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VARIHEAT M172 PLC BACNET AND MODBUS CONNECTION GUIDE

The Variheat allows for Modbus or BACnet connections for BMS interfacing.

A spare Modbus connection is provided through the RS485-2 port; a three-wire connection should be used following standard termination guidelines.

The PLC can be connected to a BACnet system through either BACnet/IP (using the Ethernet port on the PLC) or BACnet MS/TP (using the spare RS485-2 port). Only one of these BACnet connections can be active at a time and, if using MS/TP, this also prevents the RS485-2 port from being used for a Modbus connection.

BMS Settings

To configure the BMS settings, navigate to the Advanced User Settings and then select BMS settings. The first screen within here allows you to set:

Slave Address. Can be set from 0 to 255.

Baud Rate. Can be set from 0 to 5, corresponding to:

0	9600
1	19200
2	38400
3	57600
4	76800
5	115200

Protocol Used. Can be set from 2 to 4, corresponding to:

2	uNET
3	Modbus/RTU
4	BACnet MS/TP

Data Bit. Always set to 8. Included for information only, to configure own software if needed.

Parity Bit. Can be set from 0 to 2, corresponding to:

0	Null
1	Odd
2	Even

Stop Bit. Can be set from 1 to 2.

BACnet/IP Port. Can be set from 0 to 65535. 0 corresponds to the default port 47808. 65535 corresponds to BACnet stack running only on PLC side.

After changing any of the above settings, restart the PLC/Variheat to save and apply the new settings.

For Modbus Variable list see page 3. For BACnet Object list see page 8.

PLC Ethernet Settings

The second screen is used to configure the Ethernet port of the PLC. This is currently only used if set to use BACnet/IP. This screen allows you to set:

Enable DHCP. This button toggles between DHCP enabled or disabled.

IP Address. Can be set from 0 to 255.

Subnet Mask. Can be set from 0 to 255.

Default Gateway. Can be set from 0 to 255.

Primary DNS. Can be set from 0 to 255.

Secondary DNS. Can be set from 0 to 255.

HTTP Port: Can be set from 0 to 65535. 0 corresponds to default port 80.

TCP/IP Port: Can be set from 0 to 65535. Default is 502.

After changing any of the above settings, restart the PLC/Variheat to save and apply the new settings.

For Modbus Variable list see page 3. For BACnet Object list see page 8.

Modbus Variable List

All addresses are listed using IEC61131 Syntax (1 based). Variables of double length are ordered with the low word first. Boolean variables are stored within INT or UDINT registers and so can be controlled either by using them as integers (setting to 0 or 1), or by using only the first bit of the register. Please note that there are unlisted addresses in use for internal operations, such as storing default values. Altering these may cause issues with the operation of the machine and so it is strongly recommended to only access those listed below.

Booleans

Address	Name	R/?	Data Type	Default	Description
9003	Time Clock Override	R/O	BOOL in INT	Inactive	Indicates if the time clock override input is energised.
9004	Remote On Off	R/O	BOOL in INT	Inactive	Indicates if the remote on/off input is energised.
9005	Water Flow Switch	R/O	BOOL in INT	Inactive	Indicates if the water flow switch input is energised.
9009	Force Frost Check	R/W	BOOL in INT	Inactive	Forces a check of the ambient temperature when frost protection mode is enabled.
9059	Resistance Heating Required	R/O	BOOL in INT	Inactive	Displays if resistance heating is required.
16388	RH Security	R/W	BOOL in INT	Active	Enables/disables control of the humidity set point when security mode is enabled.
16389	Air Security	R/W	BOOL in INT	Active	Enables/disables control of the air set point when security mode is enabled.
16390	Water Security	R/W	BOOL in INT	Active	Enables/disables control of the water set point when security mode is enabled.
16391	NSB Security	R/W	BOOL in INT	Active	Enables/disables control of the time period settings when security mode is enabled.
16392	Occ Security	R/W	BOOL in INT	Active	Enables/disables control of the occupied force switch when security mode is enabled.
16393	Damp Security	R/W	BOOL in INT	Active	Enables/disables control of the damper force switch when security mode is enabled.
16394	Eco Security	R/W	BOOL in INT	Active	Enables/disables control of the operation switch when security mode is enabled.
16396	User Security Enable	R/W	BOOL in INT	Inactive	Enables/disables security mode.
16397	Priority Security	R/W	BOOL in INT	Active	Enables/disables control of the priority switch when security mode is enabled.
16428	DST Active	R/O	BOOL in INT	Inactive	Enables/disables forcing of the compressor when water heating is required.
16437	RCU Option	R/W	BOOL in INT	Inactive	Indicates if Daylight Savings is currently in effect.
16439	Resistance Heater	R/W	BOOL in INT	Inactive	Enables the RCU (set to true only if RCU option installed).
16453	Enable Standby Persist	R/W	BOOL in INT	Inactive	When enabled, causes the PLC to use the StandbySwitchPersist variable for controlling the machine.
16455	Standby Switch Persist	R/W	BOOL in INT	Inactive	A special version of the standby switch that is held in the memory when power is lost. Use only when EnableStandbySwitch is set to true.
16888	Standby Switch	R/W	BOOL in UDINT	Inactive	Main switch for turning the machine on or off.
16890	Operation Switch	R/W	BOOL in UDINT	Inactive	Enables/disables air and humidity control, for use during summer with pool hall doors open.
16892	Priority Switch	R/W	BOOL in UDINT	Active	Indicates the current state of the priority switch.
16894	Set Clock	R/W	BOOL in UDINT	Inactive	Used to set the entered time and date (in SetYr, SetDay etc.) as the current time and date in the PLC.
16896	Enable DST	R/W	BOOL in UDINT	Active	Enables or disables daylight savings adjustment

