Protocol description

Nilan Combi Controller

Remote Modbus

Modbus version 2

Created 31.01.2021
Revision 15.04.2021

Table of Contents

1. Revision history

Version	Software	Date	Description
1	1.1.x.38	31-01-2021	First release
2	1.1.x.43	06-04-2021	Added parameters to this document. IR0004, IR0005, HR6313, HR6533, HR6534
3	1.1.x.43	08-04-2021	Added parameters to this document. HR6213, HR6313, HR6505, HR6533, HR6534, HR6535, HR6536, HR6537, HR6538, HR6539, HR6540, HR6541, HR6542, HR6543, HR6545, HR6554, HR6558, HR6559, HR6561, HR6562, HR6563, HR6564, HR6572, HR6573, HR6585, HR6586, HR6591, HR6592, HR6593, HR6594, HR6595, HR6596, HR6597, HR6598, HR6599, HR6600, HR6601, HR6602, HR6604, HR6605, HR6606, HR6607, HR6608, HR6609, IR6167, IR6169, IR6171, IR6173, IR6185, IR6186, IR6187, IR6188, IR6189, IR6191, IR6192, IR6194, IR6195, IR6200, IR6201, IR6214, IR6215, IR6219, IR6220
4	1.1.x.44	15-04-2021	Added parameters to this document. HR6506, HR6507, HR6508, HR6509, HR6510, HR6511, HR6512, HR6513, HR6514, HR6515, HR6516, HR6517 Protocol version is updated to 2. Added parameters to protocol and document: HR6700, HR6701, HR6702

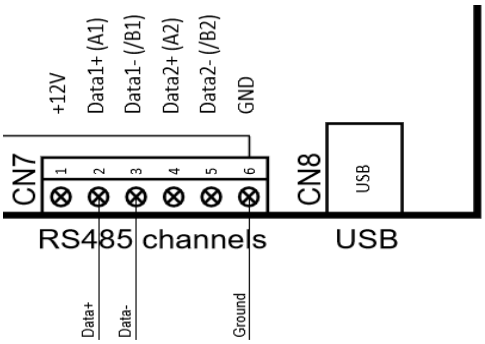
“Version” refers to the protocol data item named “Bus.Version”.

2. Connection

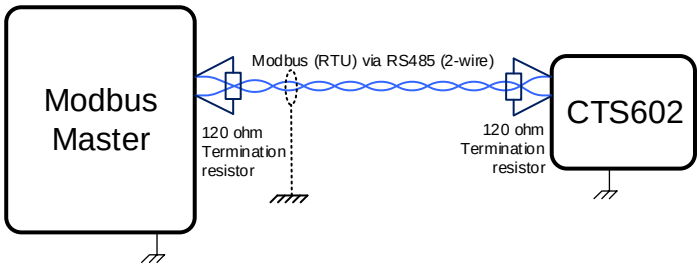
The Modbus is wired to PIN 2,3,6 on connector CN 7 located next to the USB plug on the Remote Modbus board.

Pin 1	12 VDC output
Pin 2	**COM1 - RS 485 Data+ (A) - Modbus**
Pin 3	**COM1 - RS 485 Data- (/B) - Modbus**
Pin 4	COM2 - RS 485 Data+ (A) - User panel
Pin 5	COM2 - RS 485 Data- (/B) - User panel
Pin 6	**Ground**

Remote Modbus connector:



Point to point bus wiring:



Cable specification:
Tinned twisted-pair, with foil or braided shield, connected to ground only on the master side.

Max 200 m cable length.
Characteristic impedance 100 - 130 Ohm.
Shunt capacitance < 100 pF/m.
AWG 24 / 0,25 mm^2.

Suggested types: Belden 941/942 or Multicable LIYCY-P 2*2*0,25 mm^2.

Common ground:
All network nodes must share a common ground connection as the bus signals shall refer to the same voltage potential.

There is no opto-isolation on the Remote Modbus.

Network termination:
120 Ohm resistors shall be connected between the two RS485 signal wires at each end-point of the bus wire.

The resistor value shall match the characteristic impedance of the cable.

Receiver impedance >= 12 kOhm.

3. Setup

Protocol	Modbus (RTU mode), see http://www.modbus.org/specs.php
Node address	Default 30, Address is selectable between 1 and 247
Device type	Remote Modbus is a Modbus slave
Baud rate	19.200
Databits	8
Stopbits	1
Parity	Even
Packet size	Max. 255 bytes

Communication speed and parameters cannot be changed, except for the node address.

4. Supported functions

Input and holding registers are supported.
Unless otherwise specified, all registers are 16 bit size.

The controller will respond to the below listed Modbus message functions only.
Please note that no other function codes are supported.

Function	Name	Description
03	Read Holding Registers	Read one or more holding registers
04	Read Input Registers	Read one or more input registers
16	Preset Multiple Registers	Write one or more holding registers

5. Register layout

Register addresses are given in decimal notation.
Version information's are information's from Combi Controller, not from Remote Modbus controller.

