



BACnet Protocol

Nilan CTS602 with HMI350T

For commercial solutions

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1. Revision history

Version	Software	Date	Description
1	1.6.21.0	24-08-2021	The complete Modbus version 22 list was imported into spaceLYnk. Selected parameters were exported to the SpaceLYnk BACnet server.

2. Introduction

2.1 Supported units

The unit must be one of the following Nilan models with a CTS602 controller and a build in Modbus-BACnet gateway.

Type	Model
Comfort	Comfort 1200
	Comfort 5000
VPR	VPR 120
	VPR 240
	VPR 360
	VPR 480
	VPR 560
VPM	VPM 120
	VPM 240
	VPM 360
	VPM 480
	VPM 560
	VPM 600
	VPM 700
	VPM 800
	VPM 1000
	VPM 1200
	VPM 1500
	VPM 2200
	VPM 240 Cleanroom
	VPM 360 Cleanroom
	VPM 480 Cleanroom
VPM 560 Cleanroom	
VPM 700 Cleanroom	
VPM 800 Cleanroom	
VPM 1000 Cleanroom	
VPM 1200 Cleanroom	
VPM 1500 Cleanroom	
VPM 2200 Cleanroom	

3. Modbus-BACnet gateway

The Nilan CTS602 controller has a Modbus communication port. A Schneider spaceLYnk is used as a gateway to BACnet.



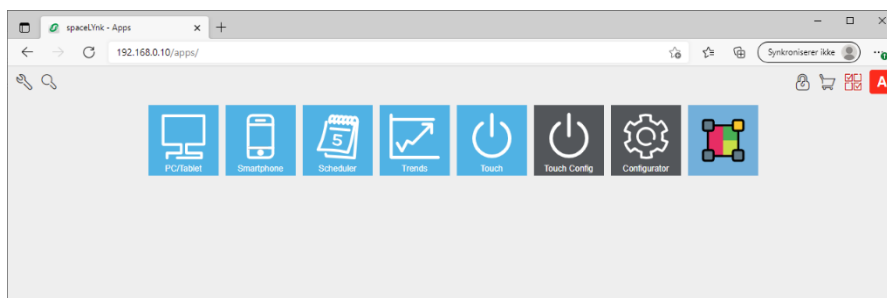
The spaceLYnk gateway acts as a BACnet server. It means that spaceLYnk serves data from the Nilan unit, which can be read by a BACnet client device and the BACnet client device can write data to the server, that is forwarded to the Nilan unit via Modbus.

spaceLYnk Configuration Interconnection of spaceLYnk and other BACnet device is done over Ethernet physical layer.

In the following it is explained how to connect to spaceLYnk and how to configure the most common settings. For other settings, we refer to the spaceLYnk User Guide.

3.1 Connection to spaceLYnk

1. Connect a standard Ethernet cable between the Nilan unit directly or via a router.
2. Default IP address of the spaceLYnk device is 192.168.0.10. Change the IP Address of the PC/router to the same range e.g. 192.168.0.9
3. Change the IP address of the computer to the same range e.g. 192.168.0.9; mask 255.255.255.0.
4. Run Google Chrome or Mozilla Firefox (for OS Windows), Safari (for OS X) and go to 192.168.0.10. Internet Explorer is not supported.
5. Login properties of the spaceLYnk device are: User name: admin Password: Nilan1974. You should now be connected to spaceLYnk.

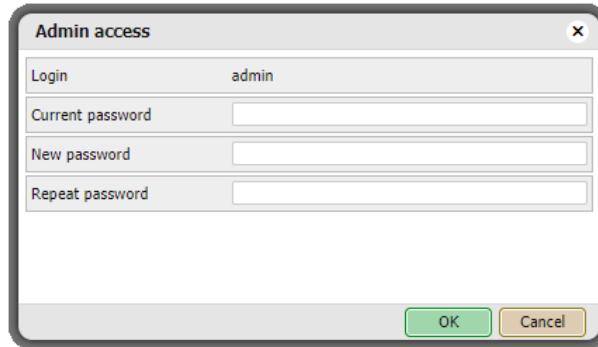


3.2 Configuration of spaceLYnk

In spaceLYnk, it is possible to change password, IP-address or BACnet settings.

