register	**00003**	val_u1	Allowed values: 1 to 247 Default: 1	YES	YES	YES
	Modbus baudrate	R/W	Holding register	**00004**	val_u2	Allowed values: 9600, 19200, 38400, 57600 Default:19200	YES	YES	YES
	Modbus mode	R/W	Holding register	**00005**	val_u1	0 DISABLED 1 READ_ONLY 2 READ_WRITE 3 WRITE_WITH_PASSWORD Default: 0	YES	YES	YES
	Modbus password	W	Holding register	**00006**	val_u2	When Modbus mode = WRITE_WITH_PASSWORD, the write commands are disabled until this register is written by a valid password. Once the password is written, the the write comands are accepted for next 11 minutes. Then the password has to be set again. Two steps are required for password change: 1. Write the old password 2. Write the new password before 11 minutes elapses. Default password: 1234, Write only, range for password is 1 - 65534	YES	YES	YES
	Modbus parity	R/W	Holding register	**00007**	val_u1	0 - NONE 1 - ODD 2 - EVEN	YES	YES	YES
	Modbus stop bits	R/W	Holding register	**00008**	val_u1	0 - 1 STOP BIT 1 - 2 STOP BITS	YES	YES	YES
	Location name	R/W	Holding register	**00010-00025**	val_utf8	Placeholder for 32 bytes of location description. See “working with strings” chapter for more info.	YES	YES	YES
	Standby	R/W	Holding register	**00026**	val_u1	0 OFF 1 ON	YES	YES	YES
	Vacation	R/W	Holding register	**00027**	val_u1	0 OFF 1 ON	YES	YES	YES
	Datetime	R/W	Holding register	**00028-00029**	val_u4	Current time - unit timestamp format - localtime including DST (if enabled) - minimum date is 2018-01-01 00:00:00 - maximum date is 2099-12-30 23:59:59	YES	YES	YES
	Daylight saving time allowed	R/W	Holding register	**00030**	val_u1	0 Disabled 1 Enabled	YES	YES	YES
	Cooling minimum outdoor temperature	R/W	Holding register	**00031**	val_d2_fp100	Only available in hardware profiles, which support cooling. Cooling is blocked, when outdoor temperature is lower than this value. In profiles which support cooling, minimum outdoor temp for cooling must be >= maximum outdoor temp for heating	YES	YES	YES
	Heating maximum outdoor temperature	R/W	Holding register	**00032**	val_d2_fp100	Heating is blocked, when outdoor temperature is higher than this value. In profiles which support cooling, maximum outdoor temp for heating must be <= minimum outdoor temp for cooling	YES	YES	YES
	Update mode	R/W	Holding register	**00033**	val_u1	0 Dont allow from mobile app 1 Enabled 2 Disabled entirely	YES	YES	YES
	Heating/Cooling mode BMS override	R/W	Holding register	**00034**	val_u1	Note: Only available in hardware profiles, which support manual H/C change-over. In other profiles override is set to DISABLED. 0 - DISABLED 1 - HEATING MODE 2 - COOLING MODE 3 - H/C MODE SET BY EXTERNAL SWITCH (only when HW input is available)	YES	YES	YES
	Timezone number	R/W	Holding register	**00035**	val_u2	For list of supported timezones see tab "Timezone list"	YES	YES	YES
	Cooling to Heating change-over outdoor temperature	R/W	Holding register	**00036**	val_d2_fp100	Only available in hardware profiles 3.3.1 and 3.3.3 (Automatic H/C change-ver). Outdoor temperature for Cooling to Heating change-over <= outdoor temperature for Heating to Cooling change-over.	-	-	YES
	Heating to Cooling change-over outdoor temperature	R/W	Holding register	**00037**	val_d2_fp100	Only available in hardware profiles 3.3.1 and 3.3.3 (Automatic H/C change-ver). Outdoor temperature for Heating to Cooling change-over >= outdoor temperature for Cooling to Heating change-over.	-	-	YES
ROOMS (INDOOR ZONES)									
Room 1				**001xx**					
ROOM TYPE	Note: Dummy room is special type of room, where no thermostat or sensor is installed. Dummy room does not support cooling mode. To find out room type, check input register 127.						YES	YES	YES
NORMAL, DUMMY	Aggregated warning	R	Discrete Inputs	**00101**		A problem is pending in Room	YES	YES	YES
NORMAL, DUMMY	Aggregated error	R	Discrete Inputs	**00102**		A critical problem is pending in Room	YES	YES	YES
NORMAL	Warning - low battery	R	Discrete Inputs	**00103**		There are one or more peripherals in the room with low battery.	YES	YES	YES
NORMAL	Error - peripheral lost	R	Discrete Inputs	**00104**		There are one or more peripherals in the room which are not responding.	YES	YES	YES
							YES	YES	YES
NORMAL, DUMMY	Desired temp	R	Input Register	**00101**	val_d2_fp100	Shows the desired temperature in the room.	YES	YES	YES
NORMAL, DUMMY	General Heating/Cooling state (radiator | underfloor | integration)	R	Input Register	**00102**	val_u1	1 IDLE 2 HEATING 3 COOLING 4 BLOCKED_HEATING 5 BLOCKED_COOLING	YES	YES	YES
NORMAL, DUMMY	General Heating/Cooling blocking source (radiator | underfloor | integration)	R	Input Register	**00103**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	YES	YES	YES
NORMAL	Air temperature	R	Input Register	**00104**	val_d2_fp100	Current air temperature measured in the room.	YES	YES	YES
NORMAL	Floor temperature	R	Input Register	**00105**	val_d2_fp100	Current floor temperature measured in the room.	YES	YES	YES
NORMAL	Relative humidity	R	Input Register	**00106**	val_d2_fp100	Current humidity measured in the room.	YES	YES	YES
NORMAL	Calculated dew point	R	Input Register	**00107**	val_d2_fp100	Current calculated dewpoint	YES	YES	YES