16898	Enable Dance Hall	R/W	BOOL in UDINT	Inactive	Enables/Disables dance hall mode with duration settings.
16900	Dance Hall Constant	R/W	BOOL in UDINT	Inactive	Sets Dance Hall mode to be on constantly when 1 or to timed mode when 0.
16902	Compressor	R/O	BOOL in UDINT	Inactive	Indicates if the compressor is currently being called for.
16904	Air Heating	R/O	BOOL in UDINT	Inactive	Indicates if air heating is needed.
16906	Water Heating	R/O	BOOL in UDINT	Inactive	Indicates if water heating is needed.
16908	RCU Valves	R/O	BOOL in UDINT	Inactive	Displays if the RCU is required.
16910	Defrost Active	R/O	BOOL in UDINT	Inactive	Indicates if the machine is in Defrost Mode.
16912	Frost Protection Active	R/O	BOOL in UDINT	Inactive	Indicates if frost protection is currently active.
16914	Pressure Fault	R/O	BOOL in UDINT	Inactive	Indicates an HP or LP fault.
16916	Fire Alarm	R/O	BOOL in UDINT	Inactive	Indicates if the machine has stopped due to a fire alarm.
16918	Fan Blockage	R/O	BOOL in UDINT	Inactive	Indicates if the fan blockage alarm is active.
16920	PoolPumpFaultReport	R/O	BOOL in UDINT	Inactive	Indicates a pool pump fault.
16922	ServiceDueReport	R/O	BOOL in UDINT	Inactive	Indicates if the Next Service date has been passed.
16924	Main Fan Alarm	R/O	BOOL in UDINT	Inactive	Indicates if the main fan is not functioning correctly.
16926	Clock Needs Setting	R/O	BOOL in UDINT	Inactive	Indicates if the clock has not been set.
16928	Occupied	R/O	BOOL in UDINT	Inactive	Indicates if the machine is in Occupied Mode.
16930	Forced Vent	R/O	BOOL in UDINT	Inactive	Indicates if the forced ventilation input is energised.
16932	Resistance Heater Stat	R/O	BOOL in UDINT	Inactive	Indicates the state of the resistance heater stat input.
16934	Remote On Off	R/O	BOOL in UDINT	Inactive	Indicates the state of the remote on/off input.
16936	Remote Occ Unocc	R/O	BOOL in UDINT	Inactive	Indicates the state of the remote occupied input.
16938	Boiler	R/O	BOOL in UDINT	Inactive	Indicates if the boiler is being called for.
16940	Pool Pump	R/O	BOOL in UDINT	Inactive	Indicates if the pool pump is being called for.
16942	Fault BMS	R/O	BOOL in UDINT	Inactive	Indicates if the fault output is energised.
16944	Reversing Valve	R/O	BOOL in UDINT	Inactive	Indicates if the reversing valve is energised.
16946	Fans Enable	R/O	BOOL in UDINT	Inactive	Indicates if the machine is calling for the fans to run.
16948	Remote Damper	R/O	BOOL in UDINT	Inactive	Indicates if the remote damper output is energised.
17050	Unit On True	R/O	BOOL in UDINT	Inactive	Indicates if the machine is on and running
17264	Enable Second Period Mon	R/W	BOOL in UDINT	Inactive	Enables the second unoccupied period.
17266	Enable Second Period Tues	R/W	BOOL in UDINT	Inactive	Enables the second unoccupied period.
17268	Enable Second Period Weds	R/W	BOOL in UDINT	Inactive	Enables the second unoccupied period.
17270	Enable Second Period Thurs	R/W	BOOL in UDINT	Inactive	Enables the second unoccupied period.
17272	Enable Second Period Fri	R/W	BOOL in UDINT	Inactive	Enables the second unoccupied period.
17274	Enable Second Period Sat	R/W	BOOL in UDINT	Inactive	Enables the second unoccupied period.
17276	Enable Second Period Sun	R/W	BOOL in UDINT	Inactive	Enables the second unoccupied period.
9003	Time Clock Override	R/O	BOOL in INT	Inactive	Indicates if the time clock override input is energised.
9004	Remote On Off	R/O	BOOL in INT	Inactive	Indicates if the remote on/off input is energised.
9005	Water Flow Switch	R/O	BOOL in INT	Inactive	Indicates if the water flow switch input is energised.
9009	Force Frost Check	R/W	BOOL in INT	Inactive	Forces a check of the ambient temperature when frost protection mode is enabled.
9059	Resistance Heating Required	R/O	BOOL in INT	Inactive	Displays if resistance heating is required.
16388	RH Security	R/W	BOOL in INT	Active	Enables/disables control of the humidity set point when security mode is enabled.