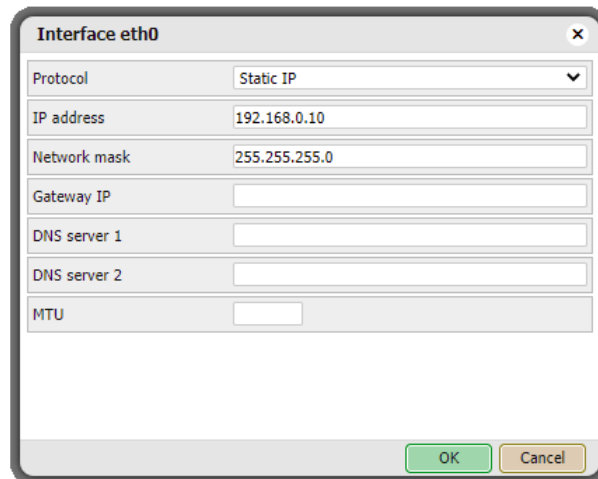
3.2.1 Change password

Password can be changed in Configurator\Utilities\System\System\Admin access



3.2.2 Interface settings

Go to Configurator\Utilities\System\Network\Interfaces window, click on the specific interface to change the IP settings.



Protocol – Specific protocol used for addressing:

Static IP – Static IP address (default 192.168.0.10).

DHCP – DHCP protocol used to fetch IP configuration. IP address as received from the DHCP server. This field appears only if the IP address is assigned.

Network mask – Network mask (default 255.255.255.0 (/24)).

Gateway IP – Gateway IP address.

DNS server 1 – Primary DNS server IP address.

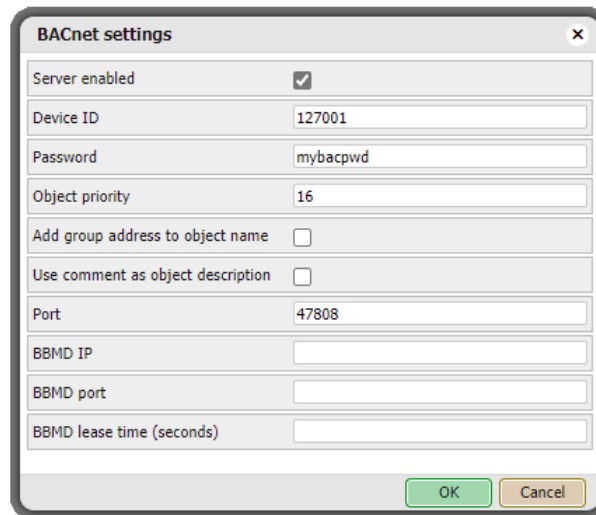
DNS server 2 – Secondary DNS server IP address.

MTU – Maximum Transmission Unit, the largest size of the packet which is passed in the communication protocol (150 by default).

When changes are made, an ‘Apply Changes’ icon appears in the top-right corner. This should be applied for changes to take effect. spaceLYnk will automatically reboot after changes are applied.

3.2.3 BACnet settings

spaceLYnk acts as a BACnet server which can be configured under Configurator\Utilities\System\Network\BACnet settings



Server enabled – Enable/Disable BACnet server

Device ID – BACnet device ID which must be unique on BACnet network

Password – BACnet password

Objects priority – Define to which priority array spaceLYnk will write to. spaceLYnk writes to Relinquish Default (RD) property by first reading (Upload from BMS) only – it takes the current value of the object. It is not possible to change the value of Relinquish Default property afterwards. If object read from spaceLYnk has higher value than RD property, then it raises the Overwritten flag.