Object	Parameter	R/W	Modbus Table	Modbus Address	Data type	Description	3.2 FWPKG 12	3.3 FWPKG 14	3.4 FWPKG 16
NORMAL	Associated to Radiators	R	Input Register	**00111**	val_u1	0 .. NONE 73 .. ITC1 (Address of modbus object) 74 .. ITC2 (Address of modbus object) 77 .. HCC1 (Address of modbus object) 78 .. HCC2 (Address of modbus object) 79 .. HCC3 (Address of modbus object) 81 .. H/C Source (Address of modbus object)	YES	YES	YES
NORMAL	Associated to UFHC	R	Input Register	**00112**	val_u1	0 .. NONE 73 .. ITC1 (Address of modbus object) 74 .. ITC2 (Address of modbus object) 77 .. HCC1 (Address of modbus object) 78 .. HCC2 (Address of modbus object) 79 .. HCC3 (Address of modbus object)	YES	YES	YES
NORMAL	Associated to Drying (humidity control)	R	Input Register	**00114**	val_u1	0 .. NONE 650 .. DEHUM 1 (Address of modbus object) 651 .. DEHUM 2 (Address of modbus object) 652 .. DEHUM 3 (Address of modbus object) 653 .. DEHUM 4 (Address of modbus object)	YES	YES	YES
NORMAL	Associated to Thermal integration (thermal. integ control)	R	Input Register	**00115**	val_u1	0 .. NONE 650 .. DEHUM 1 (Address of modbus object) 651 .. DEHUM 2 (Address of modbus object) 652 .. DEHUM 3 (Address of modbus object) 653 .. DEHUM 4 (Address of modbus object)	YES	YES	YES
NORMAL	Associated to Ventilation (air quality control)	R	Input Register	**00116**	val_u1	0 .. NONE 610 .. Ventilation 1 (Address of modbus object) 611 .. Ventilation 2 (Address of modbus object)	-	YES	YES
NORMAL	Radiators state (air temperature)	R	Input Register	**00117**	val_u1	0 NONE (not used in this room or load was not detected on at least one output) 1 IDLE 2 HEATING 3 COOLING 4 BLOCKED_HEATING 5 BLOCKED_COOLING	YES	YES	YES
NORMAL	Underfloor Heating/Cooling state (floor temperature)	R	Input Register	**00118**	val_u1	0 NONE (not used in this room or load was not detected on at least one output) 1 IDLE 2 HEATING 3 COOLING 4 BLOCKED_HEATING 5 BLOCKED_COOLING	YES	YES	YES
NORMAL	Drying state (relative humidity)	R	Input Register	**00119**	val_u1	0 NONE (not used in this room) 1 IDLE 2 DRYING 3 BLOCKED_DRYING	YES	YES	YES
NORMAL	Thermal integration state (air temperature)	R	Input Register	**00120**	val_u1	0 NONE (not used in this room) 1 IDLE 2 HEATING 3 COOLING 4 BLOCKED_HEATING 5 BLOCKED_COOLING	YES	YES	YES
NORMAL	Ventilation state	R	Input Register	**00121**	val_u1	0 NONE (not used in this room) 1 STOPPED 2 UNOCCUPIED 3 ECONOMY 4 COMFORT 5 BOOST 6 BLOCKED	-	YES	YES
NORMAL	Blocking source - Radiators	R	Input Register	**00122**	val_u1	Same as Heating/Cooling blocking source	YES	YES	YES
NORMAL	Blocking source - Underfloor Heating/Cooling	R	Input Register	**00123**	val_u1	Same as Heating/Cooling blocking source	YES	YES	YES
NORMAL	Blocking source - Drying	R	Input Register	**00124**	val_u1	Same as Heating/Cooling blocking source	YES	YES	YES
NORMAL	Blocking source - Integration	R	Input Register	**00125**	val_u1	Same as Heating/Cooling blocking source	YES	YES	YES
NORMAL	Blocking source - Ventilation	R	Input Register	**00126**	val_u1	Same as Heating/Cooling blocking source	-	YES	YES
NORMAL, DUMMY	Room type	R	Input Register	**00127**	val_u1	0 - NORMAL (DEFAULT) 1 - DUMMY (no thermostat or sensor installed)	YES	YES	YES
DUMMY	Associated Heating Source	R	Input Register	**00128**	val_u1	0 .. NONE 73 .. ITC1 (Address of modbus object) 74 .. ITC2 (Address of modbus object) 77 .. HCC1 (Address of modbus object) 78 .. HCC2 (Address of modbus object) 79 .. HCC3 (Address of modbus object) 81 .. H/C Source (Address of modbus object)	YES	YES	YES
NORMAL, DUMMY	Room name	R/W	Holding register	**00101 - 00116**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	YES	YES	YES
NORMAL, DUMMY	Room mode	R/W	Holding register	**00117**	val_u1	0 SCHEDULE 1 MANUAL In SCHEDULE mode, the "Room temperature setpoint" is not used and the room temperature is controlled by scheduler.	YES	YES	YES
NORMAL, DUMMY	Room mode override	R/W	Holding register	**00118**	val_u1	0 NONE 1 TEMPORARY 2 VACATION_AWAY 3 ADJUST NORMAL ROOM: In override mode (> NONE), the "Room temperaturesetpoint" is not used. The requested temperature is corrected by user via room thermostat or mobile application. You can disable the override mode by setting this value to 0 (NONE) DUMMY ROOM: In override mode (> NONE), the "Room temperature preset" is not used. The requested temperature preset is changed by user via LCD or mobile application. You can disable the override mode by setting this value to 0 (NONE)	YES	YES	YES
NORMAL	Room temperature setpoint	R/W	Holding register	**00119**	val_d2_fp100	Temperature requested by user. This values is not used when - Room mode = SCHEDULE (Scheduler temperature is used) - Location.Vacation = ON (Vacation temperature is used) - Location.Standby = ON (Standby temperature is used) - Temporary mode is activated (User defined temperature is used) Writing invalid value (327,67) stops room heating/cooling demand only when Vacation or Standby is not active.	YES	YES	YES
NORMAL	User Interface access level (thermostat lock)	R/W	Holding Register	**00120**	val_u1	8 LOCKED (Read Only) 16 HOTEL 32 UNLOCKED	YES	YES	YES
NORMAL, DUMMY	Standby temperature	R/W	Holding Register	**00121**	val_d2_fp100	Room temperature setpoint used when the system is in Standby mode. Writing invalid value (327,67) stops room heating/cooling demand only when Standby is active.	YES	YES	YES