16389	Air Security	R/W	BOOL in INT	Active	Enables/disables control of the air set point when security mode is enabled.
16390	Water Security	R/W	BOOL in INT	Active	Enables/disables control of the water set point when security mode is enabled.
16391	NSB Security	R/W	BOOL in INT	Active	Enables/disables control of the time period settings when security mode is enabled.
16392	Occ Security	R/W	BOOL in INT	Active	Enables/disables control of the occupied force switch when security mode is enabled.
16393	Damp Security	R/W	BOOL in INT	Active	Enables/disables control of the damper force switch when security mode is enabled.

Integers/Reals

Address	Name	R/?	Data Type	Default	Min	Max	Description
16713	Last Service Day	R/O	INT	N/A	0	31	Date of last service (Day)
16714	Last Service Month	R/O	INT	N/A	0	12	Date of last service (Month)
16715	Last Service Year	R/O	INT	N/A	15	49	Date of last service (Year)
16716	Next Service Day	R/O	INT	N/A	0	31	Date of next service (Day)
16717	Next Service Month	R/O	INT	N/A	0	12	Date of next service (Month)
16718	Next Service Year	R/O	INT	N/A	15	50	Date of next service (Year)
16778	Humidity Set Point	R/W	REAL	60	15	80	Used to set the desired humidity. (%)
16780	Humidity Probe Reading	R/O	REAL	N/A	-3277	3277	Displays the humidity, including any offset. (°C)
16782	Humidity Offset	R/W	REAL	0	-20	20	Sets an offset for the humidity sensor to calibrate it. (%)
16790	Air Set Point	R/W	REAL	28	10	40	Used to set the desired air temperature. (°C)
16792	Air Probe Reading	R/O	REAL	N/A	-3277	3277	Displays the air temperature, including any offset. (°C)
16794	Air Offset	R/W	REAL	0	-10	10	Sets an offset for the air probe to calibrate it. (°C)
16796	NSB Adjustment	R/W	REAL	4.5	1	10	Used to set the night set back amount for air control. (°C)
16810	Water Temp Set Point	R/W	REAL	26	10	36	Used to set the desired water temperature. (°C)
16812	Water Probe Reading	R/O	REAL	N/A	-3277	3277	Displays the water temperature, including any offset. (°C)
16814	Water Offset	R/W	REAL	0	-10	10	Sets an offset for the water probe to calibrate it. (°C)
16824	Ambient Probe Reading	R/O	REAL	N/A	-3277	3277	Displays the ambient temp, including any offset. (°C)
16826	Ambient Offset	R/W	REAL	0	-10	10	Sets an offset for the ambient probe to calibrate it. (°C)
16832	Frost Probe Reading	R/O	REAL	N/A	-3277	3277	Displays the frost protection probe temp. (°C)
16850	Occ Pump Delay	R/W	REAL	0	0	23	Pool pump delay in occupied mode (Hours)
16852	Un Occ Pump Delay	R/W	REAL	1	0	23	Pool pump delay in unoccupied mode (Hours)
16856	Dance Hall Adjustment	R/W	REAL	0	-10	10	Air temperature setback while Dance Hall mode is active. (°C)
16858	Dance Hall Duration	R/W	REAL	3	0	9	Used to set the duration of dance hall mode. (Hours)
16860	Dance Time Left	R/O	REAL	N/A	-3277	3277	Displays the time remaining while in dance hall mode. (Hours)
16862	Set Year	R/W	REAL	0	15	50	Used to set a new date, along with SetClock.
16864	Set Month	R/W	REAL	0	1	12	Used to set a new date, along with SetClock.