Add group address to object name – KNX address will be included in object's name

Use comment as object description – Comment i.e.

ETS import will be used as object's description

Add group address to object name – Names of BACnet objects contains information about group address, when this option is selected.

Port – BACnet port, default 47808

BBMD IP – BACnet router IP.

BBMD port – BACnet router port

BBMD lease time (seconds) – registration resend interval

4. Register layout

4.1 Device

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2305	Bus.Version	2 (AV)	R	—	Protocol version number	•	•	•
2306	App.VersionMajor	2 (AV)	R	—	Software version – major (2 character ascii text)	•	•	•
2307	App.VersionMinor	2 (AV)	R	—	Software version - minor (2 character ascii text)	•	•	•
2308	App.VersionRelease	2 (AV)	R	—	Software version - release (2 character ascii text)	•	•	•

4.2 Binary inputs

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2311	Input.UserFunc	5 (BV)	R	—	User function	•	•	•
2312	Input.AirFilter	5 (BV)	R	—	Air filter alarm	•	•	•
2313	Input.DoorOpen	5 (BV)	R	—	Door contact	•	—	•
2314	Input.Smoke	5 (BV)	R	—	Smoke alarm	•	•	•
2315	Input.MotorThermo	5 (BV)	R	—	Motor thermo fuse	•	•	—
2316	Input.Frost_Overht	5 (BV)	R	—	Heating surface frost / overheat	•	•	•
2317	Input.AirFlow	5 (BV)	R	—	Airflow monitor	•	—	—
2318	Input.P_HI	5 (BV)	R	—	High pressure switch	—	•	•
2319	Input.P_LO	5 (BV)	R	—	Low pressure switch	—	•	•
2323	Input.Defrost	5 (BV)	R	—	Defrost thermostat	—	•	•
2325	Input.DamperClosed	5 (BV)	R	—	Air damper closed position switch	•	•	•
2326	Input.DamperOpened	5 (BV)	R	—	Air damper opened position switch	•	•	•
2327	Input.FCorThermoAl	5 (BV)	R	—	Combined FC and thermo alarm	—	—	•

4.3 Analog inputs

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2329	Input.T1_Intake	2 (AV)	R	°C	Fresh air intake temperature	—	•	•
2330	Input.T2_Inlet	2 (AV)	R	°C	Inlet temperature (before heater)	—	—	—
2331	Input.T3_Exhaust	2 (AV)	R	°C	Room exhaust temperature	•	—	—
2332	Input.T4_Outlet	2 (AV)	R	°C	Outlet temperature	•	—	—
2333	Input.T5_Cond	2 (AV)	R	°C	Condenser temperature	—	•	•
2334	Input.T6_Evap	2 (AV)	R	°C	Evaporator temperature	—	•	•
2335	Input.T7_Inlet	2 (AV)	R	°C	Inlet temperature (after heater)	•	•	•
2336	Input.T8_Outdoor	2 (AV)	R	°C	Outdoor temperature	•	—	—
2337	Input.T9_Heater	2 (AV)	R	°C	Heating surface temperature	•	•	•
2338	Input.T10_Extern	2 (AV)	R	°C	External room temperature	•	•	•
2346	Input.T18_PresPibe (T35)	2 (AV)	R	°C	Pressure pibe temperature	—	•	•
2347	Input.pSuc	2 (AV)	R	bar	Suction pressure	—	•	•
2348	Input.pDis	2 (AV)	R	bar	Dischage pressure	—	•	•
2349	AirQual.RH	2 (AV)	R	%	Humidity sensor value	•	•	•
2350	AirQual.CO2	2 (AV)	R	ppm	Carbon dioxide sensor value	•	•	•