5.1 Input registers

Name	Address	Scale	Unit	Description
Bus.Version	000			Protocol version number
VersionMajor	001	text		Software version - major (2-character ascii text)
VersionMinor	002	text		Software version - minor (2-character ascii text) "1" = AIR "2" = GEO
VersionRelease	003	text		Software version - release (2-character ascii text)
AppId	004			Application Id 32780=Combi
HWId	005			Hardware Id 16=Combi
VersionPatch	006	text		Software version - release (2-character ascii text)
Input.UserFunc	100			User function
Input.AirFilter	101			Air filter alarm
Input.DoorOpen	102			Door contact
Input.Smoke	103			Smoke alarm
Input.MotorThermo	104			Motor thermo fuse
Input.Frost_Overht	105			Heating surface frost / overheat
Input.AirFlow	106			Airflow monitor
Input.P_HI	107			High pressure switch
Input.P_LO	108			Low pressure switch
Input.Boil	109			Hot water boiling
Input.3WayPos	110			Hot water 3-way valve position
Input.DefrostHG	111			Hotgas defrost type selection
Input.Defrost	112			Defrost thermostat
Input.UserFunc_2	113			User function 2
Input.DamperClosed	114			Air damper closed position switch
Input.DamperOpened	115			Air damper opened position switch
Input.FCorThermoAl	116			Combined FC and thermo alarm
Input.SG_A	117			Smart grid A
Input.SG_A	118			Smart grid B
Input.T0_Controller	200	100	°C	Controller board temperature
Input.T1_Intake	201	100	°C	Fresh air intake temperature
Input.T2_Inlet	202	100	°C	Inlet temperature (before heater)
Input.T3_Exhaust	203	100	°C	Room exhaust temperature
Input.T4_Outlet	204	100	°C	Outlet temperature
Input.T5_Cond	205	100	°C	Condenser temperature
Input.T6_Evap	206	100	°C	Evaporator temperature
Input.T7_Inlet	207	100	°C	Inlet temperature (after heater)
Input.T8_Outdoor	208	100	°C	Outdoor temperature
Input.T9_Heater	209	100	°C	Heating surface temperature
Input.T10_Extern	210	100	°C	External room temperature
Input.T11_Top	211	100	°C	Hot water top temperature

Input.T12_Bottom	212	100	°C	Hot water bottom temperature
Input.T13_Return	213	100	°C	EK return temperature
Input.T14_Supply	214	100	°C	EK supply temperature
Input.T16	216	100	°C	AUX temperature (Hotwater anode)
Input.T17_PreHeat	217	100	°C	Preheater or earth tube air intake temperature
Input.T18_PresPibe	218	100	°C	Pressure pibe temperature
Input.pSuc	219		bar	Suction pressure
Input.pDis	220		bar	Dischage pressure
AirQual.RH	221	100	%	Humidity sensor value
AirQual.CO2	222		ppm	Carbon dioxide sensor value
Alarm.Status	400			Alarm state bit mask 0x80 : Active alarm(s) are present 0x0F : Total number of alarms
Alarm.List_1_ID	401			Alarm 1 - Code 0x80 : (reserved future use) 0x7F : Display code 1..99
Alarm.List_1_Date	402			Alarm 1 - Date Bit word packed in DOS date format Year 0 = 1980 15 8 7 0 YYYYYYYM MMMDDDDD
Alarm.List_1_Time	403			Alarm 1 - Time Bit word packed in DOS time format Seconds are in scale 2 (0..29 = 0..58 seconds) 15 8 7 0 HHHHHMMM MMMSSSSS
Alarm.List_2_ID	404			Alarm 2 - Code
Alarm.List_2_Date	405			Alarm 2 - Date
Alarm.List_2_Time	406			Alarm 2 - Time
Alarm.List_3_ID	407			Alarm 3 - Code
Alarm.List_3_Date	408			Alarm 3 - Date
Alarm.List_3_Time	409			Alarm 3 - Time
Control.RunAct	1000			Actual on/off state 0 : Off 1 : On
Control.ModeAct	1001			Actual operation mode 0 : Off 1 : Heat 2 : Cool 3 : Auto 4 : Service

Control.StateDisplay	1002			Actual control state 0 : Off 1 : Shift 2 : Stop 3 : Start 4 : Standby 5 : Ventilation stop 6 : Ventilation 7 : Heating 8 : Cooling 9 : Hot water 10 : Legionella 11 : Cooling + hot water 12 : Central heating 13 : Defrost 14 : Frost sequre 15 : Service 16 : Alarm 17 : Heating + hot water
Control.SecInState	1003		Sec	Actual time in state
AirFlow.VentSet	1100		Step	Actual ventilation step set point 0 : Off 1..4 : Step number
AirFlow.InletAct	1101		Step	Actual inlet fan speed step 0 : Off 1..4 : Step number
AirFlow.ExhaustAct	1102		Step	Actual exhaust fan speed step 0 : Off 1..4 : Step number
AirFlow.SinceFiltDay	1103		Days	Days since last air filter change alarm One day is measured as 24 hours of active running time
AirFlow.ToFiltDay	1104		Days	Days to next air filter change alarm One day is measured as 24 hours of active running time
AirTemp.IsSummer	1200			Summer state 0 : Off 1 : On
AirTemp.TempInletSet	1201	100	°C	Inlet temperature request (T7 setpoint)
AirTemp.TempControl	1202	100	°C	Actual value for controlled temperature
AirTemp.TempRoom	1203	100	°C	Actual room temperature (T15 or T10)
AirTemp.EffPct	1204	100	%	Passive heat exchanger efficiency calculation
AirTemp.CapSet	1205	100	%	Requested capacity
AirTemp.CapAct	1206	100	%	Actual capacity
Compressor.Type	1500		0..2	0: None, 1: On/Off, 2: Modulated hotgas valve
HPS_Alarm.Count	1600			Number of active alarms
HPS_Alarm.CountActive	1601			Number of listed alarms that has not yet been cleared
HPS_Alarm.Level	1602			Highest state of any listed alarm (0=Clear, 1=Inactive, 2=Active, 3=Set)