Object	Parameter	R/W	Modbus Table	Modbus Address	Data type	Description	3.2 FWPKG 12	3.3 FWPKG 14	3.4 FWPKG 16
NORMAL, DUMMY	Vacation temperature	R/W	Holding Register	**00122**	val_d2_fp100	Room temperature setpoint used when the system is in Vacation mode Writing invalid value (327,67) stops room heating/cooling demand only when Vacation is active.	YES	YES	YES
NORMAL, DUMMY	Exclude from vacation	R/W	Holding Register	**00123**	val_u1	Do not allow the Vacation mode in this room	YES	YES	YES
NORMAL	Adaptive mode	R/W	Holding Register	**00124**	val_u1	Allow adaptive mode	YES	YES	YES
NORMAL	Thermal integration heating offset	R/W	Holding Register	**00125**	val_d2_fp100	Thermal integration heating offset	YES	YES	YES
NORMAL	Thermal integration hysteresis	R/W	Holding Register	**00126**	val_d2_fp100	Thermal integration hysteresis	YES	YES	YES
NORMAL	Humidity threshold heating	R/W	Holding Register	**00127**	val_d2_fp100	Humidity threshold heating	YES	YES	YES
NORMAL	Humidity threshold cooling	R/W	Holding Register	**00128**	val_d2_fp100	Humidity threshold cooling	YES	YES	YES
NORMAL	Humidity hysteresis	R/W	Holding Register	**00129**	val_d2_fp100	Humidity hysteresis	YES	YES	YES
NORMAL	Drying - cooling water offset	R/W	Holding Register	**00130**	val_d2_fp100	Drying - cooling water offset	YES	YES	YES
NORMAL	Drying - cooling water offset hysteresis	R/W	Holding Register	**00131**	val_d2_fp100	Drying - cooling water offset hysteresis	YES	YES	YES
NORMAL	Dew point cooling threshold	R/W	Holding Register	**00132**	val_d2_fp100	Dew point threshold temp when cooling	YES	YES	YES
NORMAL	Dew point cooling threshold hysteresis	R/W	Holding Register	**00133**	val_d2_fp100	Dew point threshold temp hysteresis when cooling	YES	YES	YES
NORMAL	Humidity high alarm limit	R/W	Holding Register	**00134**	val_d2_fp100	Humidity high alarm limit	YES	YES	YES
DUMMY	Room temperature preset	R/W	Holding register	**00135**	val_u1	0 - ECO 1 - COMFORT 2 - EXTRA COMFORT Temperature preset requested by user. This value is not used when - Room mode = SCHEDULE (Scheduler temperature is used) - Location.Vacation = ON (Vacation temperature is used) - Location.Standby = ON (Standby temperature is used) - Temporary mode is activated (User defined temperature is used)	YES	YES	YES
Room 2	Same as Room 1			**002xx**					
Room 3	Same as Room 1			**003xx**					
...				**...**					
Room 16	Same as Room 1			**016xx**					
OUTDOOR ZONES									
Outdoor 1				**033xx**					
	Aggregated warning	R	Discrete Inputs	**03301**		A problem is pending in Outdoor zone	YES	YES	YES
	Aggregated error	R	Discrete Inputs	**03302**		A critical problem is pending in Outdoor zone	YES	YES	YES
	Warning - low battery	R	Discrete Inputs	**03303**		There are one or more peripherals in the Outdoor zone with low battery.	YES	YES	YES
	Error - peripheral lost	R	Discrete Inputs	**03304**		There are one or more peripherals in the Outdoor zone which are not responding.	YES	YES	YES
	Air Temp	R	Input Register	**03301**	val_d2_fp100	Used in H/C mode switching, H/C blocking	YES	YES	YES
	Air Temp Filtered	R	Input Register	**03302**	val_d2_fp100	Used in heat curve calculations, frost protection	YES	YES	YES
	Air Temp Geometrical	R	Input Register	**03303**	val_d2_fp100	Not yet used	YES	YES	YES
	Name	R	Holding Register	**03301 - 03316**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	YES	YES	YES
	Air Temp BMS Override	R/W	Holding Register	**03317**	val_d2_fp100	Overrides Air Temp value (register 03301). Invalid value (327,67) means override is disabled.	YES	YES	YES
DHW CONTROLLERS									
DHW 201				**065xx**					
	Aggregated warning	R	Discrete Inputs	**06501**		A problem is pending in DHW	YES	YES	YES
	Aggregated error	R	Discrete Inputs	**06502**		A critical problem is pending in DHW	YES	YES	YES
	Warning - Retentive Low Energy	R	Discrete Inputs	**06503**			YES	YES	YES
	Error - DHW temp high	R	Discrete Inputs	**06504**			YES	YES	YES
	Error - Motor failure	R	Discrete Inputs	**06505**			YES	YES	YES
	Error - DHI sensor failure (source inlet)	R	Discrete Inputs	**06506**			YES	YES	YES
	Error - DHO sensor failure (source return)	R	Discrete Inputs	**06507**			YES	YES	YES
	Error - DHW sensor failure	R	Discrete Inputs	**06508**			YES	YES	YES
	Error - DCW sensor failure	R	Discrete Inputs	**06509**			YES	YES	YES
	Warning - Pressure high	R	Discrete Inputs	**06510**			YES	YES	YES
	Warning - Pressure low	R	Discrete Inputs	**06511**			YES	YES	YES
	Error - Pressure critical low	R	Discrete Inputs	**06512**			YES	YES	YES
	Error - flow sensor failure	R	Discrete Inputs	**06513**			YES	YES	YES
	Desired DHW temp	R	Input Register	**06501**	val_d2_fp100	Shows the desired temperature of the domestic hot water.	YES	YES	YES
	State	R	Input Register	**06502**	val_u1	1 IDLE 2 HEATING (hot water is consumed by user) 3 BYPASS (keeping heat exchanger hot for circulation) 4 BLOCKED_HEATING 5 BLOCKED_BYPASS Shows, whether the system wants to heat or to have bypass activated.	YES	YES	YES
	Blocking source	R	Input Register	**06503**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	YES	YES	YES
	Circulation state	R	Input Register	**06504**	val_u1	0 NONE (disabled) 1 IDLE 2 ON	YES	YES	YES
	Measured DHW temp	R	Input Register	**06505**	val_d2_fp100	Current temperature of the domestic hot water flowing from DHW	YES	YES	YES
	Source - Inlet temp	R	Input Register	**06506**	val_d2_fp100	Current temperature of the water incoming from the heat source.	YES	YES	YES
	Source - Return temp	R	Input Register	**06507**	val_d2_fp100	Current temperature of the water returning to the heat source.	YES	YES	YES
	Pressure	R	Input Register	**06508**	val_d2_fp100	Current pressure of the secondary system	YES	YES	YES
	Domestic Cold Water Temp	R	Input Register	**06509**	val_d2_fp100	On heat exchanger input	YES	YES	YES
	Domestic Cold Water flow	R	Input Register	**06510**	val_d2	flow meter (analog) in l/h	YES	YES	YES
	Valve position	R	Input Register	**06511**	val_d2_fp100	Valve position in flows	YES	YES	YES
	Boost pump state	R	Input Register	**06512**	val_u1	Boost pump state 0 IDLE 1 ON	YES	YES	YES
	Name	R/W	Holding Register	**06501 - 06516**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	YES	YES	YES
	Mode	R/W	Holding Register	**06517**	val_u1	0 SCHEDULE 1 SCHEDULE_ADAPTIVE 2 ECO 3 COMFORT Eco = circulation and hot bypass are disabled Comfort = circulation and hot bypass are enabled	YES	YES	YES
	User interface access level (calefa display lock)	R/W	Holding Register	**06518**	val_u1	16 USER (user menu) 32 INSTALLER (inst. menu)	YES	YES	YES
	Block request	R/W	Holding Register	**06519**	val_u1	0 NONE 1 BLOCK_REQUEST When BLOCK_REQUEST is set, then the system blocks heating and bypass to eliminate consumption from heat supplier.	YES	YES	YES
	Power consumption limit	R/W	Holding Register	**06520**	val_u2		YES	YES	YES
	DHW temp set	R/W	Holding Register	**06521**	val_d2_fp100	Requested temperature of domestic hot water.	YES	YES	YES
	DHW bypass temp	R/W	Holding Register	**06522**	val_d2_fp100		YES	YES	YES
	Circulation - Pump present	R/W	Holding Register	**06523**	val_u1	0 DISABLED 1 ENABLED (scheduler)	YES	YES	YES
	Circulation - Inlet temp	R/W	Holding Register	**06524**	val_d2_fp100	When circulation is enabled and there is NO dhw consumption, then the DHW temperature is regulated to this value.	YES	YES	YES
	Exclude from vacation	R/W	Holding Register	**06525**	val_u1	Do not allow the Vacation mode	YES	YES	YES