16866	Set Day	R/W	REAL	0	1	31	Used to set a new date, along with SetClock.
16868	Set Hour	R/W	REAL	0	0	23	Used to set a new time, along with SetClock.
16870	Set Minute	R/W	REAL	0	0	59	Used to set a new time, along with SetClock.
16872	Set Second	R/W	REAL	0	0	59	Used to set a new time, along with SetClock.
16874	Year	R/O	REAL	N/A	-3277	3277	Displays the current year.
16876	Month	R/O	REAL	N/A	-3277	3277	Displays the current month.
16878	Day	R/O	REAL	N/A	-3277	3277	Displays the current day.
16880	Hours	R/O	REAL	N/A	-3277	3277	Displays the current hour.
16882	Minute	R/O	REAL	N/A	-3277	3277	Displays the current minute.
16884	Sec	R/O	REAL	N/A	-3277	3277	Displays the current second.
16886	Day of Week	R/O	REAL	N/A	-3277	3277	Displays the current day of week.
16950	Occupancy	R/W	UDINT	1	0	2	Controls if the machine should be forced into occupied, unoccupied or left to the NSB schedule
16952	Damper Switch	R/W	UDINT	1	0	2	Controls if the dampers should be forced to min, max or left to be automatically controlled
17038	DST Start Minute	R/W	USINT	0	0	59	Start time for Daylight Savings if enabled. (Minutes)
17039	DST Start Hour	R/W	USINT	1	0	23	Start time for Daylight Savings if enabled. (Hours)
17040	DST Start Day	R/W	USINT	0	0	6	Start time for Daylight Savings if enabled. (Day)
17041	DST Start Week	R/W	USINT	5	1	5	Start time for Daylight Savings if enabled. (Week of Month)
17042	DST Start Month	R/W	USINT	3	1	12	Start time for Daylight Savings if enabled. (Month)
17043	DST End Minute	R/W	USINT	0	0	59	End time for Daylight Savings if enabled. (Minutes)
17044	DST End Hour	R/W	USINT	2	0	23	End time for Daylight Savings if enabled. (Hours)
17045	DST End Day	R/W	USINT	0	0	6	End time for Daylight Savings if enabled. (Day)
17046	DST End Week	R/W	USINT	5	1	5	End time for Daylight Savings if enabled. (Week of Month)
17047	DST End Month	R/W	USINT	10	1	12	End time for Daylight Savings if enabled. (Month)
17048	DST Offset	R/W	UDINT	60	0	120	Offset to adjust time by when going into/out of Daylight Savings. (Minutes)
17208	Start Hours Mon 1	R/W	USINT	8	0	23	Start time for first period. (Hours)
17209	Start Hours Tues 1	R/W	USINT	8	0	23	Start time for first period. (Hours)
17210	Start Hours Weds 1	R/W	USINT	8	0	23	Start time for first period. (Hours)
17211	Start Hours Thurs 1	R/W	USINT	8	0	23	Start time for first period. (Hours)
17212	Start Hours Fri 1	R/W	USINT	8	0	23	Start time for first period. (Hours)
17213	Start Hours Sat 1	R/W	USINT	8	0	23	Start time for first period. (Hours)
17214	Start Hours Sun 1	R/W	USINT	8	0	23	Start time for first period. (Hours)
17215	Start Minutes Mon 1	R/W	USINT	0	0	59	Start time for first period. (Minutes)
17216	Start Minutes Tues 1	R/W	USINT	0	0	59	Start time for first period. (Minutes)
17217	Start Minutes Weds 1	R/W	USINT	0	0	59	Start time for first period. (Minutes)
17218	Start Minutes Thurs 1	R/W	USINT	0	0	59	Start time for first period. (Minutes)
17219	Start Minutes Fri 1	R/W	USINT	0	0	59	Start time for first period. (Minutes)
17220	Start Minutes Sat 1	R/W	USINT	0	0	59	Start time for first period. (Minutes)