HPS_Alarm.Code1	1604			Code of highest ranked alarm. Please see note below regarding decoding
HPS_Alarm.Code2	1605			Code of second highest ranked alarm
HPS_Alarm.Code3	1606			Code of third highest ranked alarm
HotWater.Type	1700		0..3	0: None, 1:Only hotware (VGU), 2:With ventilation (VP), 3:With central heating (VGU180)
HotWater.AnodeState	1701		0..3	0=OFF, 1=OK, 2=SERVICE, 3=ERROR
CentralHeat.HeatExtSet	1800	100	°C	Actual setpoint for external heating source
HPS_Input.T17_Supply	1900	10	°C	In THeatSupply
HPS_Input.T16_Return	1901	10	°C	In THeatReturn
HPS_Input.T22_SHW_Bot	1902	10	°C	In TWaterTank
HPS_Input.T20_Ambient	1903	10	°C	In Tamb
HPS_Input.T15_Room	1904	10	°C	In Troom
HPS_Input.T14_Supply	1905	10	°C	In TColdSupply
HPS_Input.HPSwitch	1906			In HPSwitch
HPS_Input.LPSwitch	1907			In LPSwitch
HPS_Input.BPSwitch	1908			In BPSwitch
HPS_Input.FCSwitch	1909			In FCSwitch
HPS_Output.Compressor1	1920			Out Compressor; 0:Off, 1:On
HPS_Output.Heater	1921			Out Heater; 0:Off, 1:On
HPS_Output.HotTapWater	1922			Out HotTapWater; 0:Off, 1:On
HPS_Output.ColdPump	1923			Out ColdPump; 0:Off, 1:On
HPS_Output.HotSidePump	1924			Out HotSidePump; 0:Off, 1:On
HPS_Output.CompVolt1	1925	10		FC speed; 0-10V
HPS_HeatPump.SeasonState	1930			Act SeasonalState: 0:Summer; 1:Winter;

HPS_HeatPump.State	1931			Act State: 0:Off; 1:Ready; 2:Hot water start up; 3:Hot water; 4:Heating start up; 5:Heating; 6:Heat pump stop; 7:El heating; 8:El hot water; 9:Forced cold pump; 10:Heat Pump Stop; 11:Defrost; 12:Air defrost; 13:Hotgas defrost; 14:Drip delay; 15:Hot water - Heat pump stop; 16:Heating - Heat pump stop; 17:Stop; 18:Heating - Heat pump stop; 19:Hot water - Heat pump stop; 20:Pump exercise; 21:Forced start up; 22:Forced running; 23:Forced running; 24:Forced running - heat pump stop; 25:Manual; 26:Cooling start; 27:Cooling; 28:Ext.Stop; 29:Forced low speed
HPS_HotWater.SetPointAct	1950	10		HotWater Act Setpoint
HPS_Heating.SetPointAct	1960	10		Heating Act Setpoint
HPS_CprCtrl.MinRstTime	1970			CprCtrl RestartTime
HPS_CprCtrl.Cpr1Power	1971			CprCtrl Cpr1Power
HPS_CprCtrl.Cpr1Cap	1972	100		CprCtrl Cpr1Cap
HPS_CprCtrl.Cpr1FreqReq	1973	100		CprCtrl Cpr1FreqReq
HPS_Legionel.State	1980			Legio Act State
HPS_Legionel.TimeoutCnt	1981	3600		Legio Act TimeoutCounter
HPS_Legionel.MaxFailCnt	1982			Legio Par MaxFailCount
HPS_Legionel.FailCount	1983			Legio Act FailCounter
PreHeat.BlockRemain	2100		Sec	Remaining time for the pre-heater blocking function commanded by the HR 2100 register
AirBypass.IsOpen	3000			Bypass damper 0: Closed 1: Open
Output.AirHeatCap	3001	100	%	After heating element 0.00 – 100.00%

Defrost.ExchDefrost	3002			De-icing heat exchanger 0: Off 1: On (Passive exchanger defrost is active)
AirQual.CO2_Enable	3003			CO2 sensor present in the system or not 0: Off 1: On
AirFlow.RoomReduce	3004			Stop at low room temperature 0-4
AirFlow.LastTestDay	3005			Date for last air damper self-test Runtime hours is counted and formatted to days 0 - 65535
AirFlow.SinceFiltDay	3006			Days since last air filter change One day is measured as 24 hours of active running time. 0-9999
AirFLow.WinterReduce	3007			Low fan speed at low outdoor temperature Level 0-4
AirTemp.TempSet	3008	100	°C	Actual resulting set-point for room temperature 5.00°C - 50.00°C
AirTemp.TempControl	3009	100	°C	Master sensor for the controlled temperature (room / inlet) -40.00°C – 99.00°C
Alarm.LogEventID	3050			Event log ID (alarm code) 0 – 255
Alarm.LogDate	3051	DATE_DOS		Date of actual indexed event log
Alarm.LogTime	3052	TIME_DOS		Time of actual indexed event log
Alarm.LogT1	3053		°C	Log item temperatures -127 - 127
Alarm.LogT3	3054			
Alarm.LogT4	3055			
Alarm.LogT5	3056			
Alarm.LogT6	3057			
Alarm.LogT7	3058			
Alarm.LogT8	3059			
Alarm.LogT9	3060			
Alarm.LogT10	3061			
Alarm.LogT11	3062			
Alarm.LogT12	3063			
Alarm.LogT13	3064			
Alarm.LogT14	3065			
Alarm.LogT15	3066			
AirQual.RH_Avg	3100	100	%	Humidity average value. Range: 0..100.00
Opt9_1.BoardId	3101			If expansion I/O board is present the value must be 12.

AirFlow.VentState	3102			Ventilation state 0: OFF 1: NORMAL 2: LOW_HUMIDITY 3: HIGH_HUMIDITY 4: HIGH_CO2 5: LOW_ROOM_TEMP 6: LOW_OUTDOOR_TEMP