Object	Parameter	R/W	Modbus Table	Modbus Address	Data type	Description	3.2 FWPKG 12	3.3 FWPKG 14	3.4 FWPKG 16
	Exclude from standby	R/W	Holding Register	**06526**	val_u1	Do not allow the Standby mode	YES	YES	YES
	Boost pump mode	R/W	Holding Register	**06527**	val_u1	Boost pump mode 0 OFF 1 LOW 2 HIGH	YES	YES	YES
DHW Tank				**06600**					
	Aggregated warning	R	Discrete Inputs	**06601**		A problem is pending in DHW	YES	YES	YES
	Aggregated error	R	Discrete Inputs	**06602**		A critical problem is pending in DHW	YES	YES	YES
	Warning - cleaning process fail	R	Discrete Inputs	**06603**			YES	YES	YES
	Error - Tank temp sensor fail	R	Discrete Inputs	**06604**			YES	YES	YES
	Error - Circulation return temp sensor fail	R	Discrete Inputs	**06605**			YES	YES	YES
	Error - Source return temp sensor fail	R	Discrete Inputs	**06606**			YES	YES	YES
	Error - Source inlet temp sensor fail	R	Discrete Inputs	**06607**			YES	YES	YES
	Warning - Source inlet temp too low	R	Discrete Inputs	**06608**			YES	YES	YES
	Warning - Peripheral low battery	R	Discrete Inputs	**06609**			YES	YES	YES
	Error - Peripheral unreachable	R	Discrete Inputs	**06610**			YES	YES	YES
									YES
	Tank - Measured temp	R	Input Register	**06601**	val_d2_fp100	Current temperature of the domestic hot water in the tank	YES	YES	YES
	Tank - Desired temp	R	Input Register	**06602**	val_d2_fp100	Desired temperature of the domestic hot water inside the tank (according to sheduler or manual setup). NOTE: The tank temperature is different form the temperature flowing from the tip.	YES	YES	YES
	Tank - State	R	Input Register	**06603**	val_u1	0 OFF 1 IDLE 2 HEATING 3 CLEANING 4 BLOCKED_HEATING 5 BLOCKED_CLEANING 6 FAILURE	YES	YES	**CHANGED**
	Tank - Blocking source	R	Input Register	**06604**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	YES	YES	YES
Optional	Circulation - State	R	Input Register	**06605**	val_u1	0 NONE (disabled) 1 IDLE 2 ON	YES	YES	YES
Optional	Circulation - Return temp	R	Input Register	**06606**	val_d2_fp100	Current temperature of the domestic hot water returning from circulation.	YES	YES	YES
	Source - Inlet temp	R	Input Register	**06607**	val_d2_fp100	Current temperature of the water incoming from the heat source.	YES	YES	YES
	Source - Return temp	R	Input Register	**06608**	val_d2_fp100	Current temperature of the water returning to the heat source.	YES	YES	YES
	Name	R/W	Holding Register	**06601 - 06616**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	YES	YES	YES
	Mode	R/W	Holding Register	**06617**	val_u1	0 SCHEDULE 2 ECO Eco = Circulation is disabled	YES	YES	YES
Optional	Circulation - Cooldown time	R/W	Holding Register	**06618**	val_u2	How long the circulation is supressed after is paused due to "Stop temp difference"	YES	YES	YES
Optional	Circulation - Stop temp difference	R/W	Holding Register	**06619**	val_d2_fp100	When difference between tank temperature and return temperature from circulation is lower than this value, the circulation pump is switched off.	YES	YES	YES
Optional	Source - Return temp limit	R/W	Holding Register	**06620**	val_d2_fp100	The controller limits the source return temperature according to this value. (used only in "advanced tank mode")	YES	YES	YES
	Tank - Temp set	R/W	Holding Register	**06621**	val_d2_fp100	Requested temperature of domestic hot water.	YES	YES	YES
Optional	Tank - Temp set vacation	R/W	Holding Register	**06622**	val_d2_fp100	Requested temperature of domestic hot water in Vacation mode	YES	YES	YES
Optional	Tank - Temp set cleaning	R/W	Holding Register	**06623**	val_d2_fp100	Requested temperature of domestic hot water during the cleaning process.	YES	YES	YES
Optional	Tank - Temp set standby	R/W	Holding Register	**06624**	val_d2_fp100	Requested temperature of domestic hot water in Standby mode	YES	YES	YES
	Exclude from vacation	R/W	Holding Register	**06625**	val_u1	Do not allow the Vacation mode	YES	YES	YES
	Exclude from standby	R/W	Holding Register	**06626**	val_u1	Do not allow the Standby mode	YES	YES	YES
CALEFA ITC CONTROLLERS									
CALEFA ITC	Registers are same as SENTIO ITC			**068xx**			-	YES	YES
SENTIO ITC CONTROLLERS									
SENTIO ITC1				**073xx**					
	Aggregated warning	R	Discrete Inputs	**07301**		A problem is pending in ITC	YES	YES	YES
	Aggregated error	R	Discrete Inputs	**07302**		A critical problem is pending in ITC	YES	YES	YES
	Error - Inlet Sensor Failure	R	Discrete Inputs	**07303**		Missing or broken sensor	YES	YES	YES
	Error - Servo Failure	R	Discrete Inputs	**07304**		Missing or broken servo	YES	YES	YES
	Error - Return Sensor Failure	R	Discrete Inputs	**07305**		Missing or broken sensor	YES	YES	YES
	Error - Outdoor Sensor Failure	R	Discrete Inputs	**07306**		Missing or broken sensor	YES	YES	YES
	Error - High temp cut-off activated	R	Discrete Inputs	**07307**		Safety mechanism "high temp cut-off" is activated	YES	YES	YES
	Error - Frost protection activated	R	Discrete Inputs	**07308**		Safety mechanism "frost protection" is activated	YES	YES	YES
									YES
	State	R	Input Register	**07301**	val_u1	1 IDLE 2 HEATING 3 COOLING 4 BLOCKED_HEATING 5 BLOCKED_COOLING	YES	YES	YES
	Blocking source	R	Input Register	**07302**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	YES	YES	YES
	Pump - Demand	R	Input Register	**07303**	val_u1	1 IDLE 2 ON	YES	YES	YES
	Pump - State	R	Input Register	**07304**	val_u1	1 IDLE 2 ON	YES	YES	YES
	Measured inlet temperature	R	Input Register	**07305**	val_d2_fp100	Measured temperature of the inlet heating/cooling water.	YES	YES	YES
	Desired inlet temperature	R	Input Register	**07306**	val_d2_fp100	Desired temperature of the inlet heating/cooling water. The value which the ITC regulator wants to meet.	YES	YES	YES
	Measured return temperature	R	Input Register	**07307**	val_d2_fp100	Measured return temperature	YES	YES	YES
	Main supplier temperature	R	Input Register	**07308**	val_d2_fp100	Main supplier temperature	YES	YES	YES
	Servo position request [%]	R	Input Register	**07309**	val_d2_fp100	Servo position request in percent	-	YES	YES
	Desired room temperature by consumers	R	Input Register	**07310**	val_d2_fp100	Desired room temperature by consumers	-	-	YES
	Name	R/W	Holding Register	**07301-07316**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	YES	YES	YES
	Regulator - P value	R/W	Holding Register	**07317**	val_d2_fp10	Proportional gain of temperature regulator	YES	YES	YES
	Regulator - I value	R/W	Holding Register	**07318**	val_u2	Integrating time of temperature regulator	YES	YES	YES
	Regulator - Hysteresis	R/W	Holding Register	**07319**	val_d2_fp100	Hysteresis	YES	YES	YES
	Heat curve - type	R/W	Holding Register	**07320**	val_u1	0 MANUAL 1 CALCULATED 2 UNDERFLOOR 3 RADIATORS	YES	YES	YES
	Heat curve - manual slope	R/W	Holding Register	**07321**	val_d2_fp10	Curve slope. Used only in MANUAL	YES	YES	YES
	Heat curve - parallel displacement	R/W	Holding Register	**07322**	val_d2_fp100	Shifts calculated temperature up/down	YES	YES	YES
	Heat curve - min inlet	R/W	Holding Register	**07323**	val_d2_fp100	Lowest possible temperature	YES	YES	YES
	Heat curve - max inlet	R/W	Holding Register	**07324**	val_d2_fp100	Highest possible temperature	YES	YES	YES
	Heat curve - gain	R/W	Holding Register	**07325**	val_d2_fp10	Static gain of desired temperature calculation	YES	YES	YES
	Return temp limiter -function	R/W	Holding Register	**07326**	val_u1	0 OFF 1 MIN 2 MAX	YES	YES	YES
	Return temp max limiter - Limit	R/W	Holding Register	**07327**	val_d2_fp100	Maximum allowed return temperature (limits inlet temperature)	YES	YES	YES
	Return temp max limiter - Gain	R/W	Holding Register	**07328**	val_d2_fp10	Return limiter proportional gain. Use high value fast acting system, low value for slow acting system.	YES	YES	YES
	Return temp max limiter - Priority over inlet	R/W	Holding Register	**07329**	val_u1	0 NO_PRIORITY 1 PRIORITY (return limiter can override "Heat curve - min inlet")	YES	YES	YES