4.4 Binary outputs

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2425	Output.AirFlap	5 (BV)	R	—	Air flap	•	•	•
2426	Output.SmokeFlap	5 (BV)	R	—	Smoke flap	•	•	•
2427	Output.BypassOpen	5 (BV)	R	—	Bypass flap open	•	—	—
2428	Output.BypassClose	5 (BV)	R	—	Bypass flap close	•	—	—
2429	Output.AirCircPump	5 (BV)	R	—	Air heat circulation pump	•	•	•
2430	Output.AirHeatAllow	5 (BV)	R	—	Air heating selected	•	•	•
2431	Output.AirHeat_1	5 (BV)	R	—	Air heater relay 1	•	•	•
2432	Output.AirHeat_2	5 (BV)	R	—	Air heater relay 2	•	•	•
2433	Output.AirHeat_3	5 (BV)	R	—	Air heater relay 3	•	•	•
2434	Output.Compressor	5 (BV)	R	—	Compressor	—	•	•
2435	Output.Compressor_2	5 (BV)	R	—	Compressor 2	—	—	•
2436	Output.4WayCool	5 (BV)	R	—	4-way valve	—	•	•
2437	Output.HotgasHeat	5 (BV)	R	—	Hotgas valve - heat	—	—	•
2438	Output.HotgasCool	5 (BV)	R	—	Hotgas valve - cool	—	—	•
2451	Output.AlarmRelay	5 (BV)	R	—	Alarm relay state	•	•	•

4.5 Analog outputs

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2453	Output.ExhaustSpeed	2 (AV)	R	%	Exhaust fan speed	•	•	•
2454	Output.InletSpeed	2 (AV)	R	%	Inlet fan speed	•	•	•
2455	Output.AirHeatCap	2 (AV)	R	%	Air heater capacity	•	•	•
2457	Output.CprCap	2 (AV)	R	%	Compressor capacity	—	•	•

4.6 Alarm

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2351	Alarm.Status	2 (AV)	R	—	Alarm state bit mask 0x80 : Active alarm(s) are present 0x03 : Number of alarms listed	•	•	•
2352	Alarm.List_1_ID	2 (AV)	R	—	Alarm 1 - Code 0x80 : (reserved future use) 0x7F : Display code 1..99	•	•	•
2353	Alarm.List_1_Date	2 (AV)	R	DATE_ DOS	Alarm 1 - Date Bit word packed in DOS date format Year 0 = 1980 15 8 7 0 YYYYYYM MMMDDDD	•	•	•
2354	Alarm.List_1_Time	2 (AV)	R	TIME_D OS	Alarm 1 - Time Bit word packed in DOS time format Seconds are in scale 2 (0..29 = 0..58 seconds) 15 8 7 0 HHHHHMM MMMSSSS	•	•	•
2355	Alarm.List_2_ID	2 (AV)	R	—	Alarm 2 - Code	•	•	•
2356	Alarm.List_2_Date	2 (AV)	R	DATE_ DOS	Alarm 2 - Date	•	•	•
2357	Alarm.List_2_Time	2 (AV)	R	TIME_D OS	Alarm 2 - Time	•	•	•
2358	Alarm.List_3_ID	2 (AV)	R	—	Alarm 3 - Code	•	•	•
2359	Alarm.List_3_Date	2 (AV)	R	DATE_ DOS	Alarm 3 - Date	•	•	•
2360	Alarm.List_3_Time	2 (AV)	R	TIME_D OS	Alarm 3 - Time	•	•	•
2465	Alarm.Reset	2 (AV)	R/W	—	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	•	•	•