5.1.1 GEO/AIR

Name	Address	Scale	Unit	Description
HPS_Input.T21_SHW_Top	6167	10	°C	SHW top temp.
HPS_Input.T18_Tank	6169	10	°C	Central heat / sup. GEO: T18 central varme efter supplering AIR: T18 buffer tank
HPS_Input.T13_Return	6171	10	°C	Kold side returløb
HPS_Input.T35_PresTube	6173	10	°C	Trykrør temp.
HPS_HeatPump.CapacityAct	6185	10	%	Aktuel kapacitet
HPS_HeatPump.RunTime	6186	3600	tim	Varmepumpe (16 bit LSB): Aktive timer
HPS_HeatPump.RunTime	6187	3600	tim	Varmepumpe (16 bit MSB): Aktive timer
HPS_HeatPump.HSPRunTime	6188	3600	tim	Varm side pumpe (16 bit LSB): Aktive timer
HPS_HeatPump.HSPRunTime	6189	3600	tim	Varm side pumpe (16 bit MSB): Aktive timer
HPS_ColdPump.CPRunTime	6191	3600	tim	Kold side pumpe (16 bit LSB): Aktive timer
HPS_ColdPump.CPRunTime	6192	3600	tim	Kold side pumpe (16 bit MSB): Aktive timer
HPS_HotWater.RunTime	6194	3600	tim	Brugsvand (16 bit LSB): Aktive timer
HPS_HotWater.RunTime	6195	3600	tim	Brugsvand (16 bit MSB): Aktive timer
HPS_Heating.ElecRunTime	6200	3600	tim	Elvarme (16 bit LSB): Aktive timer
HPS_Heating.ElecRunTime	6201	3600	tim	Elvarme (16 bit MSB): Aktive timer
HPS_Defrost.DefrHGCount	6214		sec	Varmgasafrimning Aktive sekunder
HPS_Defrost.DefrAirCnt	6215		sec	Luftafrimning Aktive sekunder

HPS_HeatPump.APRunTime	6219	3600	tim	Cirkulationspumpe(16 bit LSB): Aktive timer
HPS_HeatPump.APRunTime	6220	3600	tim	Cirkulationspumpe(16 bit MSB): Aktive timer

5.2 Holding registers

Name	Address	Scale	Unit	Description
Bus.Address	50			Protocol node address (default = 30)
Output.AirFlap	100			Air flap
Output.SmokeFlap	101			Smoke flap
Output.BypassOpen	102			Bypass flap open
Output.BypassClose	103			Bypass flap close
Output.AirCircPump	104			Air heat circulation pump
Output.AirHeatAllow	105			Air heating selected
Output.AirHeat_1	106			Air heater relays
Output.AirHeat_2	107			--
Output.AirHeat_3	108			--
Output.Compressor	109			Compressor
Output.Compressor_2	110			Compressor 2
Output.4WayCool	111			4-way valve
Output.HotgasHeat	112			Hotgas valve - heat
Output.HotgasCool	113			Hotgas valve - cool
Output.CondOpen	114			Air condenser active
Output.CondClose	115			Air condenser inactive
Output.WaterHeat	116			Hot water heater
Output.3WayValve	117			Hot water 3-way valve
Output.CenCircPump	118			EK circulation pump
Output.CenHeat_1	119			EK heater relays
Output.CenHeat_2	120			--
Output.CenHeat_3	121			--
Output.CenHeatExt	122			External radiator heat
Output.UserFunc	123			User function active
Output.UserFunc_2	124			--
Output.Defrosting	125			Defrost function active
Output.AlarmRelay	126			Alarm relay state
Output.PreHeat	127			Preheater or earth tube activation
Output.ExhaustSpeed	200	100	%	Exhaust fan speed
Output.InletSpeed	201	100	%	Inlet fan speed
Output.AirHeatCap	202	100	%	Air heater capacity
Output.CenHeatCap	203	100	%	Central heater capacity
Output.CprCap	204	100	%	Compresor capacity
Output.PreHeatCap	205	100	%	Preheater capacity or earth tube air intake fan speed
Time.Second	300		ss	Second
Time.Minute	301		nn	Minute
Time.Hour	302		hh	Hour
Time.Day	303		dd	Day
Time.Month	304		mm	Month
Time.Year	305		yyyy	Year

Alarm.Reset	400			Clear one specific alarm code or all 0 : No command 1..99 : (reserved internal commands) 101..199 : Clear alarm display code 1..99 255 : Clear all alarms
Program.Select	500			Week program nb. select 0 : None 1 : Program 1 2 : Program 2 3 : Program 3 4 : Erase
Program.UserFuncAct	600			User function active (See "UserFuncSet")
Program.UserFuncSet	601			User function select 0 : None 1 : Extend 2 : Inlet 3 : Exhaust 4 : External heater offset 5 : Ventilate 6 : Cooker Hood
Program.UserTimeSet	602		Min	User function period
Program.UserVentSet	603		Step	User function ventilation step select 0 : Off 1..4 : Step number
Program.UserTempSet	604		°C	User function temperature (Extend function only)
Program.UserOffsSet	605		°C	User function temperature offset (Offset function only)
Program.User2FuncAct	610			Same as user function 1 above
Program.User2FuncSet	611			--
Program.User2TimeSet	612			--
Program.User2VentSet	613			--
Program.User2TempSet	614			--
Program.User2OffsSet	615			--
Log.Interval	700		Min	Periodic data log interval select 0: Off 1..120: Time between periodic loggings
Control.Type	1000			Machine type select (factory setting)
Control.RunSet	1001			User on / off select (equal to ON/OFF keys) 0 : Off (user input functions can still activate operation) 1 : On

Control.ModeSet	1002			User operation mode select 0 : Off 1 : Heat (no cooling active) 2 : Cool (no heating active) 3 : Auto 4 : Service (readonly - write to register 1005)
Control.VentSet	1003		Step	User ventilation step select 0 : Off 1..4 : Step number
Control.TempSet	1004	100	°C	User temperature setpoint
Control.ServiceMode	1005			Service mode select 0 : Off 1 : Defrost 2 : Flaps 3 : Inlet 4 : Exhaust 5 : Compressor 6 : Heating 7 : Hot water 8 : Central heat
Control.ServicePct	1006	100	%	Service mode capacity setpoint
Control.Preset	1007			Request preset to default settings 0 : Ready 1 : Standard (to factory defaults) 2 : Backup (to user file) 3 : Restore (from user file)
AirFlow.AirExchMode	1100			Air exchange mode 0 : Energy 1 : Comfort 2 : ComfortWater
AirFlow.CoolVent	1101		Step	Cooling high ventilation step
AirFlow.TestSelect	1102			Select a day for weekly air damper position self-test The test runs at 10 in the morning on the selected day Once enabled, the function cannot be deactivated 0: Off 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday
AirFlow.LastTestDay	1103			Date of last air damper position test Bit word packed in DOS date format (see IR 402 format)