Object	Parameter	R/W	Modbus Table	Modbus Address	Data type	Description	3.2 FWPKG 12	3.3 FWPKG 14	3.4 FWPKG 16
	Return temp max limiter - Priority over inlet	R/W	Holding Register	**07329**	val_u1	0 NO_PRIORITY 1 PRIORITY (return limiter can override "Heat curve - min inlet")	YES	YES	YES
	Return temp min limiter - Limit	R/W	Holding Register	**07330**	val_d2_fp100	Minimal allowed return temperature (limits inlet temperature)	YES	YES	YES
	Return temp min limiter - Gain	R/W	Holding Register	**07331**	val_d2_fp10	Return limiter proportional gain. Use high value fast acting system, low value for slow acting system.	YES	YES	YES
	Optimization - boost	R/W	Holding Register	**07332**	val_u1	Boost desired temperature by "Optimization - boost flow" for 1 hour 0 DISABLED 1 ENABLED	YES	YES	YES
	Optimization - boost flow	R/W	Holding Register	**07333**	val_u1	Boost flow	YES	YES	YES
	Optimization - ramping	R/W	Holding Register	**07334**	val_u1	Rise desired temperature over ramping time. 0 DISABLED 1 ENABLED	YES	YES	YES
	Optimization - ramping time	R/W	Holding Register	**07335**	val_u1	Ramping time	YES	YES	YES
	Frost protection - Mode	R/W	Holding Register	**07336**	val_u1	Activate heating in assigned loops whe inlet temperature drops bellow "Frost protection - Temp"	YES	YES	YES
	Frost protection - Temp	R/W	Holding Register	**07337**	val_d2_fp100	Frost protection limit	YES	YES	YES
	High Temp Cut-Off - Mode	R/W	Holding Register	**07338**	val_u1	Heating is blocked, when inlet temperature exceeds the limit. Alarm is raised, pump is switched off (ignoring all pump delay). 0 DISABLED 1 ENABLED	YES	YES	YES
	High Temp Cut-Off - Temp	R/W	Holding Register	**07339**	val_d2_fp100	Limit temperature for High Temp Cut-Off	YES	YES	YES
	Cooling Regulator - P value	R/W	Holding Register	**07340**	val_d2_fp10	Proportional gain of temperature regulator in cooling mode	YES	YES	YES
	Cooling Regulator - I value	R/W	Holding Register	**07341**	val_u2	Integrating time of temperature regulator in cooling mode	YES	YES	YES
	Cooling Regulator - Hysteresis	R/W	Holding Register	**07342**	val_d2_fp100	Hysteresis in cooling mode	YES	YES	YES
	Cooling inlet temp min	R/W	Holding Register	**07343**	val_d2_fp100	Lowest possible temperature in cooling mode	YES	YES	YES
	Cooling inlet temp max	R/W	Holding Register	**07344**	val_d2_fp100	Highest possible temperature in cooling mode	YES	YES	YES
SENTIO ITC2	Same as ITC1			**074xx**			YES	YES	YES
HCC CONTROLLERS									
HCC1				**077xx**					
	Aggregated warning	R	Discrete Inputs	**07701**		A problem is pending in ITC	YES	YES	YES
	Aggregated error	R	Discrete Inputs	**07702**		A critical problem is pending in ITC	YES	YES	YES
	Error - inlet sensor failure	R	Discrete Inputs	**07703**			YES	YES	YES
	Error - High temp cut-off activated	R	Discrete Inputs	**07704**		Safety mechanism "high temp cut-off" is activated	YES	YES	YES
									YES
	State	R	Input Register	**07701**	val_u1	1 IDLE 2 HEATING 3 COOLING 4 BLOCKED_HEATING 5 BLOCKED_COOLING	YES	YES	YES
	Blocking source	R	Input Register	**07702**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	YES	YES	YES
	Pump - Demand	R	Input Register	**07703**	val_u1	1 IDLE 2 ON	YES	YES	YES
	Pump - State	R	Input Register	**07704**	val_u1	1 IDLE 2 ON	YES	YES	YES
	Measured inlet temperature	R	Input Register	**07705**	val_d2_fp100	Measured temperature of the inlet heating/cooling water.	YES	YES	YES
	Desired inlet temperature	R	Input Register	**07706**	val_d2_fp100	Desired temperature of the inlet heating/cooling water. The value which the ITC regulator wants to meet.	YES	YES	YES
	Desired room temperature by consumers	R	Input Register	**07708**	val_d2_fp100	Desired room temperature by consumers	-	-	YES
	Name	R/W	Holding Register	**07701-07716**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	YES	YES	YES
	Heat curve - type	R/W	Holding Register	**07717**	val_u1	0 MANUAL 1 CALCULATED 2 UNDERFLOOR 3 RADIATORS	YES	YES	YES
	Heat curve - manual slope	R/W	Holding Register	**07718**	val_d2_fp10	Curve slope. Used only in MANUAL	YES	YES	YES
	Heat curve - parallel displacement	R/W	Holding Register	**07719**	val_d2_fp100	Shifts calculated temperature up/down	YES	YES	YES
	Heat curve - min inlet	R/W	Holding Register	**07720**	val_d2_fp100	Lowest possible temperature	YES	YES	YES
	Heat curve - max inlet	R/W	Holding Register	**07721**	val_d2_fp100	Highest possible temperature	YES	YES	YES
	Heat curve - gain	R/W	Holding Register	**07722**	val_d2_fp10	Static gain of desired temperature calculation	YES	YES	YES
	High Temp Cut-Off - Mode	R/W	Holding Register	**07723**	val_u1	Heating is blocked, when inlet temperature exceeds the limit. Alarm is raised, pump is switched off (ignoring all pump delay). 0 DISABLED 1 ENABLED	YES	YES	YES
	High Temp Cut-Off - Temp	R/W	Holding Register	**07724**	val_d2_fp100	Limit temperature for High Temp Cut-Off	YES	YES	YES
									YES
HCC2	same as HCC1			**078xx**			YES	YES	YES
HCC3	same as HCC1			**079xx**			YES	YES	YES
H/C Source									
H/C Source									
	Aggregated warning	R	Discrete Inputs	**08101**		A problem is pending in H/C Source	YES	YES	YES
	Aggregated error	R	Discrete Inputs	**08102**		A critical problem is pending in H/C Source	YES	YES	YES
	Error general failure	R	Discrete Inputs	**08103**		General failure	YES	YES	YES
									YES
	State	R	Input Register	**08101**	val_u1	1 IDLE 2 HEATING 3 COOLING 4 BLOCKED_HEATING 5 BLOCKED_COOLING	YES	YES	YES
HCW Source Elements									
Boiler/Heat Pump									
	Aggregated warning	R	Discrete Inputs	**08201**		A problem is pending in Boiler/Heat Pump	-	-	YES
	Aggregated error	R	Discrete Inputs	**08202**		A critical problem is pending in Boiler/Heat Pump	-	-	YES
	Error - inlet temp sensor failure	R	Discrete Inputs	**08203**		Inlet temperature sensors failure	-	-	YES
	Error - general failure	R	Discrete Inputs	**08204**		General failure	-	-	YES
	State	R	Input Register	**08201**	val_u1	1 IDLE 2 HEATING_PREPARE 3 HEATING_ACTIVE 4 HEATING_TERMINATE 5 COOLING_PREPARE 6 COOLING_ACTIVE 7 COOLING_TERMINATE 8 BLOCKED_HEATING 9 BLOCKED_COOLING 10 FAILURE	-	-	YES
	Blocking source	R	Input Register	**08202**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	-	-	YES
	Inlet temperature	R	Input Register	**08203**	val_d2_fp100	Measured temperature of the inlet heating/cooling water.	-	-	YES
	Requested temperature	R	Input Register	**08204**	val_d2_fp100	Requested temperature for heat pump	-	-	YES
	Name	R/W	Holding Register	**08201-08216**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	-	-	YES
	Minimum runtime [min]	R/W	Holding Register	**08217**	val_u2	Minimum runtime in minutes	-	-	YES
	Minimum cycle delay [min]	R/W	Holding Register	**08218**	val_u2	Minimum cycle delay in minutes	-	-	YES
	Demand start delay [min]	R/W	Holding Register	**08219**	val_u2	Demand start delay in minutes	-	-	YES
	Demand stop delay [min]	R/W	Holding Register	**08220**	val_u2	Demand stop delay in minutes	-	-	YES

