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Distribution:	LHA development, Rickard engineering, Rickard support
Topic:	BMS BACnet interface to FCC

Description: This document describes the BACnet points available to the BMS system when interfacing with the FCC (Fan Coil Controller). The BMS command interpretation and overlap with the mlm Tool functions are described.

Setup:

The following software/ firmware or later revisions are applicable:

- Mlm Tool – update_8_17_U12
- FCC firmware – V01.33(.zip)
- Fan Coil Wallstat (if applicable) – V08.14
- MCU 2 BW2011-2B (BACnet IP) firmware rev 6.53K
- MCU 2 BW2011-2M (ms/tp) firmware rev 6.53K

FCC network setup:

The FCC units can be daisy chained to a maximum of 15 per MCU channel. The multi-zone application allows for a maximum of three FCC units to be networked to twelve diffusers on a single PSU 2 power pack/MCU channel. Fan Coil wallstats are connected as an option to the FCC.

The mlm Tool is used to ensure the FCC network is correctly set-up and zoned for normal operation. It is assumed the user is familiar with setting up the mlm network. It is recommended to use the Setup Wizard function in the mlm Tool.

FCC without Wallstat icon:
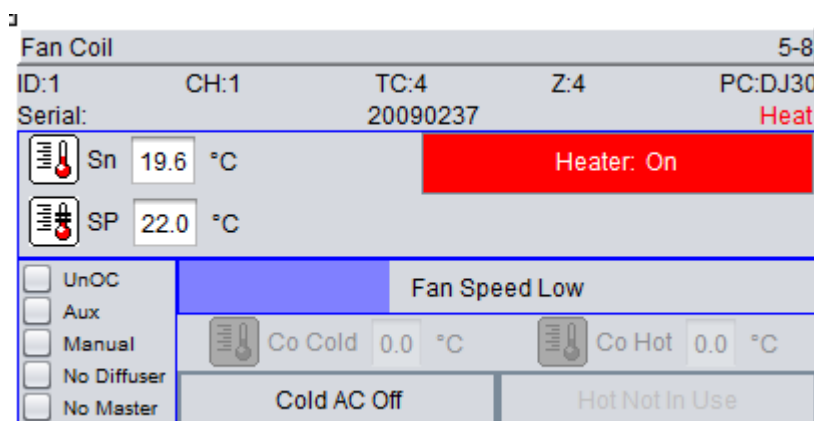
The FCC wallstat serves as a user interface for functions such as the Fan Coil on/off control, setpoint changes and fan speed settings. The on-board sensor on the wallstat can be selected for space temperature sensing.

The wallstat will also host the Operating Mode settings. For correct operation only one wallstat per zone can be installed. A single wallstat will then host the operating modes for all FCCs zoned together.

FCC with a Wallstat installed:
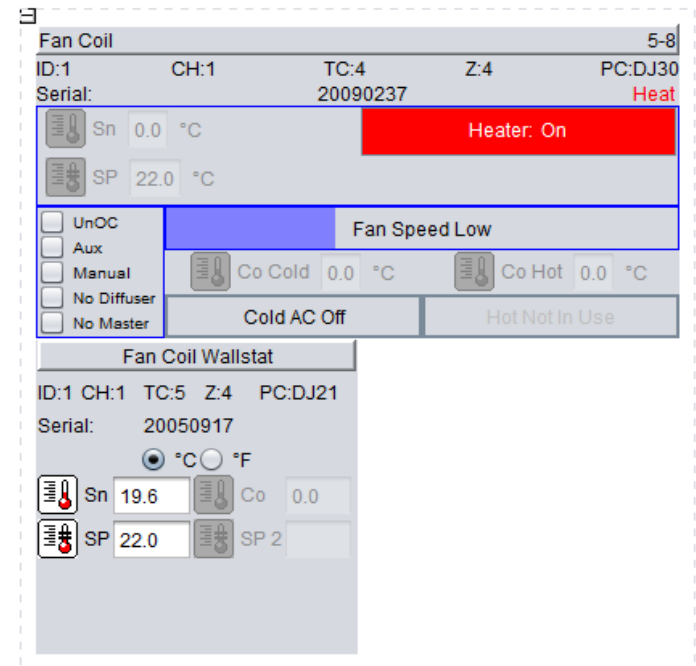
BACnet object table: The types supported are Analog Value, Analog Output, Multi-State Input and Multi-State Output. For every object type there are 60 BACnet points available.

| Object Type	Instance #	VAV Parameter	Value
Analog Value	0..59	Space Temp 1..60	0..50°C
Analog Value	60..119	Supply Water Temp 1..60	0..50°C
Analog Value	120..179	Fan Speed 1..60	1..3 or 0..100%
Analog Value	180..239	Heater output 1..60	0..100%
Analog Value	240..299	Cold Valve 1..60	0..100%
Analog Value	300..359	Hot Valve 1..60	0..100%
Analog Output	0..59	Setpoint 1..60	0..40°C
Multi-State Input	0..59	Mode 1..60	See table
Multi-State Input	60..119	Occupancy 1..60	See table
Multi-State Output	0..59	Control override 1..60	See table
Multi-State Output	60..119	Occupancy override 1..60	See table

Note: The Fan Speed AV will be 1..3 or 0..100%, depending on the Fan type selected.