AirFlow.TestState	1104			Actual air damper position test state 0: Off 1: Standby 2: Start (Set to Start to run manual test) 3: Closing 4: Opening 5: OK 6: Error
AirFlow.FiltAlmType	1105			Air filter monitoring alarm type and period select 0: Pressure guard (input) 1: 30 days 2: 90 days 3: 180 days 4: 360 days 5: 70 days and pressure guard
AirTemp.CoolSet	1200			Cooling temperature setpoint select 0 : Off (No cooling allowed) 1 : Set + 0 °C (User setpoint plus 0 degrees) 2 : Set + 1 °C 3 : Set + 2 °C 4 : Set + 3 °C 5 : Set + 4 °C 6 : Set + 5 °C 7 : Set + 7 °C 8 : Set + 10 °C
AirTemp.TempMinSum	1201	100	°C	Inlet temp. min. summer
AirTemp.TempMinWin	1202	100	°C	Inlet temp. min. winter
AirTemp.TempMaxSum	1203	100	°C	Inlet temp. max. summer
AirTemp.TempMaxWin	1204	100	°C	Inlet temp. max. winter
AirTemp.TempSummer	1205	100	°C	Summer/winter limit
AirTemp.NightDayLim	1206	100	°C	Outdoor day temperature for night cooling activation [0:Off, 20..40]
AirTemp.NightSet	1207	100	°C	Free energy night cooling room setpoint [10..30]
AirTemp.SensorSelect	1208			Control temperature sensor select 0: User panel 1: External sensor 2: Inlet channel 3: Exhaust channel
AirTemp.HeatSelect	1209	1		Valg af varmekilde: 0=No heating active, 1=Heatpump only, 2=HP+afterheat, 3=Afterheat only, 4=Afterheat+HP
Compressor.CondTempMin	1500	100		Low temperaturcurve.
Compressor.CondTempMax	1501	100		High temperaturcurve
AirTemp.TempMinCpr	1502	100		Low temperature compressor start
AirTemp.CprRestart	1503	60		Compressor stop time

HPS_Alarm.Reset	1603			Set to 65535 to clear all alarms
HotWater.TempSet_T11	1700	100	°C	Top temperature setpoint (electric)
HotWater.TempSet_T12	1701	100	°C	Bottom temperature setpoint (compressor)
HotWater.Priority	1702	1		Priority: 0=Water, 1=Inlet
HotWater.TempCprMax	1703	100		Scald protection Temperature
HotWater.HeatType	1704	1		Use of electricity supplement: 0=OFF, 1=El
HotWater.LegioType	1705	1		Day for legionella: 0=OFF,1=Mandag,1=tirsdag, ..., 7=søndag
HotWater.TempPri	1706	1	°C	Bypass offset: 0=Off, 1..30°C
CentralHeat.HeatExtern	1800	100	°C	External heating offset from room temperature setpoint
CentralHeat.HeatSelect	1801	1		0=Only Pump motion and freze secure, 1=Always central heating, 2=Only central heating when room temperature low
CentralHeat.SupplyMin	1802	100	°C	Min supply temperature
CentralHeat.SupplyMax	1803	100	°C	Max supply temperature
CentralHeat.SupplyOffset	1804	100	°C	Outdoor temperature compensation
CentralHeat.CurveSelect	1805	1		Temp. compensation curve: 1-10
CentralHeat.CircPumpMode	1806	1		0=Only when heating is active, 1=Continuous operation
CentralHeat.HeatType	1807	1		0=OFF, 1=El, 2=Heatpump, 3=Both (first compressor then electric priority)
CentralHeat.RegTime	1808	1	Sec	PID regulations time: 0=2sec, 1-25(sec)
HPS_ColdPump.StopDelay	1811			After-run time, 0 - 60 s
HPS_HotWater.Source	1820			SourceHotWater: 0:None; 1:HeatPump; 2:Electrical; 3:SolarPanel; 4:HeatPump+Electrical; 5:HeatPump+SolarPanel; 6:Electrical+SolarPanel; 7:HeatPump+Electrical+SolarPanel; 8:HeatPump Dual Condenser; 9:HeatPump+SolarPanel Dual Condenser
HPS_HotWater.TElecLimit	1821	10	°C	Max hotwater temperature with electricity: 5-55°C
HPS_HotWater.SetPoint	1822	10	°C	HeatPump hotwater setpoint: 5-70°C