Object	Parameter	R/W	Modbus Table	Modbus Address	Data type	Description	3.2 FWPKG 12	3.3 FWPKG 14	3.4 FWPKG 16
Buffer Tank									
	Aggregated warning	R	Discrete Inputs	**08301**		A problem is pending in Buffer Tank	-	-	YES
	Aggregated error	R	Discrete Inputs	**08302**		A critical problem is pending in Buffer Tank	-	-	YES
	Error - inlet temp sensor failure	R	Discrete Inputs	**08303**		Inlet temperature sensors failure	-	-	YES
	Error - priority temp sensor failure	R	Discrete Inputs	**08304**		Prority temperature sensor failure	-	-	YES
	Error - upper temp sensor failure	R	Discrete Inputs	**08305**		Upper temperature sensor failure	-	-	YES
	Error - lower temp sensor failure	R	Discrete Inputs	**08306**		Lower temperature sensor failure	-	-	YES
	State	R	Input Register	**08301**	val_u1	1 IDLE 2 HEATING_PREPARE 3 HEATING_ACTIVE 4 HEATING_TERMINATE 5 COOLING_PREPARE 6 COOLING_ACTIVE 7 COOLING_TERMINATE 8 BLOCKED_HEATING 9 BLOCKED_COOLING 10 FAILURE	-	-	YES
	Blocking source	R	Input Register	**08302**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	-	-	YES
	Source inlet temperature	R	Input Register	**08303**	val_d2_fp100	Measured temperature of the source inlet heating/cooling water.	-	-	YES
	Buffer upper temperature	R	Input Register	**08304**	val_d2_fp100	Buffer tank upper temperature	-	-	YES
	Buffer lower temperature	R	Input Register	**08305**	val_d2_fp100	Buffer tank lower temperature	-	-	YES
	Name	R/W	Holding Register	**08301-08316**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	-	-	YES
	Start difference [K]	R/W	Holding Register	**08317**	val_d2_fp100	Start charging difference in kelvins	-	-	YES
	Stop difference [K]	R/W	Holding Register	**08318**	val_d2_fp100	Stop charging difference in kelvins	-	-	YES
	Sensor priority	R/W	Holding Register	**08319**	val_u1	0 - UPPER_SENSOR 1 - LOWER_SENSOR	-	-	YES
	Flow balancing	R/W	Holding Register	**08320**	val_u1	0 - DISABLE 1 - ENABLE	-	-	YES
	Charge mode	R/W	Holding Register	**08321**	val_u1	0 - CONSUMER_ONLY 1 - DEMAND_TRIGGERED	-	-	YES
	Charge evaluation delay [min]	R/W	Holding Register	**08322**	val_u1	Charge evaluation delay in minutes	-	-	YES
HARDWARE I/O									
Thermistor Inputs									
	T1 - Thermistor input temp	R	Input Register	**12801**	val_d2_fp100	T1 temperature	-	-	YES
	T2 - Thermistor input temp	R	Input Register	**12802**	val_d2_fp100	T2 temperature	-	-	YES
	T3 - Thermistor input temp	R	Input Register	**12803**	val_d2_fp100	T3 temperature	-	-	YES
	T4 - Thermistor input temp	R	Input Register	**12804**	val_d2_fp100	T4 temperature	-	-	YES
	T5 - Thermistor input temp	R	Input Register	**12805**	val_d2_fp100	T5 temperature	-	-	YES
PERIPHERAL LIST									
Peripheral 1				**512xx**		NOTE: Dynamic list of peripherals. Position of the peripherals is not fixed. It can change when a peripheral is learned or unlearned.			
	Aggregated warning	R	Discrete Inputs	**51201**		A problem is pending in Room	YES	YES	YES
	Aggregated error	R	Discrete Inputs	**51202**		A critical problem is pending in Room	YES	YES	YES
	Warning - low battery	R	Discrete Inputs	**51203**		Battery is low in the peripheral.	YES	YES	YES
	Error - peripheral lost	R	Discrete Inputs	**51204**		Peripheral is not responding.	YES	YES	YES
	Type	R	Input Register	**51201**	val_u2	Peripheral type - Sensor, Termostat, see table at the top	YES	YES	YES
	SN	R	Input Register	**51202-51203**	val_u4	Serial number	YES	YES	YES
	Owner	R	Input Register	**51204**	val_u2	000 - Location 001 - Room 1 ... 016 - Room 16 NOTE: Object address in this modbus table is used as owner_id	YES	YES	YES
	Signal strength	R	Input Register	**51205**	val_u1	Peripheral Signal strength 0 - 6, 0 - worst signal ... 6 - best signal	YES	YES	YES
	Peripheral name	R/W	Holding register	**51201 - 51216**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	YES	YES	YES
Peripheral 2				**513xx**					
Peripheral 3				**514xx**					
....									
Peripheral 2-64				**575xx**					
EXTERNAL DEVICES									
Ventilation 1				**610xx**					
	Aggregated warning	R	Discrete Inputs	**61001**		A problem is pending in device	-	YES	YES
	Aggregated error	R	Discrete Inputs	**61002**		A critical problem is pending in device	-	YES	YES
	Warning - air filter lifetime expired	R	Discrete Inputs	**61003**		Air filter lifetime expired	-	YES	YES
	Warning - air filter solar year passed	R	Discrete Inputs	**61004**		Air filter solar year passed from last air filter change	-	YES	YES
	Warning - device specific	R	Discrete Inputs	**61005**		Read code from input register - Warning-device specific	-	YES	YES
	Error - device fault	R	Discrete Inputs	**61006**		General problem	-	YES	YES
	Error - communication error	R	Discrete Inputs	**61007**		Communication error	-	YES	YES
	Error - not compatible	R	Discrete Inputs	**61008**		Not compatible	-	YES	YES
	Error - device specific	R	Discrete Inputs	**61009**		Read code from input register - Error-device specific	-	YES	YES
	Device model	R	Input Register	**61001-61016**	val_utf8	Device model	-	YES	YES
	Warning - device specific code	R	Input Register	**61017-61018**	val_u4	Device specific warning code	-	YES	YES
	Error - device specific code	R	Input Register	**61019-61020**	val_u4	Device specific error code	-	YES	YES
	Device feature bits	R	Input Register	**61021-61022**	val_u4	Specific features (capabilities) device has 0x0001 - ALLOW_UNOCCUPIED 0x0002 - ALLOW_ECO 0x0004 - ALLOW_COMFORT 0x0008 - ALLOW_STOPPED 0x0010 - ALLOW_BOOST 0x0020 - ALLOW_BYPASS 0x0040 - FAN_PWM_CONTROL 0x0080 - FAN_BINARY_CONTROL 0x0100 - TEMP_INTAKE 0x0200 - TEMP_SUPPLY 0x0400 - TEMP_EXTRACT 0x0800 - TEMP_EXHAUST 0x1000 - HUMIDITY_INTAKE 0x2000 - HUMIDITY_EXTRACT 0x4000 - FAN_SPEED_FEEDBACK	-	YES	YES
	Ventilation state	R	Input Register	**61023**	val_u1	0 - STOPPED 1 - UNOCCUPIED 2 - ECONOMY 3 - COMFORT 4 - BOOST 5 - BLOCKED_STOPPED 6 - BLOCKED_UNOCCUPIED 7 - BLOCKED_ECONOMY 8 - BLOCKED_COMFORT 9 - BLOCKED_BOOST 10 - FAILURE 11 - MAINTENANCE	-	YES	YES

Note: Ventilation devices are connected using the Modbus RTU master function, this means for a Modbus slave connection only the TCP/IP option is available. More info in the TCP/IP chapter of this manual.