4.7 Control

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2361	Control.RunAct	5 (BV)	R	—	Actual on/off state 0 : Off 1 : On	•	•	•
2362	Control.ModeAct	2 (AV)	R	—	Actual operation mode 0 : Off 1 : Heat 2 : Cool 3 : Auto 4 : Service	•	•	•
2363	Control.StateDisplay	2 (AV)	R	—	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 12: Central heating 13: Defrost 14: Frost sequire 15: Service 16: Alarm	•	•	•
2364	Control.SecInState	2 (AV)	R	Sec	Actual time in state	•	•	•
2481	Control.RunSet	5 (BV)	R/W	—	User on / off select (equal to ON/OFF keys) 0 : Off (user input functions can still activate operation) 1 : On	•	•	•
2482	Control.ModeSet	2 (AV)	R/W	—	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)	•	•	•
2483	Control.VentSet	2 (AV)	R/W	Step	User ventilation step select 0 : Off 1..4 : Step number	•	•	•
2484	Control.TempSet	2 (AV)	R/W	°C	User temperature setpoint	•	•	•

4.8 Air flow

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2365	AirFlow.VentSet	2 (AV)	R	Step	Actual ventilation step set point 0 : Off 1..4 : Step number	•	•	•
2366	AirFlow.InletAct	2 (AV)	R	Step	Actual inlet fan speed step 0 : Off 1..4 : Step number	•	•	•
2367	AirFlow.ExhaustAct	2 (AV)	R	Step	Actual exhaust fan speed step 0 : Off 1..4 : Step number	•	•	•
2489	AirFlow.CoolVent	2 (AV)	R/W	Step	Cooling high ventilation step	•	•	•
2368	AirFlow.SinceFiltDay	2 (AV)	R	Days	Days since last air filter change alarm One day is measured as 24 hours of active running time	•	•	•
2369	AirFlow.ToFiltDay	2 (AV)	R	Days	Days to next air filter change alarm One day is measured as 24 hours of active running time	•	•	•

4.9 Air temperature

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2370	AirTemp.IsSummer	5 (BV)	R	—	Summer state 0 : Off 1 : On	•	•	•
2371	AirTemp.TempInletSet	2 (AV)	R	°C	Inlet temperature request (T7 setpoint)	•	•	•
2386	Output.AirHeatCap	2 (AV)	R	%	After heating element 0.00 – 100.00%	•	•	•
2393	AirTemp.TempSet	2 (AV)	R	°C	Actual resulting set-point for room temperature 5.00°C - 50.00°C	•	•	•
2494	AirTemp.CoolSet	2 (AV)	R/W		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 : Set + 10 °C	•	•	•
2495	AirTemp.TempMinSum	2 (AV)	R/W	°C	Summer minimum supply air temperature MinSum: 5.00-14.00	•	•	•
2496	AirTemp.TempMinWin	2 (AV)	R/W	°C	Winter minimum supply air temperature MinWin: 5.00-16.00	•	•	•
2497	AirTemp.TempMaxSum	2 (AV)	R/W	°C	Summer maximum supply air temperature MaxSum: 5.00-25.00	•	•	•
2498	AirTemp.TempMaxWin	2 (AV)	R/W	°C	Winter maximum supply air temperature MaxWin: 5.00-35.00	•	•	•
2499	AirTemp.TempSummer	2 (AV)	R/W	°C	Summer/winter limit	•	•	•
2500	AirTemp.NightDayLim	2 (AV)	R/W	°C	Outdoor day temperature for night cooling activation [0:Off, 20..40]	•	•	•
2501	AirTemp.NightSet	2 (AV)	R/W	°C	Free energy night cooling room setpoint [10..30]	•	•	•
2502	AirTemp.SensorSelect	2 (AV)	R/W	—	Control temperature sensor select 0: User panel 1: External sensor 2: Inlet channel 3: Exhaust channel	•	•	•
2503	AirTemp.HeatSelect	2 (AV)	R/W	—	Valg af varmekilde: 0=No heating active, 1=Heatpump only, 2=HP+afterheat, 3=Afterheat only, 4=Afterheat+HP	•	•	•
2546	AirTemp.RoomNZ	2 (AV)	R/W		Room temperature regulation deadband 0.20 – 10.00	•	•	•
2548	AirHeat.SelectSet	2 (AV)	R/W	—	After heating activation: 0: Off 1: On (No effect is AirHeat.Type (H4005) is 0.)	•	•	•
2541	AirHeat.Delay	2 (AV)	R/W	Min	Delay timer for after-heat activation 0-60 min.	•	•	•
2385	AirBypass.IsOpen	5 (BV)	R	—	Bypass damper 0: Closed 1: Open	•	—	—