HPS_HotWater.NeutralZone	1823	10	°C	HeatPump hotwater neutral zone: 0,1-15°C
HPS_Heating.Source	1830			Source for heating: 0:None; 1:HeatPump; 2:Electrical; 3:HeatPump+Electrical
HPS_Heating.CtrlMode	1831			Heat control mode: 0:On/Off - Tret; 1:Modulating - Tsup; 2:On/Off - TWaterTank; 3:Modulating - TWaterTank
HPS_Heating.ElecDelay	1832	60		Electric heating start delay; 0-60 min
HPS_Heating.NeutralZone	1833	10	°C	HeatPump heating neutral zone: 0,1-15°C
HPS_Heating.MinHeatTime	1834			HeatPump heating min. heating time: 0-300 min
HPS_Compr.MinCprStop	1840	60		MinCompStopTime; 1-15 min
HPS_Compr.UStart	1841	10		FC start voltage; 0-10V
HPS_Compr.MaxVoltage	1842	10		Max voltage to FC
HPS_Compr.MinVoltage	1843	10		Min voltage to FC
HPS_CprCtrl.CprMode	1850			CprMode: 0:Off; 1:Single Ext FC; 2:Single ON/OFF; 3:Dual ON/OFF; 4:FC and ON/OFF; 5:Dual FC; 6:Single Bus FC; 7:Single ON/OFF w. Unloader; 8:Dual ON/OFF w. Unloader; 9:Dual ON/OFF w. SCR
HPS_CprCtrl.MinOnTime	1851			Compressor minimum on time: 0-600min
HPS_Legionel.TreatTBottom	1860	10	°C	Hotwater Legionella Treat Temp: 50-80°C
HPS_Legionel.Timeout1	1861	3600		Max teatment time: 0-18 h
HPS_Datalog.FInt	1870	60		Datalog log interval: 2-900 min
AirQual.RH_VentLo	1910		Step	Humidity low winter step select
AirQual.RH_VentHi	1911		Step	Humidity high step select
AirQual.RH_LimLo	1912	100	%	Humidity limit for low ventilation
AirQual.RH_TimeOut	1913		min	Humidity max. time on high ventilation
AirQual.CO2_VentHi	1920		Step	CO2 high step select
AirQual.CO2_LimLo	1921		ppm	CO2 limit for normal ventilation
AirQual.CO2_LimHi	1922		ppm	CO2 limit for high ventilation

User. UserMenuOpen	2002			Menu is open: 0=Closed, 1=Open, 2=No OFF key
User.Language	2003	1		HMI language: 0=English 1=German 2=French 3=Swedish 4=Danish 5=Norwegian 6=Finnish 7=Czech 8=Polish 9=Italian
PreHeat.Block	2100			COMFORT(n) only Temporarily prevent pre-heater operation (R5 output) Cannot be re-blocked before period has expired (IR 2100) 0: No command 1: Set to request heater being blocked (for 2 hours)
DPT.DoCalibrate	2200		0,1	Calibrate DPT. 1: Start calibration
CentralHeat.HeatExtern	4000	100	°C	Regulation deadband external room heating -5.00°C – 5.00°C
AirFlow.CoolVent	4001			High fan speed at high indoor temp (cooling demand) Level OFF, 2-4
AirFlow.WinterTemp	4002	1	°C	Low outdoor temperature -20°C - 10°C
AirFlow.WinerVent	4003			Fan speed at low outdoor temperature 0: OFF 1 - 3: Level
AirFlow.TestSelect	4004			Day for automatic test 0: OFF 1: Mo 2: Tu 3: We 4: Th 5: Fr 6: Sa 7: Su
AirHeat.Type	4005			After heating type 0: No additional heat 1: Electrical 2: Electric on binary relays 3: Water
AirHeat.Delay	4006	1	Min	Delay timer for after-heat activation 0-60 min.

AirTemp.TempMinSum	4007	100	°C	Summer minimum supply air temperature MinSum: 5.00-14.00
AirTemp.TempMaxSum	4008	100	°C	Summer maximum supply air temperature MaxSum: 5.00-25.00
AirTemp.TempMinWin	4009	100	°C	Winter minimum supply air temperature MinWin: 5.00-16.00
AirTemp.TempMaxWin	4010	100	°C	Winter maximum supply air temperature MaxWin: 5.00-35.00
AirTemp.RoomNZ	4011	100		Room temperature regulation deadband 0.20 – 10.00
AirTemp.TempRoomLow	4012	100	°C	Low room temperature for stepwise reduced ventilation 0: OFF 1.00°C – 20.00°C
AirHeat.SelectSet	4013			After heating activation: 0: Off 1: On (No effect is AirHeat.Type (H4005) is 0.)
AirFlow.InletMin	4015	1		Min. inlet: 0-2
AirFlow.ExhaustMin	4016	1		Min exhaust: 1-2
AirFlow.ExhaustMax	4017	1		Max exhaust: 1-4
AirFlow.StartDelay	4018	60		Start delay
AirBypass.WalkingTime	4019	1	Sec	Damper walkin time: 60-900 sec.
Defrost.Fans	4020			Frost protection or de-icing - Ventilation level 0: OFF 1 : USER 2: LOW
Defrost.Bypass	4021			Frost protection or de-icing - Bypass position 0: OFF 1: ON
Defrost.BlockMinutes	4022	1	Min	Frost protection or de-icing - Time between activations 15 - 720
Defrost.TempStart	4023	100	°C	Frost protection or de-icing - Start criteria -10.00°C – 0.00°C
Defrost.TempStop	4024	100	°C	Frost protection or de-icing - Stop criteria 2.00°C – 12.00°C
Defrost.DurMaxCpr	4025	1	Min	Frost protection or de-icing - Max duration compressor 2 – 60
Defrost.DurMaxExh	4026	1	Min	Frost protection or de-icing - Max duration exchanger 5 – 60
Defrost.T6MinRunSec	4027	1	Sec	T6 min defrost time: 10-120sec.

Program.EditIndex	4030			Week program Index: 0-41 (7 days multiply by 6 functions each day)
Program.EditPeriod	4031			Week program Day index: 0-6 (0=Monday..)
Program.EditPeriodNx	4032			Week program Next day index: 0-6 (0=Monday..)
Program.EditFunc	4033			Week program Day function 0-5.
Program.EditTimeStar	4034			Week program Start time: 0000 – 2345: 0800 = 8:00, 1215 = 12:15
Program.EditVent	4035			Week program Fan settings: 0-4 0=Off, 1-4 Level
Program.EditTemp	4036	1	°C	Week program Temperature: 5°C - 50°C
Control.RestartMode	4040			External fire alarm auto reset 0: OFF 1: HPLP 2: CONTINUE 3: SELF_CLEAR
Control.PowerSave	4041			Enable power saving features 0: OFF 1: ON
Alarm.LogIndex	4050			Alarm log index 0 - 15
AirFlow.InletScale	4098		%	Scaling of inlet fan control voltage for max. air volume Range: 50..100
AirFlow.ExhaustScale	4099		%	Scaling of exhaust fan control voltage for max. air volume Range: 50..100
AirFlow.InletSpd_1	4100			Inlet step 1 speed setup Range: 20..100
AirFlow.InletSpd_2	4101			Inlet step 2 speed setup Range: 20..100
AirFlow.InletSpd_3	4102			Inlet step 3 speed setup Range: 20..100
AirFlow.InletSpd_4	4103			Inlet step 4 speed setup Range: 20..100
AirFlow.ExhaustSpd_1	4104			Exhaust step 1 speed setup Range: 20..100
AirFlow.ExhaustSpd_2	4105			Exhaust step 2 speed setup Range: 20..100
AirFlow.ExhaustSpd_3	4106			Exhaust step 3 speed setup Range: 20..100
AirFlow.ExhaustSpd_4	4107			Exhaust step 4 speed setup Range: 20..100