Object	Parameter	R/W	Modbus Table	Modbus Address	Data type	Description	3.2 FWPKG 12	3.3 FWPKG 14	3.4 FWPKG 16
	Ventilation blocking	R	Input Register	**61024**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	-	YES	YES
	Supply fan speed actual [rpm]	R	Input Register	**61025**	val_u2	Supply fan speed actual [rpm]	-	YES	YES
	Exhaust fan speed actual [rpm]	R	Input Register	**61026**	val_u2	Exhaust fan speed actual [rpm]	-	YES	YES
	Supply fan speed setpoint [%]	R	Input Register	**61027**	val_d2_fp100	Supply fan speed setpoint [%]	-	YES	YES
	Exhaust fan speed setpoint [%]	R	Input Register	**61028**	val_d2_fp100	Exhaust fan speed setpoint [%]	-	YES	YES
	Supply volume flow setpoint [m^3/h]	R	Input Register	**61029**	val_u2	Supply volume flow setpoint [m^3/h]	-	YES	YES
	Exhaust volume flow setpoint [m^3/h]	R	Input Register	**61030**	val_u2	Exhaust volume flow setpoint [m^3/h]	-	YES	YES
	Intake air temperature	R	Input Register	**61031**	val_d2_fp100	Intake air temperature	-	YES	YES
	Supply air temperature	R	Input Register	**61032**	val_d2_fp100	Supply air temperature	-	YES	YES
	Extract air temperature	R	Input Register	**61033**	val_d2_fp100	Extract air temperature	-	YES	YES
	Exhaust air temperature	R	Input Register	**61034**	val_d2_fp100	Exhaust air temperature	-	YES	YES
	Heat recovery bypass damper position [%]	R	Input Register	**61035**	val_d2_fp100	Heat recovery bypass damper position [%]	-	YES	YES
	Free cooling enabled	R	Input Register	**61036**	val_u1	Free cooling enabled	-	YES	YES
	Air filter last change	R	Input Register	**61037-61038**	val_u4	Timestamp, updates when register "Air filter lifetime used" is set to zero	-	YES	YES
	Device name	R/W	Holding register	**61001-61016**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	-	YES	YES
	Air filter lifetime	R/W	Holding Register	**61017-61018**	val_u4	Air filter lifetime (minutes) - maximum value is dependent on device model	-	YES	YES
	Air filter lifetime used	R/W	Holding Register	**61019-61020**	val_u4	Write 0 to reset timer	-	YES	YES
	Exhaust Fan Level Unoccupied [%]	R/W	Holding register	**61021**	val_d2_fp100	Exhaust Fan Level Unoccupied [%]	-	YES	YES
	Exhaust Fan Level Eco [%]	R/W	Holding register	**61022**	val_d2_fp100	Exhaust Fan Level Eco [%]	-	YES	YES
	Exhaust Fan Level Comfort [%]	R/W	Holding register	**61023**	val_d2_fp100	Exhaust Fan Level Comfort [%]	-	YES	YES
	Exhaust Fan Level Boost [%]	R/W	Holding register	**61024**	val_d2_fp100	Exhaust Fan Level Boost [%]	-	YES	YES
	Supply Fan Level Unoccupied [%]	R/W	Holding register	**61025**	val_d2_fp100	Supply Fan Level Unoccupied [%]	-	YES	YES
	Supply Fan Level Eco [%]	R/W	Holding register	**61026**	val_d2_fp100	Supply Fan Level Eco [%]	-	YES	YES
	Supply Fan Level Comfort [%]	R/W	Holding register	**61027**	val_d2_fp100	Supply Fan Level Comfort [%]	-	YES	YES
	Supply Fan Level Boost [%]	R/W	Holding register	**61028**	val_d2_fp100	Supply Fan Level Boost [%]	-	YES	YES
	Exhaust Fan Level Unoccupied [m^3/h]	R/W	Holding register	**61029**	val_u2	Exhaust Fan Level Unoccupied [m^3/h]	-	YES	YES
	Exhaust Fan Level Eco [m^3/h]	R/W	Holding register	**61030**	val_u2	Exhaust Fan Level Eco [m^3/h]	-	YES	YES
	Exhaust Fan Level Comfort [m^3/h]	R/W	Holding register	**61031**	val_u2	Exhaust Fan Level Comfort [m^3/h]	-	YES	YES
	Exhaust Fan Level Boost [m^3/h]	R/W	Holding register	**61032**	val_u2	Exhaust Fan Level Boost [m^3/h]	-	YES	YES
	Exhaust Fan Level Boost [m^3/h]	R/W	Holding register	**61033**	val_u2	Supply Fan Level Unoccupied [m^3/h]	-	YES	YES
	Supply Fan Level Eco [m^3/h]	R/W	Holding register	**61034**	val_u2	Supply Fan Level Eco [m^3/h]	-	YES	YES
	Supply Fan Level Comfort [m^3/h]	R/W	Holding register	**61035**	val_u2	Supply Fan Level Comfort [m^3/h]	-	YES	YES
	Supply Fan Level Boost [m^3/h]	R/W	Holding register	**61036**	val_u2	Supply Fan Level Boost [m^3/h]	-	YES	YES
	Allow Stopped level	R/W	Holding register	**61037**	val_u1	Allow Stopped level 0 - NOT ALLOWED 1 - ALLOWED	-	YES	YES
	Allow Unoccupied level	R/W	Holding register	**61038**	val_u1	Allow Unoccupied level 0 - NOT ALLOWED 1 - ALLOWED	-	YES	YES
	Standby mode level	R/W	Holding register	**61039**	val_u1	0 - STOPPED 1 - UNOCCUPIED 2 - ECONOMY	-	YES	YES
	Vacation mode level	R/W	Holding register	**61040**	val_u1	0 - STOPPED 1 - UNOCCUPIED 2 - ECONOMY	-	YES	YES
	Heat exchange mode (recovery bypass)	R/W	Holding register	**61041**	val_u1	0 - ALWAYS ON 1 - AUTOMATIC	-	YES	YES
Ventilation 2				**611xx**			-	YES	YES
							-		
Dehumidifier 1				**650xx**					
	Aggregated warning	R	Discrete Inputs	**65001**		A problem is pending in device	YES	YES	YES
	Aggregated error	R	Discrete Inputs	**65002**		A critical problem is pending in device	YES	YES	YES
	Warning - air filter lifetime expired	R	Discrete Inputs	**65003**		Air filter lifetime expired	YES	YES	YES
	Warning - air filter solar year passed	R	Discrete Inputs	**65004**		Air filter solar year passed from last air filter change	YES	YES	YES
	Error - HCW supplier	R	Discrete Inputs	**65005**		Heating/Cooling water supplier is not set	YES	YES	YES
	Error - device fault	R	Discrete Inputs	**65006**		Device fault - general signal from device	YES	YES	YES
	Type	R	Input Register	**65001**	val_u1	Device type 0 GENERIC 1 P300_S300 2 PC300_SC300	YES	YES	YES
	Drying status	R	Input Register	**65003**	val_u1	0 NONE (function not available) 1 IDLE 2 DRYING 3 BLOCKED_DRYING	YES	YES	YES
	Drying blocking	R	Input Register	**65004**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	YES	YES	YES
	Thermal integration status	R	Input Register	**65005**	val_u1	0 NONE (function not available) 1 IDLE 2 HEATING 3 COOLING 4 BLOCKED_HEATING 5 BLOCKED_COOLING	YES	YES	YES
	Thermal integration blocking	R	Input Register	**65006**	val_u1	Please check top of the document - GENERAL BLOCKING SOURCES	YES	YES	YES
	Thermal Integ. demand condition	R	Input Register	**65007**	val_u1	100 - IN ANY ROOM 101 - IN ALL ROOMS 1-32 - PARTICULAR ROOM (Address of modbus object)	YES	YES	YES
	Air filter last change	R	Input Register	**65010-65011**	val_u4	Timestamp, updates when register "Air filter lifetime used" is set to zero	YES	YES	YES
	Associated HCW supplier	R	Input Register	**65012**	val_u1	0 .. NONE 73 .. ITC1 (Address of modbus object) 74 .. ITC2 (Address of modbus object) 77 .. HCC1 (Address of modbus object) 78 .. HCC2 (Address of modbus object) 79 .. HCC3 (Address of modbus object) 81 .. H/C Source (Address of modbus object)	YES	YES	YES
	Device name	R/W	Holding register	**65001-65016**	val_utf8	String description (32 Bytes, UTF8, NULL terminated)	YES	YES	YES
	Air filter lifetime	R/W	Holding Register	**65017-65018**	val_u4	Air filter lifetime (minutes)	YES	YES	YES
	Air filter lifetime used	R/W	Holding Register	**65019-65020**	val_u4	Write 0 to reset timer	YES	YES	YES
	Drying allow in mode	R/W	Holding Register	**65021**	val_u1	0 - IN COOLING MODE 1 - IN HEATING MODE 2 - IN BOTH	YES	YES	YES
	Drying cooling water	R/W	Holding Register	**65022**	val_d2_fp100	Desired cooling water temperature	YES	YES	YES
	Thermal integ. allow in mode	R/W	Holding Register	**65023**	val_u1	0 - IN COOLING MODE 1 - IN HEATING MODE 2 - IN BOTH	YES	YES	YES
	Thermal integ. heating water temp	R/W	Holding Register	**65024**	val_d2_fp100	Desired heating water temperature	YES	YES	YES
	Thermal integ. cooling water temp	R/W	Holding Register	**65025**	val_d2_fp100	Desired cooling water temperature	YES	YES	YES
Dehumidifier 2				**651xx**			YES	YES	YES
Dehumidifier 3				**652xx**			YES	YES	YES
Dehumidifier 4				**653xx**			YES	YES	YES