17221	Start Minutes Sun 1	R/W	USINT	0	0	59	Start time for first period. (Minutes)
17222	End Hours Mon 1	R/W	USINT	17	0	23	End time for first period. (Hours)
17223	End Hours Tues 1	R/W	USINT	17	0	23	End time for first period. (Hours)
17224	End Hours Weds 1	R/W	USINT	17	0	23	End time for first period. (Hours)
17225	End Hours Thurs 1	R/W	USINT	17	0	23	End time for first period. (Hours)
17226	End Hours Fri 1	R/W	USINT	17	0	23	End time for first period. (Hours)
17227	End Hours Sat 1	R/W	USINT	17	0	23	End time for first period. (Hours)
17228	End Hours Sun 1	R/W	USINT	17	0	23	End time for first period. (Hours)
17229	End Minutes Mon 1	R/W	USINT	0	0	59	End time for first period. (Minutes)
17230	End Minutes Tues 1	R/W	USINT	0	0	59	End time for first period. (Minutes)
17231	End Minutes Weds 1	R/W	USINT	0	0	59	End time for first period. (Minutes)
17232	End Minutes Thurs 1	R/W	USINT	0	0	59	End time for first period. (Minutes)
17233	End Minutes Fri 1	R/W	USINT	0	0	59	End time for first period. (Minutes)
17234	End Minutes Sat 1	R/W	USINT	0	0	59	End time for first period. (Minutes)
17235	End Minutes Sun 1	R/W	USINT	0	0	59	End time for first period. (Minutes)
17236	Start Hours Mon 2	R/W	USINT	8	0	23	Start time for second period. (Hours)
17237	Start Hours Tues 2	R/W	USINT	8	0	23	Start time for second period. (Hours)
17238	Start Hours Weds 2	R/W	USINT	8	0	23	Start time for second period. (Hours)
17239	Start Hours Thurs 2	R/W	USINT	8	0	23	Start time for second period. (Hours)
17240	Start Hours Fri 2	R/W	USINT	8	0	23	Start time for second period. (Hours)
17241	Start Hours Sat 2	R/W	USINT	8	0	23	Start time for second period. (Hours)

BACnet objects

Objects are auto-discovered in BACnet. A list of objects and a description are included below. If an object can be written, make sure to write to the Relinquish Default property, which will then be automatically copied to Present Value by the controller. The precision of each value has been included in the default value.

Analog value Objects:

Instance	Object Name	Description	Default Value	Units
0	Humidity Set Point	Sets desired humidity	60	%
1	Humidity Probe Out	Humidity Probe reading	N/A	°C
2	Humidity Offset	Humidity Probe Offset, adjusts reading if probe has lost accuracy.	0	°C
3	HAL1	Humidity set point offset, recommended to leave as default.	5	%
4	RH1 Diff	Humidity set point differential, recommended to leave as default.	3	%
5	RH2 Diff	Humidity set point differential, recommended to leave as default.	3	%
6	Air Set Point	Sets desired air temperature	28	°C
7	Air Probe Out	Air Probe temperature reading	N/A	°C
8	Air Offset	Air Probe Offset, adjusts reading if probe has lost accuracy.	0	°C
9	NSB Adjustment	Night Set Back adjustment to air temp set point	4.5	°C
10	AS3 Offset	Air set point offset, recommended to leave as default.	1.5	°C
11	AS4 Offset	Air set point offset, recommended to leave as default.	3	°C
12	AS1 Diff	Air set point differential, recommended to leave as default.	0.5	°C
13	AS2 Diff	Air set point differential, recommended to leave as default.	0.5	°C
14	AS3 Diff	Air set point differential, recommended to leave as default.	0.5	°C
15	AS4 Diff	Air set point differential, recommended to leave as default.	0.5	°C
16	Water Temp Set Point	Sets desired water temperature	26	°C
17	Water Probe Out	Water Probe temperature reading	N/A	°C
18	Water Offset	Water Probe Offset, adjusts reading if probe has lost accuracy.	0	°C
19	AL1 Offset	Water set point offset, recommended to leave as default.	0.3	°C
20	WS1 Diff	Water set point differential, recommended to leave as default.	0.2	°C
21	WS2 Diff	Water set point differential, recommended to leave as default.	0.2	°C
22	Ambient Set Point	Used to determine damper positions based on Ambient temp.	33	°C
23	Ambient Probe Out	Ambient Probe temperature reading	N/A	°C
24	Ambient Offset	Ambient Probe Offset, adjusts reading if probe has lost accuracy.	0	°C
25	Ambient Differential	Ambient differential, recommended to leave as default.	1	°C
26	Frost Level Set Point	Used to determine damper positions based on Frost protection temp	3	°C
27	Frost Probe Display	Frost protection probe reading	N/A	°C
28	Frost Differential	Frost Protection set point differential, recommended to leave as default.	1	°C
29	Defrost Set Point	Sets temperature at which to begin defrosting	-2	°C
30	Defrost Probe Display	Defrost Probe temperature reading	N/A	°C
31	Defrost Offset	Defrost Probe Offset, adjusts reading if probe has lost accuracy.	0	°C
32	Defrost Diff	Defrost set point differential, recommended to leave as default.	7	°C
33	Main Fan Speed Control	Main fan control signal	N/A	V
34	Exhaust Fan Speed	Exhaust fan control signal	N/A	V
35	Damper Out	Damper motor control signal	N/A	V
36	Occ Pump Delay	Pool pump delay in occupied mode	0	Hours
37	Un Occ Pump Delay	Pool pump delay in unoccupied mode	1	Hours
38	Defrost Off Delay	Delay before stopping defrost	0	Seconds
39	Dance Hall Adjustment	Dance Hall adjustment to air temp set point	0	°C
40	Dance Hall Duration	Duration before Dance Hall mode automatically ends	3	Hours
41	Dance Time Left	Time left in dance hall mode	N/A	Hours
42	Set Year	Sets time (year) on the controller	0	Years
43	Set Month	Sets time (month) on the controller	0	Months
44	Set Day	Sets time (day) on the controller	0	Days
45	Set Hour	Sets time (hours) on the controller	0	Hours
46	Set Minute	Sets time (minutes) on the controller	0	Minutes
47	Set Second	Sets time (seconds) on the controller	0	Seconds