AirQual.Type	4108			Enable Indoor Air Quality (IAQ) control function Range: 0..2 0: OFF, 1: HUMIDITY, 2: HUM+CO2
Control.AnaOutType	4109			Heater output signal type (if not air channel type) Range: 0..4 0: PERIOD 1: 0-10 V 2: 0/5/10 V 3: RELAY 3 4: RELAY 7
AirTemp.RoomResponse	4110			Room temperature controller response type Select predefined or user adjustable parameters Range: 0..3 0: SLOW, 1: NORMAL, 2: FAST, 3: USER
PreHeat.Defrost	4111			Nordic: Select anti frost also during evap. defrost COMFORT: Select T8 preheater allowance on R5 Range: 0..1 0: STANDARD 1: EXTRA
PreHeat.TempSet	4112			T4 start criteria when temperature controlled exchanger defrosting is selected (without no-frost) Range: 0..5 0: OFF (Disable defrost, use heater only) 1..5 If ”Nordic” types with active T4 regulation only: Anti frost setpoint for min. exchanger outlet temp. 0: OFF (OFF=Disable, use passive defrost only) 1..5

5.2.1 GEO/AIR

Name	Address	Scale	Unit	Description
HPS_Defrost.DefrTimeIn	6213		min	Istæller: 0 – 240 min
HPS_Misc.Model	6313			AIR: 0=AIR9_INVERTER_0_10_V 1=AIR5_INVERTER_0_10_V 2=AIR9_INVERTER_MODBUS 3=AIR5_INVERTER_MODBUS GEO: 0=GEO6_INVERTER_0_10_V 1=GEO3_INVERTER_0_10_V 2=GEO6_INVERTER_MODBUS 3=GEO3_INVERTER_MODBUS
HPS_HeatPump.CoolHeatPara	6505			Samme tid køl, varme: 0 = Nej, 1 = Ja
HPS_HeatCtrl.Type	6506			The controller will try to maintain a stable room temperature if heating is enabled. A heating setpoint is calculated according to the settings on this menu. To maintain a comfortable room temperature the controller can compensate for ambient temperature and/or room temperature. This is achieved using different compensation curves where the effect of different ambient temperatures on the heating setpoint can be set. There are 8 different modes for weather compensation. Options: • 0 = Min comp.: No ambient compensation, fixed setpoint • 1 = Ambient: With ambient temperature compensation • 2 = Room: Only room compensation • 3 = Amb+room: With ambient and room temperature compensation Default is Min comp
HPS_HeatCtrl.CurPnt1	6507	10	°C	Corrected room temperature setpoint at ambient temperature of **-20°C** Range -100.0°C – 100.0°C Default 45.0°C (Curve 1)

HPS_HeatCtrl.CurPnt2	6508	10	°C	Corrected room temperature setpoint at ambient temperature of **-10°C** Range -100.0°C – 100.0°C Default 42.0°C (Curve 1)
HPS_HeatCtrl.CurPnt3	6509	10	°C	Corrected room temperature setpoint at ambient temperature of **00°C** Range -100.0°C – 100.0°C Default 39.0°C (Curve 1)
HPS_HeatCtrl.CurPnt4	6510	10	°C	Corrected room temperature setpoint at ambient temperature of **+10°C** Range -100.0°C – 100.0°C Default 33.0°C (Curve 1)
HPS_HeatCtrl.CurPnt5	6511	10	°C	Corrected room temperature setpoint at ambient temperature of **20°C** Range -100.0°C – 100.0°C Default 30.0°C (Curve 1)
HPS_HeatCtrl.CurPnt6	6512	10	°C	Corrected room temperature setpoint at ambient temperature of **30°C** Range -100.0°C – 100.0°C Default 20.0°C (Curve 1)
HPS_HeatCtrl.CurPnt7	6513	10	°C	Corrected room temperature setpoint at ambient temperature of **40°C** Range -100.0°C – 100.0°C Default 17.0°C (Curve 1)
HPS_HeatCtrl.Curve	6514			Select between 10 preconfigured curves or a manual configured curve. Default curve 1 0 = Manual, 1..10 = curves
HPS_HeatCtrl.TroomSet	6515	10	°C	View or adjust the wanted room temperature setpoint. If compensation is active, the room temp. set point cannot be changed. Range 5.0 – 40.0°C Default 20.0°C
HPS_HeatCtrl.ToffSet	6516	10	°C	Set an adjustment/fine tuning for the selected temperature curve. This offset is applied for the entire curve regardless of selected curve. Range -10.0 – 10.0°C Default 0.0°C
HPS_HeatCtrl.AmbCmpMax	6517	10	°C	Maximum allowed corrected room temperature setpoint Range -100.0°C – 100.0°C Default 5.0°C
HPS_Param.MainSwitch	6533			Mainswitch Heat pump mode=0:Off;1:On;2:Manual
HPS_Param.SeasonMode	6534			SeasonalMode: 0:Summer; 1:Winter; 2:Auto
HPS_Param.CoolingMode	6535			Varme / Kølemode: Off / Passiv