General blocking sources

Table 1

1	UNKNOWN
2	CONTACT
3	FLOOR_TEMP
4	LOW_ENERGY
5	AIR_TEMP
6	DEW_POINT
7	OUTDOOR_TEMP
8	FAULT (general fault, e.g. missing sensors)
9	FAULT_HTCO
10	PERIODIC_ACTIVATION
11	BMS
12	DEADBAND
13	DRYING
14	HEATING/COOLING MODE
15	INSUFFICIENT DEMAND
16	COOLDOWN PERIOD
17	HCW SOURCE NOT RELEASED
18	ROOM MODE
19	SYSTEM IS INITIALIZING
20	SYSTEM IS SHUTTING DOWN
21	NO OUTPUT
22	FIRST OPEN ACTIVATION
23	ROOM WITH NO TEMPERATURE

The number of blocking sources is still growing.
There can be another values than listed in this documentation.

Purpose of the modbus interface

(Use cases)

* it is NOT a user interface
* it is NOT an installer interface
* It shall alow following:

1. See all warnings and errors
2. Optimize the system by expert (tuning)
   a. Power consumption
   b. Reliability
   c. Suppress activity of system parts (e.g. circulation)
3. Restrict user posibilities & reset user settings
   a. Set UI access levels
   b. Reset temperature correction made by user (hotel)
   c. Basic setup - manual control

NOTE: Ventilation devices are connected using the Modbus RTU master function, this means for a Modbus slave connection only the TCP/IP option is available. More info in the TCP/IP chapter of this manual.

Value Component type

Table 2

0x0	Calefa controller DHW-201
0x1	Not used
0x2	Not used
0x3	Not used
0x4	Sentio touch screen LCD-200
0x5	Sentio wired room thermostat RT-210
0x6	Sentio wireless room thermostat RT-250
0x7	Sentio wired room sensor RS-211
0x8	Sentio wireless room sensor RS-251
0x9	Sentio wireless room thermostat w/IR RS-250IR
0xA	Sentio extension unit 8 zones EU-208-A
0xB	Sentio extension unit 6 relays EU-206-VFR
0xC	Sentio wireless outdoor sensor ET-250
0xD	Sentio wired outdoor sensor ET-210
0xE	Sentio Smart Radiator Thermostat
0xF	Not used
0x11E0	Sentio Central Control Unit CCU-208

List of supported IANA time zones

Table 3

Area/Town Factory	UTC offset	Zone number 0
Europe/Amsterdam	+01:00	1024
Europe/Astrakhan	+04:00	1025
Europe/Berlin	+01:00	1026
Europe/Bratislava	+01:00	1027
Europe/Brussels	+01:00	1028
Europe/Budapest	+01:00	1029
Europe/Copenhagen	+01:00	1030
Europe/Dublin	+00:00	1031
Europe/Helsinki	+02:00	1032
Europe/Istanbul	+03:00	1033
Europe/Kaliningrad	+02:00	1034
Europe/Kirov	+03:00	1035
Europe/London	+00:00	1036
Europe/Madrid	+01:00	1037
Europe/Moscow	+03:00	1038
Europe/Oslo	+01:00	1039
Europe/Paris	+01:00	1040
Europe/Prague	+01:00	1041
Europe/Riga	+02:00	1042
Europe/Rome	+01:00	1043
Europe/Samara	+04:00	1044
Europe/Saratov	+04:00	1045
Europe/Stockholm	+01:00	1046
Europe/Ulyanovsk	+04:00	1047
Europe/Vilnius	+02:00	1048
Europe/Volgograd	+03:00	1049
Europe/Warsaw	+01:00	1050
Atlantic/Faroe	+00:00	2048
Atlantic/Reykjavik	+00:00	2049
America/Cancun	-05:00	3072

Area/Town Factory	UTC offset	Zone number 0
America/Chihuahua	-07:00	3073
America/Danmarkshavn	+00:00	3074
America/Godthab	-03:00	3075
America/Hermosillo	-07:00	3076
America/Matamoros	-06:00	3077
America/Mexico_City	-06:00	3078
America/Ojinaga	-07:00	3079
America/Scoresbysund	-01:00	3080
America/Thule	-04:00	3081
America/Tijuana	-08:00	3082
Asia/Anadyr	+12:00	4096
Asia/Barnaul	+07:00	4097
Asia/Chita	+09:00	4098
Asia/Irkutsk	+08:00	4099
Asia/Kamchatka	+12:00	4100
Asia/Khandyga	+09:00	4101
Asia/Krasnoyarsk	+07:00	4102
Asia/Magadan	+11:00	4103
Asia/Novokuznetsk	+07:00	4104
Asia/Novosibirsk	+07:00	4105
Asia/Omsk	+06:00	4106
Asia/Sakhalin	+11:00	4107
Asia/Srednekolymsk	+11:00	4108
Asia/Tomsk	+07:00	4109
Asia/Ust-Nera	+10:00	4110
Asia/Vladivostok	+10:00	4111
Asia/Yakutsk	+09:00	4112
Asia/Yekaterinburg	+05:00	4113

Factory timezone

Factory timezone is read-only. It is used for compatibility reasons. E.g. When updating from SW which didnt support timezones. UTC offset is last known, DST rules are same as for Europe. When Factory is set, you should change it to supported timezone.

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