FCC Mode (status) – multi-state input 0-59:

The following table contains the FCC mode inputs. Please note these integer values are presented in decimal format on the BMS front end. The string value can be read at the state_text_property for the specific point.

Decimal Value	Mode Description
1	System Idle (Fan only mode)
2	Initializing
3	Heating mode
4	Cooling mode
5	Manual operate mode
6	Override mode (Inputs or occupancy)
7	Off

Note: The control mode is displayed in the top right corner of the FCC icon.
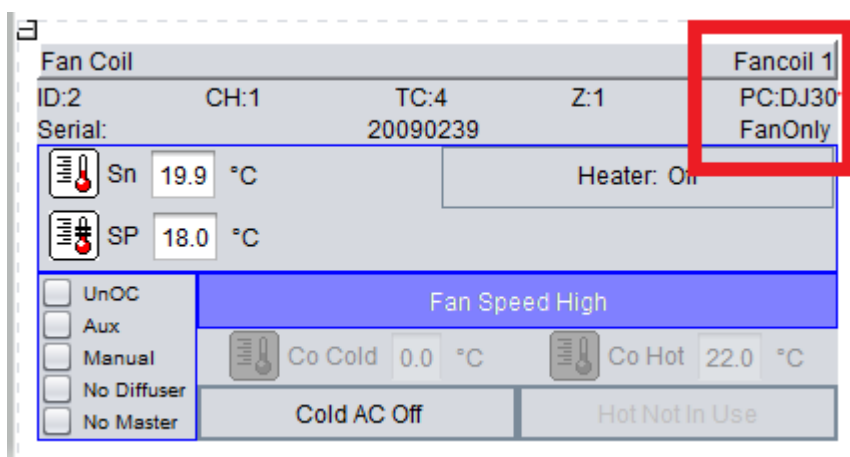
Occupancy Mode (status) – multi-state input 60-119:

The following table contains the occupancy mode inputs. These integer values are presented in decimal format on the BMS front end. The string value can be read at the state_text_property for the specific point.

Decimal Value	Mode Description
1	Occupied
2	Unoccupied

BMS control override – multi-state output 0-59:

The MLM 24 system contains some BMS commands to force certain FCC behaviour. The following table indicates the command (decimal) values:

| Function	Command	Description
Off	1	Off – default value
Fan Only	2	Fan only operation
Full Auto	3	Automatic Temperature & Fan control
Auto	4	Manual Fan / Automatic Temperature control

Occupancy override – multi-state output 60-119:

The following table contains the occupancy override functions as set by the BMS.

Decimal Value	Mode Description
1	Occupancy normal (no override from BMS)
2	Override unoccupied
3	Override occupied

Operating Mode (Command 72):

The Operating Mode command is similar in function to the BMS control override MSO 0-59 and can be selected in the node panel under Process/Operating mode. Writing to any of these functions will duplicate the corresponding BMS command.
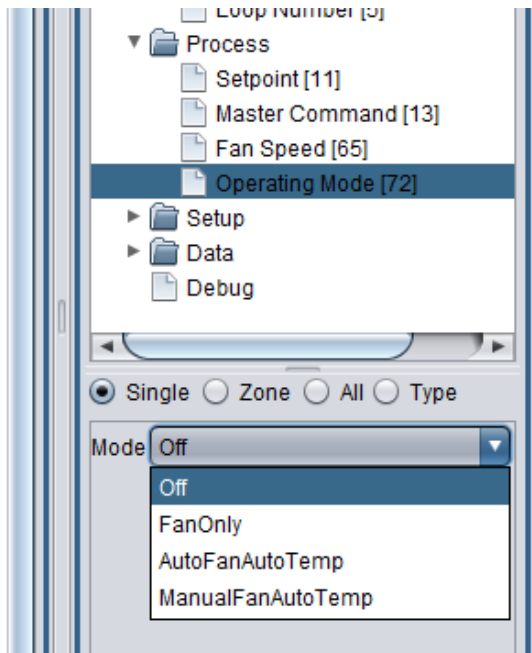
Fan Speed command (65) /Analog Value 120..179:

- If an EC fan is selected both the command and display values are 0..100%. For three speed fan operation the values are 1, 2 or 3.
- The Fan Speed command is only applicable in the Fan Only and Manual Fan modes of operation.
- The Fan Speed command is not active in the multi-zone mode of operation.

Duplicate functions:

If a wallstat is installed with the FCC, some equivalent functions will be visible on the mlm Tool node panel for both FCC and wallstat. In such an instance the wallstat acts as the master node, with only the wallstat functions as displayed in the node panel active. Therefore this is also applicable to an FCC without a connected wallstat but zoned with an FCC connected to a wallstat. These functions includes:
- Setpoint (11)
- Master Command (13)
- Fan speed (65)
- Operating Mode (72)
- Power up (87)