48	Year	Time (Year) set on controller	N/A	Years
49	Month	Time (Month) set on controller	N/A	Months
50	Day	Time (Day) set on controller	N/A	Days
51	Hours	Time (Hours) set on controller	N/A	Hours
52	Minutes	Time (Minutes) set on controller	N/A	Minutes
53	Sec	Time (Seconds) set on controller	N/A	Seconds
54	Day of Week	Time (Day of week) set on controller	N/A	N/A

Binary Value Objects:

Instance	Object Name	Description	Default Value
0	Standby Switch	Starts the running of the machine or puts it into standby mode	Inactive
1	Operation Switch	Enables or disables air and humidity control	Inactive
2	Priority Switch	Controls the priority switch	Active
3	Set Clock	Used to save the Set Time variables to the clock	Inactive
4	Enable DST	Enables or disables daylight savings adjustment	Active
5	Enable Dance Hall	Enables dance hall mode	Inactive
6	Dance Hall Constant	Controls if dance hall mode runs constantly or for a specified time period when enabled	Inactive
7	Compressor Required	Indicates if the compressor is being called for	N/A
8	Air Heating	Indicates if the air LPHW valve is being called for	N/A
9	Water Heating	Indicates if the water LPHW valve is being called for	N/A
10	RCU Demand	Indicates if the RCU valve output is energised	N/A
11	Defrost Active	Indicates if machine is currently in defrost mode	N/A
12	Frost Protection Active	Indicates if the machine is in frost protection mode	N/A
13	Pressure Fault	Fault caused by high or low pressure	N/A
14	Fire Alarm	Indicates if the machine has stopped due to the fire alarm input	N/A
15	Fan Blockage	Indicates if the filter blocked input sees a blockage	N/A
16	Pool Pump Fault	Fault caused by low water flow when it is required	N/A
17	Service Due	Indicates if a machine service is due	N/A
18	Main Fan Alarm	Fault caused by the main fan not running when required	N/A
19	Clock Needs Setting	Indicates if the clock needs setting	N/A
20	Occupied	Indicates if machine is in Occupied mode	N/A
21	Forced Vent	Indicates if the forced vent input is made	N/A
22	Resistance Heater Stat	Indicates if the resistance heater stat input is made	N/A
23	Remote On/Off	Indicates if the remote on/off input it made	N/A
24	Remote Occ/Unocc	Indicates if the remote occ/unocc input it made	N/A
25	Boiler	Indicates if the boiler is being called for	N/A
26	Pool Pump Required	Indicates if the pool pump is being called for	N/A
27	Fault BMS Required	Indicates if the Fault BMS output is energised	N/A
28	Reversing Valve Required	Indicates if the reversing valve is energised	N/A
29	Fans Enable	Indicates if the fans are being called for	N/A
30	Remote Damper Required	Indicates if the remote damper output is energised	N/A
31	Unit On	Indicates if the machine is on and running	N/A

Multistate Value Objects:

Instance	Object Name	Description	Default Value	Min	Max
0	Occupancy	Controls if the machine should be forced into occupied, unoccupied or left to the NSB schedule	1	0	2
1	Damper Switch	Controls if the dampers should be forced to min, max or left to be automatically controlled	1	0	2
2	Protocol On Board2	Selects what protocol is used by the RS485-2 port	3	2	4
3	Address On Board2	Sets the address for the RS485-2 port	1	0	255
4	Data Bit On Board2	Sets the data bit for the RS485-2 port	8	8	8
5	Stop Bit On Board2	Sets the stop bit for the RS485-2 port	1	1	2
6	Parity Bit On Board2	Sets the parity bit for the RS485-2 port	2	0	2
7	Baud Rate On Board2	Sets the Baud rate for the RS485-2 port	1	0	5
8	BACnet Port	Port used for BACnet/IP	0	0	65535

Schedule Objects:

Two objects use schedules, each using several attributes as described below.

Instance 0, Unoccupied (or Night Set Back) Schedule (schedule controlling the unoccupied times):

Attribute	Name	Default	Min	Max
Weekly_Schedule[0].day_schedule[0].time.hour	Start Hours Mon 1	8	0	23
Weekly_Schedule[1].day_schedule[0].time.hour	Start Hours Tues 1	8	0	23
Weekly_Schedule[2].day_schedule[0].time.hour	Start Hours Weds 1	8	0	23
Weekly_Schedule[3].day_schedule[0].time.hour	Start Hours Thurs 1	8	0	23
Weekly_Schedule[4].day_schedule[0].time.hour	Start Hours Fri 1	8	0	23
Weekly_Schedule[5].day_schedule[0].time.hour	Start Hours Sat 1	8	0	23
Weekly_Schedule[6].day_schedule[0].time.hour	Start Hours Sun 1	8	0	23
Weekly_Schedule[0].day_schedule[0].time.min	Start Minutes Mon 1	0	0	59
Weekly_Schedule[1].day_schedule[0].time.min	Start Minutes Tues 1	0	0	59
Weekly_Schedule[2].day_schedule[0].time.min	Start Minutes Weds 1	0	0	59
Weekly_Schedule[3].day_schedule[0].time.min	Start Minutes Thurs 1	0	0	59
Weekly_Schedule[4].day_schedule[0].time.min	Start Minutes Fri 1	0	0	59
Weekly_Schedule[5].day_schedule[0].time.min	Start Minutes Sat 1	0	0	59
Weekly_Schedule[6].day_schedule[0].time.min	Start Minutes Sun 1	0	0	59
Weekly_Schedule[0].day_schedule[1].time.hour	End Hours Mon 1	17	0	23
Weekly_Schedule[1].day_schedule[1].time.hour	End Hours Tues 1	17	0	23
Weekly_Schedule[2].day_schedule[1].time.hour	End Hours Weds 1	17	0	23
Weekly_Schedule[3].day_schedule[1].time.hour	End Hours Thurs 1	17	0	23
Weekly_Schedule[4].day_schedule[1].time.hour	End Hours Fri 1	17	0	23
Weekly_Schedule[5].day_schedule[1].time.hour	End Hours Sat 1	17	0	23
Weekly_Schedule[6].day_schedule[1].time.hour	End Hours Sun 1	17	0	23
Weekly_Schedule[0].day_schedule[1].time.min	End Minutes Mon 1	0	0	59
Weekly_Schedule[1].day_schedule[1].time.min	End Minutes Tues 1	0	0	59
Weekly_Schedule[2].day_schedule[1].time.min	End Minutes Weds 1	0	0	59
Weekly_Schedule[3].day_schedule[1].time.min	End Minutes Thurs 1	0	0	59
Weekly_Schedule[4].day_schedule[1].time.min	End Minutes Fri 1	0	0	59
Weekly_Schedule[5].day_schedule[1].time.min	End Minutes Sat 1	0	0	59
Weekly_Schedule[6].day_schedule[1].time.min	End Minutes Sun 1	0	0	59
Weekly_Schedule[0].day_schedule[2].time.hour	Start Hours Mon 2	8	0	23
Weekly_Schedule[1].day_schedule[2].time.hour	Start Hours Tues 2	8	0	23
Weekly_Schedule[2].day_schedule[2].time.hour	Start Hours Weds 2	8	0	23
Weekly_Schedule[3].day_schedule[2].time.hour	Start Hours Thurs 2	8	0	23
Weekly_Schedule[4].day_schedule[2].time.hour	Start Hours Fri 2	8	0	23
Weekly_Schedule[5].day_schedule[2].time.hour	Start Hours Sat 2	8	0	23
Weekly_Schedule[6].day_schedule[2].time.hour	Start Hours Sun 2	8	0	23
Weekly_Schedule[0].day_schedule[2].time.min	Start Minutes Mon 2	0	0	59
Weekly_Schedule[1].day_schedule[2].time.min	Start Minutes Tues 2	0	0	59
Weekly_Schedule[2].day_schedule[2].time.min	Start Minutes Weds 2	0	0	59
Weekly_Schedule[3].day_schedule[2].time.min	Start Minutes Thurs 2	0	0	59
Weekly_Schedule[4].day_schedule[2].time.min	Start Minutes Fri 2	0	0	59
Weekly_Schedule[5].day_schedule[2].time.min	Start Minutes Sat 2	0	0	59
Weekly_Schedule[6].day_schedule[2].time.min	Start Minutes Sun 2	0	0	59
Weekly_Schedule[0].day_schedule[3].time.hour	End Hours Mon 2	17	0	23
Weekly_Schedule[1].day_schedule[3].time.hour	End Hours Tues 2	17	0	23
Weekly_Schedule[2].day_schedule[3].time.hour	End Hours Weds 2	17	0	23
Weekly_Schedule[3].day_schedule[3].time.hour	End Hours Thurs 2	17	0	23
Weekly_Schedule[4].day_schedule[3].time.hour	End Hours Fri 2	17	0	23
Weekly_Schedule[5].day_schedule[3].time.hour	End Hours Sat 2	17	0	23
Weekly_Schedule[6].day_schedule[3].time.hour	End Hours Sun 2	17	0	23
Weekly_Schedule[0].day_schedule[3].time.min	End Minutes Mon 2	0	0	59
Weekly_Schedule[1].day_schedule[3].time.min	End Minutes Tues 2	0	0	59
Weekly_Schedule[2].day_schedule[3].time.min	End Minutes Weds 2	0	0	59
Weekly_Schedule[3].day_schedule[3].time.min	End Minutes Thurs 2	0	0	59
Weekly_Schedule[4].day_schedule[3].time.min	End Minutes Fri 2	0	0	59

Weekly_Schedule[5].day_schedule[3].time.min	End Minutes Sat 2	0	0	59
Weekly_Schedule[6].day_schedule[3].time.min	End Minutes Sun 2	0	0	59
Weekly_Schedule[0].day_schedule[2].value	Enable Second Period Mon	0	0	1
Weekly_Schedule[1].day_schedule[2].value	Enable Second Period Tues	0	0	1
Weekly_Schedule[2].day_schedule[2].value	Enable Second Period Weds	0	0	1
Weekly_Schedule[3].day_schedule[2].value	Enable Second Period Thurs	0	0	1
Weekly_Schedule[4].day_schedule[2].value	Enable Second Period Fri	0	0	1
Weekly_Schedule[5].day_schedule[2].value	Enable Second Period Sat	0	0	1
Weekly_Schedule[6].day_schedule[2].value	Enable Second Period Sun	0	0	1

Instance 1, Daylight Saving Schedule:

Attribute	Name	Default	Min	Max
Exception_Schedule[0].listOfTimeValues[0].time.min	DST Start Minute	0	0	59
Exception_Schedule[0].listOfTimeValues[0].time.hour	DST Start Hour	1	0	23
Exception_Schedule[0].period.calendarEntry.weekNDay.dayOfWeek	DST Start Day	0	0	6
Exception_Schedule[0].period.calendarEntry.weekNDay.weekOfMonth	DST Start Week	5	1	5
Exception_Schedule[0].period.calendarEntry.weekNDay.month	DST Start Month	3	1	12
Exception_Schedule[1].listOfTimeValues[0].time.min	DST End Minute	0	0	59
Exception_Schedule[1].listOfTimeValues[0].time.hour	DST End Hour	2	0	23
Exception_Schedule[1].period.calendarEntry.weekNDay.dayOfWeek	DST End Day	0	0	6
Exception_Schedule[1].period.calendarEntry.weekNDay.weekOfMonth	DST End Week	5	1	5
Exception_Schedule[1].period.calendarEntry.weekNDay.month	DST End Month	10	1	12
Exception_Schedule[0].listOfTimeValues[0].value	DST Offset	60		