HPS_Param.StartUpTime	6536			Start pause: 15 120 sec
HPS_Param.HPStopT	6537	10	°C	VP Stoptemp: 30 - 70 ºC
HPS_Param.HPAmbStopT	6538	10	°C	VP Stop udetemp.: -45 - 10 ºC
HPS_Param.TotalStopT	6539	10	°C	Total Stoptemp: 30 - 90 ºC
HPS_Param.HPStopS	6540			VP Stopføler: Returløb / Fremløb / Ingen
HPS_Param.TotalStopS	6541			Total stopføler: Returløb / Fremløb / Ingen
HPS_Param.PumpExInter	6542	86400		Pumpemotionsindstilling (16 bit LSB): 60 dage / Slukket
HPS_Param.PumpExInter	6543	86400		Pumpemotionsindstilling (16 bit MSB): 60 dage / Slukket
HPS_Param.HPPause	6545			Kompressor pause : Nej / Ja
HPS_HotWater.Capacity	6554	10	%	Brugsvandskapacitet: 10 - 100 %
HPS_Heating.StopCap1	6558	10	%	Stop kapacitet: 0 - 100%
HPS_Heating.StartDifCap	6559	10	%	Start diff. Kapacitet: 0 - 100%
HPS_Heating.SetPMinCool	6561	10	°C	Cooling min. temp.: 5 - 50 ºC
HPS_Heating.SetPointMin	6562	10	°C	Min. setpunkt: 0 - 70°C
HPS_Heating.SetPointMax	6563	10	°C	Max. setpunkt: 0 - 70°C
HPS_Heating.TEvapMin	6564	10	°C	Fordamper mmin. temp.: -45 - -5°C
HPS_Compr.Gain	6572			Forstærkning: 1.0 - 20.0
HPS_Compr.Tn	6573			Integrationstid: 300 - 600sec.
HPS_Legionel.WaitTime	6585	86400		Ligionella interval (16 bit LSB): 1- 21 dag(e) / Slukket
HPS_Legionel.WaitTime	6586	86400		Ligionella interval (16 bit MSB): 1- 21 dag(e) / Slukket
HPS_Defrost.Mode	6591			Afrimningsmetode: Slukket / Luft / Varmgas / Auto
HPS_Defrost.FFTambMin	6592	10	°C	Tvangsvent. ude min.: -45 - 10 ºC
HPS_Defrost.FFTambMax	6593	10	°C	Tvangsvent. ude max.: -45 - 10 ºC

HPS_Defrost.FFTevapStop	6594	10	°C	Tvangsvent. stop temp.: -45 - 10 ºC
HPS_Defrost.TFrosting	6595	10	°C	Isniveau: -45 - 10 ºC
HPS_Defrost.TIceMelt	6596	10	°C	Issmelte temperature: -45 - 5 ºC
HPS_Defrost.TMeltFast	6597	10	°C	Hurtig issmelte temp.: -45 - 30 ºC
HPS_Defrost.TRelFrost	6598	10	°C	Relativ isniveau: 2 - 15 ºC
HPS_Defrost.MaxTime	6599		min	Max. Afrimningstid: 240 min
HPS_Defrost.MinInterval	6600		min	Min. tid mellem afrimning: 10 – 480 min
HPS_Defrost.StopTemp	6601	10	°C	Fordamper stop temp.: 1 - 25°C
HPS_Defrost.DefrostCap	6602		%	Afrimnings kapacitet: 0 – 100%
Control.SmartGridOn	6604			Smart grid: Slukket / tændt
HPS_HotWater.SGAddTemp	6605	10	°C	Hæve brugsvand temp.: 0 - 10 ºC
HPS_HotWater.SGAddHeater	6606			Brugsvand: Slukket / Tændt
HPS_Heating.SGOCAddTemp	6607	10	°C	Ekstra temp. ved overkap.: 0 - 10 ºC
HPS_Heating.SGLPAddTemp	6608	10	°C	Hæve centralvarme temp.: 0 - 10 ºC
HPS_Heating.SGAddHeater	6609			Central varme: Slukket / Tændt
HPS_Param.CoolingAllow	6700			Allow cooling. 0 = No 1 = Yes
HPS_Param.SelectHWtank	6701			Hotware tank selection 0 = None 1 = SHW 2 = DHW
HPS_Param.Buffertank	6702			Buffer tank selection 0 = None 1 = Has buffer tank

6. Communication example

The sample shown below is a general Modbus communication example and is not specific for this device.

Request: 0b041000000e75a4
Response: 0b041cffff0000095008b0e4a80014000b000108e108f1ffff000f0002fff39f8e

Request (Input register)

0x0b	Slave addr	1 byte
0x04	Function code	1 byte
0x1000	Start addr	2 bytes
0x000e	Quantity	2 bytes
0x75a4	CRC	2 bytes

Response

0x0b	Addr	1 byte
0x04	Function code	1 byte
0x1c	NB bytes of data	1 byte
0xffff	Value1	2 bytes
0x0000	Value2	2 bytes
0x0950	Value3	2 bytes
0x08b0	Value4	2 bytes
0xe4a8	Value5	2 bytes
0x0014	Value6	2 bytes
0x000b	Value7	2 bytes
0x0001	Value8	2 bytes
0x08e1	Value9	2 bytes
0x08f1	Value10	2 bytes
0xffff	Value11	2 bytes
0x000f	Value12	2 bytes
0x0002	Value13	2 bytes
0xfff3	Value14	2 bytes
0x9f8e	CRC	2 bytes

Request: 0b03200000018f60
Response: 0b030200002045

Request (Holding register)

0x0b	Slave addr	1 byte
0x03	Function code	1 byte
0x2000	Address	2 bytes
0x0001	Quantity	2 bytes
0x8f60	CRC	2 bytes

Response

0x0b	Slave addr	1 byte
0x03	Function code	1 byte
0x02	Quantity	1 byte
0x0000	Value1	2 bytes
0x2045	CRC	2 bytes