4.10 Air quality control

#	Name	Type	R/W	Unit	Descriptionx	Comfort	VPR	VPM
2388	AirQual.CO2_Enable	5 (BV)	R	—	CO2 sensor present in the system or not 0: Off 1: On	•	•	•
2421	AirQual.RH_Avg	2 (AV)	R	%	Humidity average value. Range: 0..100.00	•	•	•
2524	AirQual.RH_VentLo	2 (AV)	R/W	Step	Humidity low winter step select	•	•	•
2525	AirQual.RH_VentHi	2 (AV)	R/W	Step	Humidity high step select	•	•	•
2526	AirQual.RH_LimLo	2 (AV)	R/W	%	Humidity limit for low ventilation	•	•	•
2527	AirQual.RH_TimeOut	2 (AV)	R/W	min	Humidity max. time on high ventilation	•	•	•
2528	AirQual.CO2_VentHi	2 (AV)	R/W	Step	CO2 high step select	•	•	•
2529	AirQual.CO2_LimLo	2 (AV)	R/W	ppm	CO2 limit for normal ventilation	•	•	•
2530	AirQual.CO2_LimHi	2 (AV)	R/W	ppm	CO2 limit for high ventilation	•	•	•
2582	AirQual.Type	2 (AV)	R/W	—	Enable Indoor Air Quality (IAQ) control function Range: 0..2 0: OFF, 1: HUMIDITY, 2: HUM+CO2	•	•	•

4.11 User function

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2467	Program.UserFuncAct	2 (AV)	R	—	User function active (See “UserFuncSet”)	•	•	•

4.12 Damper test

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2490	AirFlow.TestSelect	2 (AV)	R/W	—	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	•	•	•
2491	AirFlow.LastTestDay	2 (AV)	R	DATE_ DOS	Date of last air damper position test Bit word packed in DOS date format (see IR 402 format)	•	•	•

4.13 Time/week program

#	Name	Type	R/W	Unit	Description	Comfort	VPR	VPM
2459	Time.Second	2 (AV)	R/W	ss	Second	•	•	•
2460	Time.Minute	2 (AV)	R/W	nn	Minute	•	•	•
2461	Time.Hour	2 (AV)	R/W	hh	Hour	•	•	•
2462	Time.Day	2 (AV)	R/W	dd	Day	•	•	•
2463	Time.Month	2 (AV)	R/W	mm	Month	•	•	•
2464	Time.Year	2 (AV)	R/W	yyyy	Year	•	•	•
2466	Program.Select	2 (AV)	R/W	—	Week program nb. select 0 : None 1 : Program 1 2 : Program 2 3 : Program 3 4 : Erase	•	•	•
2562	Program.EditIndex	2 (AV)	R/W	—	Week program Index: 0-41 (7 days multiply by 6 functions each day)	•	•	•
2563	Program.EditPeriod	2 (AV)	R/W	—	Week program Day index: 0-6 (0=Monday..)	•	•	•
2564	Program.EditPeriodNx	2 (AV)	R/W	—	Week program Next day index: 0-6 (0=Monday..)	•	•	•
2565	Program.EditFunc	2 (AV)	R/W	—	Week program Day function 0-5.	•	•	•
2566	Program.EditTimeStar	2 (AV)	R/W	—	Week program Start time: 0000 – 2345: 0800 = 8:00, 1215 = 12:15	•	•	•
2567	Program.EditVent	2 (AV)	R/W	—	Week program Fan settings: 0-4 0=Off, 1-4 Level	•	•	•
2568	Program.EditTemp	2 (AV)	R/W	°C	Week program Temperature: 5°C - 50°C	•